OUR BACKDOOR NEIGHBORS

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By FRANK C. PELLETT

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**OUR
BACKDOOR
NEIGHBORS**

The Naturalist decided to take the nest to his study, and see what he could do toward raising the orphans by hand.

Our Backdoor Neighbors

By FRANK C. PELLETT

PHOTOGRAPHS FROM LIFE
BY THE AUTHOR

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TO MY WIFE

ADA E. PELLETT

COMPANION, FRIEND, COUNSELOR

To whom more than to any other
I owe whatever measure of
success I may hope to attain, this
book is affectionately dedicated.

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PREFACE

THE stories that follow are the author's personal experiences with the creatures described. Every illustration is from an original photograph made by the author. Several years of time and almost unlimited patience have been necessary to secure them.

Several of the photographs have already appeared in various magazines, including such well-known publications as *Outing*, *Country Life in America*, *Forest and Stream*, and *Guide to Nature*. Some of the stories also have been published in *Outing*, and the readers of that magazine may recognize the "Chicken Thief," "The Neighborly Screech Owls," and the Red-tail family. A few of the pictures have also been published in the author's book, *Productive Beekeeping*.

This book is given to the public with the hope that these intimate stories of life in the big out-of-doors may lead to a better understanding of the difficulties and dangers that beset the wild creatures, and a more sympathetic relationship with them.

FRANK C. PELLETT.

Tamakoche, Atlantic, Iowa, July 31, 1917.

WHERE THE
NATURALIST LIVED

WHERE THE NATURALIST LIVED

THE Naturalist lived in a modest old farmhouse surrounded by beautiful trees. The house was small and unattractive,

A modest, old farmhouse surrounded by beautiful trees.

but he was more interested in birds and bees and trees and flowers than in houses. Mrs. Naturalist did not find her habitation all that

might be desired, but her husband found so much joy in their surroundings that he could not contain it alone. She absorbed some of his enthusiasm and was content.

There were many wild flowers which the neighbors regarded as weeds.

About the house there were clumps of elderberries, where the birds came to feed in the hot days of August, and mulberries where they were content to dine in cherry time. There were many wild flowers, such as asters and goldenrod, crownbeard and rudbeckia, which

the neighbors regarded as weeds, but which the Naturalist guarded with jealous care. Brown thrashers and catbirds sang in the apple trees, and vireos nested in the blackberry bushes. Screech owls and flickers reared their families in the boxes which the Naturalist built for them among the trees, and wrens sang daily as they brought worms to feed their families which were growing up under the eaves of his study.

Rabbits played on the lawn in summer and ate the bark from the shrubbery in winter. Squirrels gathered the nuts from the trees before the door and scolded when the boys

A last remaining bit of Iowa woodland.

decided that they were entitled to a part of the harvest. Spiders were permitted to spin their webs across the open spaces in the wood without interference, for the Naturalist had built a high fence about a last remaining bit of Iowa woodland, and reserved it for the original inhabitants. No cattle or pigs were permitted to pasture there, no hunters were allowed to shoot the wild creatures that took refuge within the inclosure, and few besides the Naturalist and his boys ever intruded. In summer the undergrowth was so dense that it was with difficulty that one could force a way through. Hundreds of wild birds nested there undisturbed, wild flowers grew in profusion, and insect life was very abundant. Here the Naturalist spent many long summer days in cultivating an intimate acquaintance with the many wild creatures that lived out their lives under conditions somewhat similar to those which their ancestors had enjoyed before the white man came.

Practical people passing by were inclined to remark at the waste of good farm land growing up in such a tangle, and to chide the Naturalist because he failed to cut his weeds. However, they were not on speaking terms

with the denizens of the little wood, nor did they see the beauty of the plants which to the eyes of the nature lover are anything but weeds. The Naturalist could never quite understand how people could be content to spend the long days within doors when there was so much worth while outside. Neither could he understand how they could keep so busy all day long with such practical things as cultivating their corn or hoeing their gardens when there were so many songs to be heard and

Wild flowers grew in profusion.

so many pictures of ever-changing hue to be seen. When he worked among his bees he must stop ever and anon to watch the busy little creatures bringing in their loads of bright yellow pollen and to listen to their cheerful hum as they went about their labor. Now and again a brilliant cardinal would alight in a tree top and whistle, or a quail would call "Bob White" from a fence post, or a cicada would start his shrill call, in a way to make it very plain that life was not all intended for work on the bright summer days.

At night he would wander under trees watching the flashing of the lights of the fire-flies, and listening to the songs of the crickets and katydids, and sometimes lie down in the grass and fall off to sleep to awaken with the sun shining and the day once more at hand.

When he worked in his garden he marveled at the certainty with which the tendrils of the grape vine found the nearest support, and found much of interest in the life cycle of the cut worm which fed on his cabbages. The growing of vegetables was so much more interesting than the selling of them that he was inclined to neglect the latter phase. After all, why go to the trouble of growing things when

there are so many equally interesting that will grow themselves?

Perhaps you will think that the Naturalist was an impracticable person, and so he was, from the standpoint of the man who will spend six long days at hard work in order that he may buy an automobile and go chasing madly across the country on the seventh. At any time the Naturalist could step outside his door and find a hundred things far more interesting than an automobile, and he could enjoy them for six days by working one.

In spring there was the marvelous resurrection of the bloodroots and spring beauties, violets and buttercups; the coming of the birds and awakening of the frogs. In summer there was such a riot of life on every hand that he never could quite comprehend it; ripe cherries, baby chickens, frisky lambs, butterflies and bumblebees. In autumn the apples ripened on the trees and pumpkins yellowed in the fields, while the leaves turned yellow and the nuts came down. When at last winter came and buried the dead leaves beneath a cover of snow, and the song birds had winged their way southward, he sat by his fire and dreamed of spring, while the wind moaned

through the branches of the trees above his study. On sunny days he would find joy in greeting the hardy little tree sparrows and juncos in the wood, and watching the squirrels seeking for their buried nuts beneath the snow.

At any time or any season there was always much of interest to the Naturalist around his little home among the trees. Such are the conditions under which this book was written, for the Naturalist is the author, and "Our Backdoor Neighbors" are the friends that live about his door.

At any time or any season there was always much of interest to the Naturalist around his little home.

A SUMMER WITH
THE RED-TAILS

A SUMMER WITH THE RED-TAILS

AFTER A SEASON OF EXEMPLARY BEHAVIOR
THEY NEARLY BRING THEMSELVES TO
THE GALLOWS

IT was a cold, bright day in early March when Mr. and Mrs. Red-tail arrived. Patches of snow covered the ground and food was scarce. Wearied and hungry from their long journey, they made their first meal from a hen which had died and been carried to the open field because the ground was frozen too hard to permit the digging of a hole in which to bury it. The Naturalist, always on the watch, was the first to observe their arrival. He was observing them as they dined on the dead hen,

The Naturalist was the first to observe their arrival

when Tommy Jones, who lived across the road, happened to catch sight of them also.

There was no unnecessary sentiment in Tommy's make-up, and the dinner was quickly interrupted by his arrival with a gun. Fortunately, Mr. Red-tail saw him coming and departed with his spouse before Tommy could get near enough to injure them. Tommy, who regarded the Naturalist with contempt, was glad of the opportunity to prove a crime against Mr. Red-tail and his wife. The Naturalist, however, knew that the hen had lain in the field a month before the arrival of the birds, and was little impressed with Tommy's tirade against the "chicken hawks," as Mr. and Mrs. Red-tail are called by the farmers in the neighborhood in which they lived.

Tommy was very handy with his gun, and many a luckless hawk, crow, or owl fell before it. The Naturalist protested to no purpose that no crimes had been proved against them. Tommy was the kind to hang suspected criminals on suspicion.

There is little woodland in this particular part of Iowa, and big birds like the Red-tails find it difficult, indeed, to rear their families unmolested. The Naturalist lives in a bit of

woods which he guards jealously, and all friends in fur or feathers find it a veritable city of refuge. However, many a tragedy has resulted when creatures which are regarded

Father Red-tail watched silently from the topmost branch of a dead tree.

with suspicion have strayed beyond the protected bounds, and occasionally the wrathful owners of missing chickens penetrate this area to avenge the missing chickens on the first suspicious character to come within their reach.

The Naturalist is, thus, sometimes unable to protect his friends, even at home.

Mr. and Mrs. Red-tail looked the ground over and decided that they would begin house-building in a tall tree near the Naturalist's house. The Naturalist was much pleased, but anxious, for Tommy had passed the word around that a pair of chicken hawks were in the neighborhood. Within a mile of the tree which the Red-tails had selected there are fourteen houses. At each of these fourteen homes chickens are raised, and, accordingly, the inhabitants thereof are very watchful lest a hawk should rear a family in the neighborhood and thus endanger the lives of the chickens.

Mr. and Mrs. Red-tail lived a precarious life during the following weeks. The area in which they might nest was small, and thirteen guns were ready loaded and war already declared. Whenever a small boy would see them soaring high overhead, he would scamper to the house to give the alarm that chicken hawks are coming. Dad or big brother would take a look to see whether there was any chance to get within gunshot. Mr. and Mrs. Red-tail kept far to the open fields,

and thus avoided the inevitable consequences of a near investigation of a poultry yard.

SETTING UP HOUSEKEEPING

The Naturalist alone knew about the nest, although thirteen small boys would have given their biggest marble to find it. A very tall basswood tree in the very middle of the little wood was the tree selected. The nest was very bulky, nearly three feet across, and composed of coarse sticks. As it was built early in March, before the trees had donned their

The young birds kept their mouths open constantly, even when being photographed.

summer clothes, the Naturalist trembled every time he saw a neighbor passing that way. It was so big that it could be seen from a long distance. Few people have, as yet, learned to look up, and not down, and the nest escaped detection. As days passed and the trees put forth their leaves, even the Naturalist sometimes had to look a little while to find it, and he no longer feared for the safety of the big birds.

The Naturalist did not wish to cause the birds any unnecessary alarm and he refrained from an examination of the nest until Mrs. Red-tail had begun to incubate the eggs. He felt that there was no longer any danger that they would voluntarily desert after this time. The nest was fifty feet from the ground, and the tree was straight and smooth and had few branches. The Naturalist did not find it an easy climb, as he must needs stop to rest and catch his breath at every branch which would support his weight. When Mrs. Red-tail saw him coming, she slipped quietly away and hastily disappeared. Soon she had joined her mate, and together they circled high overhead, with great evident anxiety as to the purpose of the Naturalist's visit.

When at last the nest was reached, it was

found to occupy the highest possible position, and there was but a poor support for the tired visitor. It was with difficulty that he was able to lift his head above the big nest and examine the contents. The structure was almost flat, with only a slight saucer-shaped depression. The lining was composed of but a few strips of bark, and three dirty, bluish-white eggs gave promise of the future.

Try as he would, there was absolutely no place where a camera might be placed to get a satisfactory photo of the nest and eggs. No other trees were near enough to serve the purpose, and there was no place in the nest tree which would furnish support and give proper view. The Naturalist must then content himself to wait until the young birds appeared in order to secure a photographic record of the family life, and even this was unsatisfactory because the birds must be removed from the nest.

When Mrs. Red-tail was at home, she settled so close on her eggs that she could with difficulty be seen from the ground, and curious small boys passing by could find no evidence that the nest was occupied. The distance from the ground was so great and the

difficulties of the climb were such that the few that chanced to see it were content to decide that it was a last year's nest and unused. While Mother Red-tail brooded over the eggs, Father Red-tail spent hours sailing high in the upper air or watched silently from the top-most branch of a dead tree that furnished a favorable lookout over the surrounding country.

Finally the shells opened, and three downy little birds replaced the eggs in the nest. They were very weak at first, and as downy as little ducks, although much whiter in color. Mrs. Red-tail still spent most of her time on the nest for several days, while the young birds were very small. The demands for food were slight during those first days, and a mouse or two which the mother would tear to bits furnished them with a hearty meal. They grew very fast, however, and soon it kept both Father and Mother Red-tail very busy to supply food for the growing family.

The Naturalist now became very watchful and spent much time hidden in the woods where he could watch the nest and see the parent birds when they fed the young. He still felt some anxiety lest one or both of the

parent birds should fall victims to some of the thirteen guns that were kept loaded behind the doors of thirteen houses, nearby, in anticipation of an opportunity to catch Father and Mother Red-tail unawares. He also wished to see for himself whether the Red-tail family were guilty of the crimes so freely charged to them and which had led to the loading of the thirteen guns and the declaration of war at the thirteen nearby farmhouses.

Father and Mother Red-tail were very discreet and kept at a safe distance from the artillery that only waited a favorable moment to be trained upon them. They wandered far afield, or could be seen soaring higher and higher until they became mere specks in the sky or disappeared altogether. Sometimes they would be gone for a long time, while at other times they would return within half an hour with food for the young. At first when Mother Red-tail brought the food, she would alight on the side of the nest and consume much time in tearing it to bits and feeding the youngsters. After a little as they grew stronger, she permitted them to carve the meat for themselves, which they did by holding it in their talons and tearing it with their beaks.

Growing birds have voracious appetites, and by the middle of May they were consuming much food. On the eighteenth of that month the Naturalist decided that it was time to get some kind of a photograph, so the three youngsters were let down from their high home in a basket. All the time both parents wheeled about far overhead and screamed in a most distressed manner. The young birds also protested to the best of their ability. They kept their mouths open constantly, even when being photographed, and struck with their talons whenever a hand came near. As there was no better place, all three were placed in a row on an old log with a dead pocket gopher, which had just been brought for their dinner. After the picture had been taken they were hauled up again in the basket and replaced in the nest.

On this red-letter day, when they posed for their first picture, they had three pocket gophers, a large Franklin's spermophile, or prairie gray squirrel, and two field mice served up in the best hawk style. This menu was fairly typical of their daily fare, although it was varied with rats and striped ground squirrels occasionally.

Not only were there thirteen guns ready loaded for the time when Father or Mother Red-tail should visit one of the thirteen barnyards in search of chicken for dinner, but the Naturalist also had a camera loaded for the purpose of getting a likeness of these same birds. Many were the hours spent in patient watching, in order to learn more about the habits of the birds and to get their pictures.

However, it was not one of the thirteen guns, but the camera in the hands of the Naturalist which finally took Mother Red-tail by surprise. She was none the worse for the experience, and the Naturalist considers her picture as one of his most prized possessions. Both birds were so exceedingly shy that it was difficult, indeed, to get within gunshot, to say nothing of camera shot of them. It was a pleasing sight to see the two birds flying

It was not one of the thirteen guns, but the camera in the hands of the Naturalist which finally took Mother Red-tail by surprise.

upward in wide circles on a warm summer afternoon. As they would wheel in the air, the rich reddish brown color of the upper side of the tail feathers could be plainly seen. This marking, together with the narrow white tip and faint black band, is very conspicuous with the birds, and from it they get their name.

They would mount high, and then higher, until it fairly made the man and the boy who were watching dizzy to contemplate the height to which they had attained. When they had finally disappeared from sight the Naturalist would turn to the boy with some remark about the big birds and to regret that with the thirteen guns constantly loaded and the hundreds of other guns all over the State, the last big birds could soon be expected to disappear from the Iowa sky.

As the time drew near when the young birds would leave the nest, he felt some anxiety as to their fate when first they should try their wings, but he was unprepared for what happened. Since the Naturalist had spent more than eight weeks in observing the birds, and during all that time they had not departed from the paths of rectitude, he had come to believe that the crimes charged to the Red-

He would alight in close proximity to some passer-by.

One youngster lacked the worldly wisdom of his fellows.

tails were based on circumstantial evidence and that the verdict of an unprejudiced jury would be unquestionably "Not guilty!"

It so happened that on Memorial Day Tommy and a neighbor, having nothing else to do, were walking through the woods, and chanced to see the big nest in the top of the basswood tree. The young birds were now almost fully fledged and could be plainly seen on their nest. The distance to the nest was so great that neither was equal to the test of climbing so high, but with a long pole they pushed it down after they had reached a safe position on one of the higher branches. With a heavy fall the nest and all three of the young birds came tumbling down. Although the birds could not fly, they broke the fall sufficiently with their wings to be unhurt.

The arrival of the visitors had been so timed as to reach the nest just after Mother Red-tail had brought their dinner. Of late the appetites of the three hearty youngsters had taxed the resources of their industrious parents to the limit, and to-day, instead of the usual pocket gophers and mice, a stray chicken had been brought to the nest. It was still warm and bleeding when the nest was thrown down.

At last both the birds and their champion were caught. Was not here evidence enough to convict both the Naturalist and the hawks? It was at best a sorry explanation that he was able to make, but he did succeed in getting possession of the young birds and thus saving their necks. He took them home and again posed them for pictures, and the next day returned them to the woods.

The youngsters made the best of the situation and hid themselves among the leaves of the smaller trees. Their shrill cry of "Here, here, here, here," with a constantly rising inflection, served to call the watchful parents who brought them food. They changed their location, moving from tree to tree frequently, but the Naturalist still kept watch as before. Now, as before, the parent birds still continued to bring gophers and mice, and occasionally a rat. On one occasion a second stray chicken was brought in, but this time there was no one to observe the deflection but the Naturalist. However, the mischief was done. A dozen naturalists could not convince Tommy that the birds had not fed from his chicken yard all summer.

It was but a short time until they could fly,

but one youngster lacked the worldly wisdom of his fellows, and would frequently alight in close proximity to some passer-by. Fortunately, the timely arrival of the Naturalist saved him from an untimely end, until he too finally learned to mount high and still higher, until he became but a point in the blue of the summer sky. The Naturalist now saw them only on infrequent occasions, although he still watched the big birds soaring above his head whenever opportunity offered. When he heard their shrill cry of "Free, free" he was reminded of the days when Father Red-tail

The youngsters made the best of the situation.

soared high above the nest, anxiously watching for the appearance of enemies, while Mother Red-tail fed the youngsters.

When late in the summer he had watched their last flight and they had departed for warmer climes, he sighed with regret, "Will they return I wonder?"

THE CHICKEN THIEF

THE CHICKEN THIEF

GETTING THE EVIDENCE AGAINST MR. COOPER
HAWK AND HIS FAMILY

TOMMY JONES was losing his chickens; there was no question about that, and Tommy was very much disturbed by the occurrence. Mrs. Tommy had started the incubator very early that spring and had kept it going. She had also utilized every setting hen, with the result that the back yard was fairly overflowing with chickens. Nearly every night there would be one or more missing. Sometimes there would be as many as three less when they shut them up at night than when they were released in the morning.

When Tommy watched Father Red-tail soaring high overhead in the summer sky, he remembered the day when the Naturalist had been confronted with absolute proof that the Red-tails were chicken thieves, and sputtered about his neighbor and the chicken hawks. If Father Red-tail happened to be

in sight at the time when new losses were discovered among his chickens, his feelings nearly overcame him. On such occasion, if opportunity offered, he was very free to tell the Naturalist, in language more forceful than eloquent, just what he thought of him and his hawks.

This time the Naturalist was not entirely above reproach, for he had a secret. He knew the thief and knew where the stolen birds were served daily at dinner. The Naturalist was not in sympathy with the thief, but he was anxious to learn the real facts concerning the habits of an undesirable family of neighbors and was patiently watching them to find out. Besides, if Tommy Jones had used his eyes to good advantage he might have known also.

Mr. and Mrs. Cooper Hawk, like criminals generally, were very shy in their movements. While they fed daily from the poultry yards of the neighborhood, few persons ever saw them come, and when they were seen their movements were so swift that the observer had but a confused idea of the bird he saw. Tommy Jones was not the only one who charged the Red-tails with the theft of the chickens taken by the Cooper Hawks. While

Father and Mother Red-tail soared high over the fields in search of gophers the Cooper Hawks kept to the cover of the woods.

When all was quiet in the farm-yard and the

Cooper Hawk would silently alight on some object which furnished a view of the poultry yard.

farmer and his family were within doors, Cooper Hawk would silently alight on some object which furnished a view of the poultry yard. When a favorable opportunity offered he would dash in pursuit of an unfortunate chicken, and, seizing it, fly away so swiftly as

to offer little chance of pursuit. Safe in the shelter of the woods he would make a meal at his leisure. The Naturalist, being familiar with their habits, often observed them in their raids, while Tommy Jones and his neighbors swore at Father Red-tail soaring afar in the upper air.

The Naturalist had heard the shrill call, used only in the nesting season, many times before he was able to locate the nest. The location chosen was as far from a house as could well be found in that thickly settled neighborhood. It was placed under the sheltering leaves of a heavy growth of Virginia creeper, in a walnut tree, thirty-five feet above ground. The tree grew near the river about half a mile from the nearest human habitation. So cleverly was it hidden from sight that even after the Naturalist had discovered its location, he could scarcely see it from the ground.

It was on June 8 that he first climbed the tree and examined the nest. The structure was about the size of a crow's nest but composed of much smaller twigs. Most of the twigs used were not larger than those used by the wren in making her home, and few of them were as large as a lead pencil. There was only

a slight depression in the center of the nearly flat nest and no lining, excepting a few scales of bark. In the nest were three white eggs with a slight bluish tinge. Evidently incubation had been in progress several days, for all three eggs hatched on June 20, only twelve days later, and most authorities give twenty-four days as the period of incubation of the cooper hawk.

When the Naturalist undertook the task of making a photograph of the nest and eggs, he found that it was no easy task. It was not difficult to reach the site, but there was no limb on which to stand nor any suitable support within reach on which to place the camera. Accordingly, after trying various schemes without result, he strapped himself to the body of the tree immediately above the nest and, with both hands free to manipulate the camera, secured the picture shown herewith.

In the nest were three white eggs
with a slight bluish tinge.

The situation was not very satisfactory, as the outline of the nest could not well be shown directly from above and at such close range. After the eggs had hatched, he made several attempts to get a satisfactory photograph of the young in the nest from a different location. Making pictures so high from the ground is rather unsatisfactory at best, since one does not care to fall even thirty-five feet, and one has not much margin for work with his body strapped tightly to a tree. After several attempts, a picture of the young birds peering over the nest was secured, although at too close range to give a proper impression of conditions. The ends of the twigs composing the nest were so much nearer the lens than were the birds, that they appear much larger in the picture than they were in fact. After working with little satisfaction to get a picture from other points, he again climbed to the place above the nest where he had made his first attempt, and made an exposure looking directly down upon them.

When the young first appeared in the nest, they were covered with white down that gave them something the appearance of little ducks. When the first feathers began to show through

The young birds peering over the edge of the nest.

Looking directly down upon them.

the down, they were eighteen days old, and it was at that time that the picture was taken. From this time on, the birds grew very fast, and a great change could be noticed in their appearance from day to day. Ten days later they were nearly fledged and beginning to threaten to leave the nest. At times they would walk out on the limbs of the tree as though preparing for flight.

During these days the Naturalist was making daily visits to see how the birds grew, and also to see what became of Tommy Jones's chickens. The parent birds were very shy, and usually left as quickly as possible on his approach. Father and Mother Red-tail, on the other hand, remained close at hand, anxiously watching, whenever he visited their nest. Mother Sparrow Hawk at times refused to leave her young when newly hatched, even when he approached within two feet of her. Mother Screech Owl had even permitted him to lift her from the nest when her babies were little, and attacked him furiously after he had released her, but neither Mother nor Father Cooper Hawk would take any chances on remaining to see what happened when he visited their nest. He was never able to approach

very near the nest without his presence being detected, and the most he could get, as a rule, was a fleeting glimpse, through the trees, of a swiftly flying bird. The few times when

At times they would walk out on a limb as though preparing for flight.

Mother Cooper Hawk did remain she kept herself hidden among the leaves and not very near at hand.

He did not find it an easy matter to determine their menu. The Sparrow Hawk family left the fragments of their dinner in the nest so that he easily determined daily what they

were eating. The Red-tail family seldom failed to leave a partly eaten carcass, or at least feet and tails at hand, to show on what they had dined, but the Cooper Hawk family were skilled in removing every trace of incriminating evidence. Seldom did even a feather remain, and never the usual fragments of legs and other appendages.

GETTING AT THE MENU

After trying for several days to see the mother bird in the act of feeding her young, or to find some trace of partly eaten food which would give reliable information concerning their habits, he decided that there was but one way to get results—to visit the nest frequently, and whenever they had recently been fed to compel them to disgorge their dinners in the interest of science. This proved to be a disagreeable task, but it was followed faithfully for many days. While rather unpleasant business, it had the great advantage of making an accurate determination possible in many cases. At times the mutilation was so great that the species could not be easily determined with certainty in the case of small birds.

It soon became apparent where Tommy

Jones's chickens were going. During the first few weeks of the observation no evidence of any food other than poultry, pigeons, or birds was found. Breakfast, dinner or supper, it was spring chicken, pigeon, or quail. Of course, the diet was varied with such delicacies as robin, flicker, or thrush, but such commonplace food as mice and gophers was spurned. Chicken, being the most easily available, was perhaps more often served than any other single item.

When it comes to supplying six to a dozen chickens a week to a family of hawks, even a large flock soon shows the effects, and the Naturalist did not wonder that Tommy was on the warpath. When finally the Naturalist told Tommy about the nest and the daily menu, his indignation knew no bounds. What he thought of the Naturalist is better imagined than told. Still he refused to be convinced that the Red-tail family had not been equally guilty. About the first week in July the farmers were putting up their hay and harvesting their small grain. By the 12th the fields were clean, and the ground squirrels could be seen everywhere scampering about. Ground squirrel now became for a time a favorite

article of diet. However, seldom did more than a day elapse without a chicken being served in proper Cooper Hawk style, even then. The prairie gray squirrel (Franklin's spermophile) and the striped ground squirrel were the only small animals that the Naturalist knew them to take. In fact, no insects or reptiles or other small animals, as far as he could tell, entered into the diet.

When the first of the three young birds left the nest it was captured, and together with the other two taken to the home of the Naturalist, where they were placed in a large cage. Their

Two of the birds finally killed and ate the third one.

food from that time on consisted of raw meat, mostly beef scraps. They did not seem to get on well, even with each other, and apparently their appetites were not satisfied without a mixture of feathers with their meat. At any rate, two of the birds finally killed and ate the third one. In all his experience with birds the Naturalist had never seen a family where there was such an entire lack of interest in the young on the part of the parent birds. Some birds that are extremely shy are very solicitous concerning their young, but like some human criminals, self-preservation seemed to be the only thing that greatly concerned the cooper hawks.

THE
NEIGHBORLY
SCREECH OWLS

THE NEIGHBORLY SCREECH OWLS

THEY LIVED IN A HOLLOW TREE NEXT DOOR AND
SHOWED THAT THEY AT LEAST HAD
NOTHING TO CONCEAL

MR. SCREECH OWL was calling to his mate—"Wher-r-r-r-e are you-u-u?" The Naturalist was lying in the grass enjoying the moonlight and listening to the night sounds. The insistent "Katydid, Katydid, Katydid" and the low chirping of the crickets were soothing to tired nerves after a day spent in wrestling with abstract problems in the study. When Mr. Screech Owl called, "Wher-r-r-r-e are you-u-u-u?" to his mate it was not Mrs. Screech Owl who answered, but the Naturalist. Mr. Screech Owl was not exactly deceived, but he was interested, and flying to a low hanging branch over the Naturalist's head he stared down with his big round eyes and questioned, "Who-o-o-o are you-u-u-u?"

About this time Mrs. Screech Owl arrived, and, alighting on a nearby tree, called to her

mate mournfully. Mr. Screech Owl then began snapping his bill at the Naturalist in an angry manner, as if having decided that, being a creature of the day, he had no business to be

They lived very near to the Naturalist's house in the woods.

abroad after night. After a time the owls went on about their own affairs and left the Naturalist to fall asleep with no cover over his head but the summer stars. As time passed and these evening visits were often repeated, the screech owls became better acquainted with their strange visitor and came to regard him as a harmless fellow. They even per-

mitted him, on occasion, to pry into their family affairs without taking offense.

They lived very near to the Naturalist's house in the woods. Unlike the Red-tails, they were not inclined to build an elaborate home, but took possession of a hollow tree that had been vacated by a fox squirrel family a few months before. They did not even take the trouble to remove the rubbish left by the previous occupants, but Mrs. Screech Owl laid her five white eggs without any special preparation in the way of a nest. By the time the last egg had been laid the others were so dirty that it was hard to believe they had ever been white.

When the baby screech owls appeared in the nest, they were dainty, downy little things, and Mother Screech Owl was careful to keep them covered. The Naturalist was very curious about the little family and must see them frequently to satisfy his curiosity. When he approached the nest, Father Screech Owl snapped his bill and threatened violence, but Mother Screech Owl never stirred from her place in the nest. She permitted the Naturalist to lift her carefully while he looked at the youngsters, and then put her down again.

On one occasion Father Screech Owl lost his temper and struck the Naturalist on the head with his sharp claws. Such a bold attack by so small a bird amused him, but he was more careful in his movements afterward, so as not to alarm the anxious parents of the downy nestlings.

The Naturalist had made some boxes of old lumber and had fitted them up for housekeeping.

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Father Screech Owl lost his temper.

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fall, and the Natu-
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parents
of

They gave a daily
account of their bill
of fare, however, in a most peculiar way. Un-
like the hawks, the owls swallowed their food
with as little ceremony as possible and later
threw out the remnants of bones and fur in a
compact little ball. By examining the ball he
knew exactly what they had for dinner, as well
as for lunch.

For a time he felt some anxiety for the song
birds nesting in the garden, but as weeks
passed and he found remains of nothing but
mice and insects, he decided that screech owls
were more satisfactory for ridding the place
of mice than were cats. The little owls
learned after awhile that the barn was a good
place to go for mice, and sometimes the Na-
turalist would find one of them sitting in the

barn window when he went to finish the chores after dark.

The babies in the hollow tree grew very fast, and soon they were very comical little fellows with part feathers and part down. One day the Naturalist placed them in a row on a nearby limb. They were much disturbed by the light, and blinked unceasingly. The anxious parents became greatly excited and flew back and forth above them, snapping their bills and complaining until they were replaced in the hollow tree. As the young birds neared maturity they became so well acquainted with the Naturalist that they showed little anxiety because of his visits, although they sometimes looked very much surprised

when he placed them in some strange situation.

After the family was grown, Father and Mother Screech Owl decided to move. The hollow tree seemed very much deserted after their departure. In the meantime the Naturalist had made some boxes

They were very comical little fellows with part feathers and part down.

of old lumber and had fitted them up ready for housekeeping. They were made deep and the cavity was roomy, just the thing for a

They were much disturbed by the light, and blinked unceasingly.

flicker family he had thought. Some were placed on poles near the edge of the wood and some nailed to the side of the trees near the house.

Since woodpeckers do not supply any nesting material, the Naturalist had placed a quantity of cork chips in each of the boxes to supply the purpose of a nest. Not all of the boxes were occupied by flickers and another summer Mr. and Mrs. Screech Owl took a

fancy to them. Father Screech Owl lived in one box not far from the kitchen door, while Mother Screech Owl raised the new family in one nailed to the side of a tree not far away.

By this time the boys were interested in the owl family also, so that there were numerous visitors to the home of the birds in the box. The days passed quickly and the youngsters were getting crowded in their narrow quarters. Where Mother Screech Owl had been very comfortable with her eggs, four grown children found very cramped quarters.

One summer evening, one more venturesome than the rest tried his wings. It was not long after until the last one had left the box and taken to the trees. The Naturalist rejoiced in so many interesting neighbors. He would go out in the early evening and call, "Wher-r-r-r-e are you-u-u-u?" First one and then another of the owls would answer, "Who-o-o-o are you-u-u-u?" Thus it came about that the owls called to the Naturalist and the Naturalist called to them at the close of nearly every day. While the weird call was music to the Naturalist, an occasional visitor who was not familiar with them would shiver at the sound, and one half grown boy was

afraid to go to bed alone because of the doleful sound.

On warm nights the Naturalist loved to roll up in a blanket and lie in the grass. One after another of the birds would come and alight above his head and converse in the friendliest manner. From them he tried to learn the mystery of the night and looking up at the stars wondered whether other Naturalists were making friends with other owls on the planets revolving about the specks of light in the infinite depths of the heavens above. His specula-

By this time the boys were interested in the owl family also, so that there were numerous visitors to the home of the birds in the box.

tions were to no purpose, for the murmur of the night voices gradually grew faint in his ears and it would seem but a moment until he awoke with the sun streaming full in his face. The Screech Owls were nowhere to be seen, nor would they again respond to his call until the shadows again were falling.

As the nights grew frosty and the voices of the crickets were no longer heard, the Naturalist still called to the owls in early evening. The occasions were less frequent, nor were they prolonged since it was no longer pleasant to lie on the ground in the moonlight. Sometimes on a winter day when the sky was gray,

a screech owl would fly out to take a look around. At other times he would appear at the entrance of the box where he was spending the winter days, and remain looking out for hours at a time.

On a winter day when the sky was gray.

Sometimes, when the Naturalist missed the friendly creatures of the summer day which had long since gone to warmer climes, he would go to the box and arouse the little owl. It would fly out into the light and sit for a moment blinking in the sun and then sail away to find a dark place among the shadows of the wood.

Although the Naturalist never knew one of these friendly little birds to commit a single questionable act, there were some who would not have hesitated to take their lives had opportunity offered. They were accused of catching birds and chickens, and other unlikely crimes. Their accusers did not think far enough to know that they were too small to take anything but very young chickens and that even these very young chickens were never abroad at night, the only time when the owl hunts for its prey. One evening, just at early dusk, one of them alighted on a post near Tommy Jones's barn. Tommy with his ever ready gun did not fail to take note of its presence, and rested his gun across the fence to insure a good aim in the failing light. Just then a mouse ran out from under the barn and attracted the attention of the owl. Down went

the bird, and, catching the mouse, returned to its perch on the post. For once Tommy did not shoot.

Only that morning he had caught his old cat in the act of killing a young chicken. For days the young chickens had been missing, one after another, and he had blamed it all on the skunks and hawks which the Naturalist had befriended. Now he had seen with his own eyes the little owl catch the mouse that he had kept the cat to kill. Tommy put down his gun, scratched his head and turned and walked toward the house. Thus was the life of the screech owl saved and the Naturalist vindicated.

THE POLECAT

THE POLECAT

IT was a bleak day in midwinter when the Naturalist started out for his usual walk. The sky was overcast and a light snow covered the ground—just the kind of day when one enjoys a book and a snug seat by the fire. As he entered the bit of woods near his home a flock of tree sparrows and juncos flew out of the underbrush and alighted in the trees. A chickadee eyed him suspiciously, as if in doubt as to his identity. The residents of the wood had come to feel safe with him and seldom manifested any particular anxiety because of his presence.

After looking about for a time for something of special interest, he chanced upon the tracks of a little spotted skunk (*spilogale interrupta*), commonly known by the name "polecat." Since the snow was fresh, the tracks offered an opportunity to see something of what had taken place in the wood the night before. He, accordingly, followed, at a leisurely gait, the path taken by the little animal a few hours previously. The Naturalist

had known for some time that there were polecats in the wood, but he had been too much occupied with other friendships to cultivate an intimate acquaintance. As he followed the tracks of the little skunk and noted how it had stopped to sniff at a small hole in an old stump, had scratched in the leaves beside a log, in search of hibernating insects, and investigated the hollow at the base of an old basswood, he became very much interested. Here, indeed, he felt that he had overlooked a most interesting neighbor, and determined to know more of his haunts and habits, even though years of investigation were necessary.

After having followed the tracks for some distance the Naturalist noted evidence that the Polecat had proceeded somewhat cautiously, and, sure enough, just ahead was the snug form lately occupied by a rabbit. In a thick bunch of grass Bunny had hidden from the sight of passers-by, and thought to rest himself in quiet. The little skunk in passing had scented Bunny's retreat, and advancing quietly from behind had caught him by surprise. The skunk is slow and rather awkward in its movements at times, but when in the act of seizing its prey moves with surprising quickness.

Here the snow was beaten down, showing the struggle of the dying rabbit with a polecat at its throat. Only a few feet distant, the partly eaten carcass on the blood-stained snow gave evidence that the polecat had eaten his fill, and made off to his burrow.

The Naturalist spent some time in examining the marks of the struggle, and reading the story as written in the snow. To-morrow the sunshine or more snow might forever obliterate the record, and he wished to become fully familiar with it. Here a small animal had made a dinner on another larger and swifter than himself. To-night, no doubt, he would come again to make still another meal from the carcass, as it would be much easier than finding and killing another.

From that day the Naturalist sought for a closer acquaintance with the black shadow that constantly hung over the lives of the rabbits that lived in the wood. Poor Bunny! A harassed life is his. The hunter and his dog seek his life by day, while the owl and the skunk constantly threaten him by night. Eternal vigilance is the price of life in the woods. The little son of the Naturalist also had designs on Bunny's liberty, if not upon his life,

and had set an innocent-looking trap beside his path. The dead rabbit had a large family of relatives living in the wood, and if he was missed from among them there was no sign.

A polecat cautiously peered around the corner.

They still came out to play at nightfall, chasing each other back and forth in front of the Naturalist's window, and dining in his garden, much to the dismay of his good wife, for the shrubbery, as well as vegetables, often suffered as a result.

On closer acquaintance the Naturalist found that the polecat often came out by day, though his usual hours were after sundown. The Naturalist also began to go out by night, when the

moon was bright and he could see the movements of the little animals in the wood.

One night an incautious rabbit ventured into the trap. Before he had pushed back far enough to spring the door, a polecat cautiously peered around the corner, and seeing that Bunny was inside, followed him in. The terrified rabbit backed into the farthest corner and the trigger was sprung; rabbit and skunk were caught together. Bunny's escape was now impossible, and the polecat was only intent upon his dinner. When the boy came to the trap the following morning he received quite a surprise; a dead and partly eaten rabbit and a polecat very much alive. Back to the house he went as fast as his little legs would carry him and burst in upon his father with great excitement. The Naturalist, how-

If he approached too near, one would stamp a front foot threateningly, arching the back and throwing the tail forward over the body.

ever, was not surprised, though much amused at the excitement of his small son. The door to the trap was removed, and the polecat permitted to go about his own business.

The Naturalist now determined upon an experiment, destined to extend over nearly seven years of time. The stable and henhouse were located on the spot desired for a wild garden, so both were torn down. In order to satisfy himself as to the extent that poultry enters into the normal diet of the polecat, he decided to make chicken the most easily available food for polecats, and to entice them about the buildings. Accordingly, the hens were housed in small coops only about three feet high, on roosts not more than a foot or two from the ground, with doors wide open except in the most severe weather. He met the protests of the wife, who was interested in chickens, but not in skunks, with the statement that it was worth a lot of chickens to learn the facts.

A single observation is not of much value in determining a matter of this kind. Nearly everybody can tell of instances where skunks have killed chickens, but few are prepared to say whether all would do so with a favorable opportunity. Dozens of individual skunks

It would peek at him across a limb or around the body at a height about on a level with his head.

Sometimes one would climb a tree.

were present at different times during the seven years over which the study extended. When, as occasionally happened, an individ-

During the day they usually remained curled up in the nest.

ual polecat did form the poultry-killing habit, it was immediately disposed of, as of no further value to the experiment, and to prevent other individual animals learning bad

habits from contact with it. Some came of themselves and took up their abode in the barn or other outbuildings, some were caught, uninjured, in traps and released after a short confinement. From that day to this there has probably not been a time without from one to a dozen polecats about the place, some of which lived within a few feet of the little hen-houses.

The vile odor, the best-known characteristic of the animal, is only used as a means of defense, and months sometimes passed without the slightest evidence of it about the buildings where the animals lived. The little creatures find it a safe dependence, usually, and are not as timid as most wild animals. The Naturalist could approach near to them without offense, and sometimes played with them in the moonlight. If he approached too near, one would

Mother Skunk would peek out cautiously to see if the coast was clear.

stamp a front foot threateningly, arching the back and throwing the tail forward above the body. Sometimes one would climb a tree and peek at him across a limb or around the body at a height about on a level with his head.

It was only when the Naturalist investigated too closely, as when trying to take photographs, or urging them into some undesired position, that they resented his presence in a most annoying way. At such times copious quantities of ammonia and a change of clothes were necessary to make him again presentable in polite society.

During the day they usually remained curled up in the nest, coming out at nightfall to search for food. If there were half grown young ones, Mother Skunk would peek out cautiously to see if the coast was clear, shortly to be followed by her interesting brood. On the slightest alarm the whole family would dash for cover. During the summer months insects furnished the principal food, although if the boys failed to gather the eggs, the polecats would often dine from a hen's nest. (The Naturalist for a long time kept this a dark secret from his wife.) Next to grasshoppers, moths, and beetles, mice seemed to furnish the

favorite article on the menu. It was rare, indeed, that one troubled the chickens. In the dead of winter, when mice were hard to get,

The boys decided that a young polecat would make a fine pet.

and insects not to be found, one would sometimes fall from grace and kill a chicken. The next night the culprit usually paid the death penalty, although the Naturalist found it hard to execute the sentence. On one occasion, a mother with a large brood dependent upon her, found life too hard, so she too took to the

henroost to supply her pressing needs. Once the habit is formed it is probable that, like most bad habits, it is seldom broken. Finding an abundance of food and slight resistance in the henroost, the skunk will return again and again. After observing so many individual animals during so long a time, it became apparent to the Naturalist that mice and insects furnish the natural and preferred food, and that the poultry-killing habit is an acquired one. As the animals often live together in considerable numbers, it is easy for one to acquire the habit from another, until, in a restricted locality, all, or nearly all, may kill poultry whenever opportunity presents itself. One winter a large load of corncobs was thrown into the woodshed to be used as fuel. As there was an occasional kernel of grain still clinging to the cobs, rats soon found that the big pile would furnish both a convenient shelter and a food supply. The Naturalist did not permit a cat to remain on the place for fear of frightening some of the numerous wild creatures which made their homes with him, but the rats were so annoying that he borrowed a cat which had an enviable reputation as a ratter. The cat was confined in the woodshed for several

days, but since she did not appear to make any impression on the rats, she was returned to her owner. The Naturalist was considering some measure to rid the premises of rats, when a polecat decided to move from the barn to the woodshed. The change of residence had the desired effect, for the rats moved out without delay and with less ceremony. While mice, apparently, are more attractive to the polecats than rats, the rats seem to have a deadly fear of them, and the presence of a polecat in the building is usually sufficient to clear it quickly of the rodents. The polecats would often enter the open burrows of the pocket gopher also, and although the Naturalist was unable to determine with certainty what took place in the darkness below, the indications were that the visit proved disastrous to the gopher.

One day a neighbor's dog, which chanced to be passing, discovered Mrs. Polecat as she was crossing the yard. Rover gave chase, and, just as he opened his mouth to seize his prey, she discharged her artillery full in his face. A very sick dog immediately lost interest in the hunt, and for some days had a wholesome respect for polecats. His eyes burned like fire, and his mouth tasted worse. The intolerable

odor clung to him and made him sicker than anything in his experience. Doggie had received the contents of the scent glands in the most effective places—the mouth and eyes. He rolled about in agony, he coughed and whined; he bit off mouthfuls of grass and filled his mouth with loose earth to no purpose, for he could not rid himself of the awful sensations that clung to him. Finally he slunk off home with a most shamed appearance, and crawled under his mistress's bed. Suddenly the house was filled with a most penetrating scent. Members of the family sniffed the air and speculated on the source of the well-known smell. After a time Rover crawled out and, sheepishly wagging his tail, approached his mistress. When he attempted to put his paws in her lap she screamed and, much to his surprise, gave him a kick. Alas, poor dog! This was adding insult to injury, and Rover was at a loss to understand why he should have received punishment instead of sympathy. He went and hid under the corncrib, where he remained until the following day. When hunger finally forced him out he received scant welcome from his best friends. For days he suffered the isolation of an outcast, and it

was only after the odor had finally disappeared from his presence that he was again received as a member of the family. Thus was another family added to those who, having had an intimate introduction to her means of defense, have acquired a life-long prejudice against the skunk.

One summer Mother Polecat brought forth her young in a roll of tin in the shed. She made little preparation in the way of a nest—simply a bed of chaff with some odds and ends of cotton material that chanced to be near. Mice and insects were plentiful, and ungathered eggs occasionally offered a special treat for the polecat family. There was no annoyance by dogs or other unfriendly animals, so that the summer was one grand holiday for Mother Polecat and her brood, until it became necessary for the Naturalist to move the roll of tin in which they lived. He talked the matter over with the boys, and it was decided to pose the youngsters for a picture and then turn the family out to hunt for a new home. The boys decided that a young polecat would make a fine pet, and the little creatures were cunning indeed. However, the Naturalist persuaded them not to break family ties, and

so Mother Polecat scampered into a hollow basswood tree in the front yard, where she was followed by her four babies. After nightfall she came out to search for more satisfactory quarters. The Naturalist and his boys were much interested to learn where she would take up housekeeping next.

The Naturalist persuaded them not to break family ties.

THE MAGIC CITY

THE MAGIC CITY

THE Naturalist had a visitor, a winsome lassie from the city. She was fascinated with all the wonderful world which he showed her, and together they had wandered through the little wood and over the meadows near by. Together they had visited the oriole's nest and listened to the merry song of the brown thrasher who had her nest in the lilac bushes. Hand in hand they had walked through the wild garden, while the Naturalist pointed out the trilliums which he had gathered near the shores of Lake Michigan, the wild currant from Minnesota, the prickly pear from the badlands of Dakota, and the many other plants which he had found on his journeys to the outside world and transplanted safely to Tamakoche.

When at last they had tired of visiting with the wild creatures and returned to the easy chair in the study, she begged for a story—a really truly true story.

"Tell me about the most interesting place in the whole wide world," she said.

The Naturalist protested that he had seen

The Magic City is the hive, and the inhabitants are the bees.

very little of the big outside world, and that he really did not know what was the most interesting place.

"Then tell me about the most interesting place that you ever saw," she begged.

"I will tell you about the most interesting place that I know of," he agreed, "and I will take you to see it for yourself, and you can then tell me whether it is so."

So it came about that the Naturalist told the girl about the Magic City, and together they went to see the inhabitants and the wonderful way in which they lived.

It was June when the little girl visited the

The Naturalist then lifted out a frame which was filled with comb and covered with bees.

Naturalist, and the wood and the fields were as green as green. The birds were singing gaily in the trees above the study, and crickets and frogs sang their evening chorus after the birds had finished their daily concert. Finding it too much like the city in the study, the little girl took the Naturalist by the hand and led him outside under the big walnut and sat down on the grass.

"It is nicer out here, and, besides, the story will seem more real while I lie and look up at

The drones are big blundering fellows who never work.

the birds among the branches overhead," she said. This is the story that he told the little girl under the big tree.

"For centuries the wise men of the earth have known of the magic city.

In every generation men have visited it and endeavored to learn all the secrets of the little people that live there. Little by little they have learned some of the secrets, and there are still many that they guard very carefully and which man has never yet found out. These little people are wonderful chemists, for they gather a commonplace product from the fields and so change its character that it will keep for many years without spoiling. They are wonderful builders, and utilize a product which they make for themselves and which man has never learned to imitate, in their building. They have developed the most

wonderful system of government, for every individual living in that city has an equal opportunity, and enjoys equal privileges and an equal share of the wealth of the community.

Most interesting of all they found the queen, the mother of the whole population of the bee city.

They are very patriotic, and any member of the community will lay down her life, if necessary, without hesitation to drive away invaders who would rob them of their treasure.

When the bees would rear another queen, they provide a very large cell, which looks much like a small peanut.

“All the babies are reared in cradles exactly alike, and the same nurses care for one after another, giving them the same attention, except when they wish to rear a new queen to replace the one who is failing from old age, or to found a new city. When it comes time to divide the population and to found a new city, the old queen and the older inhabitants go

forth to begin life anew, leaving the old established home for the young. But, my dear, you must remember that it is hardly safe to speak of other creatures as though they had similar

Suddenly there was a great bluster among the bees, and with a glad, new note they tumbled hastily out.

thoughts and ways to men, for we know not by what senses they find their way, or conduct their affairs. It is better for me to show you the city itself and to explain everything that we see, than to tell you about it in a way that will give a wrong impression. The Magic City is the hive, and the inhabitants are the bees. Although they formerly made their

homes in hollow trees and in cavities in the rocks, man has learned to turn their labor to his own advantage, and provides them with hives in which to live."

The Naturalist then provided his visitor with a veil and some gloves, to guard her against possible attack by the sentinels on guard at the gates of the city, and together they went to see whether they could learn some new secret of the bee people.

On the porch of his study the Naturalist kept a small observation hive with glass sides and wooden shutters.

When they reached the apiary he called her attention to the fact that there was not one magic city but many of them, and in each lived many thousands of busy inhabitants. The Naturalist carried a smoker, an implement used by every up-to-date beekeeper. In it he set fire to some excelsior shavings and some burlap, and by pressing the bellows, sent forth a dense smoke. On approaching the hive they stopped for a time to see how busily the bees were engaged in carrying in their loads of pollen in bright yellow balls. Others going in carried nothing that the visitors could see, but which, in fact, had their honey sacs full of nectar. The Naturalist explained that the pollen was to serve as bread for the baby bees, and that they lived all the time on bread and honey. He explained also that

From roadside weeds they gathered a harvest of gold.

the nectar which they carried was gathered from the flowers, and that it seemed to be nothing much more than a little sweetened water when they found it, but that after it was brought to the hives they made wonderful changes by which it was converted into honey.

The cover was then lifted off the hive and a puff of smoke blown across the top of the exposed frames. The little girl gave an exclamation of surprise at this, and it was explained to her that the object of the smoke was to disarm the guards and save themselves from annoyance by resentful bees. He explained how carefully the bees guard their treasure, and that if they were not constantly on the watch, all the product of their hard labor would be lost. Even other bees will rob their weaker neighbors. The labor of the hive is so divided that some bees remain on guard at every opening, to make sure that each incoming bee belongs there and is bringing in something to add to the wealth of the community, instead of a stranger intent on seeking spoils.

When the smoke was blown across the hive it disturbed them greatly. There was a great rush for the open cells, and every bee began to take as big a load of honey as she could carry.

Apparently, they thought that the city was in danger, and they seemed intent on saving as much as possible of their hard-earned hoard. The Naturalist then explained that beekeepers disturbed their bees as little as possible to avoid interrupting their work of storing up honey. By keeping gentle strains of Italian bees which have become used to being handled, they are able to carry on the necessary work with very little disturbance.

The Naturalist then lifted out a frame which was filled with comb and covered with bees. He called his visitor's attention to the way in which the cells were built, with the bottom of each one opposite one third of each of three others on the opposite side of the comb. Some of the cells along the top of the comb were filled with honey, while others contained eggs and newly hatched bees. The eggs were carefully pointed out, and then the little larvæ which appear after three days when the egg hatches. The fat, wormlike little creature has no resemblance to the mature bee, but grows very fast for six days, during which it is frequently fed by the nurses. When the larva has been fed for six days, it then straightens out lengthwise in the cell and it is sealed

over. It then lives very quietly, taking no food, but there in the dark cell where no eyes can see, a wonderful change is taking place, so that at the end of twelve days the cap is removed from the cell and the mature bee comes forth.

Soon after her emergence the young bee begins to share the duties of the hive, nursing the babies, cleaning out the waste, and various other duties. Several days pass before she goes to the field to join the busy throng which are intent in laying up just as big a store of honey as possible. No matter how much honey there may be already there, if there is honey in the field and room in the hive, they will continue to pile it up against the day of scarcity.

On one comb they found a number of sealed cells that were larger than the others, and whose tops were arched high like rifle bullets. These were occupied by drones, or male bees. When mature they are big, blundering fellows who never work and who even insist on being fed by their industrious sisters. In their larval state they must be fed for a somewhat longer period, and they occupy their cells longer. Instead of reaching maturity in three weeks, like their sisters, they require twenty-

five days from the time the egg is laid. While the drone lives a carefree life during the warm summer days when his busy sisters are laying up their winter store, they are not dealt with lightly when the chill days of autumn come, and the workers are no longer busy bringing honey from the field. When at last the time comes when they take delight in remaining inside and enjoying the warmth of the hive, they are driven out heartlessly by the sisters who have cared for them so indulgently during the warm days of summer. Poor fellows! they have toiled not in the harvest, and they are now driven out to perish of cold and hunger.

Most interesting of all they found the queen, the mother of the whole population of the bee city. When they removed the comb on which she was lying, she paid little attention, but kept on looking into the cells to find those which were empty and then turning and backing in to leave an egg in each. Thus she spends her days, moving from cell to cell and laying a thousand or more eggs every day during the height of the honey-gathering season.

At the time of the little girl's visit the colony was preparing to swarm, and, accordingly,

there were some special cells in which queens are reared. When the bees would rear another queen, they provide a very large cell, which looks much like a small peanut, and feed the baby larva freely with a very rich food, called royal jelly. With the big cell and the rich food the royal baby grows very rapidly, and reaches maturity much sooner than either the worker bees or the drones. Only sixteen days from the time the egg is laid are necessary for her complete development.

While they were standing there beside the open hive, they heard a zEEP, zEEP, and a smothered answer, which was the piping of the queens. One sound was made by the mature queen on the combs, and the other by the young one which was just ready to emerge from the cell, but which was prevented from doing so by the workers until the swarm was ready to leave the hive. The girl learned that when this sound is heard the beekeeper knows that the bees are ready to swarm and will come out before very long.

A few hours later they chanced to be in the apiary when the swarm issued. Suddenly there was a great bluster among the bees, and with a glad, new note they tumbled hastily out,

frantically falling over each other in their great haste. Hundreds of them came, then hundreds more, until the air was full of bees, and so loud was their song when all joined together that they fairly seemed to roar. For a time they danced about in the warm sunshine, flying in circles, then they began to alight on a branch of a nearby apple tree. When the swarm had clustered quietly, the Naturalist brought a hive and placed it beneath them and shook them carefully down in front of the entrance. A few going in set up a joyful humming, and soon they were all moving rapidly in the direction of the call and repeating the same joyful sound. Thousands of them were soon within the hive, but many clustered on the outside and some were flying about in the air. It was several hours before they were settled down to work again and their holiday was over.

11 On the porch of his study the Naturalist kept a small observation hive with glass sides and wooden shutters. At any time he could remove the shutter and watch the bees through the glass without disturbing them in the least. They went back and forth to the fields without taking any apparent notice of his presence.

Here he took his visitor to show her how the incoming bees unloaded their pollen baskets, and how the nurses fed the baby bees that opened their mouths like hungry baby birds. They watched the queen also as she went about her egg-laying, and the busy workers sealing up the cells of ripened honey. Truly, from the roadside weeds they gathered a harvest of gold.

FOXY

FOXY

WHEN the Naturalist and his family moved to their home in the little wood, there were few wild creatures to be seen, for the previous occupant had been fond of a gun. Such as still lived about were very shy and seldom went abroad when human beings were in sight. There was no gun in the family of the Naturalist, neither was there a cat nor a dog, for the newcomers very much desired to cultivate the friendship of the little animals which lived thereabout. They planted mulberries, cherries, and various other fruits for the birds, put up nest boxes, and provided a regular water supply. Strangers were no longer permitted to shoot and neighbors' dogs were not encouraged to visit the premises. The little creatures soon noted the change, and gradually learned that the little wood and the Naturalist's home grounds were a haven of refuge, and that special attractions were offered to make them at home there. They soon lost fear and would play about on the lawn, or

scamper through the trees, as the case might be.

When the squirrels began to come to the dooryard for nuts that grew on the big walnut,

At the least alarm they would flatten out on a limb and were not easily seen from below.

and rabbits played on the lawn, while the birds sang gaily overhead, the Naturalist decided to call the place "Tamakoche," which, in the language of the Dakota Sioux Indians, means, "His own country," or "His own land."

The fox squirrel of the Mississippi valley is among the largest of American squirrels, and for a time was threatened with extermination. It is becoming established in cities and towns and in some country districts, where it is protected, so that it has been increasing in numbers again the last few years. There were but few wild ones left in the little wood, and they were not often seen for several years. At

the least alarm they would flatten out on a limb and were not easily seen from below. But since they were no longer molested, the grow-

A nest of dry leaves would be built high in a treetop.

ing families soon repopulated the whole neighborhood, and squirrels became so common that neighbors complained of their depredations in carrying away corn from the cribs in winter or gathering the ears from the fields in autumn.

The Naturalist and his boys often watched the squirrels gathering the nuts from the big walnut tree which overhung the "Bughouse,"

as the two-room laboratory and study was called. They would begin their harvest early in the fall, even before frost had loosened the nuts. Climbing the tree, one would find it an easy matter to reach the farthestmost tip of a branch, if need be, in order to get the desired nut. He would grasp the nut firmly in the mouth and climb back to a flat place near the body of the tree. Then calmly sitting on his haunches, he would deliberately remove the husk, scattering the bits about the base of the tree. When the nut was free from its outer covering, he would run lightly down the tree and scamper away two or three rods, and quickly bury it in the ground. Again and again he would repeat the process, often more than a dozen times in half an hour. With half a dozen squirrels at work, the Naturalist's boys had to be very watchful or they would find no nuts left when they came to gather their share. It is this nut-planting propensity of the fox squirrel that has had much to do with the planting of the original hard wood forests in the Mississippi valley. A squirrel will plant many more nuts in a favorable season than he can ever use for his own food. The frost of winter will crack the hard

The newborn young are very small and naked and blind.

They soon don their furs.

shell, and the nut is just the proper distance below the surface to enable the seedling to establish itself most favorably. Some species lay up their winter supply in a hollow tree or other favorable situation, where the whole hoard is kept together, but a fox squirrel will gather nuts from many trees, and plant them in every direction around the tree where they grew.

While it was fun to see the little animals gathering the nuts and putting them away for winter, it was vastly more interesting to see them dig them out in the dead of winter when the snow lay deep upon the ground. They would often climb the tree and start from a similar position to the one they had occupied when about to bury the nut the previous autumn. Without hesitation one would run down the tree and directly to a spot where a nut was buried. Then the snow would be made to fly in every direction, although the squirrel would pause a moment now and then to look about to guard against a surprise. Very seldom did one miss finding the nut in the first place where he began to dig. The Naturalist often wondered whether by means of a keen scent he was able to find where the

nut was buried, or whether there was a sort of subconscious memory that led him back to the identical spot where he had laid away his treasure several months before. When he had found the nut, he would again climb the tree or some other convenient object, and with his sharp teeth gnaw open the hard shell and make a dinner from the contents. Sometimes during severe and stormy weather the squirrels would not be seen about for several days, but the first bright day they would be playing about among the trees and seeking for food.

The old squirrels occupy a very similar nest in winter to the ones they use in summer. If a convenient hollow is at hand in some tree at a safe height from the ground—which is seldom less than fifteen or twenty feet—they will carry in strips of bark and make a very comfortable bed. The squirrels frequently appropriated the boxes which the Naturalist had

It just filled the hollow of Melvin's hand.

built for screech owls and flickers, for winter nests, though they usually retired to the wood to rear their families. If there were no satis-

They found one with its eyes open and all its clothes on.

factory cavity, a nest of dry leaves would be built high in a treetop. These nests were very cleverly formed, with the leaves so arranged as to give a shingled effect, and shed the water very effectively. The spring nests in which the young were brought forth were built more

substantially than were those which served for mere shelter. For the nursery nest a foundation of coarse twigs was sometimes laid, which gave it somewhat the appearance of a crow's nest at a little distance. Inside this outer layer of sticks were several layers of coarse leaves, and all was lined with strips of bark, which were finely cut. The top of the nest was shingled over with leaves to shed the rain, as already described, and at one side there was a small opening just large enough to serve as an entrance for Mother Squirrel.

In Iowa the young are usually born in late March or April. Sometimes there will be only one, while there may be as many as five, but the Naturalist found more nests with two young than with all other numbers put together. The newborn young are very small and naked and blind, looking much like baby rats or mice. They

Foxy's open-air dining table.

grow rapidly, however, and soon begin to don their furs, which gives them more resemblance to their parents.

When the Naturalist or the boys would find a nest, the mother would usually move her young before the next visit. She would depart in haste when they approached, and remain at a safe distance during their stay.

One spring the boys decided that they must have a pet squirrel. They could not be quite content with the wild ones that came about the house and gathered their nuts, but which would never permit an intimate acquaintance. It was seldom that any wild creature was kept long in captivity. As soon as any unfortunate which chanced to need assistance was able to care for itself, it was released, and the few young that the boys did care for in order to get them entirely tame, were permitted to have their freedom from the start.

When it was decided that they would have a pet they began scouring the woods for nests. They soon found one, but the young were so small that one of them just filled the hollow of Melvin's hand, and it did not even have its eyes open or have a trace of hair. Of course they knew it would not be possible to rear one

so young, and Mother Squirrel took good care to move to a new neighborhood after their visit. By this time, however, squirrels were common in the neighborhood, and it was not long until they found one with its eyes open

Foxy and Freddie were very good friends.

and all its clothes on. They soon found that they had undertaken quite a task, for the little fellow must be fed very often. For a time they gave it nothing but fresh milk, but it was not long until it would eat bread and butter, or a bit of honey in the comb, or a nutmeat, if the boys would crack the shell.

In the shed they made a warm nest for "Foxy," for that was his name. For a while he slept much of the time, but as he grew older he would spend more time in running about the house. If he chanced to find a piece of cake to his liking, he would seize it and scamper upon a chair or a box and help himself. In the open air a fence post furnished a very satisfactory dining table. Sometimes he would sit on Freddie's shoulder and nibble away at his stolen dainty, for Freddie and Foxy were very good friends. After a time he tired of a nest which the boys had made for him and built one after his own plans, in a plum tree near the kitchen door. He now lived in the trees like the other squirrels, but he had not forgotten that there were good things to eat in the house. It often happened that when some one opened the door to come in, Foxy would dodge in also. When he

slipped in he always made investigation to see whether the dining table was set, and if it was, to help himself to what he wanted. The butter tempted him especially, and Foxy and Mrs. Naturalist soon developed unpleasant differences on this account. The boys and their father always enjoyed Foxy's visits, but not so the mistress of the house. He persisted so strongly in getting on the table that he was finally denied admittance to the extent that she was able to enforce her ruling, although she sometimes relented after the table had been cleared.

He would scamper upon a box and help himself.

Foxy gradually extended his acquaintance to other homes near by, and since he made himself as free wherever he went, he probably got into serious difficulty during some of his visits. At any rate, he spent less and less time at home among the Naturalist's trees, and finally disappeared altogether.

THE HATCHING
OF THE TURTLES

THE HATCHING OF THE TURTLES

HORSESHOE BEND was a long, shallow pond about a half mile from the Naturalist's home. Here the boys and girls of the neighborhood had loved to gather for skating parties on bright winter days when he was a boy. Here also, in summer, he found many interesting creatures who belonged to quite a different world from the little wood. Beautiful dragon flies who spent their days flying about in the bright sunlight, laid their eggs on the stems of water plants, just below the surface, and the young, when hatched, were true water babies. Frogs sang a regular chorus every summer night and whirligig beetles spun round and round in dizzy circles, while water striders skated on the surface of the pond in summer, as the boys and girls had done in the winter. These and other creatures of the water world told their stories to the Naturalist in the same language as the creatures of the little wood, but their stories must wait until a later time to be told.

Among the many inhabitants of the pond were two old turtles. The Naturalist knew they must be very old, since they were so much larger than any other turtles living

Every year, in the month of June, Mother Snapping Turtle left the water and took a little journey.

there, or in the Nishnabotna River near by. Turtles grow slowly and live longer lives than any others of the backdoor neighbors. They lived in the pond for many years—how long nobody knew. When the snow melted and the ice went out in spring, the Naturalist would look for the old turtles, and, sure enough, they would be there. One spring when the Naturalist was still a boy, he had taken one of the turtles home with him and secured him with a

chain. A hole in the edge of his shell furnished a secure place to fasten the snap, and for many a day the old turtle dreamed of his mate in the little pond. Finally, tiring of his pet, the Naturalist released the turtle on the hill, instead of returning him to his home in the pond. The pond was half a mile away, and to get there it was necessary to pass several woven wire fences, and to cross the river. The fences presented many difficulties, for they were built to turn small pigs which were not as large as the old turtle. Just how many hours of patient looking to find a way through were necessary would be hard to tell. The young Naturalist supposed that one pond would be as good as another for a turtle, and like most boys, gave little heed to the difficulties that lay in the way of finding any water at all. However, when he visited the pond again some days later, he was much surprised to find the old turtle there again in his accustomed place. As the Naturalist grew older, he came to understand that wild creatures have many things in common with us. Love of home, freedom, and kindred is stronger in some than in others, but all have feelings worthy of respect. As years passed by and he learned more and more of

their secrets, he came to have a great fear of making unnecessary pain even for the most insignificant worm, and would suffer much inconvenience in the way of damaged garden or shrubbery before he could bring himself to persecute the little creatures, which, he felt, had as good a right to live their lives as he.

Every year, in the month of June, Mother Snapping Turtle left the water and took a little journey. To see her quietly on her way few

As soon as an egg cracked open, a little nose would be pushed out, and there Baby Turtle would sit for hours.

would guess the object of her quest. She was seeking a suitable place to lay her eggs and leave them to be hatched by the warmth of the sun's rays. She sought a sandy spot where there was good drainage. The sand was warmer than the dirt, and, probably for this reason as much as anything, it furnished better conditions for the purpose she desired.

Y When she found such a place as suited her notion she would hollow out a hole five or six inches, or more, in depth and then deposit all her eggs at one time. If she came and laid one each day as birds do, several weeks' time would be necessary, for Mother Snapping Turtle lays from twenty to forty eggs. When the eggs are all in the hole she covers it very carefully, leaving little outward evidence of the presence of her treasure, and returns again to the water, without further thought or care as to the fate of her offspring.

The eggs do not hatch until September, and when hatching time finally comes, there must be a grand scratching among the youngsters that find themselves thus buried beneath the surface. The little fellows dig out of their cavern and find their way to the water where their lives will be spent. ✓

Sometimes the Naturalist guessed the secret of Mother Snapping Turtle and found her nest. Knowing about the time when she would be making her journey in search of a nesting place, he would spend some of the warm afternoons during the middle of June in the vicinity of the pond or the river where the snapping turtles lived. Sometimes he would surprise her in the act of laying her eggs. If disturbed, she would try to hide by drawing her head as far back as possible into her shell, and later make off to the water without covering her eggs.

One spring he decided that it would be very nice to raise a family of turtles himself, so he carefully took the eggs, which were round as marbles and about an inch in diameter, and placed them in a box of sand near the "Bug-house." The box of sand was kept in the open sunshine, where it was kept warm by the sun and moist by the rains of summer. When at last September came, and the time drew near for the little turtles to appear, he carefully removed the sand from above them, leaving only a very thin layer which would betray any movement from beneath.

He had not long to wait, for soon the eggs

began to crack. Instead of pipping in the manner of hen's eggs when the young chicks are hatching, they opened across one side, as can be seen in the picture. More sand was

If disturbed, she would try to hide by drawing her head as far back as possible into her shell.

then removed, so that the Naturalist and the boys could see what was going on. As soon as an egg cracked open, a little nose would be pushed out, and there Baby Turtle would sit for hours. Not the slightest haste was manifested, and the watchers at times became tired of waiting so long for any new action. After waiting for a long time one foot would be pushed through the hole, and after another

long delay, the second foreleg would also appear. There it would remain half way out of the shell for hours longer. At last it would deliberately crawl free from the shell, and, since it was so far from the water, the Naturalist would place it in a shallow aquarium. Two or three days elapsed from the time the first egg opened until the last baby turtle was out of its shell. They took very kindly to the quarters provided for their benefit and greedily ate the flies and other insects which the boys supplied as food.

They spent much time resting on flat stones with their noses out of the water. Sometimes they would bury themselves in the soft sand on the bottom of the aquarium and remain there for long periods of time. When the cold days came and winter drew near they became less active and took less food. Finally, when the ponds and streams froze up, they refused food altogether, although they were kept in a warm room by the fire. They became very quiet and slept in the sand in the bottom of the aquarium much as Mother Snapping Turtle was doing in the mud at the bottom of Horseshoe Bend.

When spring came they were lively again

and greedily ate the flies. Toward fall the Naturalist decided that they should no longer be compelled to live in such a little pond, but that they should be free to grow as big as their mother. They had grown but little in the year spent in the aquarium, probably from lack of proper food, although these reptiles do not make very much growth in a single year. One day they were taken to the river and released in the water by the bridge. They were quick to appreciate the larger freedom and immediately disappeared beneath the muddy water.

They had grown but little in the year spent in the aquarium.

THE
GOLD-BANDED
PAPER-MAKER

THE GOLD-BANDED PAPER- MAKER¹

THE weather was very wet and the Naturalist was not finding his usual enjoyment in the open air. It only stopped raining long enough to get ready to begin again, and there were few of the bright and warm days which make one long to be an Indian and to live always out of doors. Father and Mother Red-tail had found the little grove too public a place to raise a family, and this year had made their nest in some distant location beyond the haunts of the Naturalist and Tommy Jones.

The Screech Owl family were living in a ready-made house near at hand, but for some reason the Naturalist was not making his usual number of acquaintances. It so happened that on the sixth of June he was walking among the beehives when he chanced to pick up an old cover which was leaning against an unused

¹ *Polistes metricus*, Say.

hive. To his surprise, he found on the under side of the cover a small paper nest, and on it the sole proprietor, Mrs. Gold-banded Paper-maker. Two years before he had become interested in a similar nest, only to have it destroyed when things were getting really interesting. He determined to use every precaution to prevent a similar catastrophe this time, for here was an acquaintance worth while.

Mother Paper-maker had built her little nest all by herself, and it already contained numerous cells which served the purpose of cradles for the baby wasps, for Mrs. Paper-maker was a wasp. A careful count showed fifteen eggs, and eleven young larvæ that had already hatched.

When the Naturalist had made the acquaintance of Mrs. Cottontail, there was first Mother Cottontail and then the babies. When he had come to know Mother Red-tail, there was first Mother Red-tail, then the eggs, and later the babies. When the insect world opened to him, the life cycle was still longer, for first there was Mother Paper-maker, then the eggs, later the larvæ; then they encased themselves in silken cocoons, and became pupa, and later appeared as wasps like their

mother. Mother Paper-maker was a widow, for Father Paper-maker had died the fall before, shortly after their honeymoon. So Mother Paper-maker must build her nest, care for her young, and hunt for food all alone. The Naturalist was very anxious to pry into the secrets of her household. He wished to know how she made the paper from which she built her nest, how she made the cells after she had made the paper, how she captured the insects on which she fed her young, and many other things. It no longer mattered that Father and Mother Red-tail were only seen on rare occasions, or that Mother Polecat had taken her family and moved into the woods where the Naturalist seldom saw them. The new friends soon occupied so much of his time that he did not miss the old friends who had moved away.

At first Mrs. Paper-maker was much disturbed at his presence, but he came so often and stayed so long that she soon paid no attention to his visits, even when he took the cover to which her nest was attached and laid it on his lap in order to watch her movements. When she flew away for food he always put the nest back exactly as it had been, for she

could not find it otherwise, even though she had flown directly from it but a minute or two before.

A close examination of the nest showed that

He found a small paper nest.

Mother Wasp feeding her young.

the eggs were not placed in the bottoms of the cells, as the queen bee deposits hers, but that they were attached to the side of the cell a little above the bottom. When the young larvæ hatched they remained attached to the cell in about the same position. The mother wasp spent much time in feeding her young, giving them such attention very frequently, and also spent a great deal of time with her own toilet. After every meal she would carefully clean first one leg and then

another, and brush every particle of dust off her body and head.

Soon after the nest was found the weather turned cool and it rained again. With the temperature at about fifty degrees, the mother settled herself quietly on the nest and made no move to feed her young or to continue her building. Even when the Naturalist visited her she hardly moved from her resting place above the nest. Although it remained cool for two days, as far as could be seen the larvæ were not fed. The weather warmed somewhat on the afternoon of the third day, but the wasps were not apparently conscious of it. The fourth day the mother wasp became very active again and fed her young almost constantly. The Naturalist was much puzzled about her feeding. At times she would bring little balls of food which he learned were bits of caterpillars which she had caught and kneaded into pulp between her mandibles. At other times she would seem to feed the very young larvæ, when apparently she had nothing to give them. That she did feed them he was sure because they moved their lips as though eating after she left them. Some birds feed their young with partly digested food which is

regurgitated by the mother, and it looked as though the mother wasp must be doing the same thing. The pieces of caterpillar steak which she brought home were about the size of small number eight shot. After kneading it carefully by turning it round and round between her jaws, seemingly to make it tender, she would divide it into two or three parts and give it to the larger larvæ. Sometimes they would suck these bits for several minutes, when the mother wasp would take them again and eat them herself, or give them to other larvæ. At other times the youngsters would swallow the bits after sucking them for several minutes.

One day the Naturalist caught a mosquito and, rolling it between his thumb and finger, imitated the kneading which the mother wasp gave the bits of food, as well as he could. Then placing a bit of it on a grass stem he gave it to a larva. The little larva opened its mouth, much like a young bird waiting to be fed, and took the bit of mosquito and tried for some time to eat it. He caught a red mite also and gave to another in similar manner. The mite, being very small, was swallowed at once, but the larva which had the mosquito was still

wrestling with it when the mother wasp returned to the nest and took it away. After kneading it for some time she ate it herself.

The Naturalist then caught other mosquitos and tried to feed to other larvæ in similar manner, but the mother wasp seized them and bit them viciously and dropped them at once. She became much agitated and flitted her wings in a most nervous manner. Finally the Naturalist fed such a bit to a larva without the mother seeing it until the youngster had tried for some time to dispose of it. Again she took it and kneaded it for a time, but instead of eating it herself, as she did the first time, she fed it to another larva, which swallowed it.

Thus the Naturalist took lessons from the mother wasp in feeding the babies, which were destined to serve them well later in the season when the mother had been lost. However, this is getting ahead of the story.

The Naturalist was anxious to see the mother in the act of enlarging her nest. He had seen her tear down part of some cells when she was agitated, and could hear the cutting of the paper with her sharp mandibles. After kneading it a moment she had fed a larva a bit of the paper, which it ate in apparent enjoy-

ment. He had also seen her apparently in the act of building just for a moment now and then, and was beginning to wonder whether she ever worked seriously at building.

He had about decided that she did such work with a touch now and then at odd times, when on June 25, after nearly three weeks of patient watching, he saw her hard at work. It must be remembered that the weather was cool and wet much of the time, and that conditions were favorable for insect life only a part of the time.

She gathered her raw material for paper-making near at hand, and the Naturalist had no difficulty in following her from the nest to a weather-beaten post but a few feet distant, where she secured her pulp. She alighted on the post and with her mandibles cut away enough of the weather-beaten wood to make a good mouthful. She would then fly directly to the nest, where she would stand for a moment, kneading the pulp between her jaws, and with her forefeet turning it round and round, much as she did the caterpillar which she was preparing to feed the young. She would then spend some time in looking about over her comb to select a suitable place for work.

When she had satisfied herself as to the proper place to begin, she would bite the soft pulp against the top of a partly constructed cell. It seemed very soft and waxy and spread easily. She pushed her forefeet against the opposite sides of the thin wall, backing slowly around the cell and drawing out the new tissue very thinly. Sometimes she would pass clear around the cell and sometimes only part way. At times she would add as much as a sixteenth of an inch to the structure with a single mouthful. But two or three minutes were necessary to get a load of raw material. After each mouthful she would rest a moment and make her toilet. Then she would peek into a few cells, after which she would be off again, for another load.

Between times she made a very elaborate toilet, at times standing on her hind legs and rubbing the other four together. At other times she would stand on her forelegs and extend the others behind her. Rarely she stood on her right middle leg in about her normal position and stroked herself with the others as well as rubbing them together. Standing thus on one leg, she presented a striking appearance.

Although the Naturalist spent much time with the wasps nearly every day, it was a long time before he saw Mother Paper-maker in the act of laying her egg. When the weather was nice she laid an egg nearly every day, as he knew by watching carefully the cells which were empty the day before. In cool weather she would sometimes miss a day or even two or three, if it did not warm up during a part of the day. The Naturalist would make careful note of every empty cell daily and watch to see when eggs were laid. She laid on the 11th and 12th, then again on the 14th and 15th. Only one more egg was then laid until the 20th. Apparently, these wasps are very sensitive to weather conditions.

After many days of waiting the Naturalist finally decided that the eggs were laid in the morning between eight and eleven o'clock. Finally, on the last day of June, he decided that he must witness the act of depositing the egg in the cell. He had an engagement in a distant city and felt that he could not be content to go until his curiosity had been satisfied. Accordingly, he took up his watch soon after eight o'clock and waited. The mother wasp was rather sluggish, and there was little action

to keep up interest in the wait for nearly two hours, before she began preparing for her day's work. She would remain entirely motionless for many minutes at a time, then she would look into a few cells and be quiet for a long period again. Finally about ten-thirty o'clock she flew away and was gone but a few moments, when she began looking about, apparently in search of an empty cell. Finding one by pushing her head in, she doubled herself very shortly and pushed her abdomen into it. She then remained quiet with her ovipositor near the bottom of the cell for several minutes. At last she moved out and again put her head in to see that the newly laid egg was in its proper place. Afterward she again became quiet for some time. Although the Naturalist nearly missed his train because of his long wait at the nest, he felt amply repaid for the time.

A number of eggs were noted, to ascertain the time required for hatching. Most of them hatched in just eighteen days. When the weather warmed a bit some hatched in sixteen days. Since the weather was cool and the temperature below normal, it is probable that more time was required than would be the

case in a warm season. A number of those observed in spinning their cocoons required twenty-three days to complete the transformation. A few individuals required twenty-five

Larva spinning its cocoon.

The emerging wasps would not forage
for baby sisters.

days. Two years before, some under similar observation completed this stage of development in only fifteen days, so the weather apparently greatly influences the time required in the different stages.

When the larvæ had completed their growth, the spinning of the cocoons was an interesting observation. It was on the 25th of June, after the first two larvæ had entered upon their long sleep, that the Naturalist saw two more in adjoining cells spin their cocoons

and begin the wonderful transformation, during which they were changed from helpless white larvæ to mature wasps. Probably not more than an hour was required to spin the cocoon. The silk was very filmy and so fine that a single strand could hardly be seen with the naked eye. During the spinning the larvæ moved their heads back and forth, round and round, constantly adding to the web. At first it was very thin, and the inmates of the cell could easily be seen at work through the thin network. However, it gradually thickened until they were entirely hidden from view and there was nothing to do but wait until the baby awakened from its sleep and came forth a glorified creature, as compared with the shapeless white body that entered the quiet cocoon.

Thinking to see something of the wonderful change as it took place, the Naturalist cut a small hole in the top of one cocoon. The day following the cell was found to have been emptied and a new egg placed therein. Apparently this change can only take place behind closed doors where prying eyes cannot behold the preparation for its resurrection.

The combs of the honeybee are built perpendicular with openings on both sides. The

bottom of each cell is opposite a part of the bottom of three other cells. The wasps build their combs horizontally with the open end downward and no opposite cell. While the gold-banded paper-maker builds only a single comb and makes it large or small according to whether the mother wasp be vigorous and prolific, there are other species that build several combs, one above another and inclose them all in a paper case. As the days went by the Naturalist came to cultivate a close acquaintance with the little yellow-banded wasp and her offspring. He caught mosquitos and fed to the larvæ almost daily. At times the mother would take them away and eat them herself, at other times she would feed them to the youngsters, but more often she would resent the interference with her family affairs and toss the dead mosquito contemptuously away. At times, when she became nervous or angry, she would cut the tops of some of the paper cells. Snip, snip, she would cut away, using her mandibles just like a pair of scissors. Although the Naturalist watched closely, he never saw her feed the paper to her young but the one time already mentioned. When the Naturalist found small caterpillars she would

accept them and roll them up carefully and knead the little ball vigorously and feed it to the larvæ.

On warm days Mother Paper-maker was very active. Between her building and the feeding of her young she was busy indeed. When she was engaged in enlarging the home for her growing family she would make a trip for wood pulp and return again in two or three minutes. After each load was duly placed in the wall she would tarry for a minute or two to clean herself carefully from any clinging dust, and be off again. As the season advanced the number of larvæ increased, and made a corresponding demand upon their busy mother for food. By this time several had spun their cocoons, but others were hatching all the time, and more eggs were being laid in the newly built cells.

On the morning of July 16, the Naturalist visited the nest as usual. There had been an unusually heavy rain the night before, lasting a good part of the night. When he peeked under the hive cover he was greatly disturbed to find that the nest had fallen to the ground, and that the mother wasp was not to be seen. He carefully replaced the nest, fastening it

with glue and pins to the board where it had formerly been. He hoped that the mother was afield in search of food and that she would soon return. After waiting all day in vain, he was convinced that she had gone never to return, and was at a loss to know what to do with the nestful of eggs, larvæ, and pupæ. He had marked a number of them in order to determine the period of their various stages of growth, and felt that he could hardly be reconciled to an accident of this kind.

Near at hand was another similar nest, but the mother was not a very lively sort and had but a few cells. He decided to give her both families to see whether she would adopt the unfortunates. Accordingly, the nest was fastened close beside her own nest under a big box lid.

The foster mother did not take kindly to such an arrangement, and moved rapidly over the strange comb, flitting her wings violently and showing evidences of displeasure. Since the Naturalist had seldom visited this wasp, he felt that perhaps the fact of his presence caused her agitation as much as the presence of strange babies. Accordingly, he kept away until the following morning in order to give

her an opportunity to assume her new responsibility without unnecessary annoyance. On his return the following morning he found her

The Naturalist decided to take the nest to his study, and see what he could do toward raising the orphans by hand.

with her head in a cell. She came out with an egg in her jaws, which she ate. An examination showed that she had disposed of some of the larvæ in a similar manner. Since the Naturalist could ill afford to have his observation interrupted in any such cannibalistic manner as that, he decided to take the nest to his

study, and see what he could do toward raising the orphans by hand.

He soon realized that he had undertaken a rather novel experiment. There were eggs which would hatch every day or two for two or three weeks, young larvæ just hatched and others in every stage of growth up to those which were ready to spin their cocoons. There were also a considerable number of sealed cells containing pupæ, but as yet none of the young wasps had emerged. He began to frequent the cabbage patch in search of cabbage and cutworms. Placing the unfortunate worm on a board, he would cut it into bits with a sharp knife and feed the bits to the larvæ with a grass stem as he had done when the mother was still present. He found it possible to feed the very young larvæ as well as the older ones, but they did not thrive. On the 18th of July the first cell opened and a young wasp, a perfect picture of the missing mother, emerged. The Naturalist now felt his hopes rise high, for would not the newly matured lady, mother her unfortunate sisters? He could hardly wait to see. The nest was placed on the porch of the study in order to give her full opportunity to fly to the fields in search

of food as soon as she was old enough to assume such a responsibility. The same day a second female emerged, so the Naturalist felt that he would soon be relieved of his arduous task. It is a hard job for a mere man to mother his own offspring at a tender age, and when it comes to feeding newly hatched wasps he is hardly prepared to do full justice to the needs of the infants. Within a few hours after the emergence of the young wasps he caught a cutworm and cut it up for the larvæ as usual, but this time he fed the bits to one of the elder sisters to whom he was looking for expert assistance. To his great joy, she took it and holding it between her forelegs, kneaded it exactly as he had seen her mother do so many times. After the food had received suitable preparation she fed one or two of the larvæ. This action within a few hours after her own emergence, convinced the Naturalist that his troubles were soon to end. However, he was doomed to disappointment, for this proved an unusual case. As others matured and the nest became populous with adult females, he was greatly disappointed to find that they not only would not forage for their baby sisters, but only now and then would they even take the trouble to

feed them after he had caught the worms. None of the mature wasps remained more than a few days, when they disappeared.

None of the mature wasps remained more than a few days, when they disappeared.

By the fifth of August about a dozen had emerged, and only one still remained at the nest. A larva which hatched on June 29 died that day. It was one which had been marked

to determine the length of its larval period, and although the Naturalist had kept it alive for twenty days after its mother had disappeared, it was apparently no larger than when she last fed it herself. While his careful ministration had been sufficient to enable the larger larvæ to complete their growth, the food which he was able to supply did not meet the needs of the very young ones. Either it was not suitable in quality, or it was not properly prepared or supplied in proper quantity or at the proper time. At any rate, he did not succeed in raising any of the larvæ that were not more than half grown at the death of their mother.

About this time he found still another small nest under the eaves of his study, and having given up hope of further success by hand, he pinned this nest beside the other to see whether there would be any better success in getting the orphans adopted than in the previous instance. The weather was still cool and wet. The summer of 1915 was a record-breaker in this respect. A week later the Naturalist examined the two other nests of the same kind, only to find them deserted, the mother wasps having disappeared. The nest which he had

so long cared for still remained beside the one which he had hoped would adopt it as part of the family, but the mother of this family had apparently gone also, although two lately emerged females were present.

It was on the same day that he found another paper-maker's nest, larger and more populous than any he had found. All the others, excepting the unfortunate one under his direct care, had been small and the mothers had disappeared early. Up to this time he had not seen a single male, and he was beginning to wonder about where the fathers of the next generation were to come from. Since the other nests with which he had occupied himself were now practically deserted, he was glad, indeed, to find one in normal condition. An examination showed that there were still eggs and young larvæ in the new nest, besides pupæ and seven adult females. He was so curious about the new discovery that he was stung four times that day for insisting on looking into things that the wasps seemed to feel were none of his business. On September 4 there was only one egg still unhatched, but still no males had appeared. It was not until September 10 that the first male emerged.

He was recognized on sight because of his bright yellow face and lighter color. The seven segments of the abdomen and the absence of a sting established the sex beyond question. For several days about as many males appeared as females, but soon there were more males. By the 21st of September the Naturalist found that there were more males at the nest than females. As about as many were leaving the nest as were emerging from the cells, the tendency was toward a decrease in number of adults present rather than an increase. The last larva died on October 3. It was nearly grown, but had apparently not grown any for many days. Apparently, its sisters had fed it just enough to keep it alive, but not sufficient to enable it to complete its development. The Naturalist had not marked the date when it hatched, but it was about the same size as another which hatched on August 10. If the age was the same as it appeared, it was about fifty days old. At that time there were still a few sealed cells from which the pupæ were still to emerge, and one lone female remained at the nest. The season had been so abnormal that the Naturalist had found it very difficult to make satisfactory observations and

the variation was such that no satisfactory estimate could be made of the normal period required for completing the life cycle.

With the approach of autumn the females seek their mates, and then hibernate in some sheltered place where they pass the winter. With the coming of another summer the Naturalist will seek their nests again in the hope of observing them under more favorable conditions. This time he will be familiar with their habits and will not find it difficult to see the thing for which he is looking. It is hardly necessary to suggest that he will not likely undertake to raise another wasp family by hand.

BUNNY COTTONTAIL

BUNNY COTTONTAIL

“**L**OOK out, papa, and see who's here.”

Three full-grown rabbits playing on the lawn were what papa saw. Back and forth, round and round they ran like children playing tag. Sometimes one would jump high into the air and kick up his heels. They cut up all kinds of antics, for all the world like a lot of schoolboys. The rabbits had come to feel very secure in the blackberry thicket behind the apiary, and would come out to play in the morning or evening, and sometimes in the middle of the day. There were dozens of them living in the orchard and the little wood. In summer they were the delight of the whole family, although they did eat most of the peas planted in the garden, but in winter they were the despair of the Naturalist, because, try as he would, he could not prevent them from girdling his young fruit trees, cutting off the tender shoots of his shrubbery, and barking his blackberry bushes. Every winter the trouble increased,

“Look out, papa, and see who's here.”

since the number of rabbits had multiplied surprisingly. Only once did the Naturalist lose patience and permit two hunters to spend a half day hunting rabbits. They were instructed that no matter what else they saw they must not shoot. Birds, squirrels, even skunks must be protected, but the rabbits were getting too thick. As a result of their few hours' shoot the two men killed sixty rabbits. In spite of his damaged shrubs the Naturalist felt very guilty, and could not quite bring himself to permit the shooting to be repeated, although he never could see that there were any less rabbits than there were before. The animals multiply so rapidly in a protected area that they soon become a real problem. If it had not been for the fact that the polecat family sometimes dined on rabbit, they would have overrun the place.

In spite of their mischief the Naturalist and all his family loved the little animals, and never tired of watching their play. Baby Ruth watched them with delight and would call "Bunny Rabbit," "There's Bunny Rabbit."

The rabbit is a timid and defenseless animal, and a harassed life is his. With his numerous enemies his life is constantly in peril. Hunters

and dogs constantly seek his life by day, and if, perchance, no other danger is nigh, the big red-tail hawk swoops down from the open sky intending to make a meal of him. By night the big horned owl flies stealthily overhead,

The rabbit is a timid and defenseless animal.

and is likely to catch Bunny unawares. If he rests quietly in a warm corner of a hollow log, or even in his grassy form, Mother Polecat is quite likely to happen along and slay him without mercy. Besides all these dangers which require constant vigilance on Bunny's part, the small boy sets an innocent-looking trap, which, if he enters in search of shelter, is immediately sprung, and Mr. Cottontail finds himself a prisoner, with a fine chance that he will be served for somebody's dinner. Bunny is not a suspicious fellow, and if the trap shows

evidence of having been occupied by rabbits previously, he enters without hesitation. Knowing this, the small boy will take a rabbit

Small boys set an innocent-looking trap.

caught in an old trap and confine it for a time in his new trap, before setting it. If the weather is fine, Bunny prefers to remain outside, and the traps are of little use to the boys who set them with so much care. When the weather is very cold and stormy, and there is greater need of shelter, Bunny enters the trap,

and, backing into the farther end, springs the trigger, and lo! he is caught at last.

In mild weather, be it winter or summer, all that the rabbit asks in the way of shelter is a thick bunch of grass that will furnish him a hiding place. Here he makes a nice form which looks somewhat like a nest, and sits quietly resting until all is quiet and he feels that it is safe to go abroad in search of his dinner.

The polecat moves so slowly that his only chance to catch Bunny is to take him by surprise. The big birds which seek his life also approach quietly, and catch him before he knows that danger is present. Coyotes, foxes, and dogs may take a chance on overtaking him with a straight race, but Bunny is very clever and has learned many tricks to throw them off the scent. The Naturalist would sometimes climb high in a tree, when, on a winter day, he heard the bark of dogs that told that they were following swiftly on Bunny's track. When the leaves had fallen he could see what was going on below for some distance around.

When a dog would frighten Bunny from his hiding place he would scamper away as fast as he could run, with the dog barking at his heels.

The little wood had grown up very thick, and there was much underbrush, so that Bunny could take sharp turns that were hard for the dog to follow. Usually the dog would soon find it necessary to follow the scent and depend upon his nose, rather than his eyes. As soon as the rabbit had a safe lead, he would begin running in circles, then in double circles or figure eights, frequently coming back to the same point. Nearly always this would be too much for the dog, as he could not unravel the maze of mystery, and he would run round and round over the same tracks which he had already followed. After making a few such puzzling trails to occupy the dog, Bunny would run straight away as fast as he could go for the blackberry thicket near the Naturalist's house, for dogs were not permitted to trouble him there.

Laboratory scientists who have used white rabbits in confinement to study their reasoning powers, have found them very stupid animals.

Out-of-door naturalists, who have watched them in the open and admired the many tricks which they use to avoid their numerous enemies, have found them to be very clever indeed. The laboratory naturalist will say that

all animal mental processes are instinctive, and that there is no understanding of the objects sought, or deliberation as to methods to be employed. The out-of-door naturalist, on the other hand, will say that the manifestation of ability to devise means to accomplish ends is evidence of some degree of reasoning power, and this the rabbit seems able to do.

Since her offspring are born helpless and blind, Mother Cottontail depends upon her skill in hiding them to keep them from danger. She makes a little hollow in the earth, not much larger than a robin's nest, and lines it with her own fur. In this warm nest she places her young and covers them very cleverly. Even when the Naturalist knew the location of her nest, he had to look very closely to find it, for there was no outward indication of its presence. She would cover it with grass or leaves exactly like the surroundings, and, although there were dozens of them about, it was only rarely that the Naturalist or his boys were able to find

Baby Cottontail after
leaving the nest.

She makes a little hollow in the earth and lines it with her own fur.

The young rabbit in its snug little nest.

one, unless it was turned out by the plow. If, perchance, they did find one, and carefully turn back the leaves, there were the young

They were likely to skip out and depend on their ability to hide.

rabbits in the snug little nest. On such occasions they were not long permitted to know the rabbit's secret, for if the babies were very young, their mother would soon move them to a new place; and if their eyes were open and they could run, they were likely to skip out and depend upon their ability to hide

rather than to remain in a nest whose location was known, even to a friendly naturalist. After they leave the nest they still receive their mother's care, although her brood is scattered quickly. While the mother is very timid, she will respond to the cry of her distressed young. If, however, it has fallen into the hands of a man or the jaws of a dog, she realizes that discretion is the better part of valor and seeks her own safety.

At times rabbits fight each other desperately, and the Naturalist knew cases where they even chewed each other's ears off, though the fighting animals were in confinement, where the unfortunate which was getting the worst of it could not escape from her antagonist. In the open the trouble is not likely to be so long continued, for there is always the alternative of flight.

Since the rabbit has no means of defense, it always seems to be on the watch for danger, ready to be off with the slightest alarm. The long ears are sensitive to the slightest sound, and Bunny takes no chances when his suspicions are aroused. He always prefers to take his chances in the woods or the open field, rather than to trust to a hole in the ground or

a hollow tree. It is only when very hard pressed, and there seems no other chance of escape, that he will take to such a shelter to escape an enemy.

Ready to be off with the slightest alarm.

A JOLLY OLD CROW

A JOLLY OLD CROW

THE Naturalist was very much annoyed. Something was taking his turkey eggs. He could look with composure upon the loss when the polecats robbed a hen's nest, and did

Jolly Jim Crow.

not take it as seriously as might be when the rabbits girdled his young apple trees. His White Holland turkeys were his special delight, however, and it was quite a different matter when anything happened to them. They were excellent birds of a breeding which

gave their owner cause for pride, and, besides, he was selling the eggs for a quarter apiece for hatching purposes. Twenty-five cents a meal for the denizens of the wood which ate a dozen

A sly old rascal was robbing the turkey's nest.

or more times a day, seemed a rather high price. He had smiled at Tommy Jones's displeasure when the cooper hawk was catching his chickens, but now it was the Naturalist's turn to question the habits of some of his neighbors. It did not take long to find the culprit, but to catch him was a different matter. The turkeys' white feathers made them very conspicuous, and they could be seen for a

long distance. A black old rascal of a crow sat on the top of a high tree in the little wood, and watched when one of them would go to her nest. As soon as she left, he immediately made a dinner of the egg. For a time the Naturalist was inclined to get angry and to shoot the old crow (in case he should get a chance). After a time he became ashamed of the idea that he should find it necessary to go gunning for any wild creature that lived in the little wood, and decided that if he could not have turkeys without such a performance, he would sell the turkeys, so sell them he did.

He was not the only one who had turkeys, however, and the black old bird and others of his kind, ate most of the turkey eggs in the whole neighborhood. At one time the old scamp found that the Naturalist had a nice flock of baby chicks, and took to dining on them. He conferred similar

Crow's egg, life size.

attentions upon the neighbors also until Tommy Jones saw the old fellow after his dinner, and shot him—killed in the very act of carrying off a young chicken, there was no question but that Tommy had killed the identical crow that was causing so much mischief. There were still many crows about, and they came around the Naturalist's home as freely as before, but, much to his relief, they did not trouble the baby chicks any more. The fact was thus established that only the one crow in that flock was taking the young chickens, although there were others that liked turkey eggs.

The crow is a very intelligent bird and learns easily. One who watches them closely will soon learn that there is a great difference in their individual peculiarities. Had it not been for the execution of the old sinner which was taking the little chickens, probably all the crows in the neighborhood would have soon learned the same trick. The nests of both hens and turkeys were robbed so persistently that the thirteen guns which had been loaded for the red-tails were trained upon the crows at every opportunity. However, this fact seemed to give them little anxiety, for they were abun-

dantly able to look out for themselves. When no one was watching they would alight in a barn lot or orchard, while one of their number kept watch in some commanding position. At the least suspicious sign he would give the alarm and the whole flock would slip away before a man or a boy could get within gunshot. The Naturalist never worried on their account, for he felt very sure that no matter how many boys and guns were watching for them, there would be no apparent diminution of their numbers.

The poor crow is almost universally distrusted. In the wooded regions he is in disrepute because of his habit of pulling up sprouting grain. Some also accuse him of injury to melons, and a scarecrow of some kind is a common sight in the small fields. In Iowa he is maligned as an egg-sucker and accused of catching the young poultry. In the Mississippi valley the grain fields are so extensive that the small amount of grain which he destroys is seldom missed. The fact is that he is guilty of all the counts in the indictment, but "catching comes before hanging," and the crow has learned how to avoid the numerous pitfalls designed for his undoing.

Such friends as the Naturalist are fully alive to the good traits, which are not inconsiderable, for he renders great service in the destruction of grubs, beetles, and young field mice. Although such would give him all his due, they can hardly be blind to his shortcomings. However, it would be unwise to condemn him in too sweeping a fashion, for in many localities he is undoubtedly a valuable ally in overcoming certain pests. It is a misfortune when a misguided legislative body places a bounty on his head. While at certain times in certain localities his mischief seems to justify his destruction, the annoyance caused by his pranks is a sufficient incentive without adding a bounty, which will also be effective in localities where he renders a service that more than offsets his injuries.

The Naturalist was very much interested in the elaborate notes by means of which the birds communicated with each other, and spent many months learning to imitate their call. In time he came to give the call so perfectly as to deceive strange crows which had not learned to look with suspicion upon a call from an unusual position. One spring day when the Naturalist was renewing his ac-

quaintance with the first arrivals after a winter's absence, he amused himself by hiding and watching the movements of flocks of crows which were passing. There were numerous crows passing by, all bound in the same direction. They did not come in large flocks, but two or three at a time, and kept coming for a considerable time. An old sentinel in the top of a tall tree called, "Caw-caw, caw-caw, caw-caw, caw," to each bunch that passed. After watching them for some time and noting that he gave the same signal every time, without variation, the Naturalist became very anxious to learn the meaning of this particular signal, and the place to which it directed the passing birds.

After the sentinel had given his signal to a passing bird and it had gone on for a little distance, the Naturalist gave three short, quick notes, in imitation of one of their alarm signals, "Caw, caw, caw." The bird that had passed, at once turned and came back, circling about in search of the source of the call. Seeing nothing, he again started off in the same direction in which he had been going. Again the Naturalist called, and again he came back. The third time he responded to the call and

wheeled about overhead. The fourth time he flew directly to a nearby tree and called, "Caw, caw, caw," rather slowly. Upon receiving his answer he detected the deception, and flew away as rapidly as possible, paying no further attention to the calls. There was so much fun in watching the birds trying to find the lost member of their tribe, that the Naturalist repeated the experiment at intervals during the morning with similar results. Some birds would solve the mystery sooner than others, but he was able to deceive a considerable number of them.

After learning to imitate their calls, the Naturalist took keen delight in trying to ascertain the meaning of their various notes. On one occasion a pair of crows located a horned owl near their nest. Upon giving the alarm there were soon nineteen crows tormenting one poor owl. They drove him from tree to tree, all the time cawing in the most distressing manner, until the bird seemed fairly distraught. For a long time after that occasion the Naturalist enjoyed hiding and repeating the alarm signal which he had heard given at that time. Soon crows would be coming from every direction and looking for the owl, or

for some other occasion for a general congregation. Once, when the Naturalist was enjoying a stroll through a bit of woods several hundred miles from his home, he remarked to friends that he had not seen a crow in that neighborhood. When assured that crows were present in the locality, he at once gave the alarm call and astonished his friends by bringing together a goodly flock within a few minutes.

These experiments convinced the Naturalist that the crow has a more highly developed system of communication by means of vocal notes, which more nearly approach spoken language than any other native bird. He also became convinced that by devoting sufficient time to it one could come to understand the meaning of the various notes, and possibly interpret their communications.

One spring the Naturalist could not resist the temptation to take a young crow from the nest before it could fly. It was fed freely with bread and milk and such table scraps as it would eat. The youngster soon became very tame, and made himself at home among the trees about the house. He made friends with the bantam hen and with a skunk that lived

there at the time. On occasion they would all investigate the possibilities of dinner from the same pan, as all were permitted to help

He made friends with the bantam hen and with a skunk that lived there at the time.

themselves from the supply of table scraps which Mrs. Naturalist set out for them. He was a most interesting bird, but suspicious of every stranger. When visitors came and desired to make his acquaintance he would usually take himself to the top of some of the tallest trees and caw, but would refuse to come down at the call of the Naturalist. He was

very diffident about having his picture taken, and although he would take food from the Naturalist's hand when no one was near, if the

The baby was feeding him bread and milk with a spoon.

latter had no suspicious implements, it proved a very hard matter to get him to pose for a photo. One morning the Naturalist had tried for a very long time to get a picture without success, and had gone to the house. On looking out he saw the baby feeding him bread and milk with a spoon, and snapped a most unexpected pose of both.

Although he never learned to talk, Jim Crow learned a very good imitation of a laugh. He would alight on any chance object near the Naturalist and laugh heartily at the slightest excuse. He seemed to have no understanding of the call of the wild crows that came about the place, and could never seem to know quite what to make of their noise when they alighted in the trees and tried to scrape an acquaintance. He laughed so much that he was entitled to his name of "Jolly Jim Crow."

The boys decided that crows would be very good subjects for observing on their own account.

However, some of his pranks did not seem so funny to the Naturalist. One day he was feeding with the hens, when he pecked an old hen so hard on the head, that she reeled for a moment and then fell dead. Jolly Jim laughed very hard at this, and for a moment the Naturalist was tempted to wring his neck.

One morning the

Naturalist found him with a wound on his own head, the result of some kind of an accident. His laugh that day had a sob in it, and poor Jolly Jim Crow soon died. In spite of his mischief, he was missed very much by his friends who have continued to look forward to another tame crow who would laugh at the misfortunes of the tenants of the barnyard.

One spring the boys decided that it was time for them to be naturalists on their own account, and to make some observations according to their own notions. They decided that crows would be very good subjects, and tramped the woods along the river for miles, as well as carefully examining every part of the little wood in search of their nests. After spending several hours in searching, they found a nest in a tall tree near the river, and about a mile from home. It was no mean

It was no mean climb to the nest.

climb to the nest, and Kent being the eldest, claimed the privilege of first examination.

They kept a careful record of all their observations. They were anxious to determine whether the crow laid every day or only every other day. Their book showed that they found the nest on April 10, and that it contained one egg. April 11, there were two eggs and the 12th there were three eggs. The fourth egg was not present in the nest until the 14th, which puzzled them somewhat, as it indicated that the egg laying was not entirely regular. Five eggs were laid in all.

When it came to getting a picture of the nest, they had to fall back upon the Naturalist, who climbed the tree to a point above the nest, and strapping himself to a branch took a photo from above, as he had done of the cooper hawks' nest. There were only two eggs in the nest when the picture was taken, but he did not enjoy dangling so high above the earth enough to go back again, just to get a few more eggs in the same kind of picture.

When the incubation began the boys continued their interest to see how long it would take them to hatch. On the first of May they found two young ones, and on the second there

They found a nest in a tall tree near the river.

There were but two eggs in the nest when the picture was taken.

were four, while the next day the fifth egg had hatched also. The boys were pleased to learn that it required three weeks for crows' eggs to

Young crows, twenty days old.

hatch, the same as for hens' eggs. The nest was composed of coarse twigs, with a deep depression about the size and shape of the inside of a man's hat. The inside of the nest was lined with strips of soft bark. The boys visited the nest frequently, to see how fast the little crows grew. At first they were naked

little things which seemed to be all mouths, but they grew rapidly, and soon were covered with black feathers. When the youngsters were twenty days old the Naturalist was pre-

The last of the young ones had left the nest.

ailed upon to climb the tree a second time and get a picture of the young ones. One youngster died in the nest, whether from so much competition he was unable to get sufficient food, or for some other reason, the boys could never quite determine. When they were thirty days old the last of the young ones had left the nest.

Before their observation was completed

they had found four more crows' nests, and were becoming as ardent naturalists as their daddy. They have since taken up the study of the crow language, also, and who knows but that the whole family of Naturalists will be conversing in the crow tongue before long?

THE
CATERPILLAR'S
P R O P H E C Y

THE CATERPILLAR'S PROPHECY

THE Naturalist had the blues; his digestion was working at cross purposes with his ambition, and the European war was getting on his nerves. Reading so much of death and destruction filled him with gloom, and raised many questions as to the cause, purpose, and end of life. The agnostic had almost convinced him that death was not a door, but a blind wall beyond which one might not pass. On this basis he tried to formulate some satisfactory philosophy on the purpose of life, but there was none. He speculated much on the futility of man's labor in building his houses of sand. All men seemed as children older grown. Instead of games of marbles and ball they played at manufacturing, railroading, and banking, but no more purpose seemed apparent than in the childhood games, beyond the amusement of those who played. Some men lived like swine wallowing in the mud, other like horses pulling heavy loads, and still others like vain birds preening their feathers

in the sun. He questioned whether those pulling their loads or those sitting in the sun enjoyed the present moment more than those wallowing in the mire.

He thought to little purpose, and his questionings were in vain, for he could find no solution of the enigma of life. Man's origin and destiny remain shrouded in mystery, and the more serious the attempt to solve the riddle, the greater the confusion of the mind. Wearily he decided that life is but a tiny island in the unexplored sea of eternity. He knew nothing of how he had reached the island at birth and only knew that the relentless waves of death, constantly beating upon it, sooner or later would carry him off into the boundless sea. Vaguely he wondered whether there were other islands somewhere, which he might reach, or whether, with death, would come oblivion, as the agnostic taught.

Tiring of useless speculation, he threw himself down in the shade of an apple tree under which grew a milkweed. A monarch butterfly alighting, caught his attention, and he was soon so much absorbed in her movements that problems of life and death no longer vexed him. The butterfly tarried but a moment,

flitting about carelessly from place to place. Finally she approached the milkweed, and after a moment of hesitation deposited a tiny white egg on the under side of a leaf. A moment more and she was gone without thought or care as to the fate of her offspring.

The Naturalist examined the plant with some care, and found that other butterflies had been there before and that several of the tiny eggs were present under the leaves on different parts of the plant. Immediately he was happy again in the living present, which could supply things denied him by the dead past and the uncertain future. Here was material to occupy his time most pleasantly for many days. The butterfly was concerned about only to-day; why should he bother his head about a longer time?

As free from care as a child or a bird, the Naturalist spent many hours dream-

The milkweed suffered seriously as a result of their presence, and was soon almost entirely stripped of its leaves.

ing beside the milkweed in the orchard. The tiny eggs soon hatched and ugly little caterpillars with black and white stripes appeared. They were voracious little fellows, apparently consuming more than their own bulk of coarse food within a few hours. As the days went by they moulted, or shed their skins, which were getting too tight, and appeared in new suits of larger size. As they grew they improved in appearance, and yellow bands in addition to the black and white became more conspicuous. Although the caterpillars had improved somewhat in appearance, they were still any-

As the youngsters neared maturity the Naturalist took them to his study, where he could observe their final change.

thing but attractive with their fierce-looking horns and prison stripes. The milkweed suffered seriously as a result of their presence, and was soon almost entirely stripped of its leaves.

As the youngsters neared maturity the Naturalist took them to his study, where

he could observe the final change, the wonderful transformation toward which they had been hastening while he had dreamed beside their milkweed. They were supplied with an abundance of fresh leaves from other milkweeds, but it was not for long. They had eaten their portion of rough herbage and were preparing for the day when they should sip nectar from the flowers. The Naturalist was not alone in watching to see what should take place when

It turned itself into the form of an inverted question mark, as though, like the Naturalist, trying to peer beyond the veil that hid its future.

a caterpillar has finished its portion of rough fodder, but his boys, who by this time were also coming to be naturalists on their own account, were equally watchful.

At last one after another of the caterpillars stopped feeding and began looking about for a suitable place to don the rich raiment suited to the new life on which they were about to enter. When one found a place to its liking, it prepared a silken fastening and turned itself

into the form of an inverted question mark, as though, like the Naturalist, trying to peer beyond the thick veil that hid its future. Then a

The caterpillar gradually became incased in a beautiful casket of green and gold, as though some invisible fairy were preparing it for burial.

most wonderful change took place. The Naturalist and the watching boys could not comprehend it, although it took place before their very eyes. No more could they describe it, but the questioning caterpillar gradually became incased in a beautiful casket of green and gold, as though some invisible fairy were preparing it for burial. Finally there was no longer any sign of the ugly caterpillar with its

prison stripes, but a marvelous casket which might have been made for the body of a queen, hung silently before them.

It was on the nineteenth of June, just when nature was at her best, that the caterpillar entered her silent tomb, and the Naturalist and his sons kept close watch during the days that followed to see what would come next. Finally, ten days later, the green of the casket was seen to change to a rich brown, and they knew that mother nature was preparing another of her great surprises. A few hours later the casket was split from a movement from within, and a strange creature came forth. It was not the caterpillar which they had seen enter the strange habitation, that they had seen spun from sunlight, ten days before. It was a far more beautiful creature and as different in its habit, physical construction, and appearance as night is from day. Man may watch silently beside the casket of the silent occupant, and note the wonderful change in the creature that comes forth, but how the change is wrought is not for him to know.

At first the little stranger presented a very novel appearance. She had wings, but they were all folded over her back. She walked

about uncertainly and gradually unfolded her wings until they were nicely spread, as a butterfly's should be. She then remained quietly hanging to the shell of the empty casket from which she had so lately emerged, while she dried her feathers and gained strength to venture forth.

All too soon she began flitting her wings as though to try them, and soon finding them strong enough to bear her weight flew to the window. She was then released and sailed

away in the sunshine. She was soon sipping nectar from the clover blossoms, and from the roadside thistles, all unmindful of the coarser food which had so lately sustained her, and probably forgetful of the hard life that had so recently prepared her for the glorified state in which she now found herself.

The Naturalist had lost all trace of his

She then remained quietly hanging to the shell of the empty casket.

gloom. He was convinced that nature would do no more for the caterpillar than for him. He no longer speculated vainly concerning the beginning or end of life. He was content with his coarse fare, even as the caterpillar had been, being assured that when it no longer was sufficient to sustain him, the invisible fairies that prepared the casket for the caterpillar would do as much for him, and he would lie quietly down for his long sleep. Since the caterpillar could not foresee so wonderful a change as would make it a butterfly, neither could he foresee what might be in store for him. He had faith to believe that the same invisible Hand that had transformed the sleeping caterpillar would prepare him for such a state as would bring the fullest development to his dormant powers.

From a lowly and insignificant creature he had learned what the greatest philosophers among mankind had failed to teach him, and he now had faith to believe that some good purpose was being served by the lowliest lives. As a child cannot comprehend the thoughts of a man, no more can a man understand the designs of his Creator. Both must be content to await their normal growth.

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