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FOSSIL ARTHROPODS OF BRITISH COLUMBIA

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5. A NEW DEPOSIT OF LIGNITE

On September 1, 1949, Mr. Walter MacKay Draycot presented the writer with a lot of black shaly Interglacial lignite, much more solidly compressed, consisting of plant material with almost no fine silts, as compared with that from Lynn Creek. It was collected along the Seymour River which enters Vancouver channel just east of Lynn Creek; at a point 8 miles from the mouth and at an altitude of 450 feet.

One of the characteristics throughout this shale was the large number of shining black seeds, resembling insect chitin, and entirely different plant remains from those in the Lynn Creek lignite. These will be reported on later by a paleobotanist.

A few insect remains were obtained, and will be considered in this series of articles.

6. FOSSIL SPIDER SILK

1950a
The most surprising find of all in the Seymour River lignite was five little silken egg cases, and I was inclined to think that these might be the oldest examples of silk in existence, until I read Dr. McCook's chapter on Ancestral Spiders and Their Habits, in his great monograph on "American Spiders and Their Spinning Work," 1890 (vol. 2:446-469), in which he cites eleven specimens of cocoons from the Oligocene shales of Florissant, Colorado; Green River, Wyoming; and Quesnel, British Columbia. These had been given the name *Aranca columbiæ* Scudder (1878), which McCook in 1880 assigns to the Theridiidæ, and Scudder (1890) agrees. These were oval in shape and most of them hung by a pedicel.

Following the Scudder plan the new cocoons are named in a general genus to indicate the probable family.

SALTICUS SEYMOURI, new species

Five silken cocoons, semi-lenticular, cut straight across and open on that side; measuring 4.16 x 3.0 mm., 3.52 x 2.40 mm., 3.84 x 2.56 mm., 3.28 x 2.4 mm., and 3.04 x 1.92 mm. Two of them contained round masses, probably crushed eggs. The silk is very closely woven, and of a creamy or straw color. My assumption is that the spider remains in the case with her egg ball. The case does not consist of two layers united at edges, but is a one piece pocket sac, open at one side, and hence most likely to belong to a small Salticid. The Gnaphosidæ and Thomisidæ make lenticular cases with the two layers united at the edges.

1950b

7. A CARABID FROM LYNN CREEK LIGNITE

A fine pair of elytra belonging to the genus *Notiophilus* was recovered from Interglacial lignite, collected along Lynn Creek, North Vancouver, British Columbia, by Walter MacKay Draycot in October 1946. These elytra had such characteristic sculpture that I felt there could be no doubt as to their generic position, but was three years in discovering that.

The genus *Notiophilus* belongs to the North Temperate Regions and in America occurs as 17 species, most of which are unicolorous. Three species have a yellowish to brownish longitudinal vitta, which also characterizes these new elytra.

H. C. Fall monographed the genus in *Psyche* 13:79-92, in 1906; and Thomas Lincoln Casey reviewed it in *Memoirs on the Coleoptera* 9:139-143, in 1920. These texts leave only *N. sylvaticus* Eschscholtz, *N. nemoralis*, Fall, and *N. semiopacus* Eschscholtz with which to compare our specimens. The first two are characterized by a broad and entire yellow lateral vitta occupying the lateral interstriae; and *semiopacus* has a dull lateral vitta, which may be entire, or distinct only toward the apex. Fall does not give any cue of difference in sculpture or texture of the vitta from the remainder of the surface.

The only other character by which an elytron in this genus can be determined by keys or descriptions, is the number of annulate setigerous punctures or foveae near the apex of the elytra. No mention is made of the presence of such punctures elsewhere on the elytra, although they are present in the various species of the genus.

N. sylvaticus and *N. nemoralis* have two such punctures or foveae near the apex, and *semiopacus* has three, rarely two or four, while the new species has six or seven more or less discernible annulate punctures near the apex, and in addition has three at the base, and five others scattered on the disc. Since *semiopacus* is the only species with more than two apical punctures, the new material was compared with California specimens, and is unquestionably different. In *semiopacus* there are two short diagonal striae joining the sutural stria. In *vancouveri* these striae are abbreviated, the first to two punctures, the second to four and a basal annulate vitta. Furthermore the surface of the elytron in *semiopacus* is not deeply wrinkled in the vitta, but of same surface level, although the sculpture is reticulate around all striae and smooth in the radial and cubital areas.

Checking from distributional standpoint, *N. nemoralis* is known only from New England; *N. sylvaticus* occurs in the coastal belt from Southern Mendocino County, California, through Oregon, Washington, Vancouver and British Columbia, to Sitka and Kenai, Alaska, from sea level to over 5000 feet on Mt. Rainier. *N. semiopacus* occurs in Oregon and California to

San Diego. The two Western species are readily separated by frontal characters, which of course are not available to us. On present evidence then, *vancouveri* is a distinct species belonging near *sylvaticus* and *semiopacus*.

NOTIOPHILUS VANCOUVERI new species

Described from a pair of elytra from Interglacial lignite from Lynn Creek, North Vancouver, British Columbia, found by Walter MacKay Draycot. Length of elytron 3.40 mm., breadth 1.00 mm. Color shining black with a brownish median vitta arising basally in the cubital area, at the center of the disc including all medial and cubital striæ, and at apex reaching radial striæ. Texture of the black areas shining smooth; of the vitta, soft, longitudinally wrinkled, minutely reticulate, and much thinner than the black areas.

A characteristic of *Notiophilus*, *Leistus*, *Nebria*, and *Pelophila* is that the elytra are margined at base. This character has not been correlated with modern morphology.

The so-called basal margin is the *plica basalis* or basal fold of Snodgrass, and extends from the base of radius to the vannal fold. It is usually concealed by the prothorax. In this material the axillary region is a broad basal margined band, representing the second axilla, behind which is the third axilla to which vannus and jugum are attached. The first axilla, to which the costa is attached, is seen only on the underside. In the dorsal view (Plate 2, figure 1) just a narrow portion of the vannus, which clasps the body, can be seen.

The costa is only glimpsed at base above (Plate 2, figure 1), but beneath, it extends as a reinforcing brown rib to the apex (Plate 2, figure 3); while the subcosta forms the sutural margin and is black.

The radius is a punctate stria against the subcostal rim. Two short radial veins, R_2 and R_3 are represented by 2 and 4 punctures and R_3 has an annulate puncture at base. The radial interspace is broad and smooth, impunctate and as wide as the entire medial and first cubital area, which in the center is colored brownish. The first four longitudinal punctate striæ, which were called by Fall striæ 4, 5, 6, 7, constitute the four branches of medius, with a basal annulate puncture separating the first two (M_1 , M_2) from the last two (M_3 , M_4). M_2 has two discal annulate punctures. Three cubital striæ are present. The first two include the base of the brown vitta and extend to the impunctate apical area; first cubital has an annulate puncture at middle; the third cubital is indicated basally by a few punctures and an annular puncture, and thence is faintly indicated by punctules on the otherwise smooth cubital and cubital-postcubital interspace. Postcubitus arises from a basal annular puncture and has another near base, and extends at the edge of the vannal fold to its terminus.

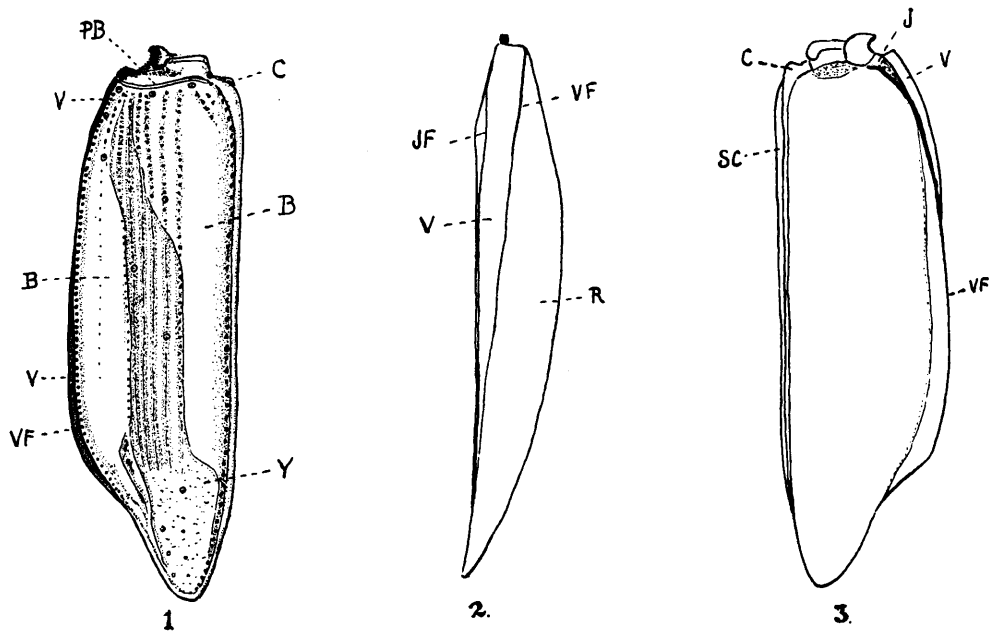


PLATE 2

FIGURE 1. *Notiophilus vancouveri* Pierce, dorsal view of left elytron. B—smooth shining black;

Y—soft, reticulate brown. C—costa; PB—plica basalis; V—vannus; VF—vannal fold.

FIGURE 2. The same, lateral view. JF—Jugal fold; R—remigium; V—vannus; VF—vannal fold.

FIGURE 3. The same, under side. C—costa; SC—subcosta; J—jugum; V—vannus; VF—vannal fold.

Hence in the old terminology the elytron is 11-striate with the 2nd, 3rd, and 10th abbreviate.

The apical fourth of the elytron in the brown soft zone is more or less smooth, with one large and three faint annulate punctures representing first medius and three representing fourth medius (Fall's 7th stria).

The vannus is vertical, broadest in basal fourth (Plate 2, figure 2), and thence gradually narrowing to its terminus at about apical tenth. A tiny infold at base beneath represents the jugum, which very narrowly folds over the edge of vannus as shown in Figures 2, 3.

8. THE GENUS *DONACIA* IN BRITISH COLUMBIA LIGNITE

1950c

T. D. A. Cockerell in 1927 described *Donacia connelli* from Cordova Bay lignite, but since then Mr. Draycot has found much material in the genus.

The beautiful, graceful beetles of the genus *Donacia* in the Chrysomeloidea, occur upon the leaves and stems of water lilies, arrowhead, pond-weed, skunk cabbage, pickerel weed, reeds, sedges, and other water-loving plants, and hence are semiaquatic in habit. The larvæ live on the outside of the submerged roots and obtain their air through the tissues of the host plant. When ready to pupate they enclose themselves in silken cocoons attached to the plant.

This genus is characteristic of Interglacial lignites across North America, and the writer has much material on hand for future reports from other areas.

DONACIA (*DONACIA*) *DRAYCOTI* new species

Received November 1, 1946 from Walter MacKay Draycot, collected in banks of Lynn Creek, North Vancouver, B. C., in interglacial lignite.

Holotype (LC 74), three fragments of a brilliant blue green elytron; length about 4.7 mm., width 1.68 mm.; ratio 2.809:1. Striæ (ten in number) consist of elongate punctures, but striæ not impressed, separated by 0.12 to 0.14 mm.; transverse wrinkles very close, short, continue across striæ, anastomosing, and curving; both marginal interspaces smoother. On under side punctures represented by oval tubercles, wrinkling less evident; ten rows of tubercles are distinct.

In addition Mr. Draycot obtained material in 1945, 1946, and 1947; and on September 1, 1949 the writer visited Mr. Draycot, accompanied by Mrs. Pierce, Mr. Carroll Lang, and Miss Ruth Scherfee, and we were joined by Dr. John E. Armstrong, and his assistant Mr. W. L. Brown of the Geological Survey of Canada,

the party picking up considerable matrix from which further material was obtained.

The brilliant blue fragments of this species were found in all lots received; and the paratype series consists of fragments Numbered LC 4, 9, 11, 12, 13, 15, 17, 19, 20, 21, 22, 23, 24, 25, 28, 66, 70, 78, 105, 112, 120, 141, 143, 145, 148, 152, 158, 162, 169, 174, 197, 206, 211, 213, all of a brilliant deep blue to bluish black. But there were other specimens with identical sculpture, which must be considered as black, and these are also included as paratypes of *draycoti*, numbered LC 5, 6, 10, 18, 26, 27, 31, 63, 84, 88, 93, 113, 142, 164, 166, 168, 191, 210, 220.

The elytra are characterized by ten striae rows of punctures, which are so obscured dorsally by the dense, irregular transverse rugosity that they are easily overlooked. These transverse ridges are short, anastomosing with those of other lines, and exist several between successive punctures of the striae. There is no definite pattern to them. The pleurites of the specimens with blue elytra are black.

DONACIA (DONACIA) CORDOVÆ, new species

When Dr. Cockerell described in *Canadian Entomologist* (59:-303-304, 1927), the discovery of the deposit of interglacial lignite at Cordova Bay, near Victoria, Vancouver Island, he described *Donacia connelli* with elytra smooth between striae, and referred other material to *D. pompatica* Scudder, of Scarborough, Ontario interglacial lignites, which is described as having punctured striae rather deep, and the whole surface transversely wrinkled at the punctures; color bluish purple, deep violet, or dark metallic green. The writer has not seen Cockerell's Cordova Bay material, but has four fragments of a *Donacia* taken by Walter MacKay Draycot, from the same site. These do not in any wise fit either the description or the Scudder illustration of *Donacia pompatica*, but are rather of the type of *D. draycoti*.

The holotype of *D. cordovæ* (CB5) is a pair of elytra, crushed on the matrix, color bluish purple; length 6.0 mm., breadth of single elytron 1.76 mm.; ratio of length to width 3.409:1. The outer margin of the elytra is bright metallic green. While striae punctures can be detected, they are obscured by the more prominent transverse wrinkling.

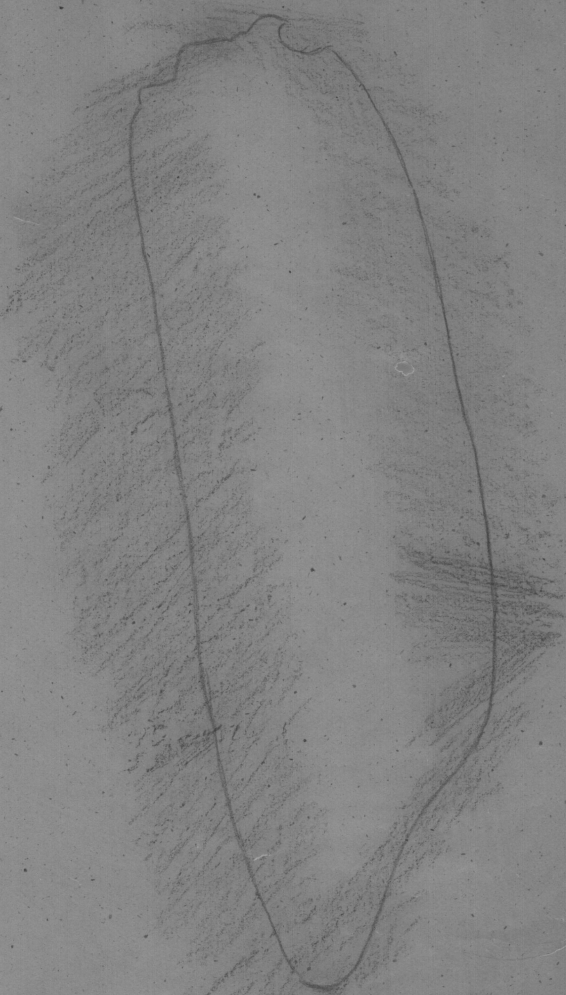
Paratype CB 7 and CB 8 are fragments of the same type of elytron with identical coloring; while paratype CB 6 is blue green in color.

DONACIA (DONACIA) LYNNI, new species

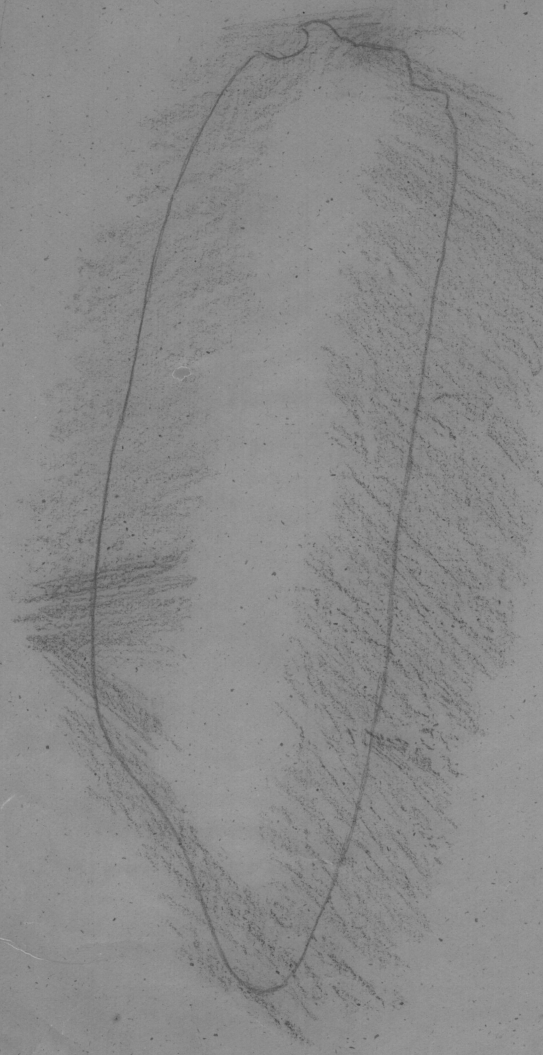
From Lynn Creek interglacial lignite collected by Walter MacKay Draycot 1945, 8 miles northeast of Vancouver City.

Holotype LC 16; paratype LC 14. Length of holotype elytron 7.04 mm., width 2.64 mm.; ratio 2.666:1; distance between striae

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0.24 to 0.26 mm.; ten striæ; color black; striæ deep and sharp cut, interspaces roundingly and deeply wrinkled transversely. Paratype length of elytron 8 mm.

COMPARATIVE MEASUREMENTS OF FOSSIL DONACIA

Donacia sp.	Locality	Accession Number	Color	Length mm.	Width mm.	Ratio L:W:: —:1	Other Data
<i>lynni</i> Pierce	Lynn Cr. Vancouver, B.C.	LC 14	Black	8.00	2.64	2.666	Paratype
		LC 16	Black	7.04			Holotype
<i>elongatula</i> Scudder	Fort Riv. Hadley, Mass.		Shining piceous	7.25	2.2	3.295	Type
<i>cordovæ</i> P.	Cordova B. B. C.	CB 5	Bluish purple	6.00	1.76	3.409	Holotype
<i>connelli</i> Cockerell	Cordova B.		Green	5.00	1.50	3.333	Type
<i>pompatica</i> Scudder	Scarboro, Ontario		Metallic green	5.00	1.45	3.448	Type
<i>draycoti</i> P.	Lynn Cr.	LC 74	Blue green	4.7	1.68	2.809	Holotype
		LC 27	Black	4.40	1.60		Cast
		LC 31	Black		1.592	Paratype	
		LC 15	Deep blue	4.48	1.52	2.947	Paratype
		LC 162	Deep blue	4.40	1.52	2.894	Partial pair
		LC 143	Deep blue	4.16+	1.52	2.894	Cast
		LC 141	Deep blue		1.52		
		LC 4	Blue	4.40	1.52		
		LC 63	Black		1.52	3.111	Cast
		LC 10	Black	4.48	1.44		
		LC 197	Deep blue		1.44	Cast	
		LC 152	Deep blue		1.44		
		LC 66	Deep blue		1.44		
		LC 11	Deep blue		1.44		
		LC 9	Deep blue		1.44		
		LC 93	Black		1.44		
		LC 113	Black	4.40	1.28+	Inside	
		LC 168	Black	4.24			
LC 70	Deep blue	4.16					
LC 13	Deep blue	4.00	1.20+				
<i>stirioides</i> Wickham	Sangamon R. Mahomet, Ill.	LC 28	Deep blue	3.60	1.60	2.25	Inside
			Metallic blue	3.85	1.50	2.056	
<i>stiria</i> Scudder	Scarboro, Ontario		Deep blue-black	3.2+	1.4		

Thus on size and ratios the new species separate from the described species. When the other materials at hand are studied a key to the sculpture will also separate them adequately.