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BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. VII.

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A BABY HERON.

REST H. METCALF.

HOW many of the boys and girls who read *BIRDS AND ALL NATURE* ever saw a baby heron? I am sure you would like to see ours. He measures from tip to tip of his wings, that is, with his wings spread just as far as we could stretch them, five feet and ten inches, and from the tip of his bill to the tip of his toe very nearly five feet. Now, isn't that a little baby? He is nearly full-grown but has not on the dress of the old birds; that is why we call him baby. He is called a crane by some people, but his right name is great blue heron, and his scientific name is *Ardea herodias*. Shall I tell you about his dress? His head is all dusky now, but when he puts on his new dress his forehead and central part of the crown will be white enclosed by a circle of black—a fine black crest with two elongated black plumes that make him appear to be very much dressed up. His back and wings are blue-gray, but like his head will be decorated with elongated scapulæ feathers, when he gets on his dress suit, and his long neck, which now has a rather dingy look, will have a beautiful collar of cinnamon brown tinged with purple and a white line in front from throat to breast. The tail is short and very inconspicuous. He really is a beautiful bird in spite of his long neck and long legs.

He is the largest of our New England herons and is not very abundant. You may find him about large bodies of water, and during the daytime he prefers the solitude of the forests and sits quietly in tall trees for hours, but in the early mornings and late afternoons he may be seen standing motionless at the edge of the water until a fish or a frog appears, when, with unerring stroke of his long beak, as quickly as lightning, he seizes it and beats it until dead, then swallows it; this act is often repeated. He varies his diet with meadow mice, snakes, and insects, so he certainly does not lead a very monotonous life. Our baby ate for his last breakfast four good-sized perch. Wasn't that a fine breakfast? I know you would like to hear about his early home. It was in a terribly dismal swamp, where it was almost impossible to reach, through mud to your knees and through briars and tangled bushes high as your head. There, several feet above your head was a nest, nearly flat, made of different sizes of twigs put together in a loose and lazy manner. Usually there are three or four light bluish-green eggs. Only one brood is reared in a season.

There are some people who say that the blue heron is good for food, but those who have once tried it do not care for another plate. They are the most suspicious of our birds and the hardest to be approached for they are constantly on the lookout for danger and with their long necks, keen eyes, and delicate organs of hearing, they can detect the approach of a hunter long before he can get within gunshot. They have a very unmusical voice, their call being a hoarse guttural "honk."

Once they were found in larger numbers, but now are seldom seen but in pairs or singly, and what a pity that foolish fashion of trimming ladies' hats has nearly exterminated so many varieties of beautiful birds! God gave us many beautiful things to enjoy in this world, and are they not more beautiful when we can see them alive in nature just where God placed them, than they are when dead and taken by pieces to adorn our heads?

THE KILLDEER.

(*Aegialitis vocifera*.)

DR. LIVINGSTONE described a relative of this bird which he met with in Africa as "a most plaguey sort of public-spirited individual that follows you everywhere, flying overhead, and is most persevering in his attempts to give fair warning to all animals within hearing to flee from the approach of danger," a characteristic which has caused the killdeer to be an object of dislike to the gunner. It is usually the first to take alarm at his approach and starts up all other birds in the vicinity by its loud cries. It can run with such swiftness that, according to Audubon, to run "like a killdeer" has in some parts of the country passed into a proverb. It is also active on the wing and mounts at pleasure to a great height in the air, with a strong and rapid flight, which can be continued for a long distance. In the love season it performs various kinds of evolutions while on the wing.

This plover is found throughout temperate North America to Newfoundland and Manitoba, nests throughout range, and winters south of New England to Bermuda, the West Indies, Central and South America. From March to November, and later, it is resident, and is very abundant in spring and autumn migrations. These birds are generally seen in flocks when on the wing, but scatter when feeding. Pastures and cultivated fields, tracts of land near water, lakesides and marshes seem necessary to it. The sound uttered by it, *killdeer, killdeer, dee, dee*, is almost incessant, but it is often low and agreeable, with a plaintive strain in it. When apparently in danger the voice rises higher and shriller. Cows, horses, sheep, and the larger poultry that wander over a farm are said not to alarm these birds in the least. But they are wild in the presence of man wherever they have been persecuted. They will often squat till one is close upon them, and will then suddenly fly up or run off, startling the unwary intruder by their loud and clear cry. In winter the killdeer is an unusually silent bird, in which season it is found dispersed over the cultivated fields in Florida, Georgia, the Carolinas, and other southern states, diligently searching for food. Davie says that it may often be heard on moonlight nights. The nest is placed on the ground, usually in the vicinity of a stream or pond, often on an elevated spot in the grass or in a furrowed field. It is merely a slight depression in the ground. The eggs are drab or clay color, thickly spotted and blotched with blackish brown and umber, small and quite pointed. They are generally four in number, measuring 1.50 to 1.60 long by about 1.10 broad.

The plovers resemble the snipe in structure, but are smaller, averaging about the size of a thrush. Their bills also are shorter. They have three toes usually; their bodies are plump; short, thick necks, long wings, and in some instances they have spurs on the wings. They pick their food, which is largely of an animal nature, from the surface of the ground, instead of probing for it, as their shorter bills indicate. The flesh of the killdeer is not highly regarded as a food.



FROM COL. F.
KAEMPFER.
A. W. MUMFORD,
PUBLISHER, CHICAGO.

KILLDEER.
¾ Life-size.

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COTTON TEXTILES. II.

W. E. WATT, A. M.

COTTON is spun and woven into so many useful forms that we could hardly live without it since we have become so thoroughly accustomed to the comforts and luxuries it supplies to us. From the loose fiber that we use in treating our teeth when they get to troubling us to the delicate lace handkerchief which is such a dream of the weaver's art we use cotton for our commonest and our most extraordinary purposes.

Muslin takes its name from Mosul, in India, where it was first made. Although muslin is now made in both Europe and America in great quantities, the kind that is most famed for its fineness is that from Dacca, India. To get an idea of the fine threads used in making the rarest of this muslin we must note that one pound of cotton is spun into three hundred eighty hanks of thread with eight hundred forty yards of thread in each hank. This means that one pound of cotton is spun out to the length of 319,000 yards, or over one hundred eighty-one miles.

One pound of this thread would, if it could be stretched out without breaking, reach from New York City up the Hudson to Albany, and there would still be enough of it unused to reach over to Saratoga. Ten pounds would reach from New York city to Omaha, with enough left over to reach back to Chicago.

It is even possible to exceed this in fineness if we do not care for use. To show the perfection of a machine, a thread of the fineness of 10,000 has been spun. If this could be strung out, as suggested above, it would reach 4,770 miles. One pound of the finest fiber has thus been spun so that it would reach from New York to Naples, Italy, and there would still be enough of it left to reach half-way back to London on the return trip.

Where three hundred and eighty hanks of thread are spun from a pound the muslin made from it is called three hundred eighty-degree muslin. But even this is not the finest muslin made. It is the finest made by the old hand processes, but the perfections of machinery have made it possible for us to have seven hundred-degree cotton. A strange thing about our finest machine-made cotton is that it does not seem to the eye or the touch to be as fine as the Dacca. There is a peculiar softness which cannot be imitated by the machine.

I went the other day into one of our great dry-goods stores to see how fine a piece of cotton I could buy. I was surprised to find that the gentlemanly clerks knew very little about where the goods were made and almost nothing at all about the processes. They were very obliging, but their business of selling does not seem to require any knowledge of those things I was so desirous of learning.

The finest things I found were India linen and Swiss mull. The India linen has a remarkable name, seeing it is not linen and is made in Scotland. The Swiss mull is nearly as well named, for it is also made in Glasgow. Whether these goods sell better because their names seem to indicate that they are made somewhere else I cannot say, but the truth seems to be that they were called by these names innocently enough by those who first made them, being proud that they could produce mull equal to the finest worn by the ladies in Switzerland or equal to the finest products of the Indian looms.

It is well known that in the dry-goods business it seems to be greatly to the advantage of the merchant to have fine names for his wares, the larger houses regularly employing women who do nothing but find fancy names for the things that are for sale. Goods are sometimes displayed with one name for several days without finding a purchaser, but the namer soon comes in with a new name to attach to the goods and some of the very shoppers who do not care for them under the first name buy them readily under the new one.

A lady recently asked me to tell her the difference between muslin and long cloth. I thought there might be a difference, but have been unable to find anyone who can tell what it is. Both names are applied to white cotton goods of various degrees of fineness. Long cloth is of a superior quality of cotton, and so is muslin when intended for dress goods. Some of the names under which white cotton goods are sold are muslins, tarletans, mulls, jaconets, nainsooks, lawns, grenadines, saccarillas, cottonade, cotton velvet, and velveteen.

Cotton is rarely manufactured where raised. It is carried to the seacoast as a rule by river steamers, though there have been instances where the laziness and ingenuity of man have combined to send it down-stream in bales completely covered with india rubber wrappings, so they floated to their destination with little care and no harm from water.

With all our boasted Yankee shrewdness and cunning in mechanics we do not make up the finer grades of cotton very extensively. As a rule the coarser kinds of cloth that take much material and less skill are made here, while the finer grades that get more value out of the pound of cotton are made abroad, chiefly in Great Britain.

As an indication of this the figures taken in the year 1884 form a striking illustration. The average amount of cotton spun by each spindle in Great Britain that year was thirty-four and a half pounds, while the amount consumed by each spindle in America averaged just sixty-five pounds, showing that the products of our spindles are just twice as heavy on the average as those of the English and Scotch. A fortunate thing about our goods when sent abroad is that they are

accurately marked and prove to be very nearly what they are represented. This is not the case with goods shipped out of Great Britain, where their long experience in handling cotton has made them more expert than we in stuffing their goods with sizing and other adulterations which make the goods deceptive. There is so little tendency in this direction among American manufacturers that our good name has given us an advantage in China and India, where our manufactures are much more readily sold than what purport to be the same of British make.

Most of our cotton that is not exported is made up into yarns, threads, and the coarser goods, such as shirtings, sheetings, drills, print cloths, bags, and so forth. Yet there are several of our mills, especially in the North, that turn out the finer fabrics with great credit to the country. Large quantities of cotton are, of course, used up in woolen mills, where mixed goods are made, and hosiery mills, felt factories, and hat works consume it largely. Much cotton also goes into mattresses and upholstery.

It comes from a boll having three or five cells. This bursts open when it is ripe. Cotton fiber is either white or yellow, and varies in length from a little over half an inch to two inches. When gathered it is separated from its clinging seeds by the cotton gin, and is then pressed firmly in bales weighing about five hundred pounds each, although in some countries the customary sizes of bales vary two or three hundred pounds from this weight.

Of the twenty or more varieties of cotton but two are given much attention in the United States. These are the famous sea island cotton and the common, woolly-seed kind. The sea island cotton grows on the islands off the coast of South Carolina, in Florida, and on the coast of Texas. The peculiar salt air and humidity of these coasts seem necessary to its perfection, for when it is planted in the interior it quickly loses its best qualities and becomes similar to the common variety. Its fibers are long and silky, and used for the finest laces, spool cotton, fine muslins, and such goods, but there is so little of it as compared with the woolly seed cotton that it is but an insignificant part of our great crop.

Cotton is the only fibre that is naturally produced ready to be worked directly into cloth without special chemical or mechanical treatment. It is the great article of comfortable and cheap covering for man's person. When gathered and baled it is in a knotted and lumpy state, from which it is rather difficult to extricate the fibers and arrange them for spinning. As we follow the cotton through the mill we come to these machines in the following order: It goes to the opener first, where it is beaten and spread out so that a strong draft of air drives out much of its impurities; it then goes to the scutcher after being formed into laps; the lap machine makes it into flat folds; the carding engine not only cards it but straightens the fiber and gives it another cleaning; in the drawing frame it is arranged in loose ropes with the fibers parallel; then the slubbing frame gives it a slight twist; the intermediate and finishing frames twist it still farther, especially when preparing it for the higher numbers; the throstle frame prepares coarse warps; and on the mules, either self-acting or hand, the coarse or fine yarns are spun. In some systems several operations are performed by the same machine.

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Weaving follows. It consists in passing threads over and under each other as a stocking is darned, the main difference being that in darning the needle passes up and down to get over or under the threads it meets, while in weaving the threads met by the moving thread move out of the way so the shuttle may pass straight through the whole width of the cloth. As the shuttle comes back the threads are reversed so that the ones that were up before are now down and those that were down are now up. The machine that holds many threads for this work is the loom.

An English clergyman by the name of Edmund Cartwright has the credit of inventing the power loom. His description of his labors is interesting. We copy from one of his letters: "Happening to be in Matlock in the summer of 1784, I fell in company with two gentlemen of Manchester, when the conversation turned on Arkwright's spinning machinery. One of the company observed, that as soon as Arkwright's patent expired, so many mills would be erected, and so much cotton spun, that hands never could be found to weave it. To this observation I replied, that Arkwright must then set his wits to work and invent a weaving mill. This brought on a conversation on the subject, in which the Manchester gentlemen unanimously agreed that the thing was impracticable; and, in defense of their opinion, they adduced arguments which I certainly was incompetent to answer, or even to comprehend, being totally ignorant of the subject, having never at that time seen a person weave. I controverted, however, the impracticability of the thing, by remarking that there had lately been exhibited an automaton figure which played at chess."

"Some little time afterward, a particular circumstance recalling this conversation to my mind, it struck me that, as in plain weaving, according to the conception I then had of the business, there could only be three movements, which were to follow each other in succession, there would be very little difficulty in producing and repeating them. Full of these ideas, I immediately got a carpenter and smith to carry them into effect. As soon as the machine was finished I got a weaver to put in the warp, which was of such material as sail-cloth is usually made of. To my delight a piece of cloth, such as it was, was the product. As I had never before turned my thoughts to anything mechanical, either in theory or practice, nor had ever seen a loom at work or knew anything of its construction, you will readily suppose that my first loom must have been a most rude piece of machinery. The warp was placed perpendicularly, the reed fell with a force of at least half a hundred weight and the springs which threw the shuttle were strong enough to have thrown a Congreve rocket.

"In short, it required the strength of two powerful men to work the machine at a slow rate and

only for a short time. Conceiving in my great simplicity that I had accomplished all that was required, I then secured what I thought a most valuable property by a patent, 4th of April, 1785. This being done, I then condescended to see how other people wove. And you will guess my astonishment when I compared their easy mode of operation and mine. Availing myself, however, of what I then saw, I made a loom, in its general principles nearly as they are now made; but it was not until the year 1787 that I completed my invention, when I took out my first weaving patent Aug. 1 of that year."

As usual this worthy man, who had won the right to the title he received, was not the only discoverer or inventor of the thing credited to his name. Long before his time a description of a similar loom had been presented to the Royal Society of London, but he had no knowledge of it. He spent between £30,000 and £40,000 bringing his invention to a successful stage, but failed to make it profitable to himself. A small return was made to him later, at the suggestion of the principal mill-owners of the country, when he received from the government the sum of £10,000. His work has been much improved in detail since, but it has never been altered in its main principles.

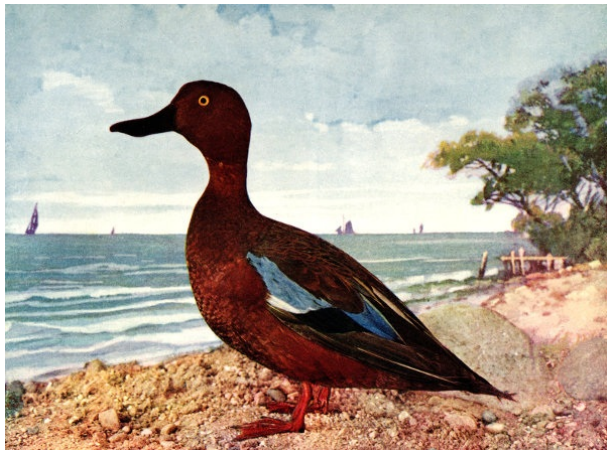
But with all our arts and marvelous machines the most beautifully fine cotton fabric is yet the Dacca muslin. It is called "woven wind," and when spread out upon the grass it is said to resemble gossamer. It used to be made for the Indian princes before the days when the British took possession of the country. It was made only in a strip of territory about forty miles long and three miles in width. With the change in rulers the weavers largely dropped the work which they and their ancestors had done for centuries, handing down their art from father to son; they took to the business of raising indigo, as their soil and climate were well adapted to its production and the demand was good.

Yet there are some of them weaving at this day, though not in sufficient numbers to produce the muslin as a regular article of commerce. A bamboo bow strung with catgut, like a fiddle string, is used to separate the fiber from the seed. It is carded with a big fishbone. The distaff is held in the hand and the loom is a very old-fashioned affair, home-made of bamboo reeds, so simple that a few shillings will purchase one, though a lifetime will not make one able to use it.

The weaver chooses a spot under the shade of a large tree, digs a hole in the dirt for his legs and the lower part of the "geer" and fastens his balances to some convenient bough overhead. His exceedingly fine threads will not work well except in such a shady spot and early in the morning, when there is just the right amount of moisture in the tropical air. There is no line of hand work in which there is such a contrast to-day as in the business of making cotton goods. Machinery has vastly outstripped the hand in quantity of product and accuracy, yet the old ways prevail in the manipulation of the very finest of web. Although Whitney's saw gin made a revolution in the industry, yet the long and delicate fibers of sea-island cotton are separated from the seed in the old way of passing seed cotton between two rollers which are going in different directions. The smooth seeds of this cotton pop away from the fiber quite readily without breaking it. If it were pulled through Whitney's gin there would be more or less tearing and breaking. So the great invention does not apply to cleaning the very finest material. The short wool fibers of common cotton are not so much hurt by the saw teeth and the amount of work done by the gin makes this damage of no account.

At the Atlanta Cotton Exposition in 1882 the old and the new were strikingly contrasted. The mountain people of the South, in many instances, live after the old fashions of colonial times. They make homespun cloth which is a revelation to us. Some of these people were induced to show their work at the exposition, and they were as much astonished at the apparel of their visitors who gazed upon them and their strange labor as were the visitors at the work and manners of the mountaineers.

Two carders operated hand cards, two spinsters ran the spinning-wheels and one weaver made cloth upon a hand loom. In ten hours these five people made eight yards of very coarse cloth.



FROM COL. F.
KAEMPFER.
A. W. MUMFORD,
PUBLISHER, CHICAGO.

CINNAMON TEAL.
 $\frac{1}{2}$ Life-size.

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THE CINNAMON TEAL.

(*Anas cyanoptera*.)

DAVIE says that the geographical distribution of this beautiful teal is western America, from the Columbia river south to Chili, Patagonia, and Falkland Islands; east in North America to the Rocky Mountains; casual in the Mississippi Valley, and accidental in Ohio. It is abundant in the United States west of the Rocky Mountains, breeding in Colorado, Utah, Nevada, California, Idaho, and Oregon. Its habits are similar to those of the blue-wing. Its favorite breeding-places are in fields of tall grass or clover, not far from water. The eggs range from nine to thirteen, and the nest is so completely woven of grass, feathers, and down that it is said the entire structure may be picked up without its coming apart. Oliver Davie, the well known ornithologist, says that it gave him pleasure to be able to add this beautiful duck to the avifauna of Ohio as an accidental visitor. On the 4th of April, 1895, a fine male of this species was taken at the Licking County reservoir by William Harlow. On the 6th Mr. Davie skinned and mounted it and it is now one of the rare Ohio birds in his collection. It proved to be good eating. This, he says, is the first record of the cinnamon teal ever having been taken in the state.

The eggs of this species are creamy-white or pale buff, the average size being 1.88×1.38.

A SCRAP OF PAPER.

ELANORA KINSLEY MARBLE.

"A bluebird sings on the leafless spray,
Hey-ho, winter will go!"

HE ARRIVED that year very early in the season. It was about the twelfth of February that I first heard his plaintive note far up in the maple tree. Could it be Mr. Bluebird, I questioned as I hastened to the window opera-glass in hand? Yes, there he stood, not too comfortably dressed I am afraid, in his blue cap, sky-blue overcoat and russet-brown vest edged with a trimming of feathers soft and white.

There had been a slight fall of snow during the night, and I fancied, from his pensive note, that he was chiding himself for leaving the Mississippi Valley, to which he had journeyed at the first touch of wintry weather in Illinois.

"If it wasn't for the snowdrops, the crocus, the violets, and daffodils," he was saying in a faint sweet warble, "I'd linger longer in the South than I do. They, dear little things, never know, down in their frozen beds, that winter will soon give place to spring till they hear my voice, and so, no matter how bleak the winds or how gray the sky, I sing to let them know I have arrived, my presence heralding the birth of spring and death of winter. It well repays me, I am sure, when, in March under the warm kisses of the sun their pretty heads appear above the ground, and, smiling back at him, out they spring dressed in their new mantles of purple and yellow."

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At this moment from the topmost branch of an adjoining maple came a low, sweet, tremulous note very much indeed like a sigh.

"Ah," said he, surveying the new-comer with flattering attention, "that is the young daughter of Mr. and Mrs. Bluebird who nested in Lincoln Park last summer. For some reason they decided not to go South this season but remained in Chicago all winter. She strikes me as being a very pretty young-lady bird, and certainly it will be no more than friendly upon my part to fly over there and inquire how she and her family withstood the rigors of a Northern winter."

From Miss Bluebird's demeanor, when he alighted upon a twig beside her, I concluded she greatly disapproved of his unceremonious approach. Prettily lifting her wings and lightly trembling upon her perch she made as if to fly away, but instead only changed her position a little, coyly turning aside her head while listening to what the young gentleman had to say.

Encouraged by this Mr. Bluebird's manner became very friendly indeed, and very soon, reassured by his respectful demeanor and sentiments uttered in a voice of oh, such touching sweetness, the young-lady bird unbent, responding at length in a very amiable manner, I noticed, to her companion's remarks.

The conversation which followed may have been very commonplace or very bright and sparkling, but as there is always an undercurrent of sadness in the bluebird's note, and an air of pensiveness expressed in its actions, one could only conjecture what the tenor of this one might be.

The pair, to my intense satisfaction, the next day met again in the top of the maple tree exchanging confidences in low, tremulous strains of surpassing sweetness, uneasily shifting their stations from time to time, lifting their wings, as is their pretty habit, and trembling lightly upon their perches as though about to rise and fly away.

The following morning, which was the fourteenth day of February, Mr. Bluebird's manner when he greeted his new acquaintance appeared to offend her very much. She was cold and distant, whether from maidenly coyness or a laudable desire to check his too confident, proprietorship sort of air, who can say? In no way daunted, that gay bachelor pressed his suit warmly, picturing in tones of peculiar tenderness the snug little home they would establish together, what a devoted husband he would be, attentive, submissive, following her directions in all things. Miss Bluebird shook her head.

It was all very well, she replied, for him to talk of poetry and romance, but he knew well enough that upon her would devolve all the serious cares of life. While he would be very active in hunting for tenements, submitting, no doubt, to her choice, was it not the custom of all the Mr. Bluebirds to fly ahead in quest of material, gayly singing, while their mates selected and carried and builded the nest? What poetry would there be in life for her, she would like to know, under such circumstances, and then, when all was done, to sit for hours and days on the eggs she had laid in order to rear a brood. Oh, no! She was not ready to give up all the pleasures of life yet, and then—and then—Miss Bluebird lowered her eyes and stammered something about being too young to leave her mother.

What argument Mr. Bluebird brought to bear against this latter reason for rejecting his suit I cannot say, but being a wise bird he only stifled a laugh behind his foot and continued more warmly to press it. Again and again he followed her when she took a short flight, quavering *tru-al-ly, tru-al-ly*, no doubt telling her of the many good qualities of the Mr. Bluebirds, how devoted they were, how they ever relied upon the good judgment and practical turn of their mates, never directing, never disputing, but by cheerful song and gesture encouraging and applauding

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everything they did. Then, too, unlike some other husbands that wear feathers, they regularly fed their mates when sitting upon the nest and did their duty afterward in helping to rear the young.

As he talked Miss Bluebird's coldness gradually melted till at length she coyly accepted his invitation to descend and examine a certain tenement which, hoping for her acceptance, he had the day previous, he said, been to view.

"We can at least look it over," he said artfully, noticing the elevation of her bill at the word "acceptance," "though of course it is too early in the season to occupy it. Mr. Purple Martin lived in it last year and——"

Miss Bluebird interrupted him, a trifle haughtily, I thought.

"Is the tenement you speak of in a stump, fence hole, or tree cavity?" she inquired.

"Neither," he hastened to answer; "it is a box erected by the owner of these premises."

"Ah," said she, graciously, "that is another matter," and very amiably spread her wings and descended upon the roof of the box in question.

"You see," explained Mr. Bluebird, "the man who put up this dwelling knew what he was about. He had no intention the sparrows should occupy it, so he built it without any doorsteps or piazza, as you have no doubt remarked."

"Really," replied Miss Bluebird, "in my opinion that is a great defect. A house without doorsteps ——"

"Is just what certain families want," interrupted Mr. Bluebird, smilingly. "Our enemies, the sparrows, cannot fly directly into a nest hole or box like this, as we can, but must have a perch upon which first to alight. It is for that reason, my dear, this house was built without doorsteps. No sparrow families are wanted here."

Miss Bluebird at this juncture thought it proper to be overcome with a feeling of shyness, and could not be prevailed upon to enter the box.

More than once her companion flew in and returned to her side, singing praises of its coziness as a place of abode.

"With new furnishings it will do capitally," said he; "we might even make the Purple Martins' nest do with a little——"

Miss Bluebird's bill at once went up into the air.

"If there is anything I detest," said she, scornfully, "it is old furniture, especially second-hand beds. If that is the best you have to offer a prospective bride, Mr. Bluebird, I will bid you good-day," and the haughty young creature prettily fluttered her wings as if about to fly off and leave him.

"Do not go," he pleaded; "if this house does not please you I have others to offer," and Miss Bluebird, moved apparently by his tender strains, sweetly said *tru-al-ly* and condescended to fly down and enter the box.

It was scarcely a minute ere she reappeared, and, flying at once to her favorite branch in the maple tree, called to him to follow. A scrap of paper, woven into his nest by the Purple Martin the past season, fluttered to the ground as she emerged from the box, and while the pair exchanged vows of love and constancy up in the maple tree, I picked it up and saw, not without marveling at the sagacity of Mr. Bluebird, who probably had dragged it into sight, a heart faintly drawn in red ink, and below it the words:

"Thou art my valentine!"

THE CLAPPER RAIL.

(*Rallus longirostris crepitans*.)

THIS bird, sometimes called the salt-water marsh hen, is found in great abundance in the salt marshes of the Atlantic coast from New Jersey southward. It breeds in profusion in the marshes from the Carolinas to Florida, and has lately been found breeding on the coast of Louisiana on the Gulf of Mexico, Dr. A. K. Fisher having taken an old bird and two young at Grand Isle in 1886. The clapper rail arrives on the south-eastern coast of New Jersey about the last of April, its presence being made known by harsh cries at early dawn and at sunset. Nest-building is commenced in the latter part of May, and by the first of June the full complement of eggs is laid, ranging, says Davie, from six to nine or ten in number, thirteen being the probable limit. Farther south the bird is known to lay as many as fifteen. On Cobb's Island, Virginia, the clapper breeds in great numbers, carefully concealing the nest in high grass. The color of the eggs is pale buffy-yellow, dotted and spotted with reddish-brown and pale lilac, with an average size of 1.72×1.20 , but there is a great variation in this respect in a large series.

At the nesting-season the rails are the noisiest of birds; their long, rolling cry is taken up and repeated by each member of the community. The thin bodies of the birds often measure no more than an inch and a quarter through the breast. "As thin as a rail" is a well-founded illustrative expression.

"To get a good look at these birds in their grassy retreats," says Neltje Blanchan, "is no easy matter. Row a scow over the submerged grass at high-tide as far as it will go, listen to the skulking clatterers, and, if near by, plunge from the bow into the muddy meadow, and you may have the good fortune to flush a bird or two that rises fluttering just above the sedges, flies a few yards, trailing its legs behind it, and drops into the grasses again before you can press the button of your camera. A rarer sight still is to see a clapper rail running, with head tilted downward and tail upward, in a ludicrous gait, threading in and out of the grassy maze."

The rail can swim fairly well, but not fast. Its wings are short, but useful, and it is so swift-footed that dogs chase it in vain.



FROM COL. F.
NUSSBAUMER & SON
A. W. MUMFORD,
PUBLISHER, CHICAGO.

CLAPPER RAIL.
 $\frac{3}{4}$ Life-size.

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THE SWINGING LAMPS OF DAWN.

REV. CHARLES COKE WOODS.

Aneath the threshold of my home
A wily foe had strayed,
And on a rose-tree in the loam
A wondrous thing he made;
Beneath the cover of the night
He built a silken gin,
And at the break of morning light
Bade all the homeless in.

Each shining cord was made with skill,
And woven with such grace,
That none would dream he meant to kill,
In such a royal place;
The beauty of that bright bazar
No one could ever fear,
Its mirrors caught the morning star,
That glistened crystal-clear.

Its swinging lamps were globes of dew,
Enkindled by the dawn,
And when the morning breezes blew
Across the velvet lawn,
The shining lamps swung to and fro.
Enraving the eye,
Till garbed in light-ropes, all aglow,
Was every flower and fly.

But when the lights began to wane,
As sea-tides slowly ebb,
I heard the minor notes of pain
Issuing from a web;
And as my cautious feet drew nigh,
I heard the dying song
Of one deluded, wayward fly
That watched the lamps too long.

THE LATE DR. ELLIOTT COUES.

C. C. MARBLE.



ELLIOTT COUES

THE subject of this sketch, whose death occurred on Christmas, 1899, at Baltimore, Md., was one of the few men who have become famous both in physical and psychical science. He had long been recognized as one of the leading naturalists of America, and of late years had acquired equal distinction as a philosopher.

Early in April last Dr. Coues supplied us with the material for a sketch of his life, to which we are indebted chiefly for what this article contains. He was born in Portsmouth, N. H., Sept. 9, 1842, and was the son of Samuel Elliott Coues and Charlotte Haven Ladd Coues. His father was the author of several scientific treatises which anticipated some of the more modern views of physics, astronomy, and geology; so that young Coues would seem to have inherited his bent of mind towards study and research. The name is of Norman French origin. Dr. Coues' father was a friend of Franklin Pierce, and early in the presidency of the latter received from him an appointment in the United States patent office, which he held nearly to his death in July, 1867. The family moved to Washington in 1833 and Dr. Coues had always been a resident of that city, excepting during the years he served in the West and South as an army officer or engaged in scientific explorations. As a boy he was educated under Jesuit influences at the seminary now known as Gonzaga College. In 1857 he entered a Baptist college, now Columbian University, where he graduated in 1861 in the academic department, and in 1863 in the medical department of that institution. To the degrees of A. B., A. M., Ph. D., and M. D., conferred by this college, his riper scholarship added titles enough to fill a page from learned societies all over the world.

His taste for natural history developed early in an enthusiastic devotion to ornithology, and before he graduated he was sent by the Smithsonian Institution to collect birds in Labrador. Among his earliest writings are the account of this trip, and a treatise on the birds of the District of Columbia, both published in 1861, and both papers secured public recognition in England as well as in this country, thus making a beginning of his literary reputation.

While yet a medical student, Dr. Coues was enlisted by Secretary Stanton as medical cadet, U. S. A., and served a year in one of the hospitals in Washington. On graduating in medicine in 1863, he was appointed by Surgeon-General Hammond for a year as acting assistant surgeon U. S. A. and, on coming of age passed a successful examination for the medical corps of the army. He received his commission in 1864, and was immediately ordered to duty in Arizona. His early years of service in that territory, and afterward in North and South Carolina, were utilized in investigating the natural history of those regions, respecting which he published various scientific papers. Though he wrote some professional articles, during his hospital experience, Dr. Coues seems never to have been much interested in the practice of medicine and surgery. After about ten years of ordinary military service as post surgeon in various places he was, in 1873, appointed naturalist of the U.S. northern boundary commission, which surveyed the line along the forty-ninth parallel from the Lake of the Woods to the Rocky mountains. In 1874 he returned to Washington to prepare the scientific report of his operations. He edited all the publications of the United States geological and geographical survey of the territories from 1876 to 1880 and contributed several volumes to the reports of the survey, notably his "Birds of the Northwest," "Fur Bearing Animals," "Birds of the Colorado Valley," and several installments of a universal Bibliography of Ornithology. The latter work attracted especial attention in Europe, and Dr. Coues was signally complimented by an invitation, signed by Darwin, Huxley, Flower, Newton,

Sclater, and about forty other leading British scientists to take up his residence in London and identify himself with the British Museum.

Dr. Coues also projected and had well under way a "History of North American Mammals," which was ordered to be printed by act of Congress when suddenly, at the very height of his scientific researches and literary labors, he was ordered by the war department to routine medical duty on the frontier. He obeyed the order and proceeded to Arizona, but found it, of course, impossible to resume a life he had long since outgrown. His indignant protests being of no avail, he returned to Washington and promptly tendered his resignation from the army in order to continue his scientific career unhampered by red tape.

As an author he is chiefly known by his numerous works on ornithology, mammalogy, herpetology, bibliography, lexicography, comparative anatomy, natural philosophy, and psychical research. He was one of the authors of the Century Dictionary of the English Language, in seven years contributing 40,000 words and definitions in general biology, comparative anatomy, and all branches of zoölogy. During the last few years he contributed several volumes on western history, in all twelve volumes, and by study and research was enabled to correct many errors. In 1877 he received the highest technical honor to be attained by an American scientist in his election to the Academy of National Science and was for some years the youngest academician. The same year saw his election to the chair of anatomy of the National Medical College in Washington, where he had graduated in '63. He then entered upon a professorship and lectured upon his favorite branch of the medical sciences for ten years. He appears to have been the first in Washington to teach human anatomy upon the broadest basis of morphology and upon the principle of evolution. Nearly all his life Dr. Coues has been a collaborator of the Smithsonian Institution of Washington, his name being most frequently mentioned in that connection. Many of the numberless specimens of natural history he presented to the United States government were found new to science and several have been named in compliment to their discoverer.

At the height of his intellectual activity in physical science the spiritual side of Dr. Coues' nature was awakened. He became interested in the phenomena of spiritualism, as well as in the speculations of theosophy. Belonging distinctively to the materialistic school of thought and skeptical to the last degree by his whole training and turn of mind, he nevertheless began to feel the inadequacy of formal orthodox science to deal with the deeper problems of human life and destiny.

Convinced of the soundness of the main principles of evolution, as held by his peers in science, he wondered whether these might not be equally applicable to psychical research, and hence took up the theory of evolution at the point where Darwin left it, proposing to use it in explanation of the obscure phenomena of hypnotism, clairvoyance, telepathy and the like. He visited Europe to see Mme. Blavatsky, founded and became president of the Gnostic Theosophical Society of Washington, and later became the perpetual president of the Esoteric Theosophical Society of America. In 1890 he published an exposé of the impostures of Blavatsky, and from that time his interest in the cult gradually ceased.

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Most men can do some things well, but nature is seldom so lavish of her gifts as to produce a genius who does all things equally well. It is rare to find a man like Dr. Coues, who was capable of incessant drudgery in the most prosaic technicalities, yet blessed with the poetic temperament and ardent imagination, able to array the deepest problems in a sparkling style which fascinated while it convinced. His literary labors would have killed most men, but to his grasp of mind nature had kindly joined a strong, healthy body that proved capable of any demand upon his physical endurance that his intellectual activity might make. He was tall, well-formed, classic in features, straight as an arrow, with the air of the scholar without the student's stoop, betraying no trace of mental weariness—a man with the tastes of a sybarite and the soul of a poet; to quote from a leading journal, "the imagination of a Goethe and the research of a Humboldt."

In conversation he was fascinating, possessing much of the personal magnetism ascribed to James G. Blaine. It was the pleasure of the writer to have many interviews and to enjoy a somewhat intimate correspondence with him almost up to the time of his death.

BOBBY'S "COTTON-TAIL."

GRANVILLE OSBORNE.

I.

Name's Bobby Wilkins; I'm a-goin' on six years old;
Aunt Polly says 'at I'm a-gettin' purty pert 'n bold;
She 'aint er might uv use fer boys 'at's jest er-bout my size;
If Tabby'n me hev eny fun her "angry pashuns rise," 'n
When I try ter make some sparks fly out uv Tabby's tail
Aunt Polly says, "Bad boys like you are sometimes put in jail;"
But I don't mind her not a bit, an' make jest lots uv noise,
An' nen she looks so cross an' sez, "Deliver me frum *boys*."

II.

My Aunt Polly likes her cat er-nough sight better'n me, 'n'
Keeps a-coddlin' it 'ith cream 'n' sometimes catnip tea.
Seen some tracks behin' ther shed, an' nen I sez, sez I,
"I'll catch yer, Mister Cotton-Tail, to make a rabbit pie;"
So me'n' Tommy Baker found er empty cracker box;
Thought we'd hev it big er-nough fer fear he wuz er fox,
An' nen we propped ther cover up 'n' fixed it 'ith a spring
'At shut it suddin' 'ith a bang ez tight ez anything.

III.

We cut er fresh green carrot top 'n' put it in fer bait,
Wuz both so sure we'd ketch him 'at we couldn't hardly wait;
Pounded in some stakes each side 'n' made it good 'n' stout;
If Mister Cotton-Tail got in he never could get out.
Tom staid 'ith me till mornin', an' almos' 'fore it wuz light
We run behin' ther shed 'n' foun' our trap all shet up tight;
An' nen I shouted, "Got him!" 'n' Tom threw up his hat—
Blame 'f that ol' rabbit wasn't my Aunt Polly's cat!

"THE COUNTRY, THE COUNTRY!"

FROM A CLUB OF ONE, BY A. P. RUSSELL, L. H. D. [\[A\]](#)

TREES! Think of them! In the United States thirty-six varieties of oak, thirty-four of pine, nine of fir, five of spruce, four of hemlock, two of persimmon, twelve of ash, eighteen of willow, nine of poplar, and I don't know how many of the beautiful beech. I once counted over thirty different varieties of trees in the space of one acre. And the leaves—their number, their individuality, their variety of shape and tint, the acres of space that those of one great tree would cover if spread out and laid together! In the autumn to watch them fall—how slowly, how rapidly! Yet they say nobody ever saw one of them let go. Homer's comparison to the lives of men—how fine! Better than Lucian's to the bubbles. I remember very well one October day in Ohio. It was long ago—"in life's morning march, when my bosom was young." (I like to quote from that poem of Campbell's, it is incomparable of its kind.) A delightful tramp! Elderberries. (The great Boerhaave held the elder in such pleasant reverence for the multitude of its virtues, that he is said to have taken off his hat whenever he passed it.) Grapes. Haws. Pawpaws. (Nature's custard.) Spicewood. Sassafras. Hickory nuts. Nearly a primeval forest. Vines reminding one of Brazilian creepers. Trees that were respectable saplings when Columbus landed. The dead roots of an iron-wood—so like a monster as to startle. Behemoth I thought of. "He moveth his tail like a cedar." Thistle-down. Diffused like small vices. Every seed hath wings. Here and there a jay, or a woodpecker. Grape-vines, fantastically running over the tops of tall bushes, grouping deformities, any one of which, if an artist drew it, would be called an exaggeration, worse than anything of Doré's. Trees, swaying and bowing to one another, like stilted clowns in Nature's afterpiece of the seasons. Trees incorporated, sycamore and elm, maple and hickory, modifying and partaking each other's nature; resembling so much as to appear one tree. A jolly gray squirrel, hopping from limb to limb, like a robin; swinging like an oriole; flying along the limb like a weaver's shuttle; scared away, at length, by a scudding cloud of pigeons, just brushing the tallest tree-tops, as if kissing an annual farewell. Clover. Sorrel. Pennyroyal. A drink of cider from a bit of broken crockery. ("Does he not drink more sweetly that takes his beverage in an earthen vessel than he that looks and searches into his golden chalices for fear of poison, and sleeps in armor, and trusts nobody, and does not trust God for his safety?") "All is fair—all is glad—from grass to sun!" Not a "melancholy" day. Keats' poem on Autumn comes to mind; and Crabbe's

"Welcome pure thoughts, welcome, ye silent groves;
These guests, these courts, my soul most dearly loves."

Indian summer. Balzac's comparison to ripe womanhood. The significant worn walk round the mean man's field; its crooked outline impressively striking. All in all, a white day. Memory of it supplies these notes. They might be expanded into an essay. The country, the country! Though the man who would truly relish and enjoy it must be previously furnished with a large and various stock of ideas, which he must be capable of turning over in his own mind, of comparing, varying, and contemplating upon with pleasure; he must so thoroughly have seen the world as to cure him of being over fond of it; and he must have so much good sense and virtue in his own heart as to prevent him from being disgusted with his own reflections, or uneasy in his own company. Alas!

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FROM COL. F.
KAEMPFER.
A. W. MUMFORD,
PUBLISHER, CHICAGO.

GOPHER.
5/8 Life-size.

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THE GOPHER.

THE name of gopher, according to Brehm, is applied in some American localities to various other widely variant rodents. The zoölogists, who first described the animal, obtained their specimens from Indians, who had amused themselves by cramming both cheek pouches full of earth, distending them to such a degree that if the animal had walked the pouches would have trailed on the earth. These artificially distended pouches obtained for the gopher its name; the taxidermists who prepared the dead specimens endeavored to give them what was supposed to be a life-like appearance by following the practice of the Indians in distending the cheek pouches, and the artists who delineated the animal followed the models which were accessible to them, but too truly in their drawings. Owing to these circumstances, the pictures of gophers of even recent date represent really monstrous animals, when they honestly intend to familiarize us with the gopher.

The gopher may be found east of the Rocky Mountains and to the west of the Mississippi river, between the thirty-fourth and fifty-second parallel of north latitude. It leads an underground life, digging tunnels in various directions. Tunnels, of old standing, says Brehm, are packed hard and firm from constant use. Lateral passages branch off at intervals. The main chamber is situated under the roots of a tree at a depth of about four and one-half feet; the entrance tunnel is sunk down to it with a spiral direction. This chamber is large, is lined with soft grass, and serves for a nesting and sleeping-place. The nest in which the young, numbering from five to seven, are born about the beginning of April, is lined with the hair of the mother. It is surrounded with circular passages from which the tunnels radiate. Gesner found that a passage leads from the nest to a larger hole, the storeroom, which is usually filled with roots, potatoes, nuts, and seeds. When throwing up the earth the gopher exposes itself to view as little as possible and immediately after accomplishing its purpose plunges back into its hole. According to Audubon it appears above ground to bask in the sun. We have seen it sit at the entrance to its den with an air of bold indifference to the approach of danger and then suddenly vanish under ground. Its acute sense of hearing and great power of scent protect it from surprises.

Audubon kept several gophers in captivity for months, feeding them on potatoes. Their appetites were voracious, but they would drink neither water nor milk. They made incessant efforts to regain their liberty by gnawing through boxes and doors. They constantly dragged clothing and other similar objects together, utilizing them as bedding, first gnawing them to pieces. One of them, straying into a boot, instead of turning back, simply gnawed its way through the tip. The habit of gnawing was unendurable and Audubon incontinently got rid of them.

The gopher is very destructive to valuable trees and plants, for which reason man is its most dangerous enemy, the only other foes it has to fear being water and snakes.

This pretty little rodent is often found in populous neighborhoods. A few years ago the writer saw one rush into a hole under the root of a large osage orange bush in Woodlawn, Chicago. Curiosity led him to watch for the reappearance of the animal, which soon put its head cautiously above the entrance and eyed the intruder with as much interest as a weasel will often show under like circumstances. For several weeks the gopher was visible in the morning hours. We pointed it out to several persons, each of whom declared it to be a ground squirrel. There is a great difference in these small animals, but they are frequently confounded.

The name of gopher is applied in some American localities to various other rodents.

HANS AND MIZI.

DR. ALBERT SCHNEIDER.

HANS was a little blue-eyed German orphan who had been "adopted" by a man and wife because they thought they could make good use of him; but to their chagrin they were disappointed. Hans had been told again and again that he was an ungrateful, lazy, good for-nothing. This was also the reason why his master whipped him so frequently. Now Hans was only nine years old and, of course, he could not know that he was so thoroughly bad unless he was told and the telling of it accompanied by cuffs, in order to impress this fact more fully upon his dull brain.

It was really true that Hans was lazy and perhaps queer in many ways. He disliked hard work, preferring to wander about the fields and meadows, the ditches, pastures, and the trees of the nearby forest. He had been discovered lying in the grass watching the fleeting clouds overhead and listening to the sighing of the wind in the tall grass and the overshadowing trees. In his imagination the breezes whispered soothing words, soft and low. He watched the busy bees, the ants, and the black carrion beetles tugging great loads up hill.

Often he had observed a lady with two children about his age going by on their way to Sunday-school. With wistful eyes he would watch the romping of the children and listen to their exclamations of joy as they played among the flowers. Sometimes the kind lady would beckon to Hans and talk kindly to him and make him presents. Then little Hans would cry as though his poor heart would break. He hid the gifts in a secret nook in the granary which was also his sleeping place and often he would think of the kind lady and her happy children while the love-hunger shone in his eyes.

Mizi was only a half-starved, homeless, gray kitten which came to Hans while he was hoeing in the orchard. The two understood each other at once, and why should they not? Both were homeless, friendless, and soulless. Everybody knows that a cat, much less a stray kitten, has no soul. You may say that Hans was neither a cat nor a kitten, but some little boys of the neighborhood had sneeringly remarked that he was a "fraid-cat." Besides, his master had whipped all the spirit out of him. Therefore he, too, was without a soul. Hans petted Mizi and gave her some bread-crusts and hid her in the shed to keep her out of sight of his master. Mizi gained in flesh and became very fond of Hans, and at times would try to follow him, but Hans would take her back and put her in a more secure place. Mizi did not know of the cruel master and in spite of all precautions she finally made her escape and searched for Hans. She could not find him, so she mewed again and again and finally succeeded in attracting, not only the attention of Hans but also that of the master who promptly picked up a stone and hurled it at Mizi but fortunately missed her. It may be that Mizi was not so easily frightened as Hans, for in time she tried to get to him even if the master was near. Poor, ignorant Mizi, she did not know that this show of friendliness would get Hans into trouble. The master concluded that Hans was responsible for the presence of Mizi and ordered him to take her and kill her then and there. In agony and despair Hans ran to Mizi to frighten her away but she only rubbed her glossy fur against him and purred gently and only when the frenzied master attempted to grasp her out of the protecting arms of Hans did she attempt to flee—but too late! a vicious kick caught her in the side but she managed to escape under the protecting granary. In the evening Hans went to the shed and called "Mizi, Mizi," and poor, suffering Mizi dragged herself far enough so that little Hans might stroke her head. Hans brought some bread and milk but Mizi only mewed piteously. In the morning Hans found Mizi stiff and cold near the opening of the shed. Poor Hans, he sobbed and sobbed and called, "Mizi, Mizi," most piteously but Mizi did not answer; her sufferings were over.

GEOGRAPHY LESSONS.

IT IS possible for a pupil to study geography diligently every day and forget apparently nearly everything he learns. Both geography and history are studies which may be pursued in such a way that nearly all that is acquired in any given month is lost in the next month. Those who are inclined to doubt this have but to test a class where the text has been the subject of acquisition. Test them on what they learned a month previously and even those inclined to believe this statement will be astonished that so little is retained of what once seemed to be known so well.

Mr. A sweeps his barn with the doors open and the wind blowing against his work. He works with much energy and some apparent efficiency; but the wind brings back the chaff to such an extent that there is never much clear space on his floor. Mr. B takes advantage of the direction of the wind, and every stroke counts for success and is more than doubled in effect by the help of the wind. The chaff flies before him and his floor is clear in a short time.

I have seen a steamer in waters opening upon the Bay of Fundy pouring out black smoke, beating the water into foam, and apparently making great progress. But observation of the distant shore proved that she was actually standing still. The adverse tide was such that she could not contend with it successfully. So she dropped her anchor and saved coal and the wear of machinery. Two hours later she swung with her cable, the anchor was hoisted, and she moved rapidly in the desired direction without the aid of a pound of steam. In Passamaquoddy bay are so many islands and channels and such a great fluctuation of tide that the waters are racing in various directions at all times. Fishermen study their courses and never tack against the tide. Those who go out every day do not leave home at the same hour Tuesday as on Monday, but just fifty minutes later. They do not go and return over the same courses, for many times the strongest flow of tide does not run where there was the swiftest ebb. With them the proverb, "The longest way round is the shortest way home," is often true, and I have heard them quote those words frequently.

In psychology there are both a wind and a tide. The wind is what the pupil thinks of the subject—as to its usefulness in his future life. The tide is his natural interest in the thing for its own sake.

Wind and tide are sometimes both against us, and it is a poor skipper who lacks the sense to tie up for a short time or take another course when he finds both set against him.

But there are teachers who battle fiercely against the desires and interests of their pupils, bound to compel them to learn, making a tremendous fuss, filling families with tears and tremblings, threatenings, scoldings, and reviewings—all with no permanent results of value.

There is a natural interest in children for birds. It is so strong and absorbing that it amounts to a psychological tide. The things of the bird-world act upon the child-mind rather instinctively than mentally. The whole child is active and alert when the subject is such that it fully interests him. A little effective teaching just at that time is worth more than hours of perfunctory drudgery over a similar task presented in the wrong way.

There are birds wherever man lives. They differ in color, form, and habit according to environment. The pupil who seems to be interested least in the ordinary things of the text book in geography is the very one, as a rule, to be caught with the birds and animals of the various parts of the earth. The pupil who will not retain information about the products of a country may be induced to consider intelligently something about the fauna of that country and pass readily to an interested study of the flora, and from what grows there to what is shipped from that place.

THE MINK.

(*Putorius vison.*)

THIS soft fur bearing animal has been described by Audubon and Prince De Wied. Its nearest relatives are very closely allied to the polecat and differ from it only by a flatter head, larger canine teeth, shorter legs, the presence of webs between the toes, a longer tail, and a lustrous fur, consisting of a close, smooth, short hair, resembling otter fur. Its color is a uniform brown. The fur of the American mink is much more esteemed than that of the European, as it is softer and of a more woolly character.

According to Audubon the mink ranks next to the ermine in destructive capacity, prowling around the farmyard or duck-pond, and its presence is soon detected by the sudden disappearance of young chickens and ducklings. Audubon had a personal experience with a mink which made its home in the stone dam of a small pond near the home of the naturalist. The pond had been dammed for the benefit of the ducks in the yard, and in this way afforded the mink hunting-grounds of ample promise. Its hiding-place had been selected with cunning, very near the house and still nearer the place where the chickens had to pass on their way to drink. In front of its hole were two large stones, which served the mink as a watch tower, from which it could overlook the yard as well as the pond. It would lie in wait for hours every day and would carry away chickens and ducks in broad daylight. Audubon found the mink to be especially plentiful on the banks of the Ohio river, and there observed it to be of some use in catching mice and rats. But it was also addicted to poaching and fishing. The naturalist observed it to swim and dive with the greatest agility and pursue and attack the quickest of fishes, such as the salmon and trout. It will eat frogs or lizards, but when food is plentiful it is very fastidious, preying upon rats, finches and ducks, hares, oysters and other shell fish; in short, Brehm says it adapts itself to the locality and knows how to profit by whatever food supplies it may be able to find. When frightened it gives forth a very fetid odor like the polecat.

The female gives birth to five or six young at about the end of April. If taken young they get to be very tame and become real pets. Richardson saw one in the possession of a Canadian lady who used to carry it about with her in her pocket. It is easily caught in a trap of any kind, but its tenacity of life renders it difficult to shoot. The European mink much resembles the American, except that it is somewhat smaller and its fur is coarser.

Upon a large farm in Michigan visited by the writer this summer ran a creek where the chickens, when the trough was dry—and dry it usually was—traveled to get a drink. In the bank of the creek a mink made his home, and not a week passed that one or more hens did not appear in the barnyard crippled or mangled in a manner painful to behold—painful, that is, to the visitor, but not apparently to the farmer, who only said: "It's that darned mink; some day, when I have time, I'll set a trap and catch him," and so went coolly on his way, leaving the poor maimed creatures to drag out a painful existence for days or weeks, hoping that nature would heal the wounds made by the mink.

Aside from the lack of thrift thus shown by the farmer—for the hens, when badly mangled, in time succumbed—the inhumane aspect of the case never seemed to strike him. The cultivation of his fields left no time for cultivating the finer feelings of the heart.

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FROM COL. F.
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A. W. MUMFORD,
PUBLISHER, CHICAGO.

MINK.
4/11 Life-size.

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CO., CHICAGO.

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THE NEW SPORT.

JOHN WINTHROP SCOTT.

IN THE early days every man and boy knew how to use a gun. It was a necessity of life. It brought in meat for the family. The regular business of every holiday was to go to the woods and kill. The free life of the woods, the pleasure of ranging about for a purpose, and the excitement attending success in bagging game were among their greater pleasures.

Now we live in cities mainly. Even the country boy has less regard for the gun. The game and many of the birds and animals that are not game have been killed off, so that country boys now wish to give them a chance for their lives. Probably the worst murderers of songsters and innocent animals are the ignorant city youths who get only a day or two in the woods in a year.

Guns have been "improved" to such an extent that whether the gunner has any skill or not everything in sight can be killed because of the rapidity of fire and the number of chances for killing. A gun has been invented which pours a steady stream of rapid fire as long as you hold the trigger. It was invented for killing men on the battlefield; but there are other guns nearly as destructive that are used for "sport."

Public schools, Audubon societies, women's clubs, and other humanizing agencies have so modified the ideas of boys and young men that there are but few who hunt for sport.

The cheapening of the camera and its perfection for amateur use have placed a new shooting apparatus in their hands, and many young people of both sexes are now more or less expert in making exposures and developing. A shot with a camera is worth more than a shot with a gun. You have to eat or stuff the unfortunate bird or animal you shoot with a gun. When it is gone you have nothing to show for your skill.

The shot with a camera gives you a handsome picture with many thrilling details to relate. If you wish to boast you have the evidence at hand to corroborate your statement. The pictures last indefinitely, are easily stored, and may be duplicated at will.

Camera presents last Christmas far outnumbered the guns given. Boys and girls much prefer the new sport to the old. With the aid of the bicycle in getting about the country, young people are making trips to the country with loaded cameras and bringing in much more satisfactory game than they used to get with guns.

The skill some of them have manifested in getting a focus on some shy resident of the woods or fields is indeed remarkable. Imitations of brush heaps are made out of light stuff that may easily be carried about. These may be placed before the residence of a rabbit or woodchuck for several days before the attempt is made to get a shot from beneath. A great deal of caution is sometimes necessary to get the subject accustomed even to a strange brush heap, so he will act naturally at the instant the snap is made.

Two young Englishmen made a mock tree-trunk of cloth, painted its exterior, cut holes in it for observation and for the camera, tricked it out with vines, spread it out on a light frame so they could set it up where they chose, and got so many beautiful and scientifically interesting views that they have written a book that has had a large sale. It is embellished with half-tone engravings made from their collections of photographs, and is a most delightful and useful addition to one's library. It is entitled "Wild Life at Home," and is published by Cassell & Company of New York. It has met with such popularity largely because it has appeared just at the time when so many young people are turning their attention from the killing of birds and animals to the more pleasing and humane business of catching their likenesses in their native haunts.

Dr. R. W. Shufeldt, of Washington, a distinguished naturalist, has made many photographs of wild life in the United States, and embellished his own works with reproductions of these pictures which are so very interesting and difficult to secure.

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The telephoto lens is a great help in taking the more timid subjects. Audubon used a telescope to get the most familiar glimpses of these little inhabitants of the forests long before the dry plate was invented. What would he not have given to have been the possessor of a means of taking instantly all the details and attitudes of the wild birds he loved so well!

The camera is now adding daily to the accurate knowledge we possess of the things of nature, and every young person should own one and become familiar with its rare qualities and usefulness. It is very gratifying to think that sport in the woods now means something superior to the old bloody work our boys formerly pursued with guns. With a copy of the book above mentioned a boy is equipped with suggestions and directions enough to keep him busy and well employed for several seasons.

MOLE CRICKET LODGE.

BERTHA SEAVEY SAUNIER.

MR. and Mrs. Mole Cricket had folded their hands for the winter. The busy season was over, for the ground was all hard with the foot tread of Jack Frost and the snow lay all over the lodge—a solid, warm cover that squeaked and crunched quite musically when little Boy Will rode back and forth on it with his sled Dasher.

Shadows lay rather heavily in the lodge. The caverns and galleries which had been built in warmer times were hung with darkness and all was still in slumber.

Side by side in the chamber, just under the long, dead grass and the white snow, with a roof formed of tiny roots and loose earth, lay Mr. and Mrs. Mole Cricket.

It was the same chamber in which had lain the little white eggs that the warm sun had hatched, and from it the young crickets had gone out, already valiant, to burrow their own galleries, and seek their own food.

Slumber had gone on in the chamber for many weeks when, at a sudden sound, Mr. Cricket moved. We fancy he was cross at being disturbed. "What's that?" he said.

"Boy Will," answered his wife. "He's digging up the snow to make a snow man, and shouting."

"He'll make us cold," grumbled Mr. Cricket.

"Then we must go to the cavern."

"But we can't—I'm as stiff as a stick."

"I believe I am, too."

The earth that covered their roof was very sandy and loose, when not frozen, and as it was, it yielded readily to persistent thumps such as now fell about it. The snow was soggy—just right for building purposes—and Boy Will, in his enthusiasm, scraped up a shovelful of dirt with the last bit of snow that covered the lodge. His sharp eyes saw something black lying beneath the little dead roots that had in the summer belonged to his forget-me-nots. He took the shovel—it was his mother's stove shovel—and carefully pried the dark bundle up, and with his little red fingers separated it from its wrappings.

"Aha!" he said, and ran into the house. "Look a-here!" he cried as he ran up to his father's desk. "Well, well!" said his father, looking at the objects through gold-bowed spectacles, "that's the same sort of fellow that we teased last summer with a grass blade."

"Tell me," said Boy Will, in wonder, "don't you remember the little hole in the garden, and when I put in a spear of grass how the fellow grabbed it with his jaws? I drew him out and there was Sir Mole Cricket that does so much mischief in the garden."

"Oh yes; and now here are two; but they are dead."

"No, only asleep for the winter. The warm room will revive them but they may die after all. They will have awakened out of season."

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"I wish I could put them back," said Boy Will.

"We will study them a little and then we will see," returned his father as he took up his penknife and pointed to the folded legs.

"Those big flat fore-legs are what do all the mischief. They are like strong little hands and have claws on them and they are used for digging. The main business of Sir Cricket is to burrow and he works away with these hands of his until he will have made a number of underground passages. And in his work he will cut off hundreds of new, tender roots that belong to plants and shrubs. And that's the mischief of him."

"What do they eat?"

"Why, little bugs; but they are fierce, hungry creatures, and when they meet a mole cricket that is weak and defenseless they pounce on him and eat him. They are no respecter of relatives."

"They don't deserve to live!" cried Boy Will, with a stamp.

"But we can give them their chances," returned Mr. Rey. "Now look at this one. There are two sets of wings. One outside and one inside like grasshoppers, but much shorter. Here are two delicate feelers, or antennæ, bent backward, and two at the end of the body. I suppose those are for the purpose of discovering any danger that might approach them from behind while they are busy at digging. The jaws are toothed and horny, and so, all in all, we may put Sir Cricket down in the same order in which are the katydid, grasshopper, field and house cricket, cockroach, earwig and so on, which is the order *Orthoptera*. Now come and show me where you found them."

Boy Will led the way where stood his half-built snow-man, and Mr. Rey with a stick felt about in the chamber for the opening to another cavity to the lodge.

"Ah, here it is—a warmer and a better one than the other because it is deeper," and he slipped the two objects in and stopped the doorway with earth and snow.

"Well, I declare!" said Mr. Mole Cricket from under his horny skin, "What do you think of that?"

"Why," said his wife, "they've put us in the cavern where we should have been in the first place. What a mistake it was to go to sleep in the nursery! Now we shall be quite safe until spring."

"Well, well, true enough!" returned Sir Mole Cricket. And they both fell asleep again.

SNOW BIRDS.

This poem, by Louis Honoré Frechette, the laureate of Canada, is very fine in the original, and holds the same position in French-Canadian literature that Bryant's "Lines to a Waterfowl" occupies in American classics. It is one of the poems that won for its author the crown of the French academy and the Grand Prix Monthyon of 2,000 livres.

When the rude Equinox, with his cold train
From our horizons drives accustomed cheer,
Behold! a thousand winged sprites appear
And flutter briskly round the frosty plain.
No seeds are anywhere, save sleety rain,
No leafage thick against the outlook drear;
Rough winds to wildly whip them far and near;
God's heart alone to feel their every pain.
Dear little travelers through this icy realm,
Fear not the tempest shall you overwhelm;
The glad spring buds within your happy song.
Go, whirl about the avalanche, and be,
O birds of snow, unharmed, and so teach me:
Whom God doth guard is stronger than the strong.
— C. G. B.

VEGETATION IN THE PHILIPPINES.

MUCH attention has of late been devoted to the Philippines, and as one result considerable interest has been evinced in their natural products. In the matter of vegetation they are highly favored. Fruits grow in great abundance, and the reputation of some of them is already established abroad, as is the case, for example, with the mango. Other fruits grown in the islands are the ate (the cinnamon apple of the French colonists), the mangosteen, the pineapple, the tamarind, the orange, the lemon, the jack, the jujube, the litchi (regarded by the Chinese as the king of fruits), the plum, the chico-mamey (the sapodilla of the West Indies), the bread fruit, and the papaw. The last named is eaten like a melon, and is valued as a digestive; its juice furnishes an extract which is used as a medicament under the name of papaine, or vegetable pepsin. The banana grows abundantly and is a great boon to the poor people, supplying them with a cheap, delicious, and exceedingly nutritive food; there are many varieties, ten of which are in particular highly esteemed.

Plants which are cultivated for industrial purposes include the sugar cane, of which four varieties are grown—yellow cane, Otaheite cane, purple or Batavia cane, and striped cane. Of vegetables there are several pulses used as food by the natives which never appear on the tables of the European settlers. These include the mango, mentioned above, and three or four kinds of beans, such as the butingue, the zabache, the Abra bean, and the Patami bean. These suit the natives much better than the garbanzos, or chick peas, that are so highly prized by the Spaniards. Among the tuberous roots valued as food the sweet potato ranks first, with an annual production of 98,000,000 pounds. The common or white potato, although of inferior quality, stands next in importance. Then follows the camotengcaho or manihot (cassava), the root of which is made edible by the removal of its poisonous juice in the same way as in the West Indies. After expression of the juice the pulp forms a sort of coarse-grained flour that is very nutritious, pleasant to the taste and easy to digest. Besides these tubers other plants, such as the ubi, the togui and the gabi, are cultivated in the fields for the sake of their edible roots. Other edible vegetables include calabashes, melons, watermelons, cucumbers, carrots, celery, parsley, tomatoes, egg plants, peppers, capers, cabbages, lettuce, endives, mustard, leeks, onions, asparagus, and peas. Of the cocoa palms the ordinary cocoanut tree is the most important, the oil of which is put to many and varied uses. The bamboo is much valued, the young and tender shoots making a very acceptable article of food, in the form of salads and other dishes, and the fibre is used for numerous purposes. Tobacco as a cultivated crop is generally grown in the same field as maize. Of spices the Philippines grow cinnamon, nutmegs, pepper, ginger, and majoram. Of medicinal plants the most familiar are the papaw, already mentioned, and ipecacuanha.

Among aromatic and ornamental plants may be mentioned magnolias, camellias, clematis, several kinds of roses, dahlias, ylang-ylang, papua, jessamine, and many species of orchids and ferns. These, however, grow wild in such profusion that little care is bestowed upon their cultivation. — *Gardener's Magazine*.



CARBONS.

Bituminous Coal
FROM COL. CHI. ACAD
SCIENCES.
A. W. MUMFORD,
PUBLISHER, CHICAGO.

Anthracite Coal

Graphite
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NATURE STUDY PUB.
CO., CHICAGO.

COMMON MINERALS AND VALUABLE ORES.

3.—MINERALS CONTAINING CARBON.

THEO. F. BROOKINS, B. S.,

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AMONG minerals of economic importance carbon minerals hold the unique position of being at the same time of the most common and the most rare occurrence. As far as external appearance indicates, a piece of common coal and the most brilliant diamond are widely separated; with regard to chemical composition they are closely related. Intermediate between the coal of the stoke furnace and the "brilliant" of the jewelry shop is still another well-known form of carbon, the graphite of the lead pencil. These three substances comprise the far greater part of carbon-containing minerals.

In so far as our mind's picture of a mineral is that of an aggregation of crystals of fairly perfect form our consideration of coal as a mineral is erroneous. We must yield to a broader interpretation of the essential characteristics of a mineral and modify our idea so as to include any homogeneous substance (solid, with the single exception of mercury) of fairly definite chemical composition "occurring in nature but not of apparent organic origin." Organic substances are those that are alive or have lived.

Vegetation is, undoubtedly, the origin of all coal, but often much more than a cursory examination is necessary to prove such origin. In the less altered coals the vegetable origin is readily proved by the actual presence of seeds, plant fibers, and other equally apparent organic remains. A microscopic study is necessary for finding the presence of woody fiber in the more metamorphosed form. The word metamorphose comes from the Greek; *meta* means after or over; *morphe* is form. A metamorphosis is a change of form or a forming over.

The history of the discovery of the value of coal as a means of producing heat and of the development of the coal-mining industry covers a comparatively recent period. Coal occurs in such quantities near the surface of the earth's crust and its outcrops are so numerous that it cannot have failed to attract the attention of the most ancient of peoples. Indeed, that coal could be used as a fuel is mentioned by a writer, Theophrastus, who lived 300 years B. C. The ancient Celts of Britain are reputed to have evidenced knowledge of the industrial value of coal. It was not until near the middle of the thirteenth century, however, that coal became so important an economic product as to result in statutes granting to certain places the privilege of mining it. After a long period of trial in England the superiority of coal over other fuels was recognized, and stone coal, as the harder form was commonly known, came into general use. In America bituminous, or soft coal, was mined to a slight extent in the latter half of the eighteenth century. The form now commonly used in house-heating furnaces, anthracite, for a long time baffled the colonists in their efforts to make it burn. The knowledge that an anthracite fire is most effective if not continually poked is said to have been acquired generally by accident.

Europe and the United States to-day produce practically all the coal of the world. In Europe, Great Britain, Germany, France, Austria-Hungary, and Belgium are the main sources of supply. Several important coal areas exist in our own country, notably that of the New England basin, with an area of 500 square miles; the Appalachian district, with an area of 65,000 square miles; the northern area, in Michigan, covering 7,000 square miles; the central area, comprising parts of Illinois, Indiana and Kentucky, and including 48,000 square miles; the scattered western area, with a total of 98,000 square miles; the indefinite Rocky Mountain area, and the Pacific coast region, including parts of California, Oregon, and Washington. Coal mining is yet an undeveloped industry in our territorial possessions. Alaska has an abundant supply of coal, and lesser quantities are found in Cuba and Porto Rico.

Mention has already been made of the two common kinds of coal, bituminous and anthracite. These two kinds mark different stages in the transformation from plant organism to mineral product. As the biologist traces the successive steps in the evolution of an individual of a species from germ to adult, so the geologist unfolds before us the wonderful history of a piece of coal from its first appearance on the earth to the time when it is thrown into our fire grate as fuel. Coal is the metamorphosed product of vegetable growths, changed by atmospheric agencies and the internal forces of the earth acting through a total period of perhaps millions of years. In the remote past, ages before man had appeared on the earth, the atmosphere or our globe was highly charged with carbon gases. Vegetation flourished in luxuriance. Great swamps were common. The ocean alternately covered and receded from verdure-clothed land areas. Ponds were transformed to morasses and swamps. In the swamps thus formed, the accumulated sediment of centuries upon centuries covered alternate layers of decayed plant organisms, until finally beds of peat were formed. Great masses above pressed on those underneath; the internal heat of the earth reached up and transformed the densely packed masses of peat until the beds became hard and brown, the product of the partial metamorphism being what we know as lignite, or brown coal. With the continued action of the forces of metamorphism, the lignite turned still darker, and as more gases were driven off, became heavier, until the bituminous stage was reached, which, in turn, was succeeded by the anthracite stage.

Graphite, or black lead, is a mineral containing not more than five per cent of impurities, and is generally supposed to have originated as did mineral coal, and to represent a still more advanced stage of development. It occurs in various localities both in the vicinity of coal measures and far

removed from them. The chief part of the world's supply comes from Ceylon, though Germany and the United States produce quantities of graphite of excellent quality. In the Laurentian rocks of Canada, and of course with as ancient origin, extensive deposits are found. This presence of graphite in strata in which as yet no certain traces of organic life have been found has led some to believe that this form of carbon mineral may have another than organic origin.

Various uses are served by graphite. The chemist finds it of great value in making his crucibles; the engineer uses it, finely powdered, as a lubricant; the housekeeper polishes stoves with it; the electrician uses it in his arc lights; all civilized nations use it in the lead of lead pencils. The stem, *grapho* (to write), on which so many of our words, as geography, telegraph, graphophone, etc., are formed, suggests also the origin of the name, graphite. The finest quality lead pencils are those made from graphite occurring in a state sufficiently pure to allow the cutting and grinding of pieces to the size needed. In the case of the medium and poorer grade pencils, the graphite has first been finely powdered and then pressed into the requisite shape and size.

The purest form of carbon found in nature is the diamond. The rare occurrence of diamonds indicates that the essential conditions in nature for causing the transformation of some less pure form of carbon into diamond are seldom present. While diamonds have actually been produced in the laboratory by far-seeing and indefatigable chemists, yet the cost of such products is so great as to preclude the possibility of the most precious of gems becoming at all common. The diamond is the hardest of all known substances, and will scratch any other mineral across which it may be drawn.

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Three localities have successively furnished the main part of the world's stock of diamonds. A century and a half ago, practically all the diamonds came from India, where at one time 60,000 persons were employed in diamond digging. Toward the middle of the eighteenth century, when the diamondiferous districts of India were becoming exhausted, the discovery of the precious gem in Brazilian deposits was made. At present, the supply of diamonds from Brazil has much diminished, and the diamond fields of South Africa, where is located the famous Kimberley mine, produce the larger part of the world's output of diamonds.

Among famous diamonds of the world should be mentioned the Koh-i-noor of the British crown, which, Hindu legend relates, was worn five thousand years ago by one of their national heroes. The largest known diamond, weighing three hundred sixty-seven carats, was found in Borneo, and is now owned by the Rajah of Matan.

FEBRUARY.

FEBRUARY,—fortnights two—
Briefest of the months are you,
Of the winter's children last.
Why do you go by so fast?
Is it not a little strange
Once in four years you should change,
That the sun should shine and give
You another day to live?
May be this is only done
Since you are the smallest one;
So I make the shortest rhyme
For you, as befits your time:
You're the baby of the year,
And to me you're very dear,
Just because you bring the line,
"Will you be my Valentine?"

—*Frank Dempster Sherman.*

The snow had begun in the gloaming,
And busily all the night
Had been heaping field and highway
With a silence deep and white.

Every pine and fir and hemlock
Wore ermine too dear for an earl,
And the poorest twig on the elm-tree
Was ridged inch-deep with pearl.

From sheds new-roofed with Carrara
Came Chanticleer's muffled crow,
The stiff rails were softened to swan's-down,
And still fluttered down the snow.

—*Lowell.*

LICORICE.

(*Glycyrrhiza glabra* L.)

DR. ALBERT SCHNEIDER,
Northwestern University School of Pharmacy.

But first he cheweth greyn and *licorys*
To smellen sweete.

—*Miller's Tale*, l. 504; *Chaucer*.

THE licorice yielding plant is a perennial herb with a thick root-stock, having a number of long sparingly branched roots and very long runners or rhizomes. It belongs to the same family as the peas and beans (*Leguminosæ*). It has purplish flowers with the irregular corolla characteristic of the family. The pods are rather small, much compressed, each with from two to five seeds.

The plant is in all probability a native of the warm parts of the Mediterranean region. There are several varieties of *G. glabra*, all of which are more or less extensively cultivated and placed upon the market.

As to the exact habitat of licorice there is some difference of opinion. According to some authorities its native home is in the vicinity of the sea of Azov. Dioscorides was among the first to give a description of the plant and designated the pontic lands and Kappadonia of Asia Minor as its home. The Romans named the plant *Glycyrrhiza*. Celsius, Scribonius Largus, and Plinius described it as *Radix dulcis*, sweet root, on account of its sweet taste. Galenus, the eminent Roman physician, made extensive medicinal use of the roots as well as of the juice. Alexander Trallianus also recommended licorice very highly. Although this plant enjoyed extensive use during the middle ages it was apparently not included in the herbal list of Charlemagne, *Karl der Grosse*. In the 13th century licorice was highly prized in Switzerland as a remedy for lung troubles. It was similarly used in Wales and in Denmark. Pietro di Crescenzi of Bologna (1305) was the first to give a full report of the occurrence and cultivation of licorice. The Benedictine monks of St. Michaelis cultivated it extensively in the vicinity of Bamberg. The eminent authority, Flückiger, reports a peculiar practice by these monks. A new hand in the horticultural work was initiated by requiring him to dig up a complete root of a licorice plant with all its branches including the rhizome. This was by no means an easy task on account of the ramification of the roots and the extreme length of the rhizome.

Glycyrrhiza is extensively cultivated in Greece, Italy, France, Russia, Germany, the Danubian Provinces, southern China, northern Africa, and to some extent in England. In the Italian province of Calabria licorice is planted with peas and corn. In the course of three years the roots are collected, the juice expressed and root evaporated to the proper consistency for shipping. New crops are grown from cuttings of the rhizomes. There is an excellent quality of licorice grown in the vicinity of Smyrna. The principal commercial varieties are grown in Spain, southern Russia, Turkey and Italy. Spanish and Russian licorice root is dried and shipped in bales or bundles. Spanish licorice root is unpeeled and occurs in pieces several feet in length. Russian licorice is usually peeled. Most of the licorice used in the United States is obtained from Italy, Russia, and Germany. Some of the licorice found upon the market is quite fragmentary and very dirty. The licorice raised in England is intended for home consumption and is placed upon the market in both the fresh and dried state. The fresh roots have an earthy and somewhat nauseous odor. The peel, or bark, of the roots contains tannic acid and a resinous oil, both of which are undesirable; hence the peeled article is usually preferred.



FROM KÆHLER'S
MEDICINAL-
PFLANZEN.

LICORICE.

CHICAGO:
A. W. MUMFORD
PUBLISHER

DESCRIPTION OF PLATE.—A, flowering portion of plant; 1, flower; 2, 3, 4, parts of the flower; 5, stamens; 6, stigma; 7, ovary; 8, fruit; 9, one valve of pod with seeds; 10, 11, 12, different views of seed.

The characteristically sweet taste of the licorice roots and rhizomes is due to glycyrrhizin and some sugar. Glycyrrhizin is a glucoside which splits up into glucose, a substance closely akin to sugar, and glycyrretin, a bitter substance. The extract of licorice is prepared by crushing the fresh roots or rhizomes, then boiling repeatedly in water, expressing and then condensing the sap in copper kettles until it is quite hard when cooled. In Calabria the condensed juice, while still warm and pliable, is rolled into sticks and stamped with the name of the locality where it was prepared. In those countries where the fresh roots cannot be obtained the dried roots are crushed and then treated as above. The licorice sticks prepared in this country usually have stamped upon them the initials of the manufacturing firm. Much of the evaporated juice is also placed upon the market in large lumps or masses. The pure licorice extract, prepared as indicated above, is a glossy black, very brittle, with a glassy fracture. For shipment it must be carefully packed to prevent its being broken into small bits. To reduce the brittleness various substances are added as starch and gum arabic.

Licorice extract is a highly appreciated sweetmeat but unfortunately it is often grossly adulterated with dextrin, starch, sugar, and gum arabic. Many of the licorice drops, etc., contain very little licorice, but even the poorest article seems to be highly prized by the average child. Licorice extract in mass is known as licorice paste and is extensively employed in preparing chewing tobacco and in brewing beer, to which substances it imparts a peculiar flavor and a dark color.

Licorice extract is a popular remedy for colds and sore throat, though its curative powers are certainly very slight. Physicians make extensive use of it to disguise the disagreeable taste of medicines, such as quinine. It is an ingredient of many cough remedies. The finely powdered roots are dusted over pills to prevent their adhesion and to give them consistency.

Licorice roots have the same properties as the extract and may be similarly used. Many children prefer the dried roots obtained at the drug store to the stick licorice or the licorice drops. This choice is in many respects a good one; the roots are at least not adulterated, but of course only the juice should be swallowed—a precaution which it is not necessary to emphasize—as the fibrous nature of the wood makes it difficult to swallow. Even if a little of it is swallowed no particular harm would be done, as it is not in the least poisonous, though the fibers may act as an irritant to the stomach.

As already indicated there are several species of *Glycyrrhiza* of which the roots and rhizomes are used like those of *G. glabra*, but, in addition to these there are a number of other plants designated as licorice. Indian licorice or the wild licorice of India (*Abrus precatorius*), is a woody twining plant growing quite abundantly in India; it is sometimes substituted for true licorice. Prickly licorice (*Glycyrrhiza echinata*) resembles true licorice quite closely. The wild licorice of America (*Glycyrrhiza lepidota*) is found in the Northwest. Its roots are quite sweet and often used as a substitute for true licorice. The European plant known as "rest harrow" (*Ononis spinosa*), so-called because its tangled roots impede the progress of the harrow, has roots with an odor and

taste resembling licorice. The roots are extensively employed by the country practitioners of France and Germany in the treatment of jaundice, dropsy, gout, rheumatism, toothache, ulcers, and eruptive diseases of the scalp. The name, wild licorice, also applies to *Galium circaezans* and *Galium lanceolatum* on account of the sweetish roots. The wild licorice of Australia is *Teucrium corymbosum*. Licorice vetch (*Astragalus glycyphyllus*) has sweet roots. Licorice weed (*Scoparia dulcis*) is a common tropical plant which also has sweet-tasting roots.

A WINTER WALK IN THE WOODS.

ANNE W. JACKSON.

LAST week I had the good fortune to be invited with two other girls to spend a few days in the country. We hailed the invitation with delight and accepted it with alacrity, for we all three love to get out into the woods and fields.

We started on Friday afternoon, going the first part of the journey by train. The sky was cloudy and the weather mild. We watched the moving pictures that sped by the car windows as eagerly as children.

After a half-hour's ride we arrived at a little "town" consisting of the station, one store, one house, one grain elevator, and a blacksmith's shop. Here our hostess met us with a surrey and pair, and we were soon driving along at a brisk pace, drinking in the fresh air and country scenery with pure delight. The person whose power of enjoyment in little things has become blunted, is greatly to be pitied. "Ours was as keen as though newly sharpened for the occasion; and nothing we saw, from the fields, trees, and hedges, to the setting sun, failed to give us pleasure.

A merry drive of three or four miles brought us to the farm-house, where we were cordially welcomed.

I should like to tell you about all the fun we had that night, for it was our hostess' birthday, and there was a surprise party, at which *we* were as much surprised as she was. But as it is our walk I'm going to tell about, I must leave the events of our first evening unrelated.

The next morning we three girls decided to take a walk, as we were anxious to see what birds there were about. It was a gray day, threatening rain, and very wild for December.

The moment we set foot out of doors the distant "caw-caw" of the crows sounded like an invitation in our ears. How I love that sound! It is to the ear what a dash of color is to the eye.

We took the road to the right, where we saw some woods a quarter of a mile or more away.

Before we had gone far we heard a medley of bird notes coming from the fields on our left. We couldn't make out what they were, as they were some distance away, but I caught a note now and then that sounded like a fragment of the meadow-lark's song—just a faint reminiscence of it.

After passing two pastures and a cornfield on our left, we came to a piece of thin timber land. The road, which began to descend here, had been cut down somewhat, leaving banks more or less steep on either side. We went along slowly, stopping frequently to examine the beautiful mosses and lichens which abounded. We had seen no birds, with the exception of a woodpecker, at close range yet.

Presently we came to a turn in the road which led us up a slight rise of ground, bordered on both sides by woods. Arrived at the top of this hillock we loitered about looking at the many interesting thing that are always to be seen in the woods. All at once we were startled by a shrill scream, or cry, which sounded like some young animal being strangled, and behold! an immense hawk flew off over the tree-tops. It didn't fly very far though, and gave us more of its music at intervals.

The road from this point led down to a small brook spanned by a wooden bridge. Looking down toward this bridge, a gorgeous sight met our eyes. A flock of cardinals, half a dozen or more, were flying and sporting about among the low bushes near one end of it. What a delicious touch of color for a winter landscape! There were chickadees, too, hopping about among them in a most neighborly fashion. We watched them closely, quietly drawing nearer and nearer. Pretty soon they flew into the trees close by, and from thence deeper into the woods. We saw and heard many woodpeckers, both the downy and the hairy being very plentiful.

As the place where we had seen the redbirds was such a pretty one, we were in no haste to leave it, even after they had departed. So we perched ourselves on top of an old rail fence, and waited for some birds to come to us and be looked at. We hadn't been there very long before some tufted titmice came into the trees near us, and delighted us with their cheery notes and cunning ways. The "caw" of the crows was quite loud here and, with the added notes of the woodpeckers and chickadees, made it quite lively. Every once in a while a few drops of rain would fall. But this only added to the wildness of our surroundings, and seemed to put us farther away from the rest of the world.

Though we found our rural perch very enjoyable, we felt obliged to move on again, however reluctantly. So we crossed the bridge and climbed the hill beyond. A short walk then brought us to another turn, to the right, but on the left an open gate into the woods.

We lost no time in turning in here, you may be sure. We found many more birds inside the woods than we had along the road. Here were titmice, chickadees, plenty of nut-hatches white-breasted; hairy and downy woodpeckers, and also a third kind that we were uncertain about. Its upper parts looked like black and white shepherd's plaid, and the back of its head and nape were deep red. Its note was a sonorous *COW-COW-COW-COW-COW*. We heard brown creepers about, and saw many flocks of juncos.

When we came to the end of the woods we saw a pair of our cardinals flying about some low brushwood. It was like seeing old friends.

I must not forget to mention the blue-jay, who added his voice and brilliant color to the pleasure of our walk.

We had entered a cornfield, and as we advanced, flocks of little birds, mostly juncos, would start up before us and fly into the hedge or next field, twittering gaily. Twice we heard distinctly the goldfinch's note; but as the birds all flew up at our approach, we couldn't get near enough to distinguish them. It seemed very odd to hear this summery note amidst that wintry scene.

We crossed the cornfield and came to a fence, at right angles, following which took us in the direction of the road. Just as we came up to a few scattered trees, part in the field, and part in the pastures on the other side of the fence, we again heard our medley chorus of many voices, some of which had reminded us of the meadow-lark's. The members of the chorus who proved to be the meadowlarks' cousins, the rusty blackbirds settled in these trees and gave us a selection in their best style. Some of the solo parts were really sweet.

After climbing a rail fence we crossed a small pasture and looked in vain for a gate. Nothing but barbed wire. We finally made our escape through a pigs' corn-pen, from whence we emerged into another pasture where the grass was like the softest carpet to our feet. This pasture had a gate opening onto the road; so we were very soon back again at the house, with appetites for dinner fully developed.

We saw and heard no less than fourteen different kinds of birds during our walk. So those who desire to see birds need not despair of finding them because it is winter. Nature always has plenty of beautiful things to show us, no matter what the time of year.

My story ought to end here, but I must tell you about the tufted "tits" we saw next morning. The weather turned very cold that night, and in the morning a keen wind was blowing, so we didn't think many birds would be about. But hearing some chickadees in the yard, we ventured out, and went across the road, where we sat down in the shelter of a large corncrib.

From here we saw plenty of chickadees, titmice, nut-hatches, and other woodpeckers busily engaged in hunting their breakfasts. We had a fine opportunity of studying them with our glasses.

One bold "tit" stole a grain of corn from the crib and carried it off to the tree in front of us, where he took it in his claw, and proceeded to pick the choicest morsel out of it. Presently another tufted rogue flew up and there were some "passages of arms," and a flight into another tree, and in the midst of the fray, alas! the corn was dropped.

THE SCARLET PAINTED CUP.

PROF. WILLIAM KERR HIGLEY,
Secretary of The Chicago Academy of Sciences.

These children of the meadows, born
Of sunshine and of showers.

—Whittier.

THE scarlet painted cup belongs to a large and interesting group of plants known as the figwort family (*Scrophulariaceæ*). The common name of the family is derived from the reputed value of some of the species in the cure of ficus or figwort, a disease caused by the growth of a stalked excrescence on the eyelids, tongue, or other parts of the body that are covered with a mucous membrane. The technical name is derived from *scrofula*, as some of the species are considered efficacious in the treatment of that disease. This family includes about one hundred and sixty-five genera and over twenty-five hundred species. They are common all over the world, reaching from the equator into the regions of constant frosts. It is claimed by some authorities that fully one thirty-fifth of all the flowering plants of North America are classed in this family.

Besides the painted cup there are classed in this group the mullen, the common toad-flax, the foxglove (*Digitalis*), the gerardias, and the calceolarias.

The foxglove, though causing death when the extract is taken in excess, is one of the most highly valued medicinal plants known. Nearly all the species of the family are herbs, without fragrance. Some of the species are known to be partially parasitic. True parasites are usually white or very light colored and contain no green coloring matter, which is essential when the plant is self-supporting. The parasitic forms of this family, however, do contain green coloring matter and are thus not entirely dependent on their host for the preparation of their food supply. The gerardias (false foxgloves) are frequently found attached to the roots of oaks, large shrubs, and even on the roots of grasses. It has also been shown that there is a cannibalistic tendency in some of the species of gerardia. They will not only fasten their sucker-like roots on those of other species, but also upon those of other individuals of the same species, and even upon the root branches of their own plants. This double parasitism is not rare.

The scarlet painted cup of our illustration (*Castilleja coccinea*, L.) is a native of the eastern half of the United States and the southern portion of Canada. It prefers the soil of meadows and moist woods and has been found growing abundantly at an elevation of from three to four thousand feet.

The generic name was given this plant by Linnæus in honor of a Spanish botanist. The specific name is from the Latin, meaning scarlet. Nearly all of the forty species are natives of North and South America.

The flowers are dull yellow in color and are obscured by the rather large floral leaves or bracts, which are bright scarlet—rarely bright yellow—in color. These conspicuous leaves are broader toward the apex and usually about three-cleft. By the novice they are usually mistaken for the flower, which is hardly noticeable. The stem seldom exceeds a foot in height and bears a number of leaves that are deeply cut in narrow segments. The bright color of this plant has given it many local common names more or less descriptive. Prominent among these is the Indian paint brush.

A pretty myth tells us that the painted cup was originally yellow, but that Venus, when lamenting the death of Apollo, pressed a cluster of the blossoms to her parched lips and drank the dew from the flowers, the outer leaves of which have ever since retained the color of her lips.



BY PER HARRIET E.
HIGLEY.
A. W. MUMFORD,
PUBLISHER, CHICAGO.

YELLOW LADY'S SLIPPER
AND PAINTED CUP.

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THE YOUNG NATURALIST.

SAHARA SEA.—Much of the great desert of Sahara is below the level of the Atlantic. It is proposed that the water be let in. The space covered would be big enough to warrant us in speaking of it as an ocean. There would be islands in it, as there are places that are of considerable elevation.

So much water would make a difference in climate in all directions from the present desert. It is thought the vineyards of southern Europe would be injured, as they are dependent on the dry winds that come across the Mediterranean from the great desert. The rainfall in at least one-third of the inhabited parts of the globe would be affected by this great change in the amount of water on the surface. Ships would be able to sail to ports at the south of Morocco and Algiers where now are shifting sands and few people, and new cities would spring into being far to the south where the new coast line would be formed.

There are other low and barren spots on the earth's surface that are below sea level. They would form useful basins of water if the proper canals were dug. A company has been formed to let water into the Yuma desert in southern California, where 13,000 square miles of land with no inhabitants, lies below the sea level, some of it as much as 1,000 feet. A great desert in the middle of Australia is also low. If it were flooded it would make of Australia a great rim of continent reaching round an immense sea.

One scientist has advocated the making of the Red Sea into a great fresh water lake by changing the course of the Nile so as to make that sea its outlet instead of the Mediterranean. By preventing the flow of salt water from the north through the Suez canal, and building an embankment at the south, it has been estimated that the Red Sea would become fresh in the course of time.

The Red Sea project is not at all likely to be carried out, but those for California and the Sahara may soon be made effective. When the world of commerce comes to realize what the Sahara Sea will mean for its enterprise, there will be a lively prospect of much digging and plenty of fighting over the damages done to existing interests and the rights of the various European nations to the new seaboard that will be formed.

FEEDING.—One of the duties of the teamster is to see that his horses are well fed. Where the team must be on the road at five in the morning it is the business of the man who feeds them to get up at four to give them time to eat. Incidentally he rubs them down and gets his own breakfast in a leisurely manner. An Ohio man has an electric device which will give the teamster a chance to lie a little longer in the morning. He has arranged an alarm clock which may be set for any hour so that instead of striking the hour it will make an electric connection. This connection lets fall a bag that is placed the night before over the manger of the horse to be fed at that hour in the morning. The first sound that greets the ear of the horse is not the teamster coming to open the stable, but the rattle of oats into his feed-box, and he has ample time to eat and begin the operation of digestion before he sees the man who used to be so welcome. Possibly he will not greet the man so affectionately in the future when his coming means not food for a hungry stomach but a hard day's work. But those who know the horse best are inclined to believe that the horse will always greet his master affectionately in the morning regardless of the state of his stomach.

RUBBER.—The use of rubber has grown wonderfully in the last ten years. Every year a rubber famine is predicted, and every year someone announces that a substitute has been found that is just as good as the real article. The facts seems to indicate that neither the famine nor the substitute is really at hand. Rubber plantations are being extended in Mexico to meet the demands of the growing trade, but the bulk of our rubber still comes from the Amazon country in South America, and that country is almost limitless in its supplies of this article. It is true that the trees along the banks of the rivers have been tapped until their product is much inferior to what it once was, but this condition exists only for a distance of two or three miles along the river banks. There are plenty of magnificent trees standing untouched a little farther back. All that is needed to get more rubber is to get more men into these forests gathering it. The real difficulty is to get the men to do the work. The finest rubber forests remaining near the river fronts are along the Purus, one of the large rivers flowing into the Amazon from the south.

SUNSHINE CAUGHT.—For thousands of years men have tried to use the heat of the sun's rays in the place of fire. It is now claimed that Dr. William Calver of Washington has finished an invention which will bring into the space of a few inches all the rays of heat from the sun that would naturally fall upon one acre of ground. By bringing so many rays to a focus he gets such a powerful heat that iron and steel melt in it like icicles.

A magnifying glass or lens of almost any sort held in the sunshine makes a bright, warm spot. Dr. Calver's machine gets the same effect, only more powerfully. He has secured a temperature of several thousand degrees Fahrenheit. To make his machine useful for heating houses and making steam for factories he has invented a reservoir to store the heat gathered while the sun is shining, so that it may be used at night or on dark days. Men of science have been looking for such a machine for a long time, and if Dr. Calver and his friends are not much mistaken his invention will be as great a help to civilization as the harnessing of Niagara Falls for electric work. His laboratory is in the outskirts of Washington, D. C.

WASHINGTON'S MONUMENT.

GEO. P. MORRIS.

A monument to Washington?
A tablet graven with his name?
Green be the mound it stands upon,
And everlasting as his fame!

His glory fills the land—the plain,
The moor, the mountain and the mart!
More firm than column, urn or fane,
His monument—the human heart.

The Christian, patriot, hero, sage!
The chief from heaven in mercy sent;
His deeds are written on the age—
His country is his monument.

"The sword of Gideon and the Lord"
Was mighty in his mighty hand—
The God who guided he adored,
And with his blessing freed the land.

The first in war, the first in peace,
The first in hearts that freemen own;
Unparalleled till time shall cease—
He lives, immortal and alone.

Yet let the rock-hewn tower rise,
High to the pathway of the sun,
And speak to the approving skies
Our gratitude to Washington.

Transcriber's Note:

- Minor typographical errors have been corrected without note.
- Punctuation and spelling were made consistent when a predominant form was found in this book; otherwise they were not changed.
- Ambiguous hyphens at the ends of lines were retained.
- The Clapper Rail illustration was moved from page 63 to page 62.
- The Contents table were added by the transcriber.

*** END OF THE PROJECT GUTENBERG EBOOK BIRDS AND ALL NATURE, VOL 7, NO. 2,
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