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CONTENTS.

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DESCRIPTIONS OF NEW SPECIES OF TESTUDO AND BAËNA WITH REMARKS ON SOME CRETACEOUS FORMS.*

By LAWRENCE M. LAMBE, F.G.S., F.R.S.C., Vertebrate Palæontologist to the Geological Survey of Canada.

(With two plates.)

In the collection of vertebrate remains, made by the writer in 1904, from the Oligocene deposits of Bone coulée, Cypress hills, Assiniboia, are parts of a number of costal plates of a tortoise referable to the genus Testudo. The specimens were found separately but apparently belong to one species, and, although fragmentary, they are of sufficient interest to warrant description, especially as they appear to belong to a hitherto undescribed species. For this species the name *exornata* is proposed.

The three specimens figured (plate III, figures 3, 1 and 2) are the proximal end of the left 1st costal, the distal half of the left 5th costal and the proximal end of the left 6th costal.

All the specimens shew decided groove markings. Selecting the distal end of the 5th costal plate (figure 1) as the type of the species, it is seen to be particularly narrow and thick but its outline indicates that the bone when entire had a considerable breadth proximally. Its upper surface presents a number of parallel shallow furrows in the direction of the length of the carapace. It is thickened along its posterior articular border where it joined the similarly thickened anterior border of the 6th costal,

* Communicated by permission of the Acting Director of the Geological Survey of Canada.

thus forming a stout ridge for the reception of the inguinal buttress.

The specimen shewn in figure 2 is apparently the proximal end of the left 6th costal plate. This costal when complete was evidently much broader toward its outer end. Deep sulci on the upper surface mark the position of the 4th vertebral and the 3rd and 4th costal shields. Distinct grooves also cross this plate from side to side at its inner end where the sutural surfaces for articulation with the 6th and 7th neural plates are preserved.

The third specimen (figure 3) is the inner end of the left 1st costal and on its surface are concentric grooves indicating an epidermal shield pattern such as is found in some of the modern species of the genus.

These specimens shew that the costal plates were alternately narrow and broad distally, and broad and narrow proximally, a common character of species of Testudo.

The writer is indebted to Dr. O. P. Hay, of the American Museum of Natural History, New York, for critical suggestions relative to the specimens on which the present species is based.

Measurements.

	MM.
1st costal plate.	
Maximum thickness at centre of proximal end	7
Thickness of specimen at anterior suture	5
,, ,, ,, posterior ,, ...	4
5th costal plate.	
Thickness at proximal end of specimen	5
,, near distal end at anterior suture	5
,, distally near posterior suture	8
6th costal plate.	
Thickness at proximal end	8

This species is peculiar on account of the extreme narrowness and thickness of the 5th costal plate. The surface of the carapace bore a distinct pattern of grooves which were anteriorly at least arranged concentrically within the boundaries of the epidermal shields.

BAENA PULCHRA. Sp. nov.

Plate III, fig. 4, and plate IV, fig. 1.

The specimens on which this species is based were briefly described in 1902* by the writer who at that time referred them to *Baëna hatcheri,*** Hay, from the Laramie of Converse county, Wyoming.

Further study of the material has since led the writer to believe that it represents a new species and is not to be referred to *B. hatcheri*. Mr. J. B. Hatcher in his lately published report † on the "Vertebrate fauna of the Judith River beds," in remarks on the species *B. hatcheri*, has stated that "the material referred by Lambe to *B. hatcheri* should either be included in *B. antiqua*, or made the type of a new species." With regard to this statement there is little doubt that the Red Deer river specimens do belong to a new species, but they certainly are not referable to *B. antiqua*, Lambe, of which a large part of the carapace is known.

The specimens are from the Belly River (Judith River) beds of Red Deer river, Alberta, near the mouth of Berry creek, and were collected by the writer. They consist of the anterior half of the carapace with the entire plastron of a single individual (Cat. No. 1130), and of the anterior half of the plastron of another individual, of slightly larger size (Cat. No. 1196). The carapace is crushed and slightly displaced to the left and its left margin is damaged. Other specimens from the same locality and horizon

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*Geological Survey of Canada, Contributions to Canadian Palæontology, vol. III (quarto), pt. II, "On Vertebrata of the Mid-Cretaceous of the North-west Territory.

**Annals of the Carnegie Museum, vol. 1, 1901, "Description of a new species of Baëna (B. hatcheri) from the Laramie beds of Wyoming," by O. P. Hay.

† United States Geological Survey, "Geology and Palæontology of the Judith River beds" by T. W. Stanton and J. B. Hatcher with a chapter on the fossil plants by F. H. Knowlton, 1905. This report is in effect a corroboration of Dr. George M. Dawson's correlation in 1875 and later dates of the Belly River series of the Canadian west with the Judith River series of the upper Missouri, and of the conclusions published in 1902 in Contributions to Canadian Palæontology, vol. III (quarto), pt. II, by Henry F. Osborn and Lawrence M. Lambe.

that probably belong to this species are, a poorly preserved carapace (Cat. No. 1302) that has not been crushed nor distorted in any way and that therefore gives the natural convexity* of the upper surface, the right central part of another plastron (Cat. No. 1634), and the corresponding left portion of a fourth plastron (Cat. No. 1633) of a size somewhat larger than the others and of greater shell thickness.

The type of the Belly River species now described as new, under the above name, in the following paragraphs consists of the plastron (briefly described in 1902) with the front half of the carapace of one individual. Additional information is given relative to the plastron but the characters of the carapace are now published for the first time.

The carapace is flattened and therefore appears unnaturally broad although the front margin may still be considered to be broadly rounded. On the left side the first five costal plates are preserved, on the opposite side the 1st, 2nd and 3rd remain. In the median line are the 1st, 2nd and 3rd neural plates. The nuchal plate is succeeded on the right by the first six marginal plates, on the left by the first seven marginals of which the 3rd to the 7th are seen distinctly only in the lower aspect of the shell as they are injured above and are to some extent crushed under the distal ends of the costal plates. In plate III, figure 4, the carapace is shewn as seen from above, the epidermal shields being indicated by heavy lines and the sutures between the plates by faint ones. Marginal 1 is small and triangular in shape, but the succeeding ones present no unusual characters. The neurals are broader in front than behind and vary somewhat in outline. The 2nd and 3rd are roughly six-sided, the 2nd is nearly as long as broad, but the 3rd is considerably lengthened. The 1st neural is much broader in front than behind. It is of particular interest in that it is divided transversely, the division taking place well forward so as to separate it unequally into a short, broad front portion which is received into a concave emargination of the posterior border of the nuchal plate, and a hinder part that mainly separates the pair of 1st costals.

* In this carapace the height of the centre of the upper surface above the plane of the margin is about 50 mm.

The front part has an area somewhat greater than one-third of that of the combined bone. The 1st costal is almost triangular in shape, the 2nd broadens considerably at its distal end, the 3rd broadens but little distally, the 4th narrows slightly outward, and the 5th narrows very considerably towards its outer end

Of the epidermal shields the 1st vertebral is nearly twice as broad as long, and narrows rapidly toward the front. This shield is very different in shape from the corresponding one of *Baëna antiqua.* The 2nd and 3rd vertebrals, of which the 2nd is the smaller, are narrower in front than behind and their maximum length is about equal to their greatest breadth. The costal shields need special mention. A small additional shield is in line with the 1st vertebral in advance of the 1st costal as in *B. hatcheri* described by Hay. Also, between the 1st, 2nd and 3rd costal shields and the marginal ones occur other additional shields (supramarginals), narrow in comparison with their length, one between the outer ends of the 1st and 2nd shields, a second in a corresponding position between the 2nd and 3rd. The 1st, 2nd and 3rd costal shields instead of being square at their distal ends come to a point. The position of the accessory shields finds corroboration in the second carapace already mentioned. The margin of the carapace in front is indented at regular intervals, viz. where the sulci marking the boundaries of the marginal shields pass over the peripheral border. The marginal shields as seen from above are long and narrow. The proportions of the 4th vertebral and 3rd costal shields, as indicated in the figure by broken heavy lines, are taken from the second carapace in which also another supramarginal shield is partly shewn between the distal ends of the 3rd and 4th costal shields.

The plastron is longer than broad. The anterior lobe is shorter than the posterior one and is narrower, especially at its front termination. Its margin is sinuous in front, indentations occurring where the sulci reach the border. Well developed mesoplastral bones are present, meeting in the median line where they are narrow. The entoplastral is diamond shaped, and is nearly twice as long as broad.

There is a small divided intergular shield in advance of comparatively large gular ones, the intergular sulcus crossing the plastral lobe from side to side considerably in front of and in a general way parallel to the transverse gular sulci. Four inframarginal shields are present on each side.

Baëna pulchra is about half the size of *B. hatcheri*, from which it differs mainly in the proportions of the lobes of the plastron, the shape of the entoplastral plate and the disposition of the intergular and gular shields. A number of minor differences are seen in comparing the figures of the plastron. That the Belly River species closely approaches the Laramie form is evident and in *B. pulchra* we probably have the ancestor of the closely allied *B. hatcheri* and *B. marshi*, Hay. The presence of a divided 1st neural plate in *B. pulchra* is interesting. Two other Belly River species, *Trionyx foveatus*, Leidy, and *T. vagans*, Cope, have also been shewn by the writer to possess a corresponding divided plate. A detailed description of the carapace of *B. hatcheri* has been promised by the author of that species and possibly a full series of supramarginals, such as *B. pulchra* is seen to possess, may also be found in the former species. It may be interesting to note in this connection that the living species *Macroclemmys temmincki* (Alligator turtle) of the basin of the Mississippi and Missouri rivers has an additional series of about four supramarginals intercalated betweed the costal and marginal shields.

Other species of Chelonia from the Belly River series in Canada are *Trionyx foveatus*, Leidy, *Trionyx vagans*, Cope, *Adocus lineolatus*, Cope, *Basilemys variolosus* (Cope), *Baëna antiqua*, Lambe, and *Neurankylus eximius*, Lambe. Besides the above, three species from the same horizon, have been described from material collected by Dr. G. M. Dawson in 1874 (British North American Boundary Commission*) ; these are *Plastomenus coalescens*, Cope, *Plastomenus costatus*, Cope. and *Compsemys ogmius*, Cope.

After Leidy's description, with figures, of *Trionyx foveatus* was published in 1860, little was added to our knowledge of the shell of this species until 1902 when the writer's description of his

*"Report on the Vertebrate fossils from the Fort Union group of Milk River," Appendix B by Prof. E. D. Cope to "Report on the geology and resources of the region in the vicinity of the forty-ninth parallel" by G. M. Dawson, 1875.

Red Deer river specimens appeared † Previously the species was known from a few fragments of costal and sternal bones only ; the Canadian material has given us an almost complete knowledge of the structure of both the carapace and plastron.

A nearly perfect carapace of a species of Trionyx, and numerous large fragments of the shell of the same spieces, were obtained by the writer from the Belly River beds of Red Deer river near the mouth of Berry creek. These specimens were identified by him in 1902 ‡ with *Trionyx vagans*, Cope, and full descriptions with figures were given of the carapace. The figures, in the Contributions to Canadian Palæontology, showing the details of sculpture are from photographs and may be considered as good examples of reproduction by the heliotype process. Mr. Hatcher in his report on the Vertebrate Fauna of the Judith River beds, 1905, expresses doubt as to the correctness of the identification of the Red Deer river specimens with *T. vagans*, Cope, of the Laramie. The distinctness of the Laramie and Belly River (Judith River) faunas as proved by recent work on the fossil remains of the Belly River series is in favour of the Belly River species being distinct from *T. vagans*. If however the Belly River Trionyx in question is to be proved to be specifically distinct from *T. vagans* structural differences other than those of the surface sculpture as shewn in Cope's type will have to be relied on. The following sentences appear in Mr. Hatcher's report : "By reference to his (the present writer's) figures, however, it will be apparent to all that the specimens described by Lambe pertain to a species distinct from *T. vagans*." "According to Lambe's figures the ridges on the surface sculpturing, instead of being 'thin and much narrower than the intervening pits,' as described by Cope, are heavy and broader than the intervening pits." This the present writer cannot agree with nor can he depart from his original statement that the ridges of the surface ornamentation are narrower than the pits as seen in the specimens themselves and as shewn in the photographic figures accompanying his descriptions. In 1902, through the courtesy of Professor H. F.

†Geol. Survey of Canada, Summary Report for 1901, p. 81, pls. I and II, 1902, also Contr. to Canadian Palæont., vol. III (quarto), pt. II, 1902.

‡ Ibid.

Osborn and Dr. O. P. Hay, of the American Museum of Natural History, New York, who kindly lent the type of *T. vagans*, the writer was able to compare it with the Red Deer river material. This type consists of a small fragment, about two inches long, of a costal bone in which it would be difficult to point out any reliable differences between its surface sculpture and that of the Red Deer river specimens. The original description of the species by Cope is necessarily meagre. It does not seem to be so clear, therefore, as Mr. Hatcher's remarks might lead readers of his report to suppose, wherein lie the differences between the Belly River form and *Trionyx vagans* from the Laramie.

The types of *Adocus lineolatus*, Cope, were, according to Mr. Hatcher,† "almost surely secured from the Laramie." They are fragmentary as are also the specimens obtained from the Belly River formation in Canada by the writer who, in 1902, in Contributions to Canadian Palæontology referred them to Cope's species. In comparing the types with the Canadian material the only character available is the surface sculpture in which there is so great a similarity that, for the present at least, it appears best to use the name of Cope's species for the Canadian specimens, until other characters are obtained to prove or disprove the correctness of the present writer's identification.

The plastron of *Basilemys variolosus* (Cope) is now well known from the material obtained by the writer, from the Belly River beds of Red Deer river, Alberta, and described and figured by him in 1901* and 1902**. Cope's description, based on material from Montana, was given in general terms, and published without figures, which may account for the slight notice that this large rugosely sculptured tortoise had apparently attracted.

Baëna antiqua and *Neurankylus eximius* are two other species, from the Canadian west, described and figured by the writer in 1902 (Contributions to Canadian Palæontology) from material secured on Red Deer river in the vicinity of Berry creek. Addi-

† Vertebrate Fauna of the Judith River beds, 1905.

* Ottawa Naturalist, vol. XV, p. 63, pls. III, IV, V and VI.

** Contr. to Canadian Palæont., vol. III (quarto), pt. II.

tional information regarding the structure of the shells of these forms would be most welcome.

The type of *Plastomenus coalescens* is in the museum of the Geological Survey at Ottawa, and consists of part of the plastron (not parts of the plastron and carapace as stated by Cope in his original description, and by Hatcher* in his remarks on the type material) of a species that will probably prove to be identical with the Belly River series Trionyx that the writer has identified with *T. vagans*, Cope. Dr. O. P. Hay, of the American Museum of Natural History, New York, found, in 1901, undoubted contact between the piece that had been described as belonging to the carapace and the larger portion that had been rightly considered as part of the plastron, the complete specimen representing a considerable portion of the right hyo—and hypoplastral bones with the sutural division between them clearly indicated.

The types of *Plastomenus costatus*, Cope, and *Compsemys ogmius*, Cope, are also in the museum of the Geological Survey at Ottawa.

The material on which *P. costatus* is based is very fragmentary but the sculpture shewn on part of a costal bone is quite different from that of any species from this horizon known to the writer. The sculpture will no doubt prove to be sufficiently characteristic for the identification of any additional parts of the carapace that may be discovered.

Compsemys ogmius, Cope, (type specimens at Ottawa) is, as was pointed out by the writer in 1902,** probably identical with *Basilemys variolosus* but the specimens are fragmentary and so poorly preserved, although Mr. Hatcher in his 1905 report referred to them as "fairly good material," that the specific name *ogmius* has not been made use of by the writer. The name *variolosus* is identified with well preserved material representing the greater portions of both the carapace and plastron. The name *ogmius* has been used in connection with the description of two small and poorly preserved weathered fragments of the shell of a species that

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* Geology and Palæontology of the Judith River beds, 1905, p. 74.

** Contr. to Canadian Palæont., vol. III (quarto), pt. II, 1902.

cannot with certainty be referred to *B. variolosus*. If *Compsemys ogmius* and *Basilemys variolosus* could be proved without doubt to be identical, the name *ogmius* would have priority.

EXPLANATION OF PLATES.

PLATE III.

Figure 1. Distal half of left 5th costal plate of *Testudo exornata*, as seen from above; natural size. Type.

Figure 2. View of upper surface of proximal end of left 6th costal plate of same species; natural size.

Figure 3. View from above of proximal end of left 1st costal plate of same species; natural size.

Figure 4. Anterior half of carapace of *Baëna pulchra*; viewed from above; one-half the natural size. Type.

V, vertebral shield; *C*, costal shield; *SM*, supramarginal shield; *n*, neural plate; *c*, costal plate; *m*, marginal plate.

PLATE IV.

Figure 1. Plastron of *Baëna pulchra*; viewed from below; one-half natural size. Type.

IG, intergular shield; *G*, gular shield; *HUM*, humeral shield; *PEC*, pectoral shield; *IM*, inframarginal shield; *M*, marginal shield; *AB*, abdominal shield; *FEM*, femoral shield; *AN*, anal shield; *ep*, epiplastral plate; *entp*, entoplastral plate; *hyp*, hyoplastral plate; *msp*, mesoplastral plate; *hpp*, hypoplastral plate; *xp*, ziphiplastral plate; *m*, marginal plate; * centre of front margin of carapace.

The American Association for the Advancement of Science publishes an annual volume of proceedings which is received by all members of the Association. The weekly journal, "Science," is also sent free of charge to all members. The annual volume contains about 2,000 pages, and includes most of the best scientific work of America. Any person may become a member of the Association upon the recommendation of two members. The admission fee is five dollars and the annual dues three dollars.

A NEW NORTHERN ANTENNARIA.

By EDWARD L. GREENE.

ANTENNARIA ATHABASCENSIS. Stout and low, the pistillate plant at flowering only 2 to 2½ inches high, the spread of the depressed and rosulate foliage in some approaching 3 inches: leaves subcoriaceous, spatulate-obovate, very obtuse, without evident mucro, the peliolar basal part not at all well differentiated and short, upper face dull pale green, glabrous except as to some rolls of light loose flocculent or cottony wool along the margin, beneath densely silvery, tomentose, some of the tomentum projecting beyond the edge of the leaf and appearing from above as a white margin to the leaf: infloresence of 3 to 5 large sessile heads: involucre loosely tomentose at base, the bracts all with very long white tips, the outer broad and nearly truncate, the next narrower and acutish, the inmost series fairly subulate and exceeding all the others in length: male plant not seen.

Fort Chippweyan, Athabasca, 4 June, 1903, Edward A. Preble; type specimens in U. S. Herb. A very strongly marked member of the group of *A. neglecta*, but a coarse and stout plant as to habit, though low in stature. The heads are as large as those of the Rocky Mountain *A. aprica*, but in character very different from those of that species.

THE SWAN SONG OF THE LEAVES.

By MARY ELIZABETH MCOUAT, B.A.

These leaves that redden to the fall.—*Tennyson*.

Among the more commonly observed phenomena of nature it is doubtful if there is any more commonly misunderstood than the coloring and fall of leaves in autumn. When the plain green of summer changes so suddenly to gold and crimson most people take it for granted that the frost is responsible for the transformation. But anyone who will take the trouble to think a little will see that this is a mistake. It is in August, long before the frost comes, that the red maple "crimsons to a coral reef," and it is in years when the frost comes late that the leaves color most beautifully.

It is true that the autumn colors, with all their beauty, are those of death and decay. They are in fact the swan song of the leaves. But this death and decay are not due to frost. The leaves know that their hour has come without any such reminder, and of their own accord, as it were, they prepare in truly royal fashion to leave the stage.

In this preparation there is a general breaking up of the elements which compose the foliage, and this is what causes the change of color. Yellow, the commonest of the autumn colors, is produced by the decomposition of the summer's green. The chlorophyll, which imparts this green color to all plants, is made up of two substances, one bluish and the other yellow, and in autumn when the leaf is getting ready to die, these two substances are separated. The blue disappears and the yellow remains to give its color to the foliage.

The origin of the red color is not so well understood, but it is believed to be produced by the waste mineral matter which collects in the tree during the summer. This is taken up by the roots in the water which it is their business to supply to the tree, and is stored chiefly in the leaves, where it is very much in the way, but partly through the whole tree. Now before the leaves fall the tree takes from them everything it wants to keep and gives to them everything it wants to get rid of, and the collection of all this waste matter in the leaves has much to do with their coloring. For this reason the color is most beautiful after a rainy summer, provided the fall is of the right kind. In rainy seasons there is more water for the roots to take up, and the more water taken into the tree, the more waste matter is stored up to color the leaves in fall.

The only color that the frost has anything to do with is dark brown. When the delicate cells of the leaves are frozen they die and turn brown.

With the fall of the leaf the frost has equally little to do. Trees shed their leaves in countries where it never freezes, and in the North a great many fall before the frost comes. Neither is it the autumn winds that make them fall, though both they and the frost help a little. A wind strong enough to blow the leaves off would take the twigs too and very likely uproot the tree.

The leaves fall simply because the tree cuts them off. They have done their work and are no longer needed. The tree does not eat during its winter sleep and therefore does not need the food that the leaves manufacture, and though it always has to breathe, it can breathe through its roots and bark, just as animals can breathe through their skins. So it casts aside its useless leaves as a woman discards her summer gowns, cutting them off silently and without observation, but as surely and smoothly as they could be cut with a sharp knife.

Besides being useless the leaves would also be dangerous if left on during the winter, as they would catch the snow and wind and thus cause the breaking of twigs and branches. Sometimes an early snow finds the trees unprepared, and then they are sure to suffer severely The snow collects on the leaves and the weight breaks off great branches as thick as one's arm. This would happen every year if the trees had not learned to take off their summer clothes in good time.

The cutting-off process begins when summer is at its height. As early as the dog days the trees begin to grow some cork cells between the leaf stem and the twig. This is to prevent an open wound when the leaf falls, for a tree can be wounded just like an animal. Then above the cork cells they grow a layer of another kind of cells. This is called the layer of separation or cutting-off layer, and can easily be seen on the blackberry, for instance, where it forms a yellowish green ring on the purple leaf stalk. There are three rows of cells in this cutting-off layer, and after a while the middle one dissolves into a kind of mucilage, so that nothing is left to hold the leaf to the twig except some woody threads which pass through the cutting-off layer and the layer of cork. Then the cells that are left begin to swell and push the leaf stem from the twig, until at last a puff of wind or a frosty night snaps the threads and the leaf falls to the ground.

The reason frosty nights help is because they freeze the water in the cutting-off layer. The resulting expansion causes the threads that still hold the leaf to the twig to break and as soon as the ice melts in the morning it falls. After frosty nights in the late fall, therefore, there is apt to be a great fall of leaves. That is why people think that the frost makes them fall. But if the trees had not almost cut them off before, the frost would not do it, and a great many fall without either frost or wind.

After the leaves have fallen some trees cover up the ends of the broken threads with gum, as in the case of the horse chestnut. Here the cork cells that grow at the base of the leaf stalks are shaped something like horseshoes, and the gum-covered ends of the broken threads look like nails in the horseshoe.

NOTES ON SOME BRITISH COLUMBIA MAMMALS.

By WM. SPREADBOROUGH.

The mammals enumerated below were collected or observed along the International Boundary :

BLACK-TAILED DEER—From the Skagit River to the coast. Common on the monntains just west of the Skagit.

MULE DEER--Common from Elko to the Skagit. A few seen west of the Skagit

WESTERN WHITE-TAILED DEER—Common in the valleys along streams from Midway to the Skagit.

DOUGLAS SQUIRREL—A number seen in the Skagit valley. Common from Chilliwack Lake to the coast.

SAY'S SQUIRREL—Very abundant about timber line on the mountains just west of the Skagit and from Princeton to the Skagit.

MOUNTAIN GROUND SQUIRREL—Very abundant from Midway to Sidley's near Lake Osooyos.

YELLOW-BELLIED MARMOT—Common from Cascade to Nine-mile Creek. A few seen about five miles west of Rossland.

HOARY MARMOT—Common on nearly all the high mountains from the south fork of the Salmon River to the coast.

APLODONTIA, "Mountain Beaver" — Common from the Skagit to Sumas Lake,

BEAVER—Saw a number of fresh signs along the Skagit from the Lake House to the boundary. Only one seen.

BUSHY-TAILED RAT—From the south fork of the Salmon River to the coast.

MUSK RAT– Observed from Midway to Osooyos Lake, and from Sumas to Blaine.

POCKET GOPHER—Common from Lost Creek to the summit of the Hope Mountains. A few in the Skagit valley.

POCKET MOUSE—Common at Osooyos Lake in the sage and other low bushes.

MEETINGS OF THE BOTANICAL BRANCH.

The first meeting of the Botanical Section of the Field-Naturalists' Club for the season 1905-6 was held at the residence of the undersigned. Those present were Dr. Fletcher, Prof. John Macoun, Dr. Blackadar, Dr. Ami, Messrs. James Macoun, Attwood, Campbell, R. B. Whyte, and the writer. Although no programme had been prearranged, there were enough interesting questions brought forward to keep all busy in a lively discussion. Mr. Whyte read an article from the "Rural New Yorker" on Luther Burbank, the "wizard of horticulture," in which it was stated that the praise given to him as being a creator of new species, etc., is exaggerated and distorts his achievements and merit; that he is simply a skillful plant breeder and a sincere lover of plants who achieves his successes much on the same lines on which plant breeders have scored successes before him, only his experiments are carried on on a much greater scale. Mr. Whyte and most of those present concurred in this view. In connection herewith it was said that DeVrie's mutation theory was superfluous and useless, and that his "mutations" were simply the *varieties* of other botanists. The origin of the balls of spruce needles sometimes found in or near water was commented upon. Some held they were formed by the wave motion in lakes in shallow water near the shore, others thought they were formed by eddies in pockets or holes in the beds of streams. Dr. Fletcher exhibited a cross-section of a *Eucalyptus* sapling four years old, which, however, showed a number of secondary rings between the four principal year-rings. The consensus of opinion was that these minor rings seemed to show the record the tree kept in its growth of times of drought and abundant rainfall. This brought up the question, whether the rings in a red beet are of similar origin as those in a tree or not, and as to the difference in structure between that vegetable and similar ones, like the carrot. Another question which was variously answered was, why the tamarack sheds its leaves and other conifers do not. These two questions were given to Messrs. Campbell and J. M. Macoun respectively to look up and report on at the next meeting.

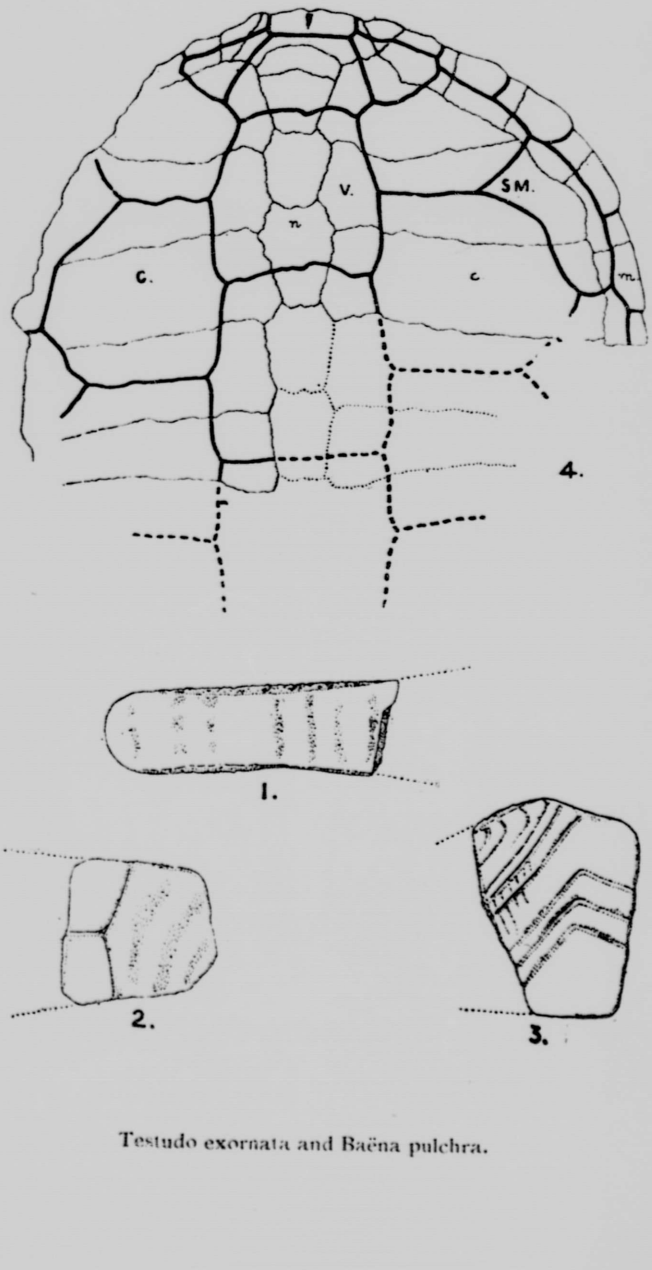
A collection of mounted plants made this year by the writer was shown for inspection in which two specimens proved of some interest, namely, *Gallium verum*, Yellow Bed-straw, which had been found in a very restricted locality by Mr. Whyte twenty-five years ago, and not since then; and *Monarda didyma*, Oswego Tea, from High Falls, Labelle Co., Quebec, new for the district. An interesting collection made by Mr. W. H. Harrington was shown by Dr. Fletcher.

G. EIFRIG.

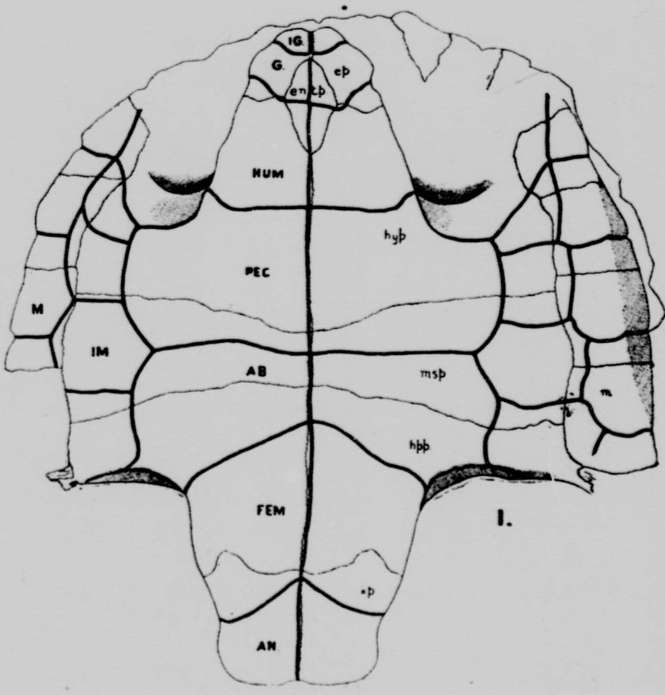
The second meeting of the Botanical Section was held at the residence of Mr. J. M. Macoun on Dec. 14th, the members present being Messrs. Eifrig, Whyte, Attwood, T. E. Clarke, Campbell and Prof. John Macoun. Some time was spent in examining specimens collected near Ottawa by the Rev. G. Eifrig. Messrs. Campbell and J. M. Macoun read several extracts referring to the falling of the leaves of coniferous trees, the conclusion arrived at being that the foliage-leaves of most conifers are very persistent and may live for several years, but that they do not fall at fixed periods; the leaf cushions keep pace in growth for a long time with the increase in size of the axes. In *Larix* and *Salisburia* the leaves alone are deciduous each autumn, in *Taxodium distichum* the axes that bear them are also deciduous.

The discussion of the structure of a beet-root, begun at the previous meeting, was resumed but no satisfactory conclusion was arrived at.

J. M. M.



Testudo exornata and Baëna pulchra.



I.

Baëna pulchra.

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