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XVII.—On some fossils from the Quebec group of Point Lévis, Quebec

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XVI.—*On a new Species of Turkey Vulture from the Falkland Islands and a new Genus of Old-World Vultures.* By R. BOWDLER SHARPE, F.L.S., F.Z.S., &c., Senior Assistant, Zoological Department, British Museum.

THE *Catharista* from the Falklands has always been referred to *C. aura*, from which species it is obviously distinct, by reason of the conspicuous grey shade on the secondaries. It might be supposed to be the *Catharista iota* of Molina from Chili; this species, however, is well represented by Mr. Cassin (U. S. Expl. Exp. pl. 1), and differs in its small size and black coloration from both the North-American and the Falkland-Islands bird. The latter is about the size of *C. aura* of North America and by no means smaller.

I am much indebted to the kindness of Mr. Reeve, of the Norwich Museum, for examining the specimens therein contained; and as he finds that the Turkey Vulture from the Falklands presents the same differences as the birds in the national collection, I have no hesitation in proposing the name of *Catharista falklandica* for the aforesaid Vulture.

At the same time I may be permitted to inquire whether there are two species of true Turkey Vulture of Jamaica. I do not refer to *C. atrata*, which is now found there also. The ordinary Turkey Vulture has always been set down as *C. aura*; but the only specimen in the museum from Jamaica is *C. Burroviana* (*C. urubitinga*, Pelz. ex Natt.). Do, therefore, *C. aura* and *C. Burroviana* both inhabit the island?

Passing to Old-World Vultures I would suggest that an end should be put to the indefinite characters of the genus *Gyps*, whose tail-feathers are *either* fourteen or twelve in number, by relegating the two species which enjoy the latter quantity to a separate genus, which may be called

PSEUDOGYPS, gen. nov.

Genus a genere "*Gyps*" dicto, rectricibus 12 nec 14 distinguendum.

The two species to be included in it will be *Pseudogyps bengalensis* and *Pseudogyps moschatus* (*africanus*, Salvad.).

XVII.—*On some Fossils from the Quebec Group of Point Lévis, Quebec.* By H. ALLEYNE NICHOLSON, M.D., D.Sc., M.A., F.R.S.E., Professor of Natural History in University College, Toronto.

HAVING during the preceding summer had the opportunity of paying a hurried visit to Quebec, I was enabled to collect a

considerable number of fossils from the Graptolitic Shales of the Quebec group along the fine exposures of Point Lévis. Most of these are, of course, familiar forms, which have been previously described and figured by Hall in his beautiful memoir on the Graptolites of the Quebec group ('Figures and Descriptions of Canadian Organic Remains,' Decade ii.). Two or three, however, of the forms which I obtained are new to science; and in characterizing these I shall at the same time take the opportunity of making some remarks on some of the already described species. The following list embraces the species which I have determined from my collection:—

HYDROZOA.

- Callograpsus elegans*, Hall.
 — *Salteri*, Hall.
Dictyonema grandis, Nich.
Clonograpsus flexilis, Hall.
 — *rigidus*, Hall.
Tetragrapsus (*Graptolithus*) *bryonoides*, Hall.
 — (—) *fruticosus*, Hall.
 — *quadribrachiatus*, Hall.
 — *approximatus*, Nich.
Didymograpsus (*Graptolithus*) *nitidus*, Hall.
 — (—) *patulus*, Hall.
 — (—) *pennatulus*, Hall.
Phyllograpsus typus, Hall.
Dawsonia acuminata, Nich.
 — *rotunda*, Nich.
 — *tenuistriata*, Nich.
Corynoides.

BRACHIOPODA.

- Lingula irene*, Billings.

CRUSTACEA.

- Caryocaris*.

Dictyonema grandis, Nich.

Frond conical or fan-shaped; branches very strong and robust, diverging from the base, frequently and regularly bifurcating, and separated by interspaces which are about twice their own width. Width of the branches from 5 to 6 hundredths of an inch. Fenestrules oblong, from 8 to 10 hundredths of an inch in width by from 5 to 6 hundredths of an inch in length, rarely square or longer than broad. Connecting filaments or dissepiments from 4 to 5 hundredths of an inch in width; sometimes narrower, generally widest in the middle,

and often curved, with their convexities directed towards the base of the frond. Cellules undetermined. Surface smooth. Length of the largest frond observed (not a perfect one) a little over two inches, breadth a little above the base about one fifth of an inch, breadth at summit nearly two inches (fig. 1, *a*, *b*).

Fig. 1.

Dictyonema grandis, Nich. : *a*, fragment of a frond, natural size, showing the rapid divergence and bifurcation of the branches; *b*, a fragment, enlarged, to show the fenestrules and connecting filaments.

There can be no doubt as to the close alliance which subsists between this species and the *Dictyonema Murrayi* described by Hall from the shales of Point Lévis (Grapt. Quebec Group, p. 138, pl. xx. figs. 6, 7). The following are the characters ascribed to the latter :—"Frond very large, gradually spreading from its origin. Branches strong, width from 5 to 8 hundredths of an inch, infrequently bifurcating; divisions little diverging, the interspaces being little wider than the branches. The fenestrules have a width of 8 by a length of 11 hundredths of an inch. The connecting filaments are wide at their origin or union with the branch, and slender in the middle; from about one third to one half as wide as the branches. Cellules undetermined. Surface smooth."

When we compare the above description with that of the present species, the latter appears to be clearly separated by the conical form of the frond, and the rapid divergence and frequent bifurcation of the branches, whilst the fenestrules are almost always markedly wider than they are long, the reverse of this obtaining in *D. Murrayi*. These peculiarities along with some other, minor differences, which will be sufficiently

evident on a comparison of the descriptions of the two forms, seem to be quite constant, and appear to me to be quite sufficient to establish the specific distinctness of *D. grandis*.

From *D. quadrangularis*, Hall (*op. cit. suprà*, p. 138, pl. xx. fig. 5), to which it also bears some resemblance, though not so close a one, *D. grandis* is readily distinguished by the fact that the branches of the former are nearly parallel and rarely bifurcate, whilst the fenestrules are very nearly square.

Loc. and Form. Common in a single stratum of greenish-grey shale, Point Lévis, the fronds covering large surfaces of the beds.

Tetragrapsus approximatus, Nich.

Frond consisting of four simple undivided stipes, arranged bilaterally, two proceeding from each extremity of the funicle. Regarding the funicle as horizontal, the stipes are as nearly as possible at right angles to it; so that the two stipes on either side of the funicle form nearly a straight line. Stipes curved at their origin from the funicle, and then running nearly straight and parallel to one another. The entire frond closely resembles two examples of *Didymograpsus* (*Graptolithus*) *patulus*, Hall, united back to back by their radicles (fig. 2, a).

Fig. 2.

Tetragrapsus approximatus, Nich.: a, a specimen nearly perfect, natural size; b, fragment of one of the stipes, magnified, to show the form of the cells.

Dimensions of the frond in the largest specimen observed: length of funicle one tenth of an inch; width of funicle one

twentieth of an inch; width of stipe at commencement one twenty-fifth of an inch, at widest portion about one line; total length of frond unknown, but exceeding three inches and a half; distance between the stipes on opposite sides of the frond from one fifth to one fourth of an inch, except close to the funicle.

Cellules about twenty-five in the space of an inch, inclined to the axis at about 45° ; the denticles prominent and sharply pointed or submucronate; the cell-mouths curved at right angles or nearly so to the cellules, and making an angle of about 135° with the axis (fig. 2, *b*).

Tetragrapsus approximatus is most nearly allied to *T. crucialis*, Salter (= *Graptolithus quadribrachiatatus*, Hall), from which, however, it is separated by several very important peculiarities. Most striking amongst these is the very remarkable shape of the frond. In *T. quadribrachiatatus*, Hall, when undistorted, the stipes upon the same side of the funicle are nearly at right angles to one another; so that (keeping the funicle horizontal) the left-hand upper stipe forms nearly a straight line with the right-hand lower stipe, and the other two stipes similarly form a straight line. The whole frond, therefore, has in this species very nearly the shape of the letter X; and it may be compared to what would result if two examples of *Didymograpsus serratulus*, Hall, were united back to back by their radicles. In *Tetragrapsus approximatus*, on the other hand, the two stipes on the same side of the funicle (keeping the funicle, as before, in a horizontal position) are nearly in the same straight line, and the two stipes on the one side are, as nearly as may be, parallel with those on the other side. Hence the whole frond (and this is a fact worthy of notice) bears a very close resemblance to two individuals of *Didymograpsus patulus*, Hall, united back to back by their radicles, this resemblance being increased by the similarity in the shape of the cellules in the two species.

Again, the cellules in *Tetragrapsus approximatus* are much more highly inclined to the axis than they are in *T. quadribrachiatatus*, the denticles are much more prominent and pointed, and the cell-mouths are markedly curved instead of being straight. As in *T. quadribrachiatatus*, the funicle does not appear to have been embraced by a central corneous disk. The peculiarities above mentioned as distinguishing *T. approximatus* are constant in a large number of individuals; and therefore no doubt can be entertained as to the distinctness of the species.

Loc. and Form. Common in dark grey or greenish grey shales of the Quebec group, Point Lévis.

CLONOGRAPSUS, Hall.

In the course of last winter, when preparing the first part of my 'Monograph of the British Graptolitidæ,' I wrote to Prof. Hall asking him to propose a generic name for forms like his *Graptolithus flexilis* and *G. rigidus*, which are clearly entitled to be placed in a separate genus. Prof. Hall's reply unfortunately reached me too late to be available in the above mentioned publication, and I therefore left these forms temporarily in the genus *Dichograpsus*. I take the present opportunity, however, of defining the species in question under the generic name of *Clonograpsus* (κλών, a twig) proposed for them by Prof. Hall.

The characters of the genus are as follows:—Frond composed of numerous (more than eight) stipes proceeding from a common funicle, on the two sides of which they are symmetrically arranged; the frond dividing dichotomously and the process of division going on after the cellules are developed, till ultimately there may be produced from sixty-four to one hundred and forty-four simple celluliferous stipes. No central disk.

The genus *Dichograpsus*, Salter, will now contain only those Graptolites in which the frond consists of eight simple stipes proceeding from a funicle, the divisions of which are sometimes enveloped in a corneous disk. The celluliferous stipes in this genus do not subdivide or branch.

The genus *Loganograpsus*, Hall, again, will embrace those compound Graptolites in which the frond consists of from eight to twenty-five simple stipes which do not subdivide, and which are sometimes united at their bases by a corneous disk.

From both of these genera *Clonograpsus* is distinguished by the great number of stipes composing the frond (sixty-four to one hundred and forty-four in the typical forms, but fewer in others), by the fact that the celluliferous stipes themselves subdivide, and by the apparently uniform absence of a corneous disk.

The only undoubted species of *Clonograpsus* from the Quebec group are *C. flexilis*, Hall, and *C. rigidus*, Hall, both of which occur in great plenty in the shales of Point Lévis. It is also probable that the *Graptolithus Richardsoni* and *G. ramulus* of the same author, from the same formation, likewise belong to this genus. Of the Graptolites of the Skiddaw series of the north of England, the *Dichograpsus multiplex*, Nich., undoubtedly belongs to *Clonograpsus*, and *Dichograpsus reticulatus*, Nich., may likewise, in all probability, be placed in this genus.

DAWSONIA, Nich.

I propose this genus, named in honour of Principal Dawson of Montreal, for the singular bodies which I have elsewhere (Monograph Brit. Grapt. part i. p. 71, fig. 41) described as the "ovarian vesicles" of Graptolites. I am led to this step by the extreme inconvenience of applying a general name like "ovarian capsules" to fossils which often present differences of specific value, which cannot be properly described unless a special name be adopted. Moreover good authorities are disposed to doubt whether these bodies are truly to be compared to the "ovarian capsules" of the Graptolites; and the name of "grapto-gonophores," which I originally applied to them (Geological Magazine, vol. iii. p. 448), is open to other grave objections as well. Upon the whole, therefore, it appears to me best to found for these fossils the provisional genus *Dawsonia*, which implies no theory as to their nature, and which will enable us to specify and name such varieties as appear to be distinct. In fact this course seems to me to be the best, even whilst I retain my belief as to their truly being the "ovarian capsules" of Graptolites; for it cannot be hoped that we shall ever be able to refer each (or perhaps any) particular species of *Dawsonia* to the species of Graptolite by which it was produced.

The characters of the genus are as follows:—Horny or chitinous capsules of a rounded, oval, conical, or campanulate shape, furnished in most cases with a little spine or mucro, and having a marginal filament exactly resembling the solid axis of a Graptolite. The marginal fibre sometimes complete, sometimes ruptured opposite to the mucro. The mucro sometimes apparently wanting, sometimes marginal, submarginal, subcentral, or central. The surface smooth or concentrically striated.

I first discovered the bodies included under this head in the Lower Silurian anthracitic shales of the south of Scotland, where they occur in great numbers along with the Graptolites; and, as before remarked, I regarded them as bearing to the Graptolites the same relation that the "ovarian capsules" do to the colonies of the Sertularians. Subsequently I detected similar bodies in the Graptolitic mudstones of the Coniston series of the north of England, also associated with numerous Graptolites. I consider it the very strongest confirmation of my views as to the nature of these fossils that I have now discovered them in vast numbers in the Quebec group, associated with the Graptolites of that formation. Not only are they very numerous, but there are at least three distinct forms of

them, as might be expected when we consider the number and complexity of the Quebec Graptolites. It would seem, therefore, that the constant association of these fossils with Graptolites (whenever these latter occur in any plenty), and their constant absence from strata in which Graptolites are unknown, constitute extremely strong proofs as to there being a natural connexion between the two sets of organisms.

Without entering further into their nature at present, I shall simply describe three well-marked forms of these bodies which occur in the shales of the Quebec group, and which differ both from one another and from the forms which are found in the Graptolitiferous rocks of the south of Scotland and the north of England.

Dawsonia acuminata, Nich.

Capsule of a long oval shape, having one extremity prolonged gradually, and without any marked line of demarcation, into a long acuminate mucro. The marginal fibre extremely delicate, and not always to be detected. Often showing an impressed line, which proceeds inwards from the mucro to a greater or less distance within the sac. Dimensions variable; in the Quebec specimens mostly about one fifth of an inch in length by one tenth of an inch at the greatest width; in English specimens the average dimensions as above, but large examples showing a length of two fifths of an inch by a greatest width of three twentieths of an inch. (Fig. 3, *a*, *a'*.)

Fig. 3.

Various forms of *Dawsonia*: *a*, *Dawsonia acuminata*, natural size; *a'*, the same, enlarged; *b*, *D. rotunda*, natural size; *b'*, the same, enlarged; *c*, *D. tenuistriata*, natural size; *c'*, the same, enlarged; *d*, *d'*, another variety of *D. tenuistriata*; *e*, *f*, forms of *D. campanulata*, enlarged.

Dawsonia acuminata is exceedingly abundant in some beds of the Quebec group at Point Lévis, where it constitutes the commonest form of the genus. The species also occurs not uncommonly in the anthracitic shales of the south of Scotland (Upper Llandeilo). The size of the Quebec specimens is exceedingly uniform, whereas English specimens vary extraordi-

narily in their dimensions, examples apparently belonging to this species ranging from about one line in length to more than a quarter of an inch. It is probable therefore that, in spite of the identity of shape, more than one form is included under this head. The species to which *D. acuminata* is most nearly allied is *D. campanulata*, from which it is distinguished by the fact that the mucro is not sharply separated from the body of the capsule, whilst its figure is quite different.

Dawsonia rotunda, Nich.

Capsule minute, oval or circular in outline, consisting of a flattened marginal limb surrounding a central elevated seed-like body (the cast of the interior of the capsule). The marginal limb is quite smooth and exhibits no structure; but the central rounded mass often exhibits striæ or furrows, which are disposed concentrically round a marginal point (fig. 3, *b*, *b'*). Dimensions very constant, the circular specimens having a diameter of a line or a little less, whilst the oval specimens have a long diameter of about a line by a short diameter of about one twentieth of an inch.

This exceedingly distinct form cannot be confounded with any of the ordinary forms of *Dawsonia*. It is found very abundantly in certain beds of the Point-Lévis shales. It is curious to note how closely *D. rotunda* approximates in structure to the "statoblasts" of the Polyzoa, since the capsule, according to all appearances, has been composed of two concavo-convex disks united by their faces, the union being effected by the adhesion of a broad marginal belt on each disk. I have not as yet determined this species from any of the Graptoliferous strata of Britain.

Dawsonia tenuistriata, Nich.

Capsule oval, obtusely ovate, satchel-shaped, or nearly round, covered with fine concentric striæ, which surround a prominent elevated point. This point (the mucro) marginal, submarginal, subcentral, or central. The striæ differing in closeness and fineness, but always delicate and regular in their arrangement. Dimensions, like the shape, very variable, but the length usually varying from one tenth to one fifth of an inch. (Fig. 3, *c*, *d*, *d'*.)

The forms included under this head are extremely like small Brachiopods of the genera *Lingula*, *Obolella*, and *Discina*; and it is difficult to convince one's self that they do not truly belong to this group. That they are not Brachiopods, however, appears certain from the following considerations. They occur in great plenty, along with the two previously described forms

of *Dawsonia*, in the shales of the Quebec group at Point Lévis. They have exactly the same texture, and are in just the same state of mineralization as the ordinary forms of *Dawsonia*. Their shape is so variable that we should have to believe that there were at least four or five distinct species of small Brachiopods in these beds, which is very unlikely. Lastly, the position of the elevated point, which would constitute the beak if they were Brachiopods, is exceedingly variable, being most commonly placed a little within the margin, but being at other times subcentral or marginal. On the other hand all the requirements of the case are met by the supposition that we have in these singular fossils the horny capsules of a species of *Dawsonia*, in which the capsule was furnished with striæ concentric to the mucro. On this view the elevated point round which the striæ are disposed is the mucro; and its variable position, as well as the variable shape of the capsule, can be readily explained by supposing that it is due to the variable direction in which the capsule has been compressed. When compressed laterally the mucro will be marginal; when compressed from above downwards the mucro will be more or less nearly central; when compressed obliquely the mucro will be submarginal.

Dawsonia campanulata, Nich.

Capsule bell-shaped, with a very distinct marginal fibre and a strong and distinct mucro. The mucro does not pass insensibly into the body of the capsule, but is sharply separated from it. The surface of the capsule smooth. The marginal fibre sometimes continuous, sometimes ruptured opposite to the mucro (fig. 3, *e, f*). Dimensions extremely variable; average specimens about one fifth of an inch in length by three twentieths of an inch in breadth.

Ordinary specimens of this form present the appearance shown in fig. 3, *e*, where the capsule has been compressed laterally and the mucro is marginal. Many specimens, however, present the appearance shown in fig. 3, *f*, in which the compression has been directed from above downwards, and the mucro forms an elevated point within the margin, surrounded by a few concentric ridges. This appearance might lead to its being confounded with *Dawsonia tenuistriata*; but it is really very different. In the latter the concentric striæ which surround the mucro are really proper to the capsule, and they are extremely fine, delicate, and regular; in vertically compressed specimens of *D. campanulata*, on the other hand, the concentric ridges which surround the mucro are truly foreign to the capsule, being merely the result of the direction of the pressure, and

being very irregular in size and number. In fact they are not striæ, properly speaking, at all, but simply concentric crumpings or corrugations of the capsule.

I need not discuss here further the affinities and structure of *D. campanulata*, as I have not yet detected the species in the shales of the Quebec group. It is, however, the commonest species which occurs in the anthracitic shales (Upper Llandeilo) of the south of Scotland.

Corynoides calicularis, Nich. (?)

Numerous examples of a species of *Corynoides*, Nich., occur in a bed of black shale at Point Lévis; but their state of preservation is such as to render their specific determination impossible. They agree very well in their dimensions with *C. calicularis*, Nich. (Geological Magazine, vol. iv. p. 107, pl. vii.), which is an abundant fossil in the Upper Llandeilo shales of Dumfriesshire, Scotland. It is quite possible, however, that more perfect examples will show that the Quebec species is distinct.

Caryocaris, sp.

It is very interesting to notice the occurrence in the Point-Lévis shales of a species of the Crustacean genus *Caryocaris*, Salter, this genus being exceedingly characteristic of the corresponding formation of the Skiddaw Slates of the north of England. The state of preservation of the Quebec specimens is such as to render their specific determination hazardous and uncertain; and I prefer therefore to leave them undescribed at present. Upon the whole they closely resemble small specimens of *Caryocaris Wrightii*, Salter (Quart. Journ. Geol. Soc. vol. xix. p. 139); but it is probable that they will turn out to be distinct. None of my specimens shows more than the carapace, and that considerably crushed.

XVIII.—*Notes on Tortoises.* By Dr. J. E. GRAY, F.R.S. &c.

Testudinella Horsfieldii.

General Goldsmid has kindly presented to the British Museum a small and a larger specimen of the shell of a tortoise, the large one wanting the front of the sternum, from Rud-I-Mil, Chuh Suguti to Duruh, in Persia, which were collected on March 23rd, 1871; they evidently belong to this species, though we have not the animal to determine the number of its claws.

The two specimens are exceedingly like *Peltastes græcus* in general character, but are much more depressed, and the horny