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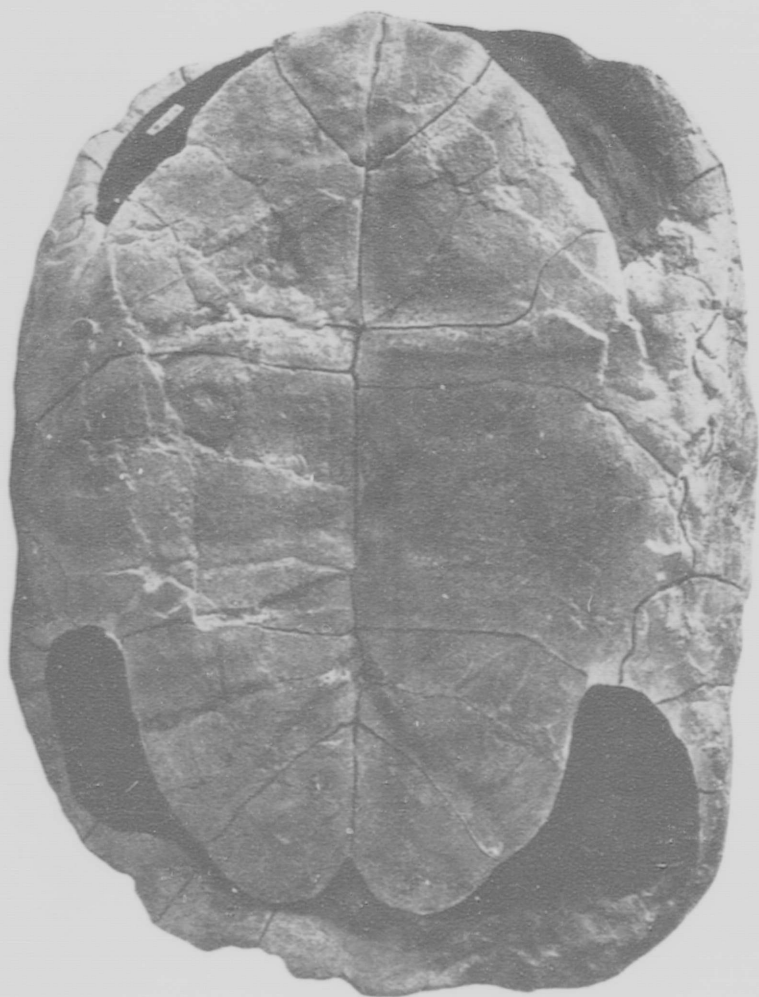
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Nos. 5-6

DESCRIPTION OF A NEW SPECIES OF TESTUDO, AND
OF A REMARKABLE SPECIMEN OF STYLEMYS
NEBRASCENSIS, FROM THE OLIGOCENE OF
WYOMING, U.S.A.*

By LAWRENCE M. LAMBE, F.G.S., F.R.S.C.,
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The specimen of *Testudo* to be described below is one of a small collection of turtles from the Oligocene of Wyoming, U.S.A., lately acquired by the Geological Survey, Canada. The collection, consisting altogether of ten well preserved specimens, was made by Charles H. Sternberg and C. M. Sternberg, in 1911, at Seaman's old ranch, Sage creek, a branch of Old Woman creek, Niobrara county (formerly included in Converse county), Wyoming. The majority of these specimens, with the exception of the one regarded as representing an undescribed species of *Testudo*, are for the present referred to *Stylemys nebrascensis*, Leidy.

The principal character distinguishing this *Testudo* from other species of the genus is the great development of the epiplastral lip which forms a very conspicuous feature of the plastron.

Of the known species of *Testudo* which shew a decided enlargement of the epiplastral lip, *T. thomsoni*, Hay, from Oligocene deposits in South Dakota, U.S.A., approaches most closely to the Sage creek form. *T. thomsoni* was described by Dr. O. P. Hay, in 1908, in his monumental work on North American turtles¹ from "the skull, the greater portion of the anterior lobe of the plastron, some cervical vertebrae, and parts of the left foreleg" "obtained in 1904, by Mr. Albert Thompson, of the the American Museum of Natural History,

*Communicated with the permission of the Director of the Geological Survey, Canada.

¹The Fossil Turtles of North America, by Oliver Perry Hay, Washington, D.C. Published by the Carnegie Institution of Washington, 1908.

New York, at Corral Draw, in Ziebach county, South Dakota" . . . "in a block of limestone which had come from the Lower Oreadon beds." A comparison of the imperfect anterior lobe of the plastron of *T. thomsoni*, the only portion of the shell of this species known, with the corresponding part of the plastron of the Sage creek specimen discloses in the latter the much greater proportionate size of the epiplastral lip and differences throughout in the proportions of the elements forming the lobe.

The Sage creek specimen consists of the carapace and plastron in a good state of preservation. The sutures between the bones are clearly seen and the sulci indicating the boundaries of the scutes are distinct. The carapace has been injured in the neighbourhood of the eighth neural, and that bone is missing. The plastron has been crushed in between the inguinal notches with the result that in this portion of the shell the sulci and sutures have been partly destroyed. The fractured humerus of both of the fore limbs protrudes from the rock which fills the axial notches, and the distal ends of the tibia and fibula of the left hind leg are exposed in like manner behind.

The carapace has been slightly flattened and its breadth in this way increased to some extent, but as it now is the maximum breadth is 410 mm. and the greatest length 479 mm. It rises 120 mm. from its lateral margin to the centre. Viewing it from above, its breadth decreases more rapidly forward than backward, so that the posterior is greater than the anterior half and has a squarer outline. This is caused mainly by the enlargement of the peripherals above the hind limbs. The lateral peripherals and the pygal continue the general convexity of the shell downward at an increased angle; the peripherals in front are produced almost horizontally forward toward their free edges whilst the more posterior lateral ones are only moderately inclined.

The nuchal bone measures 90 mm. along its free margin in front. It broadens slightly backward to its maximum breadth of 103 mm. and then rapidly narrows to its full length of 95 mm. It is notched behind to receive the front edge of the first neural.

Of the eight neural bones the first is the longest; it is much longer than broad, narrows toward the front, and its outline is convexly rounded in front and behind. The second is hexagonal with the two short sides directed backward, and the front and back edges incurved or concave. The third is quadrangular, longer than broad, with its front edge convex and the hinder one straight. The fourth, fifth, sixth and seventh are hexagonal with their two short sides directed forward.

There are two suprapygal bones of which the first is deeply notched behind, with the forks in contact with the pygal and the eleventh peripherals. Its surface is broadly convex in all

directions and has a maximum breadth behind of 102 mm., with a length, measured from its sutural junction with the pygal to the centre of its front margin, of 84 mm. The second suprapygal is diamond shaped, slightly longer than broad, and more pointed in front than behind. The surface of the pygal is longitudinally and transversely convex, broader in front than behind, with a length slightly exceeding the front breadth; its dimensions are—anterior breadth 62 mm., posterior breadth 47 mm., length 70 mm.

The second, fourth, sixth and eighth costal bones are greatly expanded distally, with a resultant decrease in the distal breadth of the third, fifth and seventh costals. The proximal end of the second costal abuts against the first and second neurals, and the third is in contact with the second, third and fourth neurals. The proximal ends of the seventh and eighth costal bones came within the area of injury, which has resulted in the loss of the eighth neural and the posterior half of the seventh, and are missing.

The first and third vertebral scutes are about as broad as long. The sulcus marking the back border of the third curves sharply forward in the centre whilst crossing the fifth neural. The second and fourth vertebral scutes are slightly longer than broad. The fifth vertebral is greatly expanded behind and its lateral sulcus passes down the midlength of the tenth peripheral bone. The nuchal scute is 34 mm. long and 26 mm. broad. The supracaudal scute is 145 mm. broad behind at the free border of the shell, and 73 mm. long in its middle line, its anterior sulcus crossing the second suprapygal 15 mm. in advance of the centre of the latter's posterior margin. The dimensions of the neural and costal bones and vertebral scutes are given in mm. in the following table:—

Neural bones			Costal bones			Vertebral scutes		
No.	Length	Breadth	No.	Proximal breadth	Distal breadth	No.	Length	Breadth
1	68	44	1			1	100	97
2	40	47	2	36	94	2	77	82
3	41	34	3	52	22	3	78	88
4	37	48	4	40	85	4	—	82
5	36	45	5	39	17	5	—	162
6	34	44	6	35	73			
7	—	44	7	—	19			
8	—	—	8	—	67			

The plastron has a length of 493 mm. Its most conspicuous and interesting feature is the greatly extended epiplastral lip which projects 28 mm. beyond the line of the front margin of the carapace. The entoplastron is roughly five sided, and is sharply pointed in front with its maximum breadth far back; its hinder edge is broad and slightly convex. It measures 86 mm. in length and 90 mm. in breadth. The anterior lobe is 163 mm. long, with a breadth of base of 229 mm. The posterior lobe is 147 mm. long, and 239 mm. broad at the base. It is divided behind by a V shaped notch; 40 mm. deep, on each side of which the free border curves rather broadly round to the side. Throughout the plastron the free border comes to an acute edge.

The anterior lip has a length of 72 mm., in advance of a line drawn between the outer termination of the gulo-humeral sulci; its breadth is 98 mm. It is 19 mm. thick on each side of the deeply impressed gular sulcus and thins outward to the acute lateral border. On the upper surface it is more convex transversely than beneath, where it has a flat slope outward from the midline. It maintains the same breadth forward from the base to near the front, where it ends in two apices widely separated by a V shaped notch 22 mm. deep. The border within the notch is smooth and thick, but on either side in front it is thin and irregular.

The gular scutes appear to extend on to the entoplastron, but the sulci here are not preserved. The humero-pectoral and the pectoro-abdominal sulci cross the plastron 25 mm. and 59 mm. behind the back edge of the entoplastron respectively. The pectoral scutes are thus very narrow, meeting along the midline of the plastron for a distance only of 34 mm. The abdomino-femoral and the femoro-anal sulci are not preserved toward the centre of the plastron, but measured between their outer terminations the abdominal scute is 131 mm. long from front to back, near the bridge, and the femoral scute has a length of 85 mm. at the free border.

The characters revealed by the Sage creek specimen place it in the genus *Testudo*. The great enlargement of the epiplastral lip distinguishes it from all other described species of the genus. Another interesting character is the extreme differentiation of the costals in breadth, an alternation in the size of which is found in a greater or less degree in some species of *Stylemys* as well as of *Testudo*. The neurals, as a series, more nearly approach those of *Stylemys* in shape than those of *Testudo*, in which there is usually an alternation of octagonal with tetragonal neurals. The first, second, third and fourth neurals and their manner of contact with the three anterior costals are somewhat after the pattern found in *Testudo laticunea*.

Cope, from the Oligocene of Colorado.

Regarding the present specimen as representing an undescribed species of *Testudo*, the name *præxtans*, having reference to the marked prominence and size of the epiplastral lip, is here proposed for the species with this specimen. (Cat. No. 8401) as the type.

In plates I and II, shewing the carapace and plastron respectively, the sutures between the bones and the sulci marking the boundaries of the scutes are well shewn and can be readily traced.

Of the specimens belonging to the collection of turtles from the Oligocene of Sage creek, mentioned in the opening paragraph of this paper, and regarded as referable to *Styemys nebrascensis*, Leidy, one in particular is of interest.

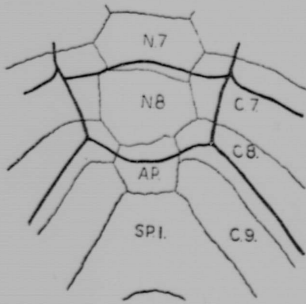
In this specimen certain abnormalities occur in the carapace which are considered of sufficient importance to warrant description. The plastron appears to be quite normal.

The shell as a whole has been somewhat distorted. A horizontal pressure on the left side has caused the left costal bones to be unduly bent down and the bridge peripherals to be incurved below. The plastron has been moved to the right and pressed upward along its longitudinal midline. Otherwise the specimen is splendidly preserved. The carapace is 276 mm. long and 215 mm. broad in its present state; its highest central point is about 119 mm. above the lower edge of the peripherals near the bridge. Plates III and IV, reproduced from photographs, shew the carapace and plastron with the bones and scute-cleaves clearly defined and reference need only be made here to the divergence of the carapace from the normal type of structure.

In the carapace there are seven costal scutes on each side instead of the usual four, and an additional vertebral scute between the fourth and the broad posterior one. Also an accessory bone occurs between the eighth neural and the first suprapygial, and there is a ninth pair of costal bones.

With the exception of the above structural peculiarities the carapace conforms to the usual type of *S. nebrascensis*. The first neural bone is of an elongated quadrangular form, and the succeeding ones are hexagonal. The costal bones shew a slight differentiation in distal breadth. The marginal bones reach the usual number of eleven on each side, as do also the marginal scutes. There are two suprapygial bones, of which the first is bifurcated behind; the second is diamond shaped and much broader than long. The nuchal scute is extremely narrow. The supracaudal scute is undivided. These characters are normal to the species.

As regards the peculiarities of structure in the carapace of this individual. The first costal scute is the largest, but its hinder sulcus has been crowded forward to some extent. The succeeding six are narrow antero-posteriorly, and take the place of the large second, third and fourth costal scutes which occur in nearly all fossil turtles with the exception of those belonging to the Trionychoidea. The first and second pair proceed outward on either side from the second vertebral scute, the third and fourth pair from the third vertebral, the fifth and sixth pair from the fourth vertebral, and the seventh pair from the accessory fifth vertebral. The relative position and size of the bones of the carapace and of their overlying scutes can be best understood by reference to plate III. The costal scutes correspond exactly on either side of the shell in each pair. The second, third, fourth, fifth, sixth and seventh measure distally, in an antero-posterior direction, 39, 26, 29, 26, 28 and 38 mm, respectively. The sulci between them pass down the second, third, fourth, fifth, sixth and seventh costal bones. The hinder sulcus of the seventh scute is on the eighth costal bone in advance of the latter's hind margin. The additional vertebral scute is small in comparison with the others, is broadest in front, and measures 28 mm. in length and 44 mm. in breadth anteriorly. Its front sulcus crosses the seventh neural and the hinder one the accessory plate.



N. 7, N. 8, neural bones 7, 8;
 AP, accessory plate;
 C. 7, C. 8, C. 9, costal bones 7, 8, 9;
 SP. 1, first suprapygial bone.

The accompanying text-figure, one-half the natural size shows the shape relative size and position of the bones and scutes of the carapace in the neighbourhood of the additional vertebral scute, the boundaries of the scutes being indicated by the heavy outlines.

The seventh neural bone is hexagonal, but differs from the preceding hexagonal ones with two short sides directed forward, in having its four lateral margins about equal. Both the eighth neural and the accessory plate are slightly irregular in shape. The eighth has six sides, of which two are short and are directed obliquely backward. The accessory plate is hexagonal with two short sides toward the front, and it joins the preceding eighth neural in an irregular manner, as shewn in the figure. The eighth pair of costal bones are in contact with both the eighth neural and the accessory plate.

The ninth pair abuts proximally against the accessory plate only.

The neurals of *S. nebrascensis* shew variations to a limited extent. In the majority of specimens of this species the second and succeeding neurals are hexagonal with the maximum breadth well forward. In the type of *Testudo culbertsoni*, Leidy, now generally regarded as properly referable to *S. nebrascensis*, the second neural is octagonal and the third quadrangular; also there is an additional bone between the eighth neural and the first suprapygal. The presence of a ninth pair of costal bones, seven pairs of costal scutes and an additional vertebral scute is considered to be, in the specimen from Sage creek, a unique example of extreme individual variation. So far as the writer is aware, in no turtle, belonging to any of the groups having large epidermal scutes in the carapace, has so great a development of vertebral and costal scutes hitherto been recorded.

EXPLANATION OF PLATES.

Plate I—Carapace of *Testudo præextans*, viewed from above; one-fourth the natural size.

Plate II—Plastron of the same shell, inferior aspect; one-fourth the natural size.

Plate III—Carapace of *Stylomys nebrascensis*, as seen from above, to shew the abnormal number of costal and vertebral scutes etc.; one-half the natural size.

Plate IV—Plastron of the same specimen, inferior aspect; one-half the natural size.

IS BARTRAM'S SANDPIPER DISAPPEARING FROM THE PRAIRIES?

Twenty years ago the Bartramian Sandpiper (*Bartramia longicauda*) was a common summer resident on the prairies of Alberta, but for the past ten years it has become one of our rarest birds, at least in central Alberta. During the summer of 1892 and several years following one could see a dozen pairs in as many miles. About the year 1900 I did not see this many in a whole season, and from that time until the present they have gradually become rarer each year until this present season I have only seen one pair.

I cannot find a reason for this disappearance, and I would like to have the experience of other observers of this bird given in the NATURALIST.

F. L. FARLEY, Camrose, Alberta.

THE BROAD-STRIPED SKUNK.
(*Mephitis hudsonicus* Rich.)

By NORMAN AND STUART CRIDDLE.

The subject of this article, including its various races and relations, covering the continent, has a reputation that none will envy and few appreciate until they come into actual contact with the animal in its vicious moments, when, closely pressed and in danger of death, it gives forth that fetid odor for which it is notorious.

In modern times it has become an instinct to consider that the name skunk implies an animal wholly obnoxious, and in consequence the name itself has become synonymous of all that is odious and depraved. The impression arrived at is, of course, due to lack of knowledge combined with the far too common practice of exaggeration. We hope in this little sketch to dispel some of these notions and to prove by the narrative that although the odor is very real, it is not necessarily a part of the animal's every-day life.

The Broad-striped Skunk was, in days gone by, a common mammal in Manitoba, and at our home at Aweme its numerous encounters with coyote, dog and probably owl, often impregnated the air with an unsavory odor which was far from pleasant. As time went on, however, conditions changed and constant persecution greatly reduced its numbers, so that to-day we have but a remnant of what went before, although the animal seems to be holding its own fairly well in the less-settled districts.

There are few handsomer mammals than skunks in this part of the world, and of the whole genus few, if any, equal the species under discussion. Unlike the eastern animal its stripes of white along the back are broad and prominent and show up strikingly in contrast to the black. In addition, it has a large white patch at the back of its head and a narrow stripe down the nose which often varies sufficiently to enable one to be separated from another; besides this there is the magnificent tail which almost wholly hides the back when held over it. Skunks in many respects are not unlike weasels; this is particularly so of the head, but the body increases in width towards the tail in such a manner as to give the animal a wedged-shaped appearance when viewed from above. In gait they are clumsy. The walk is a wobble, and in running they gallop. They are by no means fast in movement and it seems that the immunity afforded by the terrible weapon of self-defence has been to some extent acquired at the expense of speed, or possibly with such a weapon speed is no longer necessary.

In preparing for her young the female skunk seeks out some hole or covered place, such as that afforded by a barn or old building, where she can make her way beneath the foundation. She then locates a convenient grass patch where the old growth lies thickly and by means of her long claws rakes this up into bunches and drags it to her burrow, always moving backwards, by which means the long claws are used to full advantage. Several nights are occupied over this work and a vast amount of grass taken in before she becomes satisfied. In this nest are born several young, six probably being an average. Here they are reared and remain out of sight for some little time. Later they follow their mother in her wanderings after food, but it is quite late in the season before they finally separate; indeed, on some occasions they are said to winter in the same burrow.

Our species seems to be an almost omnivorous feeder, readily devouring anything in the animal line from an evil-smelling bug to a rabbit, while various fruits as well as ordinary vegetable matter is consumed. Nor must we forget eggs, of which they are very fond. But the choicest titbits of all seem to be insects; grasshoppers are taken wholesale and eaten with the utmost relish. If it were not for their habits of raiding poultry houses and their fondness for eggs it seems probable that skunks would be classed as almost wholly beneficial, but on account of these habits death is unfortunately often a necessity as it is practically impossible to drive them away. We have known them to take eggs from beneath a brooding hen without disturbing her, and likewise young chickens; at other times fully grown poultry were killed, but as a rule these are not molested when eggs or young are available. In winter time such food as is eaten must be made up almost wholly of rodents and vegetable substances. We have little evidence under this head, but on one occasion, at this season, a freshly cleaned out home revealed much Horsetail (*Equisetum*), which suggests that this plant was used for food and that perhaps, like weasels, skunks store up food for future use.

With reference to the powerful odor for which the animal has become celebrated, much misconception prevails. We are usually led to believe that this scent is carried about as a sort of attraction, not unlike some people's scent bottles, and that a liberal amount is sprinkled over the animal for that purpose, but as a matter of fact nothing is further from the truth, and to meet an odoriferous skunk is as unusual as it is objectionable. In reality they are by no means anxious to part with their perquisite and only do so when closely pursued and when life is endangered. When such emergencies arise, however, they make full use of this weapon, and woe to the enemy that gets

in its way or stands within thirty feet of the line of fire. It is not, however, the skunk that carries the odor thereafter. To show how sparingly such a defence is resorted to we may relate that the junior writer has on various occasions trapped skunks and that in no instance did they make use of it. While more than once he actually liberated them and permitted them to run off without even an indication of unpleasantness, which is more than can be said of most mammals. But, kill one, no matter how suddenly, and the scent glands seem to be at once released, causing the yellow fluid to be scattered broadcast, accompanied by that never-to-be-forgotten odor.

Like the badger and the bear, skunks appear to sleep fairly constantly during the winter months and only emerge from their burrows occasionally; there is seldom a week, however, that they do not show signs of activity, though long journeys are seldom indulged in before March.

The males do not seem to take any part in the family welfare and on this account are seldom met with, in fact, there is even reason to suspect that they are undesirable visitors near the home and that they might perchance make a meal of a newly born young if opportunity offered, though we have no direct evidence in favor of such a supposition.

On June 10th, 1912, a family of skunks was located beneath the foundations of an old building and as we wished to study their habits the junior writer set to work in the endeavor to catch them. He commenced operations by placing a shallow tin of bread and milk close to the burrow, to which the skunks proved very partial, and ate readily. It was but a short time before they appeared in his presence, and within ten days they had become sufficiently tame to readily partake of the milk while under observation. Did he get too close however, the mother angrily demonstrated her displeasure, and with hair erect and tail well over her back made short jumps towards him hitting the ground a sounding blow with her fore feet.

On June 23rd a trap was devised consisting of an apple barrel sunken in the ground, with a collapsible top, this latter being level with the surface and covered sufficiently to look natural. At dark some bread and milk was placed on the opposite side from the burrow, while the trapper waited events close at hand. As was their nightly custom, the young skunks soon appeared, and with that instinctiveness for which all wild mammals are celebrated, made a careful inspection of the trap. They would move carefully a little way on and then back off again, repeating the manœuvre a number of times, until finally they went round and soon had their noses in the milk. It was not long, however, before one, getting a little alarmed,

made a short cut for its home, forgetting the trap in its haste, and promptly fell in. The watcher then deliberately pushed in another with his foot. Meanwhile the mother, observing that all was not well, remained at the entrance of her burrow thumping the ground continuously with her feet. It being now dark, however, operations were suspended until next morning, when the mother and another baby were found secured, the parent having evidently been trying over night to release her children and fallen in in the attempt. The old one was not, however, a desirable acquisition, so she was helped out by means of a board and at once made her way to the remaining young, and finding them safe brought them out in broad daylight to eat the freshly placed bread and milk, the night exertions having evidently made her hungry as well as fearless, as she showed no regard for the observer within reach, who taking advantage of his nearness picked up another small one and placed it with its captive companions, thus making four and leaving two for the mother.

To those not familiar with skunks and having regard only to the story-book tales, these proceedings will be thought somewhat risky, but as a matter of fact they were amply justified by the results, the captures and all connected with them being accomplished with no more fuss than if the captives had been kittens and as if the celebrated odor had formed no part of them.

While the mother continued for a time to reside beneath the building, the young were placed in a box within which they remained until the end of August when, becoming pugnacious, or too rough in their play, they were transferred to a room some twelve feet square, in which they were able to romp with impunity. They soon became extremely tame, and apart from always being at the door at meal-times, would race round and round the visitors feet in their eagerness to get at the food. Nor did they hesitate to rear and set their front feet upon an outstretched hand to secure the titbit offered. They would also permit being taken up without protest, though this practice was never to their liking. In the morning they were often in a playful mood and would jump and thump the floor in pretended anger, but it was at night when they were seen to full advantage. Then, quite regardless of a lantern, they would run about, frisk and climb eagerly up to shove their noses greedily into the bread and milk-pail before we had even time to place it upon the floor. There was a resemblance to a pig in these actions, particularly in the habit of shoving each other with their shoulders to retain the dish for themselves, but otherwise they lapped up milk much as a cat does. With bread they either grabbed it with their teeth, or putting both feet in the pail made quick jerks backwards,

usually upsetting the contents, when they would draw a lump into a corner, always with the same characteristic backward movements.

Grasshoppers invariably proved a great treat, and being abundant, were sometimes collected in large quantities with the aid of a sweeping net, but never in sufficient numbers to appease the appetite of our hungry pets. It was particularly interesting to watch them catch the living ones. Moving slowly forward they sniffed about until one was located, when they immediately pounced upon it with their fore paws, and speedily took it within. Moths too were relished and were often chased round the lantern and not infrequently knocked down with the feet as they fluttered past. Twice the senior writer discovered a prowling Lion Beetle (*Calosoma calidum*) which, in spite of the strong odor peculiar to this species, was greedily devoured. Rabbits, when divided, were partaken of with relish, so were gophers and mice, and many a fight was witnessed over them, as our friends invariably desired the same portion, and in their endeavors to secure it would pull, snap, squeak and whistle, as well as shove with all their might, but eventually each was provided with a portion and would retire to a separate locality to devour it. Their hunger being thus appeased, they would curl themselves up together on their bed of hay until the shades of night produced renewed animation and activity.

Repeated experiments demonstrated that insects formed the most palatable food, next came meat in its various forms, and after this vegetable matter such as cherries (*Prunus pennsylvanica* and *P. virginica*), also carrots, raspberries, strawberries, acorns, broad beans (green), wheat heads, wild buckwheat (*Polygonum*), lamb's-quarters, peas, grass and various other vegetable substances too numerous to mention.

Our pets continued to flourish and grow until the end of September, when they were almost fully developed. At this time one became unwell with what appeared to be a sort of distemper, and in spite of every care, got rapidly worse and died without a struggle. A few weeks later another took sick and shortly after all had died. Two of these were magnificent creatures at the time of their death and but a few days previous had been at the height of activity and health as well as extremely fat. The senior writer had at that time held two of them up in his arms while they, with a total disregard for what was going on, were both ardently engaged in a battle to see which should get its head in the bread and milk can first. The very next day they were ill, and a few days afterwards were dead, from a cold that seemed to lead to sleep and from sleep to death. We were all very sorry to lose our pets, particularly our sister, who had

tended them almost daily and given them various titbits. All the horror which the name skunk implied had vanished and in its place we found a pretty, attractive animal, surpassed by few in cleanliness. When they were attended to and their house kept thoroughly clean, little, if any, of that odor for which they are famous was discernible.

The mother remained about for some time, but eventually acquired a habit of visiting the poultry house and stealing the chickens. She was trapped by the junior writer, but given her liberty again in the hope that the lesson would prove sufficient. She remained perfectly quiet while being released, and only by persistent chasing could be made to leave the premises, which she did at last without any reminder that would suggest a skunk. Returning a few days later she encountered the dogs, much to their discomfort and ours, but even this did not restrain her from her nightly raids, so eventually necessity obliged us to make away with her. As a parting, she left a by no means desirable legacy, which remained in evidence for at least a couple of months afterwards.

Of the two remaining young little is known, but from the fact that a dog met with a somewhat hasty check near the old home late in the season we have reason for hoping that at least one has survived.

SCARCITY OF BUMBLE-BEE NESTS IN THE VICINITY OF OTTAWA.

Queens of *Bombus terricola*, *ternarius*, *fervidus* and *borealis* were common on the Experimental Farm in the spring, and those of seven other species, *pennsylvanicus*, *perplexus*, *vagans*, *impatiens*, *rufocinctus*, *affinis* (only one) and *separatus* (one only) were observed. During July and early August, however, very few workers were seen and no nests could be discovered. The trial plots of red clover, a plant that never fails to attract large numbers of *Bombi* in Europe, were seldom visited by bumble-bees, though in a red clover field at Danford Lake, Que., numerous workers of *B. borealis*, an uncommon species in the United States, were noticed. Why are bumble-bee colonies so rare around Ottawa? Is it because the queens cannot find suitable nests? Or are they destroyed by parasites or larger enemies, such as skunks? Observations on the nests that have survived might reveal the main cause of the scarcity, and the writer would be very pleased to hear of any nests that may be found in the district or elsewhere, in order that he may make a careful investigation.

F. W. L. SLADEN, Asst. Entomologist for Apiculture, Division of Entomology, Central Experimental Farm, Ottawa.

CORRESPONDENCE.

EDITOR, THE OTTAWA NATURALIST:

It is with pleasure that I am able to report that for the fourth year in succession "*Tyrannus verticalis*" has migrated hither. A pair are now (May 26) looking over last year's nest with a view to re-occupation. Probably they are the original pair. In any case, they are far more welcome than their cousins, *T. tyrannus*.

H. M. SPEECHLY, Pilot Mound, Man.

NEST OF BELTED KINGFISHER.

A nest of this species with the eggs and parent bird has been acquired by the Canadian Fisheries Museum. The nest is from Meach Lake, Gatineau District, P.Q., and was found by Mr. Alex. C. Finlayson, Inspector of Fish Hatcheries, and his son, on 24th May. It was situated in a sand-pit about 10 feet from the ground and about 3 feet from the top of the pit. An excavated tunnel about 8 feet in length led from the entrance to the nest—the diameter of the entrance being about 2½ inches, and the extremity of the tunnel, where the nest was, was dome-shaped, and about 8 inches across and some 6 inches high. The nest was placed on the sand of the pit, and was merely composed of clean fish-bones and scales, upon which was the full complement of eggs—7 in number, fresh, semi-spherical, and pure white, only that their contents before being blown gave them a pinkish hue. The parent bird, which was found in the burrow, is the male, which lacks the chestnut band across the breast characteristic of the female. The nest, eggs and bird, when together exhibited in the museum, will form a graceful object.

BELTED KINGFISHER (*Ceryle alcyon*). "This is the familiar bird whose loud, coarse, rattling notes are heard along our streams. It may be seen perched upon the lower branches of a tree overhanging the water or on the top of a dead stump; these places furnish a favorite outlook, from which it plunges beneath the water to secure its prey, which is chiefly fish. It is a curious fact that Mr. W. E. D. Scott frequently met with this bird in the desert region of Southern Arizona, far from water, feeding on the large insects and lizards." (Oliver Daire, in "*Nests and Eggs of North American Birds*.")

ANDREW HALKETT.

OCCURRENCE OF THE COTTON MOTH IN ONTARIO
IN 1912.

BY ARTHUR GIBSON.

The first record I have of the occurrence of the Cotton Moth (*Alabama argillacea* Hubn.) in Canada, in 1912, is its abundance at Woodstock, Ont., where the moths appeared on the evening of October 9th, or morning of the 10th. Mr. James Dunlop, who reported the flight, stated that he first saw them on an electric light pole near the Canadian Pacific Railway Station, soon after 8 a.m. Many specimens were on the pole and on the ground nearby. Visits were then made to other electric light poles in the vicinity. An immense number of the moths were seen on and near the second pole. "The pole was on one side of the sidewalk and on the other side under some trees among the grass, the moths were covering everything. They could have been literally shovelled up. There was a large flock of hens that had also discovered them, but they did not seem to make the least impression in their numbers. Next morning very few were to be seen, just an odd one here and there."

In the Canadian Entomologist, April, 1913, a short note was published, chiefly to accompany an illustration made from a photograph of a flight taken at London, Ont., by Mr. J. F. Calvert. With the photograph, Mr. Calvert sent the following note: "Late Thursday night, or early Friday morning (October 10th-11th), there appeared in London, great numbers of the Cotton Moth. They were most noticeable around the Canadian Pacific Railway Station, the Grand Trunk Railway Station, the Grand Trunk Railway Round House, and at a few other points where powerful arc-lights were located. In some places there were heaps several inches deep under these lights. By the following Sunday (October 13th) very few were to be seen."

At Dunnville, Ont., a flight was observed in the morning of October 11th. Mr. J. C. Payne, who reported the occurrence, stated that the moths "covered, thickly, the windows and store fronts, and lay on the ground like autumn leaves. There was a rain storm during the night (10th-11th), and the moths were here in the morning, after the rain."

On the evening of October 12th, I saw numbers of the moths in New York City, particularly in store windows and in restaurants.

At Ottawa few specimens were seen, and only during one evening, viz., October 15th, when seven were observed.

EXCURSIONS.

BRITANNIA, May 17th. After a brief address from the President, Mr. Newman, as to plans of excursion, place of meeting for the discussion of specimens collected, etc., the party divided themselves into two groups: botanists and zoologists. The former, with several leaders, went towards Britannia Highlands. The zoologists took the opposite direction, judging the lowlands better suited for the aquatic life which they were seeking.

Notwithstanding the sounds of the woodman's axe and the carpenter's hammer, in clearing for and erecting homes, the denizens of the woods have not yet learned (here at least) to fear the advance of civilization. The squirrels seemed to enjoy the luxury of boarded sidewalks, which form the avenues of the future village.

Not expecting to find many of the early spring flowers, we were surprised to see the trilliums in such profusion, whose beautiful white wax-like petals adorn and beautify any landscape.

The following is a list of the flowers collected: *Trillium grandiflorum*, Jack-in-the-Pulpit (*Arisaema triphyllum*), Toothwort (*Dentaria diphylla*), Bellwort (*Oakesia sessilifolia*), Ground-nut (*Aralia trijolia*), Sarsaparilla (*Aralia nudicaulis*), Clintonia (*Clintonia borealis*), Squirrel-corn (*Dicentra canadensis*), Starflower (*Grientalis americana*), Mitrewort (*Mitella diphylla*), Goldthread (*Coptis trijolia*), Corydalis (*C. glauca*), Liverwort (*Hepatica triloba*), Twisted-stalk (*Streptopus roseus*), Maianthemum (*M. canadense*), Marsh Marigold (*Caltha palustris*), also four species of violets.

The birds seen or heard were as follows: Swallows, robins, red-and-buff-shouldered black-birds, bronzed grackles, a crow, certain sparrows, and a flicker. A burrow of some mammal, perhaps that of a wood-chuck, was seen. The pools contained numerous insects, such as aquatic beetles and hemipterons, a scarlet-coloured arachnid, and an isopod (*Asellus aquaticus*), besides different kinds of pulmonate water snails, such as *Limnaea stagnalis* and *Planorbis*. An interesting insect found was a specimen of *Meloe*, which is related to the blister beetle of commerce. Facts concerning its structure, such as the rudimentary elytra etc.; life-history, such as how the adult insect feeds on the leaves of the buttercup; the fate of the young larvæ, which are conveyed by bees to their nests, etc., were stated. A few tadpoles, upon one of which the larva of a neuropterous insect was preying, were shown in a glass jar.

After a most delightful afternoon we returned to the Pavilion, where "Talks" were given by Dr. Blackader, Mr. J. W. Eastham, Mr. A. Halkett, Mr. Newman and others.

A. L. M.

AYLMER. The district around Queen's Park, Aylmer, was the locality chosen for the excursion of the club, held Saturday afternoon, May 31st. It was necessary to change the place of meeting from Ironsides, owing to wrong information having been received about the train service; this caused several to miss the outing. The excursionists left the electric railway landing about 3.30, and after walking through the park, along the railway track and through woods for an hour and a half, they took possession of one of the vacant cottages along the lake to discuss the finds of the day. The specimens most frequently encountered, and one which nature seems to have been making a specialty of for two years, was the forest tent caterpillar. These creatures were everywhere, on leaves, in the grass, on the railroad rails, as well, in fact, as on most of the people, but the other works of nature more than compensated.

Mr. L. H. Newman, president of the club, presided, and also presented the botanical specimens. The district is not especially rich in wild flowers, although a fair number of specimens were collected. A few lady's slippers were found, a number of violet species, the beach pea, Bishop's cap, lousewort, shepherd's purse, pennyress and the fruit of poison ivy.

A very interesting talk on the wild fruits of the district was given by Mr. W. T. Macoun, Dominion Horticulturist. Mention was made that in this district there is only one native species of wild plum, the Canada plum, which is hardy, but for many years has not produced fruit because of the severe attacks of a fungus disease. Some transplanted trees, grown under good orchard culture, are now producing paying crops. This is a striking illustration of the benefits of spraying for the prevention of disease in fruit trees. The native varieties of cherries here are the choke, pin and black. A specimen of the native prickly gooseberry was collected. This species is being used in crossing to breed hardiness into the larger cultivated sorts. Specimens of the common wild black currant and the common wild red raspberry were found. The latter is the species from which most varieties of cultivated red raspberries have been developed. Most of these have been produced in southern districts and are, therefore, not hardy in cold climates. At the Experimental Farm work is being done on the plants found in the locality to produce hardier varieties. Nearly all the cultivated varieties of strawberries too have come from one of the two wild species found here; many of them are tender because grown in a southern district and hardier strains are being developed.

The geology of the district was discussed by Dr. Williams of the Geological Survey. The three distinct types of rock found were blue limestone, sandy shale and sandstone. It was ex-

plained how the limestone, found along the lake shore, formed in deep water, and the sandstone, further back on higher land, in shallow water with the shale intermediate. An exceptionally fine specimen of sandstone, made of tiny round pebbles cemented together by pressure, was found, and an interesting piece of fossil rock composed almost entirely of snails.

The birds, insects and snails were looked after by Mr. A. Halkett of the Fisheries Museum and Mr. Winterberg of the Geological Survey. Among the birds Mr. Halkett noted the oriole, kingbird, bobolink and song sparrow. The yellow swallow-tail butterfly was seen and a number of small insects and larvæ collected, including the destructive cutworm.

E. D. E.

STITTSVILLE. The excursion to Stittsville on June 14th was the last arranged for by the council for the summer season, and the afternoon's outing was much enjoyed by the goodly number of excursionists. The locality proved to be a rich field for the collector and observer.

Various species of plants were collected under the leadership of the botanists, observations were made of rock formations, and a winding stream visited by some of the members proved to be a regular natural aquarium for the general zoologist.

Mr. L. H. Newman, president of the club, named most of the plants which had been collected during the outing. Among these he showed the tall meadow-rue, bunch-berry, mouse-ear chickweed, silvery cinquefoil, small-flowered crowfoot, star-flower, lady's slipper, clintonia, dwarf raspberry, mitre-wort, twin-flower, cleavers, anemone, and a number of different sedges. He referred to the abundance of silvery cinquefoil and mouse-ear chickweed on the knolls and ridges, where the soil was lighter and inclined to be sandy. This was a good illustration of plant adaptation.

Referring to specimens of *Viola selkirkii* collected during the afternoon, Dr. Malte gave a brief account of the seed formation in the stemless violets. It was pointed out that, as a rule, the showy spring flowers are not able to produce seed, this function being taken over by so-called cleistogamous flowers, i.e. insignificant bird-like flowers which are self-fertilized automatically without being opened. These cleistogamous flowers behave very differently in different species, and offer very good characters for their identification. Only occasionally the spring flowers are fertilized, either by pollen from the same species or from other ones. In the latter case the result will be the production of hybrids, characterized by a large per cent. of un-

developed pollen unfit for fertilization. In the vicinity of Ottawa four hybrids between different *Viola* species have been found this spring.

The occurrence of *Antennaria canadensis* (Everlasting) in the district visited induced Dr. Malte to deal briefly with the phenomenon called parthenogenesis, *i.e.* the faculty of egg-cells of certain genera and species to develop the new normal individuals without the assistance of male organs. He pointed out that parthenogenesis in plants was in fact first discovered in a species of *Antennaria*, it having been observed that in this genus, which is dioecious, the male plants generally are extremely rare; and he also referred to a number of other parthenogenetic genera, such as *Taraxacum* and *Hieracium*, and finished his remarks by calling attention to the remarkable investigations on the parthenogenetic development of eggs of sea-urchins and starfishes, which, during recent years, have been carried out by scientists in the United States and France.

Mr. McGillivray collected specimens of gneiss of a typical gray colour, and also in a decayed state; samples of limestone, red granite, sandstone and a kremoloid; and he also had with him to show specimens of different kinds of minerals which he had previously collected on the island at Chelsea and at the Ironsides mine.

Except in stagnant pools, there has been for years past at the localities which the naturalists have visited, little opportunity for the study of aquatic forms of life, but the stream at Stittsville afforded excellent facilities for such study. The brook is full of small cyprinoids and other kinds of small fishes, besides a great variety of aquatic invertebrates. The fishes netted or observed were these: specimens of Red-bellied Dace (*Chrosomus erythrogaster*), a Minnow (*Leuciscus neogæus*), a small specimen of the Common Sucker (*Catostomus commersonii*), a few specimens of the Brook Stickleback (*Eucalia inconstans*), a specimen of a Darter presumably the Johnny Darter (*Boleosoma nigrum*) or perhaps its variety, the Tessellated Darter (*Boleosoma nigrum olmstedii*), but the specimen was lost before it could be examined; and numerous specimens of a Miller's Thumb (a cottoid) were seen in the stream, but none were netted. One or two specimens of a Crayfish (*Cambarus*), larvæ of a Caddis-fly with their tubes made of broken pieces of wood, one or two tiny fresh-water mussels, and various other aquatic invertebrates were also found in the brook.

The excursions of the season have been a great success, every Saturday has been fair, and the last held, at Stittsville, proved to be one of the most enjoyable and instructive.

A. H.

THE WESTERN GREBE IN ONTARIO.

There have been a good many records of the occurrence of this bird in the province, but probably not one is capable of being substantiated. All those that have been investigated have proved to be the Red-necked Grebe, which is a regular and frequent migrant through all of Ontario, and the uncertified remainder are doubtless of the same class. It is a pleasure, therefore, to put in print a genuine record for which the skin is in evidence.

Some months ago in examining the collection of Mr. J. E. Keays, of London, Ontario, I found an immature specimen of the Western Grebe which had been obtained from Mr. H. D. Carman, about 1892, and which was taken at Sarnia. The date of capture is unknown, but it was in the neighbourhood of 1888.

There is little doubt but that this species, so common in the west, strays into the regions of Lakes Superior and Huron each year, but its numbers would probably be few and only rarely would one be seen or captured by anyone competent to identify it.

W. E. SAUNDERS.

BIRD NOTES.

The following notes were given to me by Mr. I. Turner, who has spent the past winter near the "end of steel" on the Transcontinental Railway, about fifty miles east of Cochrane.

WILLOW PTARMIGAN (*Lagopus l. lagopus*). Abundant during the greater part of the winter, from about the middle of December, 1912, to March 20th, 1913. The birds were very tame, and would seldom take wing on the approach of a human being; more likely one of the males would strut ahead of the flock and with trailing wings advance, as if to challenge the intruder.

CANADA SPRUCE PARTRIDGE (*Canachites canadensis canace*). Common, and like the preceding species, very tame.

NORTHERN RAVEN (*Corvus corax principalis*). Common; usually to be found in vicinity of the camps, where they fed on offal and other refuse.

CANADA JAY (*Perisoreus c. canadensis*). Common; another camp-follower.

L. McI. TERRILL.

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