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Yours truly
George M. Dawson

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NOTE ON A SUPPOSED NEW SPECIES OF LYTOCERAS FROM THE CRETACEOUS ROCKS AT DENMAN ISLAND, IN THE STRAIT OF GEORGIA.

By J. F. WHITEAVES.

In 1871 Mr. James Richardson, then of the Geological Survey of Canada, collected a fragment of the inner whorls of an Ammonite with numerous slender and finely costulate volutions, a wide, open umbilicus, and rounded venter, from the Cretaceous rocks at Norris Rock, south of Hornby Island, in the Strait of Georgia. This specimen was described by the writer, referred with a query to *Ammonites Jukesii*, Sharpe, and figured, in the second part of the first volume of "Mesozoic Fossils," published in 1879. The type and only known specimen of *A. Jukesii*, it may be mentioned, is a mere fragment from the "hard Chalk of the county of Londonderry," Ireland, described and figured by Sharpe in his monograph of the Cephalopoda of the Chalk, published by the Palæontographical Society of London in 1853.

Much larger, more perfect and beautifully preserved specimens of the same shell as the specimen from Norris Rock, were collected at Denman Island, near Hornby Island, four in 1892 and three in 1895, by Mr. Walter Harvey, who also obtained a characteristic fragment at Hornby Island in 1892. Three of these specimens from Denman Island are now in the Museum of the Survey, and two of them were described by the writer, under the name *Lytoceras Jukesii* (Sharpe), and figured, in a paper "On some Fossils from the Nanaimo group of the Vancouver Cretaceous," published in the Transactions of the Royal Society of Canada for 1895.

When this paper was written, the writer had not seen the first part of Dr. Kossmat's memoir on the Chalk formation of Southern India, published at Vienna in 1894, in which the supposed *A. Jukesii* from Norris Rock is placed among the synonyms of *Lytoceras* (*Gaudryceras*) *Kayei* (Forbes.) On receiving a copy of this publication, it seemed to the writer that the large and fine specimens from Denman Island that had been referred to *L. Jukesii* present several points of difference from the *L. Kayei*, as therein figured, and one of the best of the Denman Island specimens was sent to Dr. Kossmat, for comparison with the Indian species. The conclusions arrived at on this point by Dr Kossmat, after this comparison had been made, and as embodied in a letter to the writer, dated March 9th, 1896, are as follows:

"Your *Lytoceras Jukesii* must be distinguished from *L. Kayei*, as you already supposed. "Specimens that are not full grown (as that figured in Mesozoic Fossils, vol. 1, pt. 2, pl. 13) agree remarkably well with all the Valudayur specimens seen by me, and it would be quite difficult to distinguish them. "But, in the adult state, the Denman Island specimens are quite different. "The body chamber of *L. Kayei*, as shown in Plate 3, fig. 2, of my publication, is ornamented with very delicate striæ, even thinner than in the inner whorls, and of almost silky appearance; whereas, on your *L. Jukesii* the ribs of the last volution become very strong and sharp, and are separated by broad intervals. "There is no doubt that such specimens are very similar to *Lytoceras* (*Gaudryceras*) *Jukesii*, Sharpe, but considering the incompleteness of Sharpe's type specimen, their identification with it will always be disputable. "Judging from the figure and description of Sharpe's specimen, the ribs of the type of *L. Jukesii*, in middle stages of growth, are sharper, somewhat more distant, and not so strongly curved forward on the sides; the increase of the whorl in thickness is more rapid, and the whorls are perhaps less numerous. "I think that it will be best to give a new name to the fine specimens from Denman Island. "Their septa are typical *Gaudryceras* septa, with descending auxiliary lobes."

The writer, accordingly, begs to propose for these specimens, which have already been described somewhat in detail and figured, the provisional name of *Lytoceras* (*Gaudryceras*) *Denmanense*.

Ottawa, April 16th, 1901.

THE SOURCES AND DISTRIBUTION OF THE GOLD-BEARING ALLUVIONS OF QUEBEC.

By R. CHALMERS, Geological Survey of Canada.

(Read before the Club, March 19th, 1901.)

The few remarks which I have to offer this evening, refer to the gold-bearing river gravels of south-eastern Quebec, in the Eastern Townships and County of Beauce. Alluvial gold has been found here in the valleys of the two principal rivers which drain the region, the Chaudière and the St. Francis. In the bottoms of the valleys along which these rivers and their tributaries flow, it occurs in scattered grains and nuggets in the gravels and sands and frequently in crevices in the underlying rocks. It is, however, most generally found in paying quantities in old river channels now partially or wholly filled with boulder-clay, these often being at a lower level than the present water-courses, and usually on one side or the other, though in the same valley. The general succession of the deposits in these river valleys is much the same throughout the region, and is as follows in descending order, (fig. 1):

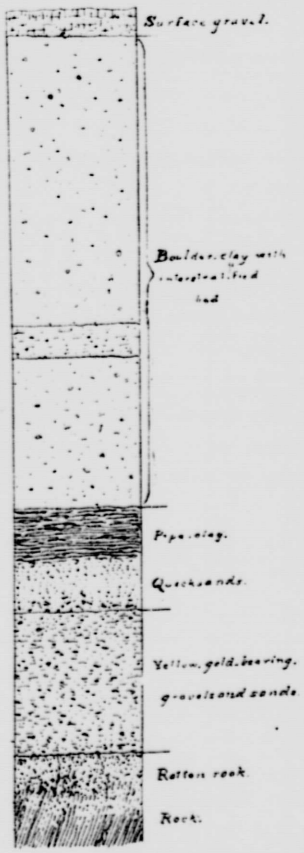


Fig. 1. General Section of the Gold-Bearing Deposits.

1. Surface gravel and sand, carrying fine gold in places.

2. Boulder-clay, including in some valleys, an interglacial deposit.

3. Stratified clay and sand, often in alternate beds; "the pipe clay" and "quick-sands" of the miners.

4. Stratified gravels, usually rusty, or oxidized, the materials belonging to local rocks. Gold-bearing, especially in lower strata. Gold often coarse.

5. Rotten rock, contains particles of gold.

6. Decomposing rock surface, uneven, non-glaciated. Gold in the crevices.

It is in division 4, the lowest member of the stratified beds, that the gold is found in greates quantity, though often met with in the overlying series, as well as in the decomposed rock beneath. Where these stratified, oxidized gravels rest on the bed rock, the gold is most plentiful in the lowest strata, and in the clefts, or between the folia, of the rocks.

The enquiry as to the origin of these gravels and how they came to be gold-bearing takes us back to an early period in the geological history of the region,—soon after it emerged from beneath the sea and became dry land. Subaerial denudation then began and has been in incessant operation ever since. About this time the larger rivers probably had their origin and began to carve out their valleys. Throughout the long ages which have intervened since, these forces of nature, under varying conditions, have been wearing away and reducing the surface of the land. This reduction has been unequal because of the unequal hardness of the rocks, and the difference in their power of resisting erosion. The degradation from these agencies must have been enormous, amounting to several hundreds, perhaps several thousands, of feet, entirely changing the appearance of the country, the existing residual forms of relief being, in no small degree, the result of this wear and waste of the land surface. Regional and orogenic movements have taken place during these ages, the effects of which are evidenced by uplifts and downthrows in several places and in the dislocation of the river valleys; but no cessation in the action of the decomposing and transporting forces seems to have occurred till a much later period, when it was interrupted by the ice age.

Coming down to the Tertiary period we can, perhaps, form some conception of the appearance of this region then, though in an imperfect degree, if we suppose it stripped of all the boulder-clay and overlying deposits. Except on some of the more prominent hills and summits, the surface of the rocks would be mantled by a thick sheet of its own debris. On the slopes and in the river valleys this material would be largely denuded and portions of the decomposed rock would form stratified beds, especially where it

had undergone transportation and modification by the action of rivers and streams. Prolonged shifting of the gravels and their gold content in this manner, assorting and reassorting the materials and the sifting out of the least weighty, allowing the gold and other heavy particles to settle to the bottom—were the processes which brought about the conditions which we now find existing as regards these auriferous deposits.

In the glacial period which followed, these river beds were buried beneath sheets of boulder-clay. The thickness of the boulder-clay in the Chaudiere valley is 100 feet or more. The ancient valley of the Gilbert was likewise filled with it to a depth of 25 to 50 feet.

On the withdrawal of the ice of the glacial period the rivers began to clear out their ancient channels cutting down into the boulder-clay and other beds, and in many places eroding the gold-bearing gravels beneath, and once more exposing them to view. But in some valleys, as for example in that of the Gilbert, the river was diverted from its original channel and caused to form a new one, and the auriferous gravels in the pre-glacial channel have thus been preserved from erosion. In these valleys the ancient channel is generally at a lower level. The pre-glacial channel of the Gilbert is from 30 to 85 feet below the bed of the present river in that part wrought for gold, and from 100 to 400 feet or more to the south of it. All the river valleys have, however, undergone dislocations during and since the glacial period, so that while some parts of a pre-glacial river channel may be considerably lower than the present one, in other places it is not.

From all the facts which have been obtained it would seem that the alluvial gold is entirely of local origin, that is, the gravels and the gold they contain belong to the rocks of the particular valley in which we now find them. But just from what rocks the gold came, whether from the pre-Cambrian or Cambrian or both is by no means evident. There is no question but that it is derived from some of the quartz veins in the vicinity of where it now occurs; but as little or no quartz mining has been carried on, no new facts were obtained by us which would elucidate the problem. Logan and Hunt regarded the gold as belonging to the oldest rocks of the region, that is to the crystalline schists of the Notre

Dame range. But the gold of southeastern Quebec is not confined to the oldest rocks. Though occurring in these, it is also found in quartz veins which traverse Cambrian slates. Indeed, the largest quantities of alluvial gold have been obtained in districts occupied by these slates, where they are cut by diorite dykes, a fact brought out by Ells. On the supposition that the original source of the precious metal is in the pre-Cambrian schists, however, these, in their disintegration and waste, may have yielded gold to the sediments which, doubtless, entered into the composition of the Palæozoic rocks. This gold would be in a fine state of division, but would be concentrated in the quartz veins at a later date.

The total gold production of southeastern Quebec, as been valued at two millions to two and a quarter million dollars. Of this amount probably from one million and a quarter to a million and a half dollars worth have been taken from the Gilbert river beds alone. Ditton is said to have yielded from seventy-five to one hundred thousand dollars. The remainder has been obtained from the gravels of Du Loup, Famine, Des Plantes and Mill rivers, tributaries of the Chaudière, and from Dudswell, Magog, etc., on the St. Francis.

A NEW HORSE GENTIAN.—In the March number of *Torreya*, Dr. Bicknell describes a new species of *Triosteum* which he names *T. aurantiacum*. An examination of the specimens in the herbarium of the Geological Survey shows that while those from Western Ontario are *T. perfoliatum* those collected at Casselman, near Ottawa, are *T. aurantiacum*. Though there are many striking differences between the two species, the most obvious one is to be seen in the main leaves "which broadly perfoliate in true *perfoliatum* are in the new species conspicuously narrowed into a merely sessile base." As the two species have much the same range *T. perfoliatum* should be looked for in this vicinity.

J. M. M.

ALLIES OF *STELLARIA MEDIA* (L.) Cyrillo.

By THEO. HOLM.

(With two plates.)

Plants as common as the "common Chickweed" are seldom collected by botanists, very seldom studied, and as a rule, but poorly represented in herbaria. Authors of manuals, especially in North-America, have usually paid very little attention to the plant, and no variety or subspecies has, so far, been recorded from Canada or the United States. Being considered as a weed infesting gardens, and being so very abundant everywhere in damp soil, it has escaped attention in this country, although other plants of similar frequent occurrence, and with much the same behaviour as weeds have been granted a good deal of attention, and have been treated quite elaborately by systematic botanists. But *Stellaria media* appears always to be the same, a single species with no characteristic forms or varieties appended, yet it is recognized as being equally common in the boreal and temperate regions of both the old and new world, and to produce its flowers from earliest spring to late autumn or sometimes even throughout the winter.

Judging from a geographical range such as this, one would naturally suspect that the species would hardly be equally uniform and constant in appearance, as it is noted to be common nearly everywhere. We all know that it may be met with in our wanderings through woods and thickets, along borders of creeks, in old river-bottoms, very often remote from inhabited places, yet it is always looked upon as an introduced plant of no interest whatever. Whether it was introduced to this country from Europe or Siberia, no one knows, but the probability is, that it has existed on the Pacific Coast a sufficient time to develop into several varieties, or perhaps even subspecies with power to spread towards more distant regions in eastern direction. It would be interesting to know something about its geographical distribution in the boreal parts of America, where it, no doubt, extends beyond the Arctic circle as it does in Siberia and Europe, Russia for instance; that it extends from the Pacific

to the Atlantic in the British provinces, has been recorded in Professor Macoun's Catalogue of Canadian plants, and it shows a similar wide range in the United States, even as far south as from California to the coasts of Florida. But it does seem strange that we actually know so little about this plant in America, and that no one has, so far, attempted to illustrate the species as it occurs in the north and south, east and west, in cultivated grounds, in woods, thickets, etc., instead of being contented with the idea that it is always the same introduced "common Chickweed."

In Europe the plant is known much better. Already Linnæus distinguished between "pentstemon" and, "decastemon" as two forms of the species, both of which were then figured in Flora Danica by M. Vahl and O. F. Mueller (1769-70); the locality for "pentstemon" is given as everywhere in cultivated grounds, while the other is said to be frequent in springy places. A corresponding variation in the number of stamens from 3 to 10 is, furthermore, recorded by Lightfoot[1] and Rafn.[2] Meanwhile Father Bernardinus of Ucria[3] described an apetalous *Stellaria*, which he consequently named *S. apetala*, and which in many respects looks like a depauperate or abnormal form of our Chickweed. This is the plant which Dumortier[4] described as *Alsine pallida* and Jordan[5] as *Stellaria boræana*, and which Piré[6] finally figured under the name *S. pallida*. "Pentstemon," "Decastemon" and "apetala" thus signify two distinct plants of which the two first were at that time supposed to represent *Stellaria media*, while "apetala" was a species distinct from this. However, some years later we find the Linnæan form "decastemon" elevated to specific rank as *Stellaria neglecta* Whe.,[7] a suggestion

[1] Lightfoot, John. Flora Scotica. 1777, p. 172.

[2] Rafn, C. G. Danmarks og Holsteens Flora, 1800, p. 381.

[3] Father Bernardinus of Ucria. Plantæ ad Linnæanum opus addendæ et secundum Linnæi systema noviter descriptæ. "Rœmer's Archiv für die Botanik," Vol. I, 1796, p. 68.

[4] Dumortier B. Prodromus floræ Belgicæ, 1827, p. 109.

[5] Jordan, A. Pugillus plantarum novarum, 1852, p. 33.

[6] Piré, Louis. Notice sur *l'Alsine pallida* Dmtr. "Bull. de la soc. Roy. de Botanique de Belgique," Vol. 2, 1863, p. 43.

[7] Weihe in: "Bluff et Fingerhuth: Compendium floræ Germaniæ," 1825, Vol. 1, p. 560.

that was followed by several botanists, among them Elias Fries,[8] who recorded it from Sweden and Denmark, and Babington,[9] who reported both this and *S. pallida* from the British Isles. There are not a few authors, however, who have felt more inclined to consider these plants as representing a single species, "*S. media*" with the others as merely varieties. Thus Fenzl[10] enumerates three varieties, *decandra*, *oligandra* and *apetala*, besides four others, which are less characteristic; a similar classification is given by Lange, [11] who distinguishes between var. *vulgaris* with 3-5 stamens, var. *neglecta* with 10 stamens and var. *apetala* without petals, or as suggested by Dœll[12] var. *decandra* and var. *apetala*.

Stellaria media is, thus, with European botanists the plant with 3-7 stamens, *S. neglecta* the one with 10 stamens and *S. apetala* with 2-5 stamens, but with no petals. Of these the typical form has been described as being very frequent in North-America, while none of the others have been cited. It would, however, be desirable to know a little more about this plant as it is represented in this country, and we thought therefore, that some more information might be obtained by presenting this brief notice about the European plant with its allies, whether these be considered as varieties or species. And there is good reason for supposing that the species, *S. media*, in this country is actually an aggregate of several well defined forms or even species, which may naturally be looked for in the cold temperate regions or farther south. So far the writer has succeeded in detecting Weihe's *S. neglecta* in the vicinity of Washington, D.C., where it grew in shady places in deciduous forests, moreover, some specimens in Dr. E. L. Greene's herbarium, collected in California proved to be this species, besides that the herbarium of the Geological Survey Department of Canada, contains several

[8] Fries, Elias. Corpus florarum provinciarum Succiæ I. Flora Scanica. 1835, p. 88.

[9] Babington, C. C. Manual of British Botany, 1874, p. 57.

[10] Fenzl in "Ledebour's Flora Rossica." 1841, Vol. I, p. 377.

[11] Lange, Joh. Haandbog iden Danske Flora, 1864, p. 342.

[12] Dœll, I. Ch. Flora des Grossherzogthums Baden, Vol. 3, 1862, p. 1224.

specimens of the same from British Columbia, Manitoba and Sable Island.* As regards *S. apetala* we have seen no specimens from North America, but it would be very strange if this should not be found here also.

In order to facilitate the identification of *S. apetala* and *S. neglecta*, we have thought it worth while to illustrate these besides giving a few notes upon their principal characteristics.

Stellaria apetala Bernard. (Plate 1, fig. 1.)

This has the general aspect of ordinary forms of *S. media* in regard to the leaf-shape and inflorescence, but it is pale green and the flower has no petals; however, rudimentary petals may occasionaly be found in the earliest developed flowers; the number of stamens varies from two to five, and the styles (fig. A.) are diverging horizontally from near the base, while in *S. media* (fig. B.) the styles are erect and only recurved at the apex. The seeds are of a pale yellowish-brown colour, minutely tubercled like those of *S. media*. The figure (1.) is drawn from a Swedish specimen, natural size.

S. neglecta Whe. (Plate 2, fig. 2.)

Generally taller, but more slender than *S. media*, deep green. The lower leaves have long petioles (fig. C) and the blade is very distinctly pointed in contrast to the leaf of *S. media*; the inflorescence is more lax and the flowers are borne on long, very slender peduncles, which bend downwards after the flowering, but become erect soon after the seeds have fallen. The petals are as long as the calyx or even a little longer, while they are shorter than the calyx in *S. media*. The stamens are ten in number, but the styles are erect with recurved apex, as in *S. media*. The seeds (fig. D.) are larger than those of *S. media* (fig. E) and the tubercles are much more prominent and often cone-shaped. The figure (2) is drawn from a specimen collected near Washington, D.C. *S. neglecta* is, according to Murbeck,[13] a well marked type in North and Middle Europe, but specimens from the Mediterranean,

* These specimens are labeled: Cedar Hill near Victoria B.C.; Burrard Inlet B.C.; Killarney Man.; Sable Island, N. S.

[13] Murbeck Sv. Die nordeuropæischen Formen der Gattung *Stellaria*. Botaniska Notiser. Lund. 1899, p. 193.

for instance North Africa, are less distinct, passing gradually over into *S. media*. Dr. Murbeck feels, therefore, more inclined to consider *S. neglecta* as a subspecies of *S. media*, rather than an independent species. While the plants from Washington and Canada show the characteristic habit of Swedish and German specimens, we must state, however, that the seeds of our specimens did not show the tubercles quite as prominent as we observed in the European plant, of which the seed (fig. D) has been illustrated.

These characters seem sufficient for distinguishing these plants, but it would be interesting to know whether *S. apetala* occurs in this country, and whether the characters are constant. It may be that *S. neglecta* is more typically developed in the northern countries than in the south. In regard to the flowering-time, *S. media* is known to bloom and produce seeds nearly throughout the year thus several generations may appear in the same year under favourable conditions. *S. apetala* and *S. neglecta* are, on the other hand, known only to bloom in the spring, and their seeds do not germinate until the following autumn, as has been observed in Europe. Our specimens from Washington of the latter were, however, collected in the last week of September with ripe seeds and a very few flowers, which might indicate a second generation.

EXPLANATION OF PLATES.

Plate 1, fig. 1.—Flowering specimen of *Stellaria apetala*, Bernard. Natural size.

Fig. A.—Pistil of same.

Fig. B.—Pistil of *S. media*.

Plate 2, fig. 2.—Inflorescence of *Stellaria neglecta*, Whe. Natural size.

Fig. C.—Stem-leaves of same, natural size.

Fig. D.—Seed of same, magnified.

Fig. E.—Seed of *S. media*, magnified.

NEW PLANTS FROM ALBERTA.

By EDW. L. GREENE.

BERBERIS BREVIPES. Allied to *B. nana* but every way smaller, the foliage of a deeper green and merely glaucescent rather than glaucous; leaves with very short petiole, not longer than the internodes of the rachis; leaflets usually seven, rather broadly elliptic-oblong, 1 to 1¾ inches long, sharply and closely spinulose-serrate, very acute, conspicuously though minutely reticulate, in texture comparatively thin; racemes short and few-flowered, but in fruit surpassing the petioles; berries small, subglobose, blue and very glaucous.

Collected at Crow's Nest Pass, Rocky Mts., August, 1897, by Prof. John Macoun; No. 18,080 of the Canadian Geological Survey Collection. It is next of kin to the more southerly *B. nana*, Greene, which so long passed, by mistake, under the name of *B. repens*; but it is wholly distinct by several characters, among the best of which is the short-stalked foliage. In *B. nana* the petioles are so long as to surpass even the long fruiting racemes.

STELLARIA SUBVESTITA. Numerous suberect stems densely tufted, slender though firm, 5 to 10 inches high, very leafy below the middle, the dichotomous cyme notably narrow and strict; leaves linear-acuminate, ¾ inch long, 1-nerved, erect, sub-tomentose beneath, otherwise more or less pilose-pubescent, the stem also pilose, the peduncle and pedicels less so; bracts of the cyme ovate or ovate-lanceolate, acute, scarious, often villous-ciliate; sepals oval, obtuse or acutish, scarious-margined, 1-nerved and the nerve often pilose; petals little exceeding the calyx; capsule not seen.

Obtained at Devil's Head Lake and Banff, National Park, July, 1891, by Prof. John Macoun; the specimens distributed for *S. longipes* var.; but the species is of different habit, and is well marked by the strong pubescence, the strict and narrow cyme, etc.

THE LATE GEORGE MERCER DAWSON.

The world of science and especially of geology received a severe shock on the evening of Saturday, the 2nd day of March 1901, when the news of the death of Dr. G. M. Dawson was announced. This sad event was altogether unexpected and leaves the ranks of the Canadian Geological Survey minus one of its most distinguished men, one who had always taken a foremost part in carrying on the good work of his predecessors in the position of Director.

Not only as a geologist, but also as an ethnologist and naturalist Dr. Dawson was well known, and his too early loss will be felt by the whole scientific world.

The immediate cause of the death, was a severe attack of capillary bronchitis which set in subsequent to a somewhat protracted but apparently only slight cold. Dr. Dawson had been attending to his official duties all day Thursday Feb. 28th and had thus been only a whole day absent from the Department when he breathed his last at five minutes after six in the evening, at his rooms in the Victoria Chambers, Ottawa.

His loss to Canada cannot be overestimated. His place can never properly be filled. He will be missed most by the various members of the Geological Survey of Canada with whom he was in constant communication regarding the advancement and welfare of every part of the Dominion of Canada.

The early training he received with his father, Sir William Dawson, at McGill University, subsequently in London, England, at the Royal School of Mines, eminently fitted him for the distinguished positions which he held during his lifetime and at the time of his death, as Director of the Canadian Geological Survey.

By his demise there is removed from this sphere of activity one of the greatest lights and intellects of the last progressive half of the century just ended. His numerous and important writings are a monument which will ever be a crown of glory and renown to his life-work, for his industry, talent and painstaking accuracy.

He was a Nestor in Canadian geology and the grasp which

his strong intellect had of all problems relating to the economic and natural resources of our vast Dominion, made him master of his Department and a centre of distribution of the most valuable information. With a diminished staff at his disposal, he guided the Department under his care with unsparing as well as inspiring efforts, and was thus producing more results and giving out more information than ever before in any period of the history of the Survey in all its different branches.

With the ever increasing demands for exact information concerning the mineral and other economic resources of Canada, with the increase of labour and attention to official matters, he was kept more than usually busy for the past six years. Through his personal efforts and that of his staff, he did much to disseminate such information regarding Canada's mineral resources, that the mining interests of the Dominion may now be said to be fairly well established upon a firm and non-speculative basis.

Dr. George Mercer Dawson was the eldest son of the late Sir William Dawson who was the honoured Principal of McGill University for upwards of forty-four years, and who preceded the subject of this sketch by a few months only, having died in Montreal, his home, on the 19th day of November, 1899, at the advanced age of 79.

"Doctor George," as he was wont to be called, was born in the town of Pictou, Nova Scotia, Aug. 1st, 1849. His early training was at the Montreal High School, then subsequently, at home under tutors, and in McGill University, where however, he did not graduate, but went to Edinburgh and London. There he carried on studies and researches in Mining and Geology, especially at the Royal School of Mines, London, from 1869 to 1872, carrying off the highest honours of his class and the Duke of Cornwall's prize in his year, also the Edward Forbes gold medal for palæontology, ranking first, and subsequently became an "Associate of the Royal School of Mines," a much coveted title.

On his return to Canada he spent some time investigating the copper and iron deposits of Nova Scotia, his native province, and later lectured in Morrin College. In 1873, he was appointed geologist and botanist to Her Majesty's British North American boundary commission, of which Major D. R. Cameron, R.A., was

Chief Commissioner for Britain. His excellent report upon the Geology and Mineral Resources of the 49th parallel from the Lake of the Woods to the Pacific Ocean marked him out as a scholar and an eminent observer. He was only twenty five years of age when this report was prepared. This volume was so eagerly sought, that it is now out of print, the edition being soon exhausted and a copy is conceded to be actually worth its weight in gold.

Then it was that were laid down the lines upon his subsequent career and researches lay, for in July 1875, when he received from the Dominion Government an appointment on the Geological Survey staff, as Chief Geologist, his explorations and researches led him into the vast and then practically unknown Northwest Territories, and in British Columbia. In the mass of his voluminous and much-sought-for reports upon the resources of the districts which he examined and explored will be found the most authentic and useful information on those now rapidly developing and flourishing districts. In his Yukon explorations of 1887 and 1888, he examined and reported upon that most valuable and important district to which the world has been and is still looking for most years for a goodly share of its source of supply of gold. He was the real discoverer and describer of that now famous gold-bearing belt in which there is happily left as a monument to his indefatigable researches in the eighties the capital town or city of the Yukon Territory, which now bears his name.

Not only were his mental strength and intellectual vigour remarkable but even his powers of physical endurance were great. As an instance of the latter, may be mentioned a boat journey of 1,300 miles and a portage of fifty from the Valley of the Liard to that of the Yukon, as one of the feats which his zeal and energy as an explorer accomplished. It would be superfluous here to give even a synopsis of his numerous reports, suffice it to say that they are all most readable and full of useful information on the regions traversed.

Besides being an eminent geologist, he was also a foremost naturalist. Amongst his contributions to the Empire may be mentioned his work as one of the Commissioners appointed by Her Late Majesty Queen Victoria, as one of the arbiters in the

Behring Sea seal fisheries. The conditions and real facts concerning seal life were studied by him and have been Britain's most powerful argument in the case. In 1883 he was appointed assistant director to the Geological Survey Department. In 1892, after his work on this commission was ended, Her Majesty Queen Victoria was pleased to create him a C.M.G., and in 1890 and 1891 respectively, Queen's and McGill Universities conferred upon him the degree of doctor of laws *honoris causâ*.

In 1891 he was made a Fellow of the Royal Society of England, the highest scientific body in Britain, for his eminent work in geological science. In 1893 he was elected President of the Royal Society of Canada; in 1894, corresponding member of the Zoological Society of London; in 1895, Fellow of the American Association for the Advancement of Science; in 1896, chosen President of Section "C" in Geology of the British Association for the Advancement of Science, and in 1897 delivered a masterly inaugural address upon the Archæan geology of Canada. In the same year, the Royal Geographical Society of London presented him with their highest award, a gold medal; and in 1891 had been awarded the Bigsby medal for eminent researches in geology by the Geological Society of London. The recipient of this medal must not be older than 45 years at his last birthday.

As an ethnologist and archæologist, Dr. Dawson stood foremost in Canada and was an eminent authority. Many of his spare hours were devoted to this most important subject. His report upon the manners and customs of the Haidas in the Queen Charlotte Islands and the numerous and interesting specimens he brought with him have laid the foundations of the ethnological department of the National Museum at Ottawa. The Geological Survey of Canada was fortunate in having so able a scientist and geologist as Dr. Dawson for its director. He has done much in disseminating exact knowledge regarding the vast regions of the west chiefly, whilst his attention and care has led him to take a most prominent part in the economic prosperity and development of the eastern or older provinces. His courteous and practical replies to the constant stream of correspondence which, in his position as chief of the Geological Survey department, he received, have done much to place Canada's mining interests on a solid

basis. He had successfully carried out the work of his predecessors, Sir William Logan and Dr. Selwyn, in investigating the resources of Canada, both far and near. His death is an irreparable loss to Canada, to science, but especially to the Geological Survey Department.

Dr. Dawson was by nature of a retiring disposition, though exceedingly sociable and amusing as well as always interesting in company, yet more so in the case of geologists, and above all in the field. He was unmarried, and a foremost member of the Rideau Club, where he was most popular and highly appreciated. He proved to possess a perfectly inexhaustible fund of ready knowledge upon questions of Canadian or of world-wide interest.

His writings are to be found in the Annual Reports of the Geological Survey department, in the Quarterly Journal of the Geological Society of London, in the American Journal of Science and Arts, in the Canadian Naturalist, the Ottawa Naturalist, &c. In 1894 he was unanimously elected President of the Royal Society of Canada, the theme of his address being "The Future of Science in Canada." He was Associate Editor of the Journal of Geology of Chicago, and for three years he was President of the Ottawa Field-Naturalists' Club, during which term he did all in his power to advance and promote the interests of the Club. His was a life constantly devoted to the best interests of his official work. He combined indomitable energy with will power which did much to keep up his vital strength as against what might be termed a weakly physique. Close attention—possibly too close attention—during late years, to office work, and a lack of outdoor physical exercise, which he was wont to enjoy in his arduous mountain climbings and in his explorations of many unknown regions of this great Dominion, possibly combined to weaken his constitution.

He was called away most suddenly and will be missed by all who knew him personally or through his writings; but he has left behind him a noble monument of his industry as an explorer and of his skill as a practical geologist both in his official work and in the personal influence which he exerted in the advancement of science and scientific thought for twenty-six years.

As a geologist Dr. Dawson's reputation was world-wide. He was one of those investigators into the realm of geological science

who sought not only to point out the at once practical and economic side in the resources of the earth's crust of Canada, his native land, but one who diligently and intelligently hammered away at the numerous problems of pure geological science. They are numerous the problems in the geology of North America which are as yet unsolved ; and, wherever an element of doubt came in, as to the truth or validity of the results propounded by this or that investigator, or whenever intricate bits of geology presented themselves to his mind and eye for investigation, he made it his sacred duty to closely examine and carefully study their various relations in the field as well as in the office, thus seeking to ascertain all the facts of the case to enable him to arrive at a satisfactory conclusion of the difficult points involved. He never rested until the problem which he had before his mind was solved. In other words he was *thorough*. His reports, maps and papers are models of excellence and description. He had a facile pen, an intelleect ready and lucid, which could grasp the situation at a glance. His love for thoroughness and the best possible work came forth time and again in his endeavors, as the head of the Geological Survey of Canada, to present to the Hon. the Minister of the Interior, and to Parliament, the reports under his care, as well as the innumerable correspondence of the department making enquiries on the resources of every quarter of our great Dominion as models of care and attention. The reports issued during his régime as Deputy Head and Director can truly be said to be the pride of the Department. As regards quality as well as quantity of work brought forth and exact information published and disseminated by him during the six years and two months of his administration, it can not be denied that they were both unparalleled in any previous period in the history of this now old and established institution.

A cursory sketch of the various regions examined by Dr. Dawson during his connection with the Geological Survey of Canada will serve to shew the amount of territory which he covered and the nature of his extensive researches.

After completing his explorations and surveys in connection with the British American Boundary Commission, and writing his priceless memoir on the same, he contributed several reports which

are noted in the Reports of Progress of the Geological Survey of Canada for 1873-74, for 1874-75. These include reports on the hematite deposits of Pictou County, Nova Scotia; on the limonites of the same county and on the spathic ore deposits of the Sutherland's River, N.S.; also on the clay-iron stones of the Tertiary, along the 49th parallel, and the limestones of the Cretaceous of the Swan River and Thunder Hill in Manitoba; together with the results of his botanical researches along the 49th parallel.

In the Report of Progress for 1875-76 comes his report on Chilco and Nazco rivers and trail to Fort George, B.C., and in the next year's report his results in the basins of the Blackwater, Salmon and Necchacco rivers and of François Lake, B.C., along with a reconnaissance report of Leech River and vicinity on Vancouver Island. This report includes a statement of the condition of mines and mining in British Columbia at this early period. Coals and lignites and many minerals of economic importance were obtained by him along the route and analyses made by the department which have helped to lay down the foundation of the mineral wealth of that once remote province, but one whose resources, thanks to Dr. Dawson's work, is to-day well known and appreciated.

In 1877 and 1878 Dr. Dawson's field of explorations was in the Queen Charlotte Islands. It would suffice to obtain an estimate of the subject of this sketch to peruse the most interesting report on the resources and possibilities of these hitherto unknown islands from his pen. It was a practically virgin district for him and the excellent maps which he prepared that were published by the Department reflect greatly to his credit however young he was at that time. Not only as a geologist did he excel in this report, but he distinguished himself also as an ethnologist of repute. He shewed the world of science what an abundant field for research and enquiry there was open on that west coast. Even with the languages and vocabularies of the different tribes of the aborigines which he visited and examined, he made himself familiar, and has contributed much of value to the Philology of the western tribes of British Columbia.

Dr. Dawson's reports are usually accompanied by an extensive series of Appendices. He was a most prolific collector of

facts and specimens. Accordingly, his reports sometimes contain as many as a dozen appendices on all kinds of subjects of importance and interest to our country. The floras and faunas met with, the insects and crustacea, the shells of the land and of the sea, weather reports and other interesting meteorological observations; as well as the fossil organic remains of the district which he visited, he ever looked after most carefully, for he truly knew their great value as horizon-markers. He not only submitted these various collections to specialists and authorities throughout the country and abroad from whom he received further information from time to time but examined and described them himself.

Later, in the Report of Progress for 1878-79, he gives notes on the geology of areas drained by the Red and Assiniboine Rivers in Manitoba, and also describes the Coal deposits of the Lignite Tertiary of the Souris River, from the Great Valley and Porcupine Creek. The report of his explorations on the Skeena and down the Peace in 1879 are embodied in the Report of Progress for the year 1879-80, which is entitled "A report on exploration from Port Simpson to Edmonton, by the Peace River." Much important astronomical data has been furnished the government by Dr. Dawson during his numerous voyages and explorations which serve to fix the latitude and longitude of distant places on our Map of the Dominion.

In 1882 Dr. Dawson visited Europe where he carried on studies having for their object the utilization of the lignites of the West as fuels, and the results of his researches were embodied in a subsequent report.

For a knowledge of the forests of British Columbia the country is under a great debt to Dr. Dawson. He sought not only to bring forward the immense value which they prove to possess but also to point out the best means to preserve such a grand heritage. In the Districts of Alberta and Assiniboia he did much to reveal their hidden geological structure and economic resources, especially as far as coal is concerned. Up to 10,000,000 tons of coal to the square mile for hundreds of square miles of territory he has described and reported, and time will only serve to emphasize the accuracy of his carefully sought out facts from the bosom of Nature which was ever ready to yield her secrets to him

who knew her heart and appreciated her bountiful stores. His report on the geology of Bow and Belly Rivers in the Report of Progress for 1880-82 affords a condensed summary of his explorations in the districts just east of the Foothill country.

In 1883, Dr. Dawson was engaged along the western slope of the Rocky Mountains proper and had with him as assistant that year Mr. J. B. Tyrrell who examined the geology and structure of the Crow's Nest Pass with its great possibilities for Coal. In 1884 he carried on explorations farther north in the Rocky Mountain and Selkirks region and prepared a reconnaissance map and a report giving the results, together with notes on the geology of the Red Deer River country.

In 1885, Dr. Selwyn was appointed as Canadian Commissioner to the Colonial and Indian Exhibition and Dr. Dawson superintended the work of the survey as Acting Director, and his time was fully occupied in attending to the duties of the office, to the shipment of the minerals and ores of the Dominion and cataloguing the same as well as of editing the first Annual Report of the Survey's new series. However, he found time to write and publish his own report on the Rocky Mt. region, and Dr. Selwyn makes the following kindly allusion to his work :—

"I wish here to record my high appreciation of the very able "and efficient manner in which Dr. Dawson has performed all the "work."

Dr. Dawson was officially appointed to the staff of the Geological Survey of Canada in 1876, as we read on page 7 of the Report of Progress for 1875-76, where Dr. Selwyn, then Director, informs us as follows :— "Mr. G. M. Dawson, late Geologist and Naturalist on the International Boundary Survey of the 49th parallel was appointed and has since been actively engaged in exploration in British Columbia." It was during this first year of Dr. Dawson's connection with the Canadian Survey that the Centennial Exhibition was held in Philadelphia and on page 2 of the report just quoted one can see that even at that early date he had the material welfare and prosperity of British Columbia at heart. He contributed, we read, not a little towards the proper representation and display of the then little known mineral resources of the Pacific province, and not only were the minerals attended to, but also the vegetable as well as the animal products of British Columbia.

His recent reports on the Kamloops District of British Columbia, those on the Southern Interior of the same province, on the Northwest Territories, on the Yukon Territory (containing in 1888, as this last mentioned report did, nearly 400 pages of description of that now famous region including its gold-bearing gravels,) also his Queen Charlotte and Vancouver Island reports, are all replete with the greatest interest and afford the best works of reference upon these important regions.

A list of Dr. Dawson's writings has been prepared from various bibliographic sources and references to original papers from his pen, in geology, natural history, &c. These comprise hundreds of reports, memoirs and papers on economic as well as scientific subjects. It is reserved for a subsequent issue of THE OTTAWA NATURALIST.

Dr. Dawson was President of the Ottawa Field-Naturalists' Club for three years, from 1891 to 1894; and as much as lay in his power he worked in the interest of our Club, not only by contributing important papers to the pages of its Transactions but also by encouraging others to do the same. His love for science and scientific work was unbounded, and of him it may be truly said that he spent himself for his country and his country's good. Especially in the West he will be greatly missed.

I cannot more fitly close this sketch than by quoting part of that admirable

ODE TO "DR. GEORGE" BY CAPT. CLIVE PHILLIPPS-WOOLLEY.*

" Hope she has fooled us often, but we follow her Spring call yet,
And we'd risk our lives on his say so and steer the course he set,
Down the Dease and the lonely Liard, from Yukon to Stikine;
There's always a point to swear by, where the little doctor's been,
Who made no show of his learning. But, Lord! what he didn't know
Hadn't the worth of country rock, the substance of summer snow.
I guess had he chosen, may be, he'd have quit the noise and fuss
Of cities and high palavers to throw in his lot with us.
He'd crept so close to Nature, he could hear what the Big Things say,
Our Arctic Nights, and our Northern Lights, our winds and pines at play.
HE loved his work and his workmates, and all as he took for wage
Was the name his brave feet traced him on Northland's newest page—
That, and the hearts of the hardfists, though I reckon for work well done,
He who set the stars for guide lights, will keep him the place he won,
Will lead him safe through the Passes and over the Last Divide,
To the Camp of Honest Workers, of men who never lied.
And tell him the boys he worked for, say, judging as best they can,
That in lands which try manhood hardest, he was tested and proved A Man."

Ottawa, 19th April, 1901. H. M. AMI.

*Ex. British Columbia Mining Record for April, 1901.

ORNITHOLOGY.

BIRD NOTES.

By W. T. MACOUN.

Although the winter was unusually long and the ground covered with snow until the second week of April the Robins, Song Sparrows and Bluebirds, three of the first migrants, were here several days earlier than either in 1899 or 1900. Although not birds, the frogs, which are among the first spring songsters, were heard near the Experimental Farm on April 10th. Mr. White reports seeing them on the 14th. By co-operation the records of the arrivals of birds become more reliable, and we have begun well this year, several members of the Club having sent in their notes. As space will not permit of publishing all the notes only the earliest dates are recorded. Observers in other parts of Canada have also contributed notes, but as these are not yet complete their publication in tabular form has been postponed until next month. Notes intended for the Ornithological Editor should be sent to him not later than the 20th of the month.

1901.

Jan. 12—SAW-WHET OWL, *Nyctala acadica*. Mr. C. H. Young.

Feb. 20—RUFFED GROUSE, *Bonasa umbellus*. Mr. A. G. Kingston.

20—BLUE JAY, *Cyanocitta cristata*. Mr. Kingston.

20—AMERICAN CROW, *Corvus americanus*. Mr. Kingston. Spring migration, March 13th. Mr. White.

20—CHICKADEE, *Parus atricapillus*. Mr. Kingston.

March 1—PRAIRIE HORNED LARK, *Otocoris alpestris praticola*. Mr. Young. Not seen at the Experimental Farm until March 19.

12—EVENING GROSBEAK, *Coccothraustes vespertina*. Three specimens seen near Normal School by the caretaker and reported by Mr. Alexander.

22—ROBIN, *Merula migratoria*. Heard by Mr. A. Gibson at Experimental Farm March 24th; seen by Mr. W. Harrington. Nest almost built at C. E. F. April 24th. First records of previous years: 1898, March 15th; 1899, April 6th; 1900, April 1st.

23—SONG SPARROW, *Melospiza fasciata*. Mr. W. A. D. Lees, at Russell, Ont.; March 24th, Mr. Young; March 24th, Mr. White. First records of previous years: 1898, March 11th; 1899, April 6th; 1900, March 31st.

24—AMERICAN ROUGH-LEGGED HAWK, *Archibuteo lagopus Sancti-Johannis*. Mr. Young.

26—BLUEBIRD, *Sialia sialis*. Mr. Lees. March 27th, Mr. Young.

1901.

March 27—PIGEON HAWK, *Falco columbarius*. Mr. Young.
28—SLATE-COLOURED JUNCO, *Junco hyemalis*. Mr. Young.
29—SHARP-SHINNED HAWK, *Accipiter velox*. Mr. White.
30—BRONZED GRACKLE, *Quiscalus quiscula æneus*. Mr. Kingston.

April 2—RUSTY BLACKBIRD, *Scolecophagus carolinus*. Mr. Young.
2—RED-WINGED BLACKBIRD, *Agelaius phœniceus*. Mr. Young.
2—AMERICAN GOSHAWK, *Accipiter atricapillus*. Mr. Kingston.
5—MEADOWLARK, *Sturnella magna*. Mr. Kingston.
9—PHŒBE, *Sayornis phœbe*. Mr. White. April 11th, Dr. Fletcher.
10—TREE SWALLOW, *Tachycineta bicolor*. Mr. Kingston.
13—AMERICAN GOLDEN-EYE, *Glaucionetta clangula americana*. Mr. White.
15—VESPER SPARROW, *Poocætes gramineus*. Mr. W. T. Macoun. April 14th, Mr. Kingston.
13—AMERICAN HERRING GULL, *Larus argentatus smithsonianus*. Mr. White.
13—BELTED KINGFISHER, *Ceryle alcyon*. Mr. Kingston.
15—PURPLE FINCH, *Carpodacus purpureus*. Mr. Macoun.
15—WHITE-THROATED SPARROW, *Zonotrichia albicollis*. Mr. Macoun.
16—RED-TAILED HAWK, *Buteo borealis*. Mr. White.
18—COW-BIRD, *Molothrus ater*. Mr. Macoun.
18—YELLOW-BELLIED SAPSUCKER, *Sphyrapicus varius*. Mr. White.
18—GOLDEN-CROWNED KINGLET, *Regulus satrapa*. Mr. Kingston.
18—AMERICAN OSPREY, *Pandion halliaëtus carolinensis*. Mr. Young.
19—NORTHERN SHRIKE, *Lanius borealis*. Mating at Experimental Farm. Seen at intervals during the latter part of the winter.
21—FLICKER, *Colaptes auratus*. Mr. Young.
22—CANADA GOOSE, *Branta canadensis*. Three birds. Mr. Macoun.
22—BUFFLE-HEADED DUCK, *Charitonetta albeola*. Mr. White.
23—PURPLE MARTIN, *Progne subis*. Mr. White.
23—BARN SWALLOW, *Chelidon erythrogaster*. Mr. White.
23—TREE SPARROW, *Spizella monticola*. Mr. White.

MEADOW-SWEET.—It is doubtful whether the true *Spiræa salicifolia* occurs in Canada. At least two varieties have been collected near Ottawa and others will probably be found. The most common form is var. *latifolia*, Ait., with obovate or elliptical dentate-serrate leaves; the inflorescence is broadly pyramidal. Another variety is *lanceolata*, Ait., with finely serrate oblanceolate leaves.

J. M. M.

ROSS'S GULL (*Rhodostethia rosia*, Macgill.)

By Professor E. E. PRINCE, Ottawa.

My brief account of the scientific results of Dr. Nansen's Polar Expedition, which appeared in THE OTTAWA NATURALIST last November, has brought me many kind and interesting communications none more so than a letter from Dr. Otto J. Klotz who generously loaned to me a volume of the Report of the International Polar Expedition sent out by the United States Government in 1881. In this volume Dr. Klotz pointed out to me, occur two fine coloured plates of Ross's Gull, or the Roseate Gull (*Rhodostethia rosea*, Macgill.) and my statement on p. 143, vol. 14 of this publication demands correction. I ventured to say that in the conjoint report of Dr. Nansen and Dr. Collett, on birds observed in the polar regions, there is given for the first time a fully detailed description of Ross's Gull with exquisitely tinted illustrative plates and I am indebted to Dr. Klotz for calling my attention to the real facts, and for enabling me to correct my statement. In matters of this kind rigid accuracy is above all things necessary and it is only just to the United States observer, Mr. John Murdoch to state that on pp. 123-4-5 of his report on the birds noticed during the International Polar Expedition, 1881-2-3 he gives a description of this rare species, and accompanies it by two tinted plates. Mr. Murdoch states that a large series of specimens was secured, and they appeared not sporadically and in scattered numbers, but in abundance on certain dates. Thus from September 28th to October 22nd, 1881, small flocks were seen moving northeast, their total numbers being so considerable that the observer speaks of them as exceedingly abundant. Next year about the end of September these gulls again appeared plentifully; but, curiously enough, they were all young birds as far as could be ascertained. Mr. Murdoch pertinently remarks that it is difficult to say what becomes of the thousands coming west, and proceeding along the Alaskan coast taking a north-easterly course. Of course the point of observation (Point Barrow) was nearly nine degrees of latitude south of Nansen's, which as I pointed out was in the Hirtenland waters, and its nesting grounds as Nansen sur-

mised are no doubt in these more remote and inhospitable regions. I may add that Mr. Murdoch's beautiful plates occur in a volume mainly consisting of meteorological and other physical records, and less likely on that account to meet the eyes of the naturalist. My indebtedness to Dr. Klotz is on that account greatly increased. I have already sent a note of correction to the New York Sun, which newspaper, as our President, Dr. Ami informed me reproduced almost complete the article published in these pages last November.

Ottawa, February, 1901.

THE GOLDEN EAGLE. AN ADDITION TO THE FAUNA OF MIDDLESEX COUNTY.

By J. E. KEAYS, London, Ont.

(Read before the Ornithological Section of the Entomological Society of Ontario.)

On Saturday, December 1st, 1900, a large bird was noticed in the vicinity of Lambeth and towards evening was seen pursuing and finally capturing a turkey from the flock of Mr. Jas. Cassidy. Carrying the bird to some distance it lit on the low branch of a tree and commenced its repast at which it remained so engrossed, that two boys, sons of Mr. Cassidy were able to approach close enough to strike it on the head with a rifle, slightly injuring its skull and stunning it so that it was easily carried to the house where it was placed in the cellar apparently dead; but after two hours it was found to be a very lively bird, and on Monday or Tuesday was brought to the city for sale, and is at present in the possession of Mr. Davey. It proves to be a Golden Eagle, in fine young plumage, and as far as we can learn a new record for Middlesex Co.

This eagle breeds sparingly through eastern Canada and is seldom seen far from the courses of large rivers or the shores of lakes, where it follows and preys upon the flocks of water-fowl. Mr. McIllwraith mentiones two taken at Hamilton and several at Toronto but a capture this far inland I think is somewhat unusual in Ontario. In the west it is much more numerous and there

breeds in the mountainous parts from New Mexico and Arizona to far north in British Columbia and Alaska.

Its food consists of mammals and large birds, such as rabbits, racoons, gophers, squirrels, grouse, waterfowl, etc., and unlike the Bald Eagle sparingly, if ever, partakes of fish, but will frequently feed upon carrion.

From time to time we see newspaper reports of children being carried away by Eagles, fortunately, however, the majority of such are sensational, but in sections of the south these birds are condemed by the sheep farmers, from the havoc they play among their flocks by feeding on the very young lambs, one firm alone reporting in 1889 the loss of from 400 to 500 lambs.

A comparison of the Golden Eagle with its near relative, the Bald gives the latter a slight advantage in size as the following table will show.

	Length.	Expanse.	Wing.
Male Golden,	30 to 35 in.	78 to 84 in.	23 to 24½ in.
Male Bald,	30 to 35 in.	84 in.	20 to 25.9 in.
Female Golden,	35 to 40 in.	84 to 90 in.	25 to 27 in.
Female Bald,	34 to 43 in.	84 to 96 in.	25½ to 28 in.

The Golden Eagle in *Adult* plumage is nearly uniform dark brown, the feathers of head and hind neck and tarsus tawny, tail darker than body and banded with grayish; *Young* similar to the adult but with basal half of tail pure white, and feathers of tarsi paler sometimes nearly white or with portions white, head and neck same as in adult. In any plumage it may easily be distinguished from the Bald Eagle by its tawny head and by having the tarsus thickly feathered down to base of toes.

NOTE.—The specimen referred to above has since come into my possession and I have made a skin of it. The bird was exceedingly fat, weighing about 10 lbs. with an alar expanse 6 ft. 11 in. from tip to tip. Beneath the skin was found one pellet of shot about No. 6, which was very much out of shape as though it had hit a bone. This pellet was embedded in the fat. The ulna, (the large bone in the wing) had been broken about an inch from the wrist, but was entirely healed over, making a very strong join.

W. E. SAUNDERS.

REVIEWS.

THE PHYSICAL FEATURES AND GEOLOGY OF THE PALÆOZOIC BASIN BETWEEN THE LOWER OTTAWA AND ST. LAWRENCE RIVERS. By R. W. Ells, LL.D. (Trans. R. S. C., Sec. IV, 1900, pp. 99-120.)

This paper may be looked upon as a continuation of one read before the Royal Society in 1894, in which many additional facts relating to the structural features of the Palæozoic formations exposed in what may be called the Ottawa Basin. This information is believed to be especially important and opportune at the present time, in view of the boring operation which have lately been undertaken for the purpose of securing a supply of natural gas and oil which would be economically valuable. The formations exposed range in age from the Potsdam sandstone which rests upon the uneven surface of the Archæan to the Medina shales which here represent the lowest member of the Silurian proper. These constitute in general a broad synclinal basin whose boundaries are defined and note is made of their extension across the St. Lawrence into the state of New York. The various railways traversing and giving access to this area are mentioned as well as certain details in regard to the elevation above sea level at certain points. These have been secured through the kindness of Mr. Jas. White, Geographer to the Department of the Interior from advance proofs of "Altitudes in the Dominion of Canada," which it is expected, will be published shortly. These levels have evidently been quoted only approximately and many of them will be corrected in Mr. White's forthcoming volume. The determination of the various lines of demarcation between the several formations is very difficult owing to the thick and widespread covering of drift. A few general remarks are made in regard to ice movement, the striæ representative of these showing no less than three such periods. The thickness of the several formations vary considerably at different points and the presence of numerous extensive faults prevents any very definite statement.

The following estimates are furnished and will doubtless be found valuable in any future boring operations which may be undertaken. The figures represent what is believed to be the greatest thickness.

Potsdam, 300-700 feet.
Calciferous, 300 feet about.
Chazy, 175 feet about.
Black River, 38-100 feet.
Trenton, 600 feet.
Utica, 100 feet.
Lorraine, ?.
Medina, 75 feet.

Descriptions of the trend of some ancient channels of the Ottawa are given as revealed by borings and the general topography of the area.

Details in regard to the position and extent of the main lines of dislocation are given and the fact noted that both vertical displacements and horizontal throws are represented.

It is believed by the author that the question of the occurrence of natural gas or oil in the Ottawa basin has never yet been actually tested. The borings already made have been placed in locations quite unfavourable for this purpose or in the case of those to the south of the Ottawa river have penetrated the rock at but few points. Gas has been found in considerable quantity in several of the deep borings which have been made in the clay along the ancient channel of the Ottawa. The location of favourable anticlinal folds is rendered very difficult owing to the thick overlying mantle of drift.

A. E. B.

SYNOPSIS OF THE GEOLOGY OF CANADA, BEING A SUMMARY OF THE PRINCIPAL TERMS EMPLOYED IN CANADIAN GEOLOGICAL NOMENCLATURE. By Henry M. Ami, M.A., D. Sc., F.G.S. (Trans. R. S. C., Sec. IV, 1900 pp. 187-225.)

This extract from the transactions of the Royal Society, with its hundred names newly coined to mystify the reader and to replace others well known and more appropriate, justifies an observation made by a Committee of the House of Commons that such purely scientific researches seem devoted rather to upsetting theories of antecedent scientists, than to the discovery of new principles or the addition of new information. The author divides the 3,616,980 square miles of British North America into

five regions, the Acadian, Laurentian Highlands, Lawrencian Lowlands, Interior Continental Plain, and Cordilleran; gives a list of the geological systems; then, "compelled" thereto "by dire necessity," proceeds "to affix provisional formational names."

Of this great area nearly two-thirds belong to the Laurentian and Huronian systems—names now generally adopted throughout the world—in which no definite organisms have been found. In regard to the occurrence of these rocks at Hudson Bay there is a vague description (p. 190) of an "undifferentiated mass of granites, ...consisting of granites and *gneisses* and other crystalline rocks similar in structure and chemical composition to.....crystalline *limestones*"!

The great gold-bearing series of Nova Scotia, provisionally called Lower Cambrian, is also barren of fossils; while the overlying Etcheminian and Upper Cambrian rocks of Newfoundland, Cape Breton and New Brunswick hold fossils in abundance. Dr. Ami, misunderstanding Mr. E. R. Faribault's description of the mode of occurrence of the gold in Nova Scotia, speaks of "many *anticlines* superimposed one upon the other at different depths and intervals;" and of strata, altered in a narrow zone by contact with granite masses, as a "metamorphic series"! Three Cambrian fossiliferous zones have been recognized in British Columbia among a great series of volcanic rocks.

Ordovician or Cambro-Silurian rocks have been determined by the author from their fossils in every one of the five regions, "the Skiddaw and Arenig, the Hartfell and Llandeilo formations being easily recognized in Canada." The Silurian system also "presents a compact fauna which in facies closely resembles rocks in the Kendal and Ludlow regions of England;" yet local designations "based upon the faunistic relations" are given by the writer. It is noteworthy that he now agrees with Dr. Honeyman to include in the Silurian the disputed beds of the Nictaux iron mines, called by him elsewhere Eo-Devonian. His new names for the Arisaig Silurian tend only to obscure the correlation of a regular succession of strata shown, forty years ago, to range from Lower Helderberg to Medina.

In all the five regions, Devonian and Carboniferous strata have been met with. Many will object to the author's grouping

of those of the Acadian provinces, since it rests neither upon the ascertained stratigraphical sequence nor on any inference from the organic remains. And in justice to Dr. Matthew, Sir J. W. Dawson, Messrs David White and R. Kidston, authorities quoted by him, he should state the evidence by which he is "constrained to place" (p. 207) in the Eo-Carboniferous ten or fifteen thousand feet of strata constituting the Mispec and Little River groups of New Brunswick, included in the Devonian by the two first named, by the last in the Upper Carboniferous. On pages 211 to 213 there is some obscurity of thought or expression concerning the age of his so-called Windsor formation, two widely divergent views being hinted at, each of which has been held in turn by Dr. Ami. The first, commonly accepted, refers that formation to the Carboniferous Limestone of England; the second maintains that its fossils indicate the summit, not the base of the Carboniferous system. The confusion of ideas is thus expressed: The Windsor formation is followed upward by the Millstone Grit; unconformably above the latter is the New Glasgow Conglomerate, the basal portion of a continuous series northward into equivalent and newer strata on Prince Edward Island called Permo-Carboniferous, Permian and Triassic and probably representing the Windsor and Millstone Grit formations of Nova Scotia! This circular classification is not stratigraphical. And if the Upper Carboniferous can not be distinguished from the Little River formation or Middle Devonian by its fossils, why should it surprise us that "no characteristic fossil evidence has as yet been obtained to enable us to clearly separate these rocks (called Permian) from the Upper or Neo-Carboniferous"? In the Geological Survey reports Upper Carboniferous and Permian have the same meaning.

It was not the author who examined the Crow's Nest and Kootenay passes (p. 210.) Instead of the North Saskatchewan, in the next sentence, he probably means the Bow River. The Albert shales of New Brunswick (p. 212) are not overlaid by the Millstone Grit as stated by him, but unconformably by Lower Carboniferous limestone, shales and conglomerate. It is also a notable fact that the Cretaceous beds of the Kamloops district in British Columbia (p. 217) described by him as "consisting of argillites, limestones and sandstones," contain no limestones. The author (p. 218) quotes the "Paskapoo series" or Paskapoo formation, or upper

division of the Laramie," when in fact the adopted names is Paskapoo *beds*. Certain crystalline limestones in the Yale district (p. 202) are said to occur west of Lansdowne, at Adams Lake, whereas that lake is fifty miles *north* of Lansdowne.

Triassic rocks occur, also according to the author, in British Columbia, Vancouver and the Queen Charlotte Islands; and Jurassic, in the Arctic archipelago. The Cretaceous, largely developed in Manitoba, the Northwest and British Columbia, includes important coal fields.

The Quaternary deposits he divides into three periods; the Glacial or boulder clays; the Champlain or marine clays deposited during a period of submergence; and the Recent or terrace period of elevation.

He introduces three different names for the boulder clays:—the Labrador formation for the boulder clay of the Laurentide glacier or glaciers; the Rupert formation for that of the Keewatin glacier; and the Cordilleran formation for the product of the Cordilleran ice sheet. These names are of no practical use, and, moreover, are misleading and tend to confusion. For example, how is it to be known from the term Rupert formation that it is a boulder clay, without referring to Dr. Ami's paper? No geologist has used any other term than the descriptive one of boulder clay or till for the product of Pleistocene ice. As well might the Triassic be given different local names in different parts of Canada.

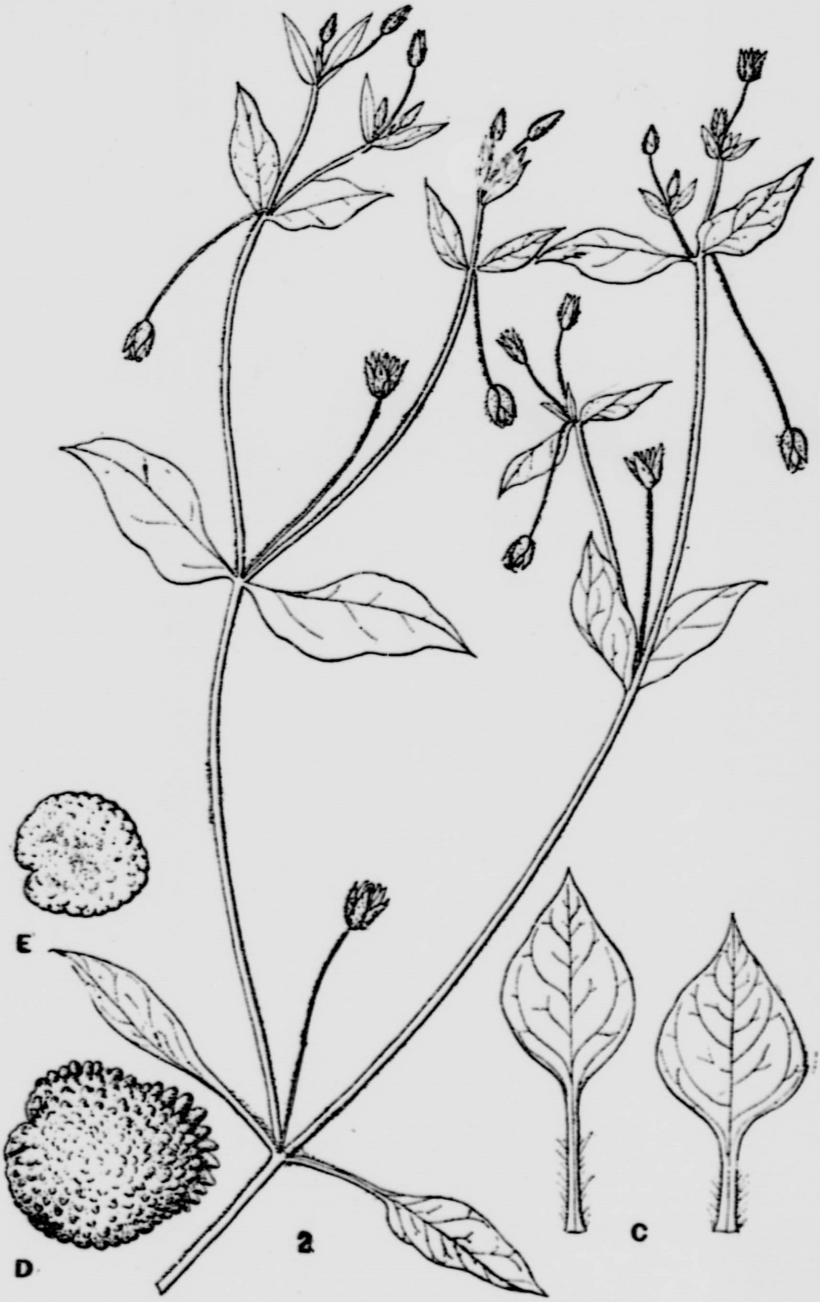
Dr. Ami also adopts the term Champlain, presumably supposing it to be the equivalent of the Leda clay and Saxicava sands. This is a name not in common use north of the International boundary, simply because neither the upper nor the lower limits of the deposits classed under that term as defined by Hitchcock and Dana correspond with those of the marine beds of the St. Lawrence valley and Maritime provinces. The two geologists referred to have made the Champlain a glacial formation, but in Eastern Canada no deposits attributable to ice action have been met with in the Leda clay and Saxicava sands. Further, the fossils they contain are really identical with forms now living in the northern part of the Gulf of St. Lawrence and on the east coast of the Labrador peninsula, where no glaciers exist at the present day.

Only in the most recent of our superficial deposits have traces of the aborigines been found, together with their stone or copper implements and remains of beaver, deer, bear and other animals of the chase identical with those of to-day. H. F.

Auctor ad nat. del.

STELLARIA APETALA

(A) Pistil of S. apetela. (B) Pistil of S. media.



Auctor ad nat. del.

STELLARIA NEGLECTA

(C) Leaves of S. neglecta. (D) Seeds of S. neglecta.

(E) Seeds of S. media.

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