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DESCRIPTION OF A NEW GENUS AND SPECIES OF
PHYLLOCARID CRUSTACEA FROM THE MIDDLE
CAMBRIAN OF MOUNT STEPHEN, B.C.¹

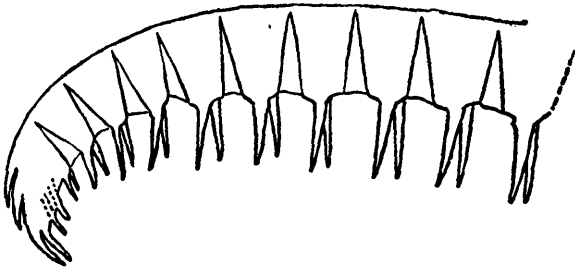
By J. F. WHITEAVES.

ANOMALOCARIS. (Gen. nov.)

Carapace and its appendages unknown or too obscurely indicated for their characters to be defined: body many jointed and consisting of not less than nine to thirteen segments, exclusive of the caudal segment; ventral portion of each of the body segments bearing a pair of slender, narrowly elongated and acutely pointed, simple and probably branchial appendages, of the nature of uropods or foot gills: posterior terminal segment margined with three pairs of caudal spines, one terminal and the other two lateral,—the posterior pair of uropods represented in the wood-cut apparently belonging to a pre-caudal segment whose posterior boundary has been obliterated.

¹ Communicated by permission of the Director of the Geological Survey of Canada.

ANOMALOCARIS CANADENSIS, sp. nov.



Anomalocaris Canadensis.—Outline of a specimen in which nine of the abdominal segments are preserved, besides the caudal segment. Natural size.

Body, inclusive of the tail, elongated, slender, decreasing slowly in size from the anterior to the posterior end, rather strongly curved posteriorly and nearly straight anteriorly, the length of the portion preserved varying in different specimens from nine to ten centimetres (as measured at about the midheight and following the curve of each), and the height or depth at the imperfect anterior end, from twelve to seventeen millimetres, exclusive of the ventral appendages. Body or abdominal segments, which, in all the specimens collected, are abnormally flattened laterally, a little higher or deeper than long, broader above than below, the pair of ventral appendages proceeding from each, nearly equal in height or depth to the segment itself. These appendages are straight and prolonged downward at almost a right angle to the main axis of the body, for although there is a slight divergence in each pair, neither are directed distinctly backward nor forward. Between each pair of segments there is evidence of a wedge-shaped or very narrowly triangular lateral area or interval, which is broadest or widest below and does not seem to extend quite to the dorsal margin. At the posterior end the segmentation is very obscurely defined. Caudal spines, which are

simple, slender, longitudinally elongated and acutely pointed, averaging six millimetres in length by about one mm. in breadth at the base: the three pairs of spines about equal in length, though the two lateral ones are placed farther forward than the central and terminal pair. Surface markings entirely unknown.

This genus and species are based upon upwards of fifty specimens collected from a band of shale of Middle Cambrian age, at Mount Stephen, near Field station on the Canadian Pacific Railway. Two of these specimens were collected by Mr. R. G. McConnell, of the Geological Survey of Canada, in 1888, and the remainder by Dr. H. M. Ami, of the same Survey, in 1891. The species seem to have been somewhat gregarious in its habits when living, for upwards of twenty specimens of it are exposed on the surface of a large slab of shale collected by Dr. Ami at this locality, and fourteen upon that of another. It is associated with numerous species of trilobites, brachiopoda, etc., most of which have been described by Dr. Carl Rominger and Mr. C. D. Walcott. All the specimens of *A. Canadensis* are crushed quite flat laterally and occur as obscurely defined and extremely thin impressions of the body segments, with the tail, the latter usually a little twisted, on each of the surfaces exposed by splitting pieces of the shale.

The generic name *Anomalocaris* (from ἀνομοιος, unlike,—καρίς, a shrimp, i.e., unlike other shrimps) is suggested by the unusual shape of the uropods or ventral appendages of the body segments and the relative position of the caudal spines.

Only three genera of Phyllocarida have previously been recorded as occurring in the Cambrian rocks of Europe or America. These are *Ceratiocaris*, McCoy (1848); *Hymenocaris*, Salter (1853); and *Protocaris*, Walcott (1884). To these may now be added *Anomalocaris*, which differs from the other three genera of Cambrian Phyllocarids in the following particulars. In *Ceratiocaris* the caudal appendages consist of a median telson or style, and two lateral stylets. Further, although ventral appendages to the body segments

have been discovered in one species of *Ceratiocaris*, the *C. stygia* of Salter, yet these are represented as "broad and paddle shaped," not slender and acutely pointed as in *Anomalocaris*. In *Hymenocaris*, according to Prof. H. A. Nicholson, the "hinder termination of the body is adorned with three pairs of unequal spines," but in the woodcut of the type and only known species of that genus, the *H. vermicauda*, which is reproduced in so many palæontological manuals, all of these spines are represented as terminal, and the body segments as devoid of any ventral appendages. The first specimens of *Hymenocaris*, by the way, were collected by Dr. Selwyn in 1846, in the Lingula Flags near Dolgelly, Merionethshire.¹ The *Protocaris Marshii* of Walcott, from the Middle Cambrian of Vermont, is described as having no fewer than thirty narrow segments "between the posterior edge of the carapace and the telson," and a telson "which supports two caudal spines."

The wood-cut of *Anomalocaris*, is a copy of an original drawing kindly made for the writer by Mr. L. M. Lambe, F. G. S., the Artist to the Geological Survey of Canada.

OTTAWA, July 30th, 1892.

THE FLORA OF MONTREAL ISLAND.

By ROBERT CAMPBELL, D.D., M.A.

For some years I have felt, in common with others interested in our local Natural History, that it is a pity we have not a complete list of the plants growing on our own island, and when giving a paper in March, 1891, on the Summer Wild Flowers of Great Britain, I volunteered to do what I could personally to repair the want, an undertaking which the Natural History Society was pleased to approve.

¹ See Proc. Brit. Assoc. 1852, p. 58.

Throughout the season of 1891, I kept my eyes open where ever I chanced to be on the island, in the prosecution of duty or in pursuit of recreation, and I succeeded in securing specimens of the following plants, which I have mounted and presented to the museum of the Natural History Society. After I had entered on my voluntary task, the Botanical Club of Canada was formed, during the sitting of the Royal Society in this city in 1891, and it has mapped out the Dominion for Botanical purposes, assigning each county or group of counties to certain well known naturalists who are asked to take the oversight of the botanical research in their respective districts, securing the co-operation of local workers in this department, cheering them on and directing their enthusiasm. Anything I can do in connection with this joint movement, I shall be glad to attempt, and if the results I reach can be utilized by the Botanical Club, I put them entirely at its disposal. On the other hand, as one person cannot be expected to fall upon everything that grows on the island, I crave the help of every botanist in the district in the effort to secure as complete a catalogue as possible of our local flora. A well assorted cabinet of the plants growing around the city, placed in the museum of the Natural History Society, and thus put within reach of all among our citizens that are interested in this delightful science, would be a great boon; and the wonder is that an attempt to secure it has not been long ago made.

I am not overlooking the Holmes' collection, nor am I unmindful of its great scientific value. But it should not be forgotten that seventy years have elapsed since it was made, and very great and important changes must have come over the flora of the district in the interval. Besides, Dr. Holmes' Herbarium did not profess to be solely a Montreal island collection, much less did it claim to present a complete catalogue of the plant-life of the island. The bulk of the specimens which he preserved for the instruction of later generations, as might be expected, were indeed gathered in the neighborhood of the city, picked up, many

of them, doubtless, while he was prosecuting his professional work. To this extent, it may be taken as a complete Montreal collection, that it represents the island plants which came under Dr. Holmes' notice, or of which he became possessed. Other places are credited occasionally as the *habitat* of the specimens embraced, but whenever a plant was found in or near the city, Montreal was invariably first mentioned among the localities in which it grew. When Montreal is not credited with a plant, it may therefore be taken for granted that Dr. Holmes never came across the plant on the island. It will be interesting to note how far the flora of Montreal to-day corresponds with that of seventy years ago; and I have compared the collection I have so far made with the Herbarium of Dr. Holmes, with the object of finding out what changes, if any, have come about. Or rather I have taken the catalogue of the Herbarium, prepared by the late Prof. James Barnston, and published in "The Canadian Naturalist and Geologist," for April, 1859, as the basis of comparison; and I shall assume that Prof. Barnston's nomenclature is correct and in agreement with the classification of Gray, as it claimed to be.

Clematis Virginiana, L.—Common Virgin's Bower.—August. Mountain Park, south of Park Ranger's house. (Holmes).

Clematis verticillaris, DC.—Virgin's Bower—Mountain above Ravenscrag and elsewhere. (Holmes' *Atragene Americana*). June.

Anemone Virginiana, Gray.—Virginian Anemone.—North end of mountain, and common on the island. June.

Anemone Pennsylvanica, L.—Pennsylvanian Anemone.—(Holmes). June. Common.

Hepatica acutiloba, DC.—Sharplobed Hepatica.—North end of Mount Royal. April and May.

Hepatica triloba, Chaix.—Round-lobed Hepatica.—South end of Mount Royal, and Petite Cote Woods. (Holmes)—April and May.

Thalictrum dioicum, L.—Early Meadow-rue.—Common. (Holmes). April and May.

Thalictrum polygamum, Muhl., (T. Cornuti, Holmes).—Fall Meadow-rue.—Common. July and August.

Ranunculus abortivus, L.—Small-flowered Crowfoot. — Everywhere. (Holmes). April and May.

Ranunculus sceleratus, L.—Cursed Crowfoot.—Wet meadow at Hochelaga. June.

Ranunculus repens, L.—Creeping Crowfoot. — Common. July and August. (Holmes).

Ranunculus acris, L.—Tall Crowfoot or Buttercup.—June, September. Common. (Holmes).

Ranunculus fascicularis.—Early Crowfoot.—Hochelaga bank. May.

Ranunculus septentrionalis, Poir.—Northern Crowfoot.—Prince Arthur street. May.

Caltha palustris, L.—Marsh Marigold.—May. Meadows, St. Cunegonde and Lachine. (Holmes).

Coptis trifolia, Salisb.—Three-leaved Gold Thread.—May, Mount Royal and Hochelaga banks. (Holmes).

Aquilegia Canadensis, L.—Wild Columbine.—West side Mt. Royal, common. May and June. (Holmes).

Aquilegia vulgaris.—Common Garden Columbine.—Escaped from cultivation, St. Laurent road. May and June.

Actæa spicata, L., var. *rubra*. Michx.—Red Baneberry.—Common. May. (Holmes).

Actæa alba, Bigel.—White Baneberry.—Common. May. (Holmes).

Caulophyllum thalictroides, Michx.—Blue Cohosh.—North end of mountain and elsewhere. May.

Nuphar advena, Ait.—Common Yellow Pond Lily.—River St. Pierre. July. (Holmes).

Chelidonium majus, L.—Celandine.—Fletcher's Field, common. (Holmes). May.

Sanguinaria Canadensis.—Bloodroot.—Common. April. (Holmes).

Dicentra cucullaria.—Dutchman's Breeches.—Petite Cote woods. (Holmes' *corydalis cucullaria*). May.

Corydalis glauca.—Pale Corydalis. — (Holmes). June. Mountain.

Nasturtium officinale, R.Br.—Water Cress.—Below bridge, near junction of cemeteries. July.

Nasturtium palustre, DC. — Marsh Cress. — (Holmes' *sisymbrium palustre*). June. Common.

Nasturtium armorica, Fries. †—Horse Radish.—Creek near Cote des Neiges. June.

Dentaria diphylla, L.—Two-leaved Toothwort.—Mountain, common. May and June. (Holmes).

Arabis levigata, DC.—Smooth Rock Cress.—Mountain, near Park Ranger's house. June. (Holmes' *turritis levigata*).

Erysimum cheiranthoides, L.—Wormseed Mustard.—Fletcher's Field. June.

Sisymbrium officinale, Scop.—Hedge Mustard.—Common. June.

Brassica sinapistrum, Bois.—Charlock.—Common. June.

Brassica alba, L.—White Mustard.—(Holmes' *sinapis alba*). Common. June.

Brassica nigra, L.—Black Mustard.—(Holmes' *sinapis nigra*). Common. June.

Draba arabisans, Michx.—Whitlow Grass.—Outremont. June.

Capsella bursa-pastoris, Mœnch.—Shepherd's Purse—Common. May. (Holmes' *thlaspe bursa-pastoris*).

Thlaspi arvense, L.—Field Penny Cross.—(Holmes). Common. July.

Lepidium virginicum, L.—Wild Pepper Grass.—Common on streets. August. (Holmes).

Lepidium campestre, L.—Peppergrass.—Cote St. Louis. August.

Viola blanda, Willd.—Sweet White Violet.—Common. May. (Holmes).

Viola cucullata, Ait.—Common Blue Violet.—Common. May. (Holmes).

Viola pubescens, Ait.—Downy Yellow Violet.—Common. May. (Holmes).

Viola Canadensis, L.—Canada Violet.—Common. May. (Holmes).

Viola canina, L., var. *Sylvestris*, Regel.—Dog Violet.—Hochelaga banks. May.

Helianthemum Canadense, Michx.—Frost Weed.—Petite Cote. June.

Hypericum perforatum, L.—Common St. John's Wort.—Common. July. (Holmes).

Hypericum mutilum, L.—Small St. John's Wort.—Hochelaga banks. July. (Holmes' *hypericum parviflorum*).

Hypericum corymbosum, Muhl.—Corymbed St. John's Wort.—Cote St. Paul. August.

Elodes virginica, Nutt.—Marsh St. John's Wort.—Bout de L'isle. August.

Saponaria officinalis, L.—Bouncing Bet.—Park Avenue. August.

Silene cucubalus, Wibel.—Bladder Champion.—Common. July.

Silene Pennsylvanica, Michx.—Wild Pink.—Field near Hochelaga bank. September.

Silene noctiflora, L.—Night Flowering Catchfly.—Fletcher's Field. July.

Lychnis githago, Lam.—Corn Cockle.—Common. July.

Stellaria media, Smith.—Common Chickweed.—Common. July. (Holmes' *alsine media*).

Stellaria longifolia, Muhl.—Longleaved Stitchwort.—June. Cote St. Antoine. (Holmes' *stellaria graminea*).

Cerastium viscosum, L.—Larger Mouse-ear Chickweed.—June. Common. (Holmes).

Cerastium arvense, L.—Field Chickweed.—July. Common.

Cerastium nutans, Raf.—Nodding Chickweed.—Petite Cote. August.

Portulaca oleracea, L.—Common Purslane. — August. Common. (Holmes).

Claytonia Caroliniana, Michx.—Spring Beauty.—May. Common. (Holmes' *C. Virginica*).

Malva rotundifolia, L.—Round Leaved Mallow.—June. Common. (Holmes).

Tilia Americana, L.—Basswood.—May. Common.

Linum usitatissimum, L.—Common Flax.—Cote St. Louis and elsewhere. Strayed from cultivation. August.

Oxalis acetosella, L.—White Woodsorrel.—July. Hochelega woods. (Holmes).

Oxalis stricta, L.—Yellow Woodsorrel.—June. Common. (Holmes' *O. Dillenii*).

Impatiens fulva, Nutt.—Spotted Touch-me-not.—July. Common. (Holmes' *I. noli-me-tangere*).

Impatiens pallida, Nutt.—Pale Touch-me-not.—August. Common. (Holmes' *I. biflora*).

Zanthoxylum Americanum, Mill.—Northern Prickly Ash.—April. Field near Petite Cote. (Holmes' *Z. fraxineum*).

Rhus typhina, L.—Staghorn Sumach.—Mt. Royal. July. (Holmes).

Rhus toxicodendron, L.—Poison Ivy.—June. Common. (Holmes).

Vitis cordifolia, Michx.—Frost Grape.—June. Common. (Holmes' *V. riparia*).

Ampelopsis quinquefolia, Michx.—Virginia Creeper.—Mountain and along fences on island. July. (Holmes' *cissus hederacea*).

Celastrus scandens, L.—Climbing Bitter-sweet.—June. Common on fences over the island. (Holmes).

Acer Pennsylvanicum, L.—Striped Maple.—May. North end of mountain.

Acer spicatum, Lam.—Mountain Maple.—May. Common. (Holmes).

Acer saccharinum, Wang.—Sugar Maple.—May. Lachine and elsewhere on island. (Holmes).

Acer dasycarpum, Ehrhart.—Silver Maple.—April. Common.

Acer rubrum, L.—Red Maple.—May. Common. (Holmes).

Trifolium pratense, L.—Red Clover.—June. Common. (Holmes).

Trifolium repens, L.—White Clover.—June. Common. (Holmes).

Trifolium agrarium, L.—Hop Clover.—June. Hochelaga bank.

Trifolium procumbens, L.—Low Hop Clover.—July. Hochelaga bank.

Medicago lupulina, L.—Black Medick.—June. Everywhere.

Melilotus officinalis, Willd.—Yellow Sweet Clover.—June. Everywhere.

Melilotus alba, Lam.—White Sweet Clover.—June. Common.

Robinia pseudacacia, L.—Common Locust.—June. St. Michel.

Desmodium acuminatum, DC.—Tick Trefoil.—August. Mountain. (Holmes' *Hedysarum acuminatum*).

Desmodium Dillenii, Darling.—Tick Trefoil.—August. Northern part of Mountain.

Desmodium Canadense, DC.—Tick Trefoil.—August. Park near north end of mountain. (Holmes' *Hedysarum Canadense*).

Vicia sativa, L.—Common Vetch.—July. Common. (Holmes).

Vicia cracca, L.—Tufted Vetch.—June. Everywhere. (Holmes).

Amphicarpæa monoica, Nutt.—Hog Peanut.—August. Overruns cemetery woods. (Holmes' *glycine monoica*).

Prunus Americana, Marshall.—Wild Plum.—Around mountain. May.

Prunus Pennsylvanica, L.—Wild Red Cherry.—Common. May. (Holmes).

Prunus Serotina, Ehrhart.—Wild Black Cherry.—Papineau Road and Petite Cote. June.

Prunus Virginiana, L.—Choke-cherry.—Very common. May. (Holmes' *P. serotina*).

Spiræa salicifolia, L.—Common Meadow-sweet.—Common. August. (Holmes' *S. latifolia*).

Agrimonia eupatoria, L.—Common Agrimony.—July. Common. (Holmes).

Poterium Canadense, Benth and Hook.—Canadian Burnet.—Savanne, St. Michel. September. (Holmes' *sanguisorba Canadensis*).

Geum album, Gmelin.—White Avens.—June. Hochelaga woods. (Holmes).

Geum strictum, Ait.—Yellow Avens.—June. Common. (Holmes).

Geum rivale, L.—Purple Avens.—July. Common. (Holmes).

Potentilla Norvegica, L.—Norway Cinque-foil.—July. Common. (Holmes).

Potentilla Canadensis, L.—Canada Cinque-foil.—June. Hochelaga bank. (Holmes' *P. simplex*).

Potentilla anserina, L.—Silver Weed.—June. Common. (Holmes).

Potentilla fruticosa, L.—Shrubby Cinque-foil.—Savanne, St. Michel. September. (Holmes).

Fragaria Virginiana, Ehrhart.—Common Strawberry.—May. Common. (Holmes).

Fragaria vesca, L.—Sharp Pointed Strawberry.—June. Common in woods.

Rubus odoratus, L.—Purple Flowering Raspberry.—Mountain and elsewhere. June. (Holmes).

Rubus triflorus, Richardson.—Dwarf Raspberry.—Hochelega banks and elsewhere. May. (Holmes).

Rubus strigosus, Michx.—Wild Red Raspberry.—June. All over the island. (Holmes).

Rubus occidentalis, L.—Black Raspberry.—East side of mountain. June. (Holmes).

Rubus villosus, Ait.—High Blackberry.—North end of mountain. June. (Holmes).

Rubus hispidus, L.—Running Swamp Blackberry.—Swamp between cemeteries. June.

Rosa blanda, Ait.—Early Wild Rose.—East end of mountain. June.

Rosa Carolina, L.—Swamp Rose.—Papineau woods. July. (Holmes).

Rosa rubiginosa, L.—Sweet Brier.—Mountain, Outremont and elsewhere. June. (Holmes).

Crataegus coccinea, L.—Scarlet Fruited Thorn.—Mountain. May. (Holmes).

Crataegus tomentosa, L.—Black or Pear Thorn.—North end of mountain and elsewhere. June. (Holmes).

Crataegus crusgalli, L.—Cockspur Thorn.—North end of mountain. June. (Holmes).

Pyrus arbutifolia, L.—Chokeberry.—Cote St. Paul. June. (Holmes' *aronia melanocarpa*).

Pyrus americana, D. C.—American Mountain Ash.—June. (Holmes' *sorbus Americana*).

Amelanchier Canadensis, var. *rotundifolia*, Torr and Gray.
—Shadbush.—May. Mountain. (Holmes' aronia ovalis).

Amelanchier Canadensis, var. *Botryapium*, Torr and Gray.
—Juneberry.—May. Hochelaga banks. (Holmes' aronia botryapium).

Ribes cynosbati, L.—Wild Gooseberry.—Between cemeteries. May. (Holmes' ribes triflorum).

Ribes hirtellum, Michx.—Small Wild Gooseberry.—June. St. Michel.

Ribes lacustre, Poir.—Swamp Gooseberry.—Hochelaga banks. June. (Holmes).

Ribes floridum, L.—Wild Black Currant. May. Between cemeteries. (Holmes).

Ribes rubrum, L.—Wild Red Currant.—May. Hochelaga banks. (Holmes).

Parnassia Caroliniana, Michx.—Grass of Parnassus.—September. Savanne, St. Michel.

Saxifraga Virginiensis, Michx.—Early Saxifrage.—May. Mountain. (Holmes' S. nivalis).

Mitella diphylla, L.—Two-leaved Mitre-wort.—Base of mountain. May. (Holmes).

Mitella nuda, L.—Naked Stalked Milella.—Hochelaga woods. June. (Holmes' M. cordifolia).

Tiarella cordifolia, L.—False Mitre-wort.—May. Base of mountain. (Holmes).

Penthorum sedoides, Gronov.—Ditch Stonecrop.—Cote St. Paul. July. (Holmes).

Circæa lutetiana, L.—Enchanter's Nightshade.—Hochelaga woods. July. (Holmes).

Circæa Alpina, L.—Small Enchanter's Nightshade.—Mountain. July. (Holmes).

Epilobium angustifolium, L.—Great Willow Herb.—July. Hochelaga woods and elsewhere. (Holmes).

Epilobium palustre, L., var. *lineare*.—Epilobe.—August. (Holmes).

Epilobium molle, Torr.—Epilobe.—August. Cote St. Paul.

Epilobium coloratum, Muhl.—Epilobe Swamp.—St. Michel. (Holmes' *E. tetragonum*).

Enothera biennis, L.—Common Evening Primrose.—August. St. Michel and elsewhere. (Holmes).

Enothera pumila, L.—Small Evening Primrose.—Hoche-
laga bank. June. (Holmes' *E. pusilla*).

Sicyos angulatus, L.—Star Cucumber.—Fletcher's Field.
September. (Holmes).

Sanicula Marilandica, L.—Snakeroot.—June. Mountain.
(Holmes).

Daucus carota, L.—Common Carrot.—June. Road-sides.

Heracleum lanatum, Michx.—Cow Parsnip.—Cote St. Paul
and elsewhere. June. (Holmes).

Pastinaca sativa, L.—Common Parsnip.—June. Road-
sides. (Holmes).

Conioselinum Canadense, Torr. and Gray.—Hemlock Par-
sley.—Back River and elsewhere.

Cicuta maculata, L.—Spotted Cowbane.—Cote St. Paul.
July. (Holmes).

Sium lineare, Michx.—Water Parsnip.—August. Pointe-
aux-Trembles. (Holmes).

Carum carui, L.—Caraway.—June. Roadsides, in many
places.

Osmorrhiza longistylis, DC.—Smoother Sweet Cicely.—
Junc. Mountain side. (Holmes' *Myrrhis longistylis*).

Osmorrhiza brevistylis, DC.—Hairy Sweet Cicely.—June.
Mountain side. (Holmes' *chærophyllum Claytoni*).

Aralia racemosa, L.—Spikenard.—North end of mountain.
July. (Holmes).

Aralia nudicaulis, L.—Wild Sarsaparilla.—June. Moun-
tain sides and elsewhere. (Holmes).

Aralia quinquefolia, Decaisne.—Ginseng.—Hoche-
laga woods. May. (Holmes' *panax quinquefolia*).

Aralia trifolia, Decaisne.—Dwarf Ginseng.—Hochelaga woods and elsewhere. (Holmes).

Cornus Canadensis, L.—Bunchberry.—Papineau woods. June. (Holmes).

Cornus circinnata, L'Her.—Round-leaved Dogwood.—Outremont road. June. (Holmes).

Cornus stolonifera, Michx.—Redosier Dogwood.—July. Common. (Holmes' *C. alba*).

Linnaea Borealis, Gronov.—Twin-flower. — Hochelaga woods and Cote Michel. July. (Holmes).

Lonicera parviflora, Lam.—Small Honeysuckle.—June. Mountain. (Holmes).

Lonicera ciliata, Muhl.—Fly Honeysuckle.—North end of mountain. May. (Holmes' *Xylosteon ciliatum*).

Lonicera oblongifolia, Muhl.—Swamp Fly-Honeysuckle.—Buchanan's woods, St. Michel. August. (Holmes).

Diervilla trifida, Mœnch.—Bush Honeysuckle.—July. Mountain. (Holmes).

Sambucus Canadensis, L.—Common Elder.—Mountain sides and elsewhere. June. (Holmes).

Sambucus racemosa, L.—Redberried Elder.—May. Mountain sides and elsewhere. (Holmes' *S. Pubescens*).

Viburnum opulus, L.—Cranberry Tree.—June. Back River road. (Holmes' *V. Oxycoccus*).

Viburnum Lentago, L.—Sheepberry.—Cote St Paul. June. (Holmes).

Viburnum acerifolium, L.—Maple-leaved Arrowwood.—June. Monté between St. Michel and Back River. (Holmes).

Lappa officinalis, All., var. *Major*, Gray.—Burdock.—June. Everywhere. (Holmes' *arctium lappa*).

Cirsium lanceolatum, Scop.—Common Thistle.—August. Everywhere.

Cirsium discolor, Spreng.—Tall Thistle.—August. St. Michel. (Holmes' *Cnicus altissimus*).

Cirsium muticum, Michx.—Swamp Thistle.—August. St. Michel. (Holmes' *cnicus muticus*).

Cirsium arvense, Scop.—Canada Thistle.—August. Everywhere. (Holmes' *cnicus horridulus*).

Xanthium strumarium, L., var. *Echinatum*, Gray.—Common Cocklebur. August. Common. (Holmes).

Ambrosia artemisiifolia, L.—Hogweed.—August. Everywhere. (Holmes).

Ambrosia trifida, L.—Great Ragweed.—August. Common. (Holmes).

Tanacetum vulgare, L.—Common Tansy.—August. Roadside in many places.

Artemisia vulgaris, L.—Common Mugwort.—August. Everywhere. (Holmes).

Gnaphalium decurrens, Ives.—Everlasting.—August. Common.

Gnaphalium polycephalum, Michx.—Common Everlasting.—August. Common.

Gnaphalium uliginosum, L.—Low Cudweed.—August. Common. (Holmes).

Antennaria plantaginifolia, Hook.—Plantain-leaved Everlasting.—May. Everywhere. (Holmes' *Gnaphalium plantaginifolium*).

Eupatorium purpureum, L.—Joe Pye Weed.—August. Mountain Park, Cote St. Paul. (Holmes' *E. verticillatum*).

Eupatorium perfoliatum, L.—Boneset.—August. Mountain Park, Cote St. Antoine. (Holmes).

Eupatorium ageratoides, L.—White Snakeroot.—August. Mountain Park, Cote St. Michel. (Holmes).

Senecio vulgaris, L.—Common Groundsel.—On all streets. July. (Holmes).

Senecio aureus, L.—Golden Ragwort.—August. St. Michel.

Solidago squarrosa, Muhl.—Golden Rod.—East slope of Mountain. August.

Solidago bicolor, L., var., *Concolor*.—Golden Rod.—Mountain base. August. (Holmes).

Solidago latifolia, L.—Golden Rod.—Mountain base. August. (Holmes).

Solidago Oeisia, L., var. *axillaris*, Gray.—Golden Rod.—Mountain base. August. (Holmes' *S. livida*).

Solidago Canadensis, L.—Golden Rod.—August. Common. (Holmes).

Solidago lanceolata, L.—Golden Rod.—August. Mountain base. (Holmes).

Aster macrophyllus, L. — Starwort. — Mountain sides. August. (Holmes).

Aster azureus, Lindl.—Aster.—Cote St. Paul. August.

Aster cordifolius, L. — Aster. — August. Everywhere. (Holmes).

Aster sagittifolius, Willd. — Aster. — September. Very common. (Holmes).

Aster laevis, L.—Aster.—August. Mountain.

Aster puniceus, L.—Aster.—August. Cote St. Paul. (Holmes).

Aster multiflorus, Ait.—Aster.—August. Cote St. Paul.

Aster tenuifolius, L.—Aster.—August. Mountain base.

Aster acuminatus, Michx. — Starwort. — Park woods. August.

Erigeron Canadense, L.—Horseweed.—August. Papineau Road. (Holmes).

Erigeron bellidifolium, Muhl.—Robin's plantain.—July. Mountain.

Erigeron Philadelphicum, L.—Common Fleabane.—June. South Mountain foot. (Holmes' *E. purpureum*).

Erigeron strigosum, Muhl. — Daisy Fleabane. — June. Pointe-aux-Trembles. (Holmes).

Erigeron annuum.—Larger Daisy Fleabane.—Cote des Neiges. August. (Holmes' *E. heterophyllum*).

Leucanthemum vulgare, Lam. — Oxeye Daisy. — June. Everywhere. (Holmes' *chrysanthemum*).

Anthemis cotula, DC.—Mayweed.—May. Everywhere. (Holmes).

Rudbeckia hirta, L.—Coneflower.—Petite Cote. July.

Helianthus divaricatus, L.—Wild Sunflower.—August. Cemeteries and Park.

Helianthus tuberosus, L.—Jerusalem Artichoke.—August. Prince Arthur street.

Bidens frondosa, L.—Common Beggar Ticks.—July. Fletcher's Field. (Holme's *B. pilosa*).

Bidens Connata, Muhl.—Swamp Beggar Ticks.—August. Cote St. Paul. (Holmes).

Bidens cernua, L.—Smaller Bur-marigold.—August. Long Pointe. (Holmes).

Achillea millefolium, L.—Milfoil.—June. Everywhere. (Holmes).

Cichorium Intybus, L.—Cichory.—July. Everywhere. (Holmes).

Hieracium Canadensis, Michx.—Canada Hawkweed.—August. Cemeteries. (Holmes' *H. kalmii*).

Hieracium scabrum, Michx.—Rough Hawkweed.—August. Papineau Road and elsewhere. (Holmes' *H. Marianum*).

Nabalus albus, Hock.—White Lettuce.—August. Common. (Holmes' *prenanthes alba*).

Nabalus altissimus, Hook.—Tall White Lettuce.—August. North end of mountain. (Holmes' *prenanthes cordata*).

Nabalus racemosus, Hook.—Rattlesnake Root.—August. Mountain Park and Cote St. Paul. Common. (Holmes' *Prenanthes racemosa*).

Taraxacum dens-leonis, Desf.—Common Dandelion.—May. Everywhere. (Holmes' *leontodon taraxacum*).

Lactuca Canadensis, L.—Wild Lettuce.—North end of mountain. August. (Holmes' *lactuca elongata*).

Lactuca integrifolia, L.—Wild Lettuce.—August. Cemetery swamp. (Holmes' *L. elongata*).

Mulgedium leucophæum, DC.—False or Blue Lettuce.—

North end of mountain. August. (Holmes' *sonchus leucophæus*).

Sonchus oleraceus, L.—Common Sow-thistle.—July. Common. (Holmes).

Sonchus Asper, Vill.—Spring-leaved Sonchus. August. Fletcher's Field and Park.

Sonchus arvensis, L.—Field Sow-thistle.—Cote St. Antoine and St. Michel. August. (Holmes).

Tragopon pratensis, L.—Yellow Goat's Beard.—July. Longue Pointe.

Lobelia cardinalis, L.—Cardinal Flower.—August. St. Michel. (Holmes).

Lobelia inflata, L.—Indian Tobacco.—August. Plateau, north end of mountain. Common. (Holmes).

Campanula Americana, L.—Tall Bell-flower.—Petite Cote and elsewhere on roadsides. August.

Vaccinium corymbosum, L.—Swamp Blueberry.—Hochelega banks. June. (Holmes).

Pyrola rotundifolia, L.—Wintergreen.—Mountain. July. (Holmes.)

Pyrola elliptica, Nutt.—Shinleaf.—Hochelega woods. July. (Holmes).

Pyrola secunda, var. *pumila*, L.—Wintergreen.—Hochelega woods. July. (Holmes).

Chimaphila umbellata, Nutt.—Prince's Pine.—August. Mountain, west side near Cemetery and Buchanan's woods, St. Michel, among pines. (Holmes' *pyrola umbellata*).

Plantago major, L.—Common Plantain.—August. Common. (Holmes).

Plantago lanceolata, L.—Rib-grass.—August. Common.

Trientalis Americana, Pursh.—Star-flower.—June. Hochelega woods. (Holmes).

Lysimachia Thyrsiflora, L.—Tufted Loosestrife.—June. Back River. (Holmes' *L. capitata*).

Lysimachia stricta, Ait.—Loosestrife.—June. Cote St. Paul. (Holmes' *L. racemosa*).

Lysimachia longifolia, Watt.—Loosestrife.—August. St. Michel.

Verbascum thapsus, L.—Common Mullein.—July. Common. (Holmes).

Veronica anagallis, L.—Water Speedwell.—Lachine. July. (Holmes).

Veronica scutellata, L.—Marsh Speedwell.—August. St. Michel. (Holmes).

Veronica peregrina, L.—Neckweed.—May. Common. (Holmes).

Veronica serpyllifolia, L.—Thyme-leaved Speedwell.—May. Hochelaga banks. (Holmes, at Berthier).

Linaria vulgaris, Mill.—Toad Flax.—July. Common on streets.

Scrophularia nodosa, L.—Figwort.—June. Common. (Holmes' S. Marilandica).

Chelone glabra, L.—Turtle Head.—August. St. Michel and between cemeteries.

Mimulus ringens, L.—Monkey Flower.—Hochelaga. July. (Holmes).

Gerardia tenuifolia, Vahl.—Slender Gerardia.—September. Savanne. St. Michel.

Pedicularis Canadensis, L.—Wood Betony.—May. Mountain base. (Holmes).

Verbena hastata, L.—Blue Vervain.—Hochelaga banks. June. (Holmes).

Verbena urticifolia, L.—Nettleleaved Vervain.—North base of mountain. August. (Holmes).

Phryma leptostachya, L.—Lopseed.—Savanne. St. Michel and mountain. August. (Holmes).

Teucrium Canadense, L.—American Germander.—August. St. Michel. (Holmes, at Boucherville).

Mentha viridis, L.—Spearmint.—Petite Cote. August. (Holmes' M. tenuis).

Mentha piperita, L.—Peppermint.—Point St. Charles. August.

Mentha Canadensis, L.—Wild Mint.—August. Common. (Holmes' *M. borealis*).

Lycopus Virginicus, L.—Bugle-weed.—Hochelega woods. August. (Holmes).

Lycopus Europæus, L., var. *Sinuatus*, Gray.—Water Horehound.—August. Common. (Holmes).

Nepeta cataria, L.—Catnip.—July. Common. (Holmes).

Nepeta glechoma, Benth.—Ground Ivy.—Fletcher's Field and elsewhere, near houses.

Lophanthus nepetoides, Benth.—Giant Hyssop.—August. Mountain, near Cote des Neiges toll bar. (Holmes' Hyssopus petoides).

Brunella vulgaris, L.—Common Heal-All.—July. Everywhere. (Holmes' *prunella vulgaris*).

Scutellaria galericulata, L.—Skullcap.—St. Michel. August. (Holmes).

Scutellaria lateriflora, L.—Mad-dog Skullcap.—August. St. Michel. (Holmes).

Galeopsis tetrahit, L.—Common Hemp-nettle.—August. Common. (Holmes).

Stachys palustris, L., var. *Aspera*, Gray.—Hedge-nettle.—Fletcher's Field. (Holmes, at Boucherville Island).

Leonurus cardiaca, L.—Common Motherwort.—August. Papineau common and elsewhere. (Holmes).

Lycopsis arvensis, L.—Bugloss.—June. Common. (Holmes).

Synphytum officinale, L.—Common Comfrey.—East side of mountain, near Cote des Neiges Road. June.

Echinosperrnum lappula, L. Lehm.—Stickseed.—June. Common. (Holmes' *Myosotis Lappula*).

Cynoglossum officinale, L.—Common Hound's Tongue.—June. Common. (Holmes).

Lithospermum hirtum, Lehm.—Hairy Puccoon.—May. Common.

Lithospermum officinale, L.—Common Gromwell.—May. Common. (Holmes).

Myosotis palustris, Withering, var. *laxa*, Gray.—Forget-me-not.—Pointe-aux-Trembles. June.

Myosotis arvensis, Hoffm.—Field Myosotis.—Cemetery Swamp. August.

Hydrophyllum Virginicum, L.—Waterleaf.—June. Base of mountain and elsewhere. (Holmes).

Calystegia sepium, R. Br.—Hedge Bindweed.—St. Michel Road. August. (Holmes' *convolvulus sepium*).

Calystegia spithamea, Pursh.—Bracted Bindweed.—Back River: June. (Holmes' *convolvulus stans*, at Three Rivers.)

Convolvulus arvensis, L.—Bindweed.—July. Fletcher's Field.

Hyoscyamus niger, L.—Black Henbane.—St. Famille street, Fletcher's Field and elsewhere. (Holmes).

Datura stramonium, L.—Common Thorn Apple.—St. Lawrence suburbs. August. (Holmes).

Gentiana Andrewsii, Griseb.—Closed Gentian.—St. Michel. August.

Apocynum androsaemifolium, L.—Dogbane.—June. Mountain. (Holmes).

Asclepias Cornuti, Decaisne.—Common Milkweed.—July. Common. (Holmes' *A. Syriaca*).

Fraxinus Americana, L.—White Ash.—Between Petite Cote and St. Michel, along fence. June. (Holmes' *F. Euptera*).

Fraxinus pubescens, Lam.—Red Ash.—Same locality. June.

Fraxinus sambucifolia, Lam.—Black Ash.—St. Michel woods. June. (Holmes).

Chenopodium album, L.—Lamb's Quarters.—July. Everywhere. (Holmes).

Chenopodium murale, L.—Pigweed.—August. Upper St. Urbain street.

Chenopodium hybridum, L.—Maple-leaved Goosefoot.—West side of mountain. August. (Holmes).

Blitum capitatum, L.—Strawberry Blite.—Fletcher's Field. August. (Holmes).

Atriplex patula, L.—Orache.—July. Everywhere on streets. (Holmes).

Amarantus retroflexus, L.—Pigweed.—August. Everywhere. (Holmes).

Polygonum aviculare, L.—Goose-grass.—August. Everywhere. (Holmes)

Polygonum incarnatum, Ell.—Knotweed.—August. Cote St. Paul.

Polygonum Pennsylvanicum, L.—Knotweed.—August. St. Urbain street. (Holmes).

Polygonum Persicaria, L.—Lady's Thumb.—July. Everywhere. (Holmes).

Polygonum amphibium, var. *aquaticum*, L.—Water Persicaria.—St. Michel. August. (Holmes).

Polygonum hydropiperoides, Michx.—Mild Water Pepper.—August. Cote St. Paul. (Holmes).

Polygonum acre, H. B. K.—Water Smartweed.—Petite Cote. August.

Polygonum hydropiper, L.—Common Smartweed.—August. Common.

Polygonum sagittatum, L.—Arrow-leaved Tear Thumb.—Mountain. August. (Holmes).

Polygonum convolvulus, L.—Black Bindweed.—Grain fields. August. (Holmes).

Polygonum dumetorum, L., var. *Scandens*, Gray.—Climbing False Buckwheat.—Cote St. Paul. (Holmes' *P. Scandens*).

Rumex orbiculatus, Gray.—Great Water Dock.—St. Michel, Savanne. August.

Rumex crispus, L.—Curled Dock.—July. Common. (Holmes).

Rumex obtusifolius, L.—Bitter Dock.—Cote des Neiges. August. (Holmes).

Rumex acetosella, L.—Sheep Sorrel.—May. Everywhere. (Holmes).

Fagopyrum esculentum, Moench.—Buckwheat.—Fletcher's Field and elsewhere. August.

Dirca palustris, L.—Leatherwood.—Petite Cote. April. (Holmes).

Euphorbia hypericifolia, L.—Spurge.—August. Fletcher's Field and elsewhere.

Euphorbia humistrata, Engelm. — Spurge. — August. Fletcher's Field.

Euphorbia obtusata, Pursh. — Spurge. — St. Lawrence suburbs. August.

Euphorbia platyphylla, L. — Spurge. — St. Lawrence suburbs. August.

Euphorbia Helioscopia, L.—Sunspurge.—July. Everywhere. (Holmes).

Euphorbia pepus, L.—Spurge.—August. Fletcher's Field and mountain base.

Euphorbia cyparissias, L.—St. Famille street and elsewhere. July.

Acalypha Virginica, L.—Three Seeded Mercury.—St. Famille street and elsewhere, very common. August. (Holmes' A. Caroliniana).

Ulmus fulva, Michx.—Slippery Elm.—April. Common. (Holmes).

Ulmus Americana, L.—White Elm.—April. Common. (Holmes).

Ulmus racemosa, Thomas.—Corky White Elm.—May. Along roadsides.

Urtica gracilis, Ait.—Nettle.—August. Along fences. (Holmes' U. procera).

Laportea Canadensis, Gandichaud. — Wood Nettle. — August. Back River. (Holmes' *Urtica divaricata*).

Cannabis sativa, L.—Hemp.—July. Common. Along roadsides. (Holmes).

Juglans cinerea, L.—Butternut.—Mountain sides and Petite Cote. (Holmes).

Carya amara, Nutt.—Swamp Hickory.—Petite Cote and mountain. May. (Holmes).

Carya alba, Nutt.—Shellbark Hickory.—West side of mountain. May. (Holmes).

Quercus rubra, L.—Red Oak.—May. Mount Royal. (Holmes).

Quercus macrocarpa, var. *Olivæformis*, Gray.—Bur Oak.—May. St. Laurent and elsewhere. (Holmes).

Fagus ferruginea, Ait.—American Beech.—May. West side of Mount Royal. (Holmes).

Corylus rostrata, Ait.—Beaked Hazel Nut.—June. Base of mountain. (Holmes' *C. anellana*).

Ostrya Virginica, Willd.—Iron Wood.—May. Mountain. (Holmes).

Betula lenta, L.—Black Birch.—May. Hochelaga woods.

Betula papyracea, Ait.—Canoe Birch.—May. Mountain. (Holmes).

Betula populifolia, Ait.—Gray Birch.—Petite Cote. May. (Holmes).

Alnus incana, Willd.—Speckled Alder.—April. Mountain foot. Common. (Holmes' *A. serrulata*).

Alnus viridis, DC.—Green Alder.—Between mountains. May. (Holmes' *A. undulata*).

Salix humilis, Marshall.—Prairie Willow.—Hochelaga bank. May.

Salix discolor, Muhl.—Glaucous Willow.—North base of mountain.

Salix petiolaris, Smith.—Petoiled Willow.—Savanne, St. Michel. August.

Salix livida, Wahl., var. *occidentalis*, Gray.—Livid Willow.—All over the island. May.

Populus tremuloides, Michx.—American Aspen.—May. All over the island. (Holmes).

Populus balsamifera, L.—Balsam Poplar.—May. Common.

Populus monilifera, Ait.—Cottonwood.—Upper St. Famille street. May. (Holmes' *P. angulata*).

Populus monilifera, Ait., var. *Candicans*, Gray.—Balm of Gilead.—May. St. Famille street.

Populus alba, L.—White Poplar.—Cote St. Antoine and elsewhere. May.

Pinus strobus, L.—White Pine.—May. Savanne, St. Michel. (Holmes).

Pinus Banksiana, Lambert.—Scrub Pine.—Mountain. May.

Abies balsamea, Miller.—Balsam Fir.—Hochelega woods. May. (Holmes' *pinus balsamea*).

Picea nigra, Link.—Black Spruce.—Petite Cote. May.

Picea alba, Link.—White Spruce.—St. Michel. May.

Tsuga Canadensis, Carr.—Hemlock.—Hochelega woods. May.

Larix Americana, Michx. — Tamarack. — Petite Cote Swamp. May.

Thuja occidentalis, L.—Cedar.—May. In all swamps on island.

Juniperus communis, L. — Common Juniper.—Between mountains. August.

Taxus Canadensis, L., var. *Canadensis*, Gray.—Ground Hemlock.—Mountain. May. (Holmes).

Arisæma triphyllum, Torr.—Indian Turnip.—June. Mountain swamp. (Holmes' *Arum triphyllum*).

Calla palustris, L.—Marsh Calla.—Petite Cote Swamp. June.

Typha latifolia, L.—Common Cat Tail.—Pointe-aux-Trembles and elsewhere. July. (Holmes).

Typha angustifolia, L.—Narrow-leaved Cat Tail.—Pointe-aux-Trembles. June.

Sparganium simplex, Hudson, var. *Angustifolium*, Gray.—Bur Reed.—June. Back River.

Alisma plantago, L., var. *Americanum*, Gray.—Water Plantain.—July. Cote St. Paul. (Holmes).

Sagittaria variabilis, Engelm.—Arrowhead.—July. Common. (Holmes' *S. sagittifolia*).

Habenaria tridentata, Hook.—Rein Orchis.—Woods near cemetery gate. June.

Habenaria orbiculata, Torr.—Rein Orchis.—Between cemeteries. July.

Spiranthes Romanzoviana, Chamisso.—Ladies' Tresses.—Savanne, St. Michel. July.

Cypripedium pubescens, Willd.—Large Yellow Lady's Slipper.—West side of mountain. June. (Holmes).

Cypripedium acaule, Ait.—Stemless Lady's Slipper.—June. Hochelaga woods. (Holmes' *C. arietinum*).

Iris versicolor, L.—Larger Blue Flag.—June. Common.

Sisyrinchium anceps, Cav.—Blue-eyed Grass.—June. Common. (Holmes).

Smilax herbacea, L.—Carrion Flower.—St. Laurent. June.

Trillium grandiflorum, Salisb.—Large White Trillium.—May. Very common. (Holmes).

Trillium erectum, L.—Purple Trillium.—Mountain, Hochelaga woods and elsewhere. (Holmes).

Trillium erythrocarpum, Michx.—Pointed Trillium.—May. Hochelaga woods. (Holmes).

Medeola Virginica, L.—Indian Cucumber Root.—June. Hochelaga woods. (Holmes).

Uvularia grandiflora, Smith.—Bellwort.—Papineau Road and mountain. May. (Holmes).

Uvularia sessilifolia, L.—Wood Daffodil.—May. North end of mountain. (Holmes).

Clintonia borealis, Raf.—Clintonia.—June. Mountain marsh and Hochelaga woods. (Holmes' *convallaria borealis*).

Streptopus roseus, Michx.—Twisted Stalk.—May. Moun-

tain and Hochelaga woods. (Holmes' *convallaria polygonatum*).

Smilacina racemosa, Desf.—False Spikenard. North end of mountain. August. (Holmes' *convallaria racemosa*).

Smilacina stellata, Desf.—False Solomon's Seal.—Lachine and elsewhere. (Holmes' *convallaria stellata*).

Smilacina bifolia, Ker., var. *Canadensis*, Gray.—False Solomon's Seal.—June. Mountain and Hochelaga woods. (Holmes' *convallaria bifolia*).

Polygonatum biflorum, Ell.—Smaller Solomon's Seal.—May. West side of mountain. (Holmes' *convallaria angustifolia*).

Erythronium Americanum, Smith.—Yellow Adder's Tongue.—May. Mountain and elsewhere. (Holmes' *E. dens-canis*).

Polypodium vulgare, L.—Polypody.—North end of mountain. June. (Holmes).

Adiantum pedatum, L.—Maidenhair.—June. Mountain. (Holmes).

Pteris aquilina, L.—Brake.—August. Common. (Holmes).

Asplenium filix femina, Bernh.—Spleenwort.—Mountain base.—June. (Holmes' *A. angustifolium*).

Aspidium thelypteris, Swartz.—Shield Fern.—Mountain base. (Holmes' *athyrium thelypteris*).

Aspidium Noveboracense, Swartz.—Wood Fern.—Mountain foot. June.

Aspidium marginale, Swartz.—Shield Fern.—Mountain base. July. (Holmes).

Onoclea sensibilis, L.—Sensitive Fern.—August. Hochelaga woods. (Holmes).

Osmunda regalis, L.—Flowering Fern.—Hochelaga woods. (Holmes).

Osmunda Claytoniana, L.—Osmunda.—August.—Hochelaga woods. (Holmes' *O. interrupta*).

Osmunda Cinnamomea, L.—Cinnamon Fern.—August. Hochelaga woods. (Holmes).

Botrychium Virginicum, Swartz.—Moonwort.—July. North end of mountain. (Holmes' B. Gracile).

Equisetum limosum, L.—Horse Tail.—May. Hochelaga. (Holmes).

Equisetum arvense, L.—Common Horse Tail.—May. Everywhere. (Holmes).

Equisetum hyemale, L.—Scouring Rush.—June. North base of mountain.

Equisetum variegatum, Schleicher.—Horse Tail.—June. Cote St. Paul.

Equisetum scirpoides, Michx.—Horse Tail.—Mountain base. July.

Lycopodium dendroideum, Michx.—Ground Pine.—August. Hochelaga banks. (Holmes).

Lycopodium clavatum, L.—Club Moss.—August. Hochelaga woods. (Holmes).

Lycopodium lucidulum, Michx.—Club Moss.—Savanne, St. Michel. August. (Holmes).

THE UTICA TERRANE IN CANADA.

By HENRY M. AMI, M.A., F.G.S., of the Geological Survey of Canada.

(Continued from page 183.)

In the vicinity of Pointe aux Trembles, above Quebec, the following species were noted in a collection made by Sir Wm. Logan and his staff in 1852 (?) :—

1. *Diplograptus pristis* ? Hisinger.
2. *Orthograptus quadrimucronatus*, Hall.
3. *Climacograptus bicornis* ? Hall.
4. *Ptilodictya* (?) sp.
5. *Anazyga recurvirostra*, Hall.
6. *Modiolopsis* sp.
7. *Calymene callicephalo*, Green.

From Cape Santé, the following species have been identified from a collection placed in the writer's hands in 1882 :—

1. *Cyathophycus reticulatus*, Walcott.
2. *Orthograptus quadrimucronatus*, Hall.
3. *Dendrograptus* sp.
4. *Leptobolus insignis*, Hall.
5. " sp.
6. *Leptaena sericea*, Sowerby.
7. *Pterinea insueta*, Conrad.
8. *Endoceras proteiforme*, Hall.
9. *Triarthrus Becki*, Green.

From a small collection of fossils labelled "Grondines," north side of the St. Lawrence, the following three forms were observed :—

1. *Climacograptus bicornis*? Hall.
2. *Diplograptus pristin*? Hall.
3. *Leptobolus insignis*, Hall.

From a collection of fossils from St. Antoine de Tilly—made by Mr. Weston—in 1887, there occurs several portions of *Triarthrus Becki*, Green, in good state of preservation, and from along the "Grève de Beauport." L'Abbé Laflamme sent a slab of shaly rock to the museum of the Geological Survey, on which there were seen :—

1. *Climacograptus* sp.
2. *Leptobolus insignis*, Hall.
3. *Triarthrus Becki*, Green.

whilst on a similar slab, which from Charlesbourg, Que., Prof. Laflamme collected, the following forms occurred :—

1. *Orthograptus quadrimucronatus*, Hall.
2. *Leptobolus insignis*, Hall.
3. *Triarthrus Becki*, Green.

West of Pointe-aux-Trembles, near Quebec the Utica shales have not been observed to crop out from beneath the the overlying till, or from under the overlying Hudson River terrane, except in the vicinity of Montreal. Here, this formation, as well as most of the Cambro-Silurian or Ordovician strata occurring in the neighbourhood, have

suffered or been subjected to considerable elevation, and consequent denudation, on account of the volcanic masses occurring at this locality. At Joliette, or "Industry Village," however, a small collection of fossils was made in 1852 by Sir William Logan, and contains the following species, which point clearly to the presence of or decided close proximity to the Utica terrane, whence these specimens were collected. They are:—

1. *Strophomena alternata*, Conrad.
2. *Leptaena sericea*, Sowerby.
3. *Orthis testudinaria*, Dalman.
4. *Asaphus Canadensis*, Chapman.

From an interesting collection made by Thos. Curry, of the Redpath Museum in connection with McGill University, at the northern extremity of the Victoria Tubular Bridge, Point St. Charles, Montreal, the following species were identified by the writer:—

1. *Climacograptus* sp.
2. *Leptograptus flaccidus*, Hall.
3. *Orthograptus quadrimucronatus*, Hall.
4. *Diplograptus* sp.
5. *Orthis testudinaria*, Dalman.
6. *Leptobolus insignis*, Hall.
7. *Cornulites immaturum*, Hall.
8. *Endoceras proteiforme*, Hall.

The shales in which the above were found are dark grey and bituminous, somewhat more calcareous than the shales of the Utica usually are, and somewhat indurated or altered, on account of the presence of the numerous dykes of syenite and trap which occur in this district. Not only near the above mentioned locality, but at the upper or western extremity of St. Helen's Island, opposite Montreal, the Utica is seen to crop out with its characteristic fossils.

Amongst the most recent additions to the knowledge of the Utica and its fauna about Montreal is the occurrence of a series of shales seen at low water last season (1891), which yielded the following forms:—

1. *Dendrograptus simplex*, Walcott.
2. *Reteograptus* ? *Eucharis*, Hall.

3. *Orthograptus quadrimucronatus*, Hall.
3. *Climacograptus Scharenbergi*? Lapw.
5. *Endoceras proteiforme*, Hall.
6. *Triarthrus Becki*, Green.

The *Utica* is also seen to crop out at and above Longueuil and then sweep round to the south by Laprairie, and is then overlaid by the Hudson River shales of Chambly, St. Hyacinthe, &c. Its measures have been examined by Dr. Ells in the 4th Range, near Clarenceville, Que., during the summer of 1891, who made an interesting collection, in which the following fossils were detected:—*Cyathohhycus reticulatus*, Walcott, *Climacograptus* sp., *Orthograptus quadrimucronatus*, Hall, *Endoceras proteiforme*, Hall, and *Triarthrus Becki*, Green.

Near Lacolle, Que., one-eighth of a mile west of the Richelieu River Bridge Dr. Ells also obtained *Orthograptus quadrimucronatus*, Hall, and *Triarthrus Becki*, Green, which serve clearly to show that the *Utica* proper is here developed. About half a mile east of this village, however, and in the river alongside the road to Grand Trunk Station, the same gentleman has brought in a suite of specimens which yielded the following forms on examination:—

1. *Climacograptus bicornis*? Hall.
2. *Diplograptus* cf. *D. mucronatus*. Hall.
3. *Leptæna sericea*, Sowerby.
4. *Triarthrus Becki*, Green.

South of here the belt of the *Utica* crosses the international boundary line, as stated above, and curving south, west and then trending north crosses the waters of Lake Ontario to reach the Province of that name—forming a belt of several miles in breadth—whose strata are almost horizontal with a gentle almost imperceptible dip to the southwest.

Along the line of the Grand Trunk Railway, in some low cuttings, as well as in a number of localities between the lake and the track where openings were made for quarry and other purposes the *Utica* may be seen. About Oshawa and Bowmanville, the black bituminous and brittle shales of this terrane are evident and fossiliferous.

An interesting collection was made by the writer in 1883 at Whitby on a farm and lot, the property of Mr. Yerex, south of the G.T.R. track close to where a bore hole was put down by a company many years ago in order to find coal or petroleum. It was in spite of Sir Wm. Logan's assertions and statements regarding the strata in this neighbourhood not being coal-bearing or "carboniferous" that the company sank the hole and found that as soon as the bituminous shales capping the Trenton were traversed, the limestones formed a compact and solid thickness of rock beneath. It is almost needless to state here that neither coal nor petroleum were "struck" at this point, and furthermore that neither of these substances occur in this region. Except the very small percentage of oil which can be extracted from the more bituminous shales of the Utica here as elsewhere—no reservoir of petroleum or occurrence of that mineral oil can be obtained in the rocks of this age.

The fossil remains found at the pit or quarry, close to the bore-hole, Whitby, belong precisely to the same geological horizon as the shales in the vicinity of the Rideau Rife Range, Ottawa, or as the shales at Collingwood to be described later on.

The species recorded from this locality are:—

1. *Leptograptus flaccidus*, Hall.
2. *Orthograptus quadrimucronatus*, Hall.
3. *Leptobolus insignis*, Hall.
4. *Lingula* sp.
5. *Leptaena sericea*, Sowerby.
6. *Zygospira modesta*, Say.
7. *Lyrodosma pulchellum*, Emmons.
8. *Trocholites ammonius*, Emmons.
9. *Endoceras proteiforme*, Hall.
10. *Primitia Ulrichi*, Jones.
11. *Asaphus Canadensis*, Chapman.
12. *Triarthrus Canadensis*, Smith.
13. *Triarthrus Becki*, Green.
14. *Crustacean*, ? (cf. fragment of *Echinognathus Clevelandi*, W.)

Then, following northward the belt of Utica crosses the Province of Ontario and is covered by a great deal of drift

or superficial deposits belonging to glacial, inter-glacial and lacustrine deposits so as to cover it almost totally, reappears in the vicinity of Nottawasaga Bay, near Collingwood and Windsor, where it can be easily recognized by its lithological characters and fossils. The list of species collected by Mr. A. S. Cochrane, of the Geological Survey of Canada, at Collingwood, in 1887, and determined by the writer comprises the following forms:—

1. *Obscure Graptolite*, probably a *Diplograptus* cf. *D. pristis*, Hisinger.
2. *Lingula Progne*, Billings.
3. " sp.
4. *Orthis testudinaria*, Dalman.
5. *Leptaena sericea*, Sowerby.
6. *Strophomena alternata*, Conrad.
7. *Rhynchonella increbescens* ? Hall.
8. *Lyrodosma pulchellum*, Emmons.
9. *Endoceras proteiforme*, Hall.
10. *Primitia Ulrichi*, Jones.
11. *Beyrichia* sp.
12. *Triarthrus Becki*, Green.
13. *Asaphus Canadensis*, Chapman.

The absence of *Leptobolus* in this list is almost phenomenal, inasmuch as the *L. insignis* of Hall occurs in large numbers, as a rule, in rocks of precisely the same horizon in other parts of Canada.

In the northern portion of Lake Huron and the Manitoulin Islands, where the Utica again crops out after disappearing beneath the waters of Georgian Bay, or where the shales, soft, friable, and easily denuded, have been carried away along the line of a great pre-glacial river, it is seen on St. Joseph's Island, in the islands north of Maple Cape, and along the shores of the Shequenandod Bay and Islands. At the last mentioned locality—Shequenandod Bay and Islands—the following fossil remains have been determined by the writer:—

1. ? *Dendrograptus simplex*, Walcott.
2. ? *Climacograptus bicornis*, Hall.
3. *Orthograptus quadrimucronatus*, Hall.
4. *Leptobolus insignis*, Hall.

5. *Primitia, Ulrichi*, Jones.
6. *Endoceras proteiforme*, Hall.
7. *Triarthrus Becki*, Green.

The above forms occur in a rather poor state of preservation in a somewhat indurated and calcareous black bituminous shale.

From the islands north of Maple Cape the following species were determined by the writer in 1882:—

1. *Sagenella ambigua*, Walcott.
2. *Ptilodictya?* sp.
3. *Monticuliporidae*.
4. *Leptobolus insignis*, Hall.
5. *Streptorhynchus filitextum?* Hall.
6. *Rhynchonella increbescens*, Hall.
7. *Lingula Progne*, Billings.
8. *Primitia Ulrichi*, Jones.
9. *Triarthrus Becki*, Green.
10. " *Canadensis*, Smith.

Amongst the specimens of *Triarthrus Canadensis*, Smith, found in this collection, one specimen is especially worthy of note. It exhibits the two characteristic spines attached to the freecheeks, the glabella, and eight body segments attached to the head. Several pygidia also occur in the collection, which may properly belong to this species. From a second collection of fossils examined from Collingwood, evidently collected by the late Alex. Murray early in the fifties, during his examination of the geographical distribution of the Lower Silurian formations belonging to the New York and Ontario systems, there are *nineteen* species found, as follows. The collection is labelled "Nottawasaga Bay, Collingwood, Ont.":—

1. *Diplograptus pristis?* Hisinger.
2. *Dictyograptus vel. Dictyonema* sp.
3. *Crinoidal fragments*.
4. *Lingula obtusa*, Hall.
5. " *Progne*, Billings.
6. " *quadrata*, Eichwald.
7. *Leptobolus insignis*, Hall.
8. *Orthis testudinaria*, Dalman.
9. *Streptorhynchus filitextum*, Hall.

10. *Strophomena alternata*, Conrad.
11. *Leptæna sericea*, Sowerby.
12. *Pleurotomaria* sp.
13. *Conularia Hudsonia*, Emmons.
14. *Orthoceras lamelloum*, Hall.
15. *Endoceras proteiforme*, Hall.
16. *Primitia Ulrichi*, Jones.
17. *Asaphus platycephalus*, Stokes.
18. " *Canadensis*, Chapman.
19. *Tyriarthrus Becki*, Green.

On the "west side St. Joseph's Island," Lake Huron, a number of specimens thus labelled, probably collected by Mr. Murray also, indicated the presence of *Leptobolus insignis*, Hall, and *Orthis testudinaria*, Dalman, the latter being unusually large, and resembling a form which approaches *O. emacerata*, Hall.

The above localities and lists of fossils from various portions of Quebec and Ontario present the leading characteristics of the Utica as it is seen to crop out along the contour or edge of the archæan continent—in contact with it at times, and then overlapping the older members of the Ordovician system; at other times occurring as a more or less narrow belt of black bituminous strata lying intermediate between the Trenton and the Hudson River, but throughout an almost uninterrupted belt of continuous strata from Anticosti to the Manitoulin Islands. As can readily be seen the notes and remarks above made are from a palæontological standpoint, and show the distribution and continuity of existing forms of life during Utica times as the shales were being deposited in the old Ordovician sea.

Besides the above localities occurring along this continuous belt or zone of Utica, there are two well-known palæozoic basins, that of Lake St. John and Ottawa in which this terrane is well developed and in which there are numerous and varied forms of animal life entombed. This points clearly to the fact that in Utica times and in these two isolated and quite separate basins, similar conditions of deposition, sedimentation and conditions under which life existed were present in those early days similar to the conditions outside of these basins.

LAKE ST. JOHN BASIN.

From the Lake St. John and Upper Saguenay district the explorations of Sir Wm. Logan, James Richardson, Scott Barlow, Dr. Selwyn, Prof. Laflamme, Mr. F. D. Adams, Mr. D. N. Saint Cyr and others have afforded a considerable quantity of material wherewith to ascertain by means of the fossils to what age or precise geological horizon the different strata there met with belonged. As early as 1829, in a report by Captain F. H. Baddeley, addressed to the Legislature of Quebec, the black bituminous schists of the Utica were recorded in this Lake St. John or Upper Saguenay district. From the collections made by Mr. Richardson, Billings described the *Triarthrus glaber* of Lake St. John as a new and undescribed form. This trilobite is the largest one of the genus yet known, and the specimens obtained by Mr. Adams in 1883 and 1884 show that its dimensions vary greatly, and even surpass those mentioned in the type specimens.

From the "Mouth of the Ouatchouan River," Lake St. John, Mr. Adams obtained the following species in a rusty weathering somewhat indurated black bituminous shale:—

1. *Orthograptus quadrimucronatus*, Hall.
2. *Leptobolus insignis*, Hall.
3. *Endoceras proteiforme*, Hall.
4. *Triarthrus glaber*, Billings.

Amongst the specimens of *T. glaber*, collected by Mr. Adams, we find that the occipital or neck segment is furnished with a small somewhat depressed linear tubercle about the centre, a character which had not heretofore been noted in this species. The fact that it is destitute of genal spines, of spines along the median axis of the body or attached to the occipital segment as in *T. spinosus*, and that the body segments of this species (*T. glaber*) are destitute of the tubercles along the median axis of the body, is quite sufficient warrant to retain the designation *glaber* for this Lake St. John species, although it does possess one occipital tubercle as single ornamentation visible.

It would thus appear that all the known Canadian species of *Triarthrus* possess this tubercle on the occipital segment, viz.: *T. Canadensis*, Smith; *T. Becki*, Green; *T. Fischeri*, Billings; *T. glaber* and *T. spinosus*, Billings and *T. Billingsi*, Barrande.

It was from the Lake St. John district that the Utica slate graptolites: *Graptolithus flaccidus*, *Graptolithus quadrimucronatus*, and *Reteograptus? Eucharis*, were described by Hall in 1865, "Canadian Organic Remains," decade II., pp. 143-147 (supplement.) The precise locality given is Blue Point, Lake St. John.

A peculiar organism occurs in the collection made by Dr. Selwyn, whose affinities are still doubtful. In some respects it has the character and structure of *Megalograptus* (Miller), and in others of a peculiar crustacean type. Further collections may afford better examples of this form whose affinities still remain unknown.

THE OTTAWA OUTLIER.

In the Ottawa Palæozoic Basin the Utica terrane is fairly well developed, and numerous as well as interesting exposures may be seen, especially in the vicinity of Ottawa city. In the townships of Plantagenet and Alfred two outliers of the Utica are recorded by Sir William Logan. No fossil remains have been seen from these outliers by the writer, but the Utica terrane about Ottawa has afforded him an excellent opportunity of studying its character and facies, as the outcrops are numerous and varied. Besides the natural exposures along the banks of the Rideau River, from the village of New Edinburgh up to near Billings' Bridge, along the Montreal Road and by the Beechwood Cemetery, as well as underlying almost the whole of Centre and Upper Town west of the canal and south of Sparks Street, with a slight dislocation along Bank Street, which brings the Utica shales in front of the Supreme Court buildings, and south of Rochesterville, as already cited, the Utica was examined by the writer along numerous pits and in excavations made by the city engineer or contractors of

public buildings, throughout the city. From the lower, middle and upper divisions of the Utica, fossil remains have been found, most of which have already been recorded in scattered pages and pamphlets published by the writer since 1882.

I shall not attempt to describe at length the various outcrops as they were examined by me and recorded about Ottawa. Suffice it to state that Rideau Ward, Cummings' Bridge, the Rideau Rifle Range, the Montreal Road, excavations along Albert, Kent, Bank, O'Connor and Maria Streets, have afforded numerous collections of fossil remains, many of which were hitherto unrecorded or altogether new to science.

The following is a condensed list of the species of fossils from the Utica of Ottawa and its vicinity:—

UTICA FOSSILS FROM OTTAWA AND ITS ENVIRONS.

HYDROZOA.

- Leptograptus annectans*, Walcott sp.
 " *flaccidus*, Hall.
Diplograptus mucronatus? Hall.
 " *pristis*? Hisinger.
 " *putillus*, Hall.
 " *quadrimucronatus*, Hall.
Sagenella ambigua, Walcott.

BRYOZOA.

- Stictopora acuta*, Hall.

BRACHIOPODA.

- Leptobolus insignis*, Hall.
 " *occidentalis*? Hall.
Siphonotreta Scotica, Davidson.
Lingula Daphne, Billings.
 " *obtusa*, Hall.
 " *Progne*, Billings.
 " *quadrata*, Eichwald.
Orthis testudinaria, Dalman.
 " *emacerata*, Hall.
Schizocrania filosa, Hall.
Leptæna sericea, Sowerby.

Strophomena alternata, Conrad.

Zygospira Headi, Billings.

LAMELLIBRANCHIATA.

Lyrodesma pulchellum, Hall.

Modiolopsis modiolaris, Hall.

Orthodesma parallelum, Hall.

Pterinea insueta, Conrad.

" *Trentonensis*, Conrad.

PTEROPODA.

Conularia Hudsonia, Emmons.

" *Trentonensis*, Hall.

GASTEROPODA.

Bellerophon bilobatus, Sowerby.

Murchisonia Milleri, Hall.

Pleurotomaria subconica, Hall.

CEPHALOPODA.

Trocholites ammonius, Conrad.

Endoceras proteiforme, Hall.

" " var. *tenuistriatum*, Hall.

Orthoceras amplicameratum, Hall.

" *coralliferum*, Hall.

" *lamellosum*, Hall.

ANNELIDA.

Serpulites dissolutus, Billings.

CRUSTACEA.

Asaphus Canadensis, Chapman.

" *platycephalus*, Stokes.

Calymene senaria, Conrad.

Cheirurus pleurexanthemus, Green.

Triarthrus Becki, Green.

" *glaber*, Billings.

" *spinousus*, Billings.

Leperditia cylindrica, Hall.

as per "*Classified List of Cambro-Silurian and Post-Tertiary Fossils from Ottawa and Vicinity*," published by the writer in 1884.

To the above may be added:—

1. *Stephanella sancta*, Hinde.

2. *Batostonella erratica*, Ulrich.

3. *Arthronema* sp.
4. *Lingula elongata*, Hall.
5. " *Cobourgensis*, Billings.
6. *Pholidops* sp.
7. *Discina Pelopea*, Billings.
8. *Anazyga recurvirostra*, Hall.
9. *Zygospira modesta*, Say.
10. *Modiolopsis anodontoides*, Conrad.
11. *Meloptoma* sp.
12. *Cornulites immaturum*, Hall.
13. *Beyrichia oculifera*, Hall.
14. *Primitia Ulrichi*, Jones.
15. " *mundula*, Jones.
16. *Turrilepas Canadensis*, Woodward.

Appended to this is a classified table of the genera and species characterizing the Utica of Canada, giving also a series of localities in the United States, typical localities as Utica, Holland Patent, &c., for comparison.¹

From the same and the foregoing it will clearly be seen and naturally deduced that the so-called Utica or Hudson River shales of Quebec city, Cape Diamond, of the Marsouin River beds, of Norman's kiln and "Coenograptus" shales in general do not occur anywhere in Canada where the Utica shales are found in their natural and undisturbed position between the Trenton and Hudson River terranes.

These belong to a district and separate terrane—the Quebec terrane of the writer—and are characterized by a fauna whose affinities are more closely related to Lower Ordovician (Levis) faunas than to an upper member of the Ordovician system.

¹ This portion of the paper will appear in a subsequent issue of the CAN. REC. OF SCIENCE.—EDITOR.

NOTES ON CAMBRIAN FAUNAS.

BY G. F. MATTHEW, ST. JOHN, N.B.

DEVELOPMENT OF THE FAUNA OF BAND *b* IN THE ACADIAN DIVISION (*Div. 1*) OF THE ST. JOHN GROUP.

In Eastern Canada, as in many other parts of the world, the earliest palæozoic rocks have comparatively few and they, scattered relics of the life which existed on the world when these rocks were formed. Hence we find in the geological literature of fifty years ago, when the sequence of faunas in the so-called transition rocks had not been established, the assumption that the rocks which contained few fossils were Cambrian, and those in which remains of an abundant life existed were assumed to be Silurian.

A problem of a similar kind awaits, or rather exercises, the palæontologist of the present day, for while the sequence of faunas in the Paradoxides beds and above, where fossils are comparatively abundant, is well understood, some confusion and uncertainty surrounds the effort to determine accurately the succession of animals in the Cambrian rocks below that horizon; an uncertainty largely due to the scarcity of organic remains in the older sediments.

As regards the fauna of Band *b* (Pre-Paradoxides beds) in this region, some information had been obtained and will be found on record chiefly in the Transactions of the Royal Society of Canada¹, but in view of the fact that no unquestionable representative of the genus *Olenellus* had been found in these beds, I embraced an opportunity to send my son, W. D. Matthew, to make further explorations at Hanford Brook, where Band *b* is exposed, for examples of this genus of trilobites. Although unsuccessful in finding *Olenellus* he made other discoveries which are perhaps of more value in broadening our knowledge of the faunas which preceded Paradoxides, than the discovery of that

¹For reference to this information consult the page references in the explanation of the plates of vol. iii. sec. iv. p. 81, vol. v. sec. iv. pp. 126 and 129, vol. vii. sec. iv. reference at p. 161.

genus would have been, and thus are of value to the palæontologist.

Perhaps the most important of these was the finding of material representing an interesting and, I think, hitherto unrecognized generic group of trilobites, whose species seem to have given some difficulty to the geologists who discovered them. These species have been referred with doubt to three several genera by the authors who described them, but in none of the three do I think they can be included.

The writer proposes first to describe the new genus and two species of another genus of this Band, and then endeavour to correlate the forms with those of other regions.

PROTOLENUS¹ Matt.

(Natural History Society of New Brunswick, Bulletin X.)

Head-shield semicircular, moderately vaulted, outer part of the cheek movable, prolonged at the genal angle into a spine.

Middle piece of the head more or less quadrate. Anterior margin wide and having a narrow distinct fold at the rim. Glabella conical, or cylindro-conical, prominent, marked by furrows on the sides. Occipital ring distinct, separated from the glabella by a furrow. Fixed cheek of variable width, bordered by a long, continuous or nearly continuous eyelobe. Extension of the dorsal suture, both in front of the eye and behind it, more or less direct to the margin.

Movable cheek regularly curved, area wider than the distinct fold, spine usually long.

Thorax of many joints, pleuræ grooved for a part of their length, slightly geniculate, curved backward in the outer part, extended into points or spines.

Pygidium in the Canadian species unknown (small?), in the Sardinian species like that of *Paradoxides*.

This genus belongs to the family of *Olenidæ*, and its most obvious features are the long conical glabella, the long con-

¹ *Protos* first, *olenus* as one of the *Olenidæ*.

tinuous or nearly continuous eyelobe and the olenoid pleuræ.

It differs from *Olenellus* by its free cheeks, from *Paradoxides*, *Olenoides* and *Zacanthoides* by its conical glabella, from *Olenus* by its continuous eyelobes, from *Anomocare* by its narrow rim and numerous thoracic segments, from *Solenopleura* by its less tumid cheeks, depressed anterior margin, long eyelobes and olenoid pleuræ, from *Conococephalites* (sens. strict.) by its long eyelobe, short posterior extension of the dorsal suture and its olenoid pleuræ.

Two Acadian species (*P. elegans* and *P. paradoxoides*) of this genus are known and are described in Bulletin X. of the Natural History Society of New Brunswick. (See also figures 1 *a-b* and 2 *a-d*, with this paper.)

ELLIPSOCEPHALUS (Zenker).

This genus has long been known in Europe, but on this side of the Atlantic, except a broken head-shield found near the base of Band *b* of the St. John group, and provisionally referred to this genus, it has not been recognized. As limited by Linnarsson to its typical forms it has but a narrow range in the lowest Cambrian beds. Its latest species appears to be *E. Hoffi* (Fig. 6), of Bohemia, found there with *Paradoxides* (*P. Bohemicus*). Another species, *E. polyetopus*, is found with the oldest type of *Paradoxides* in Sweden (*P. Ælandicus*), which is also the oldest type in Eastern Canada (*P. lamellatus*). A third species (*E. Nordenskjoldi*) is found in Europe (Norway and Sweden) with the Olenelloid trilobite, *Holmia Kjerulfi*. From these facts we gather that the range of the genus (sens. strict.) is in the top of the *Olenellus* zone and the lower half of the *Paradoxides* zone. The genus has not been recognized in America anywhere west of the Acadian region.

ELLIPSOCEPHALUS GALEATUS, n. sp. Figs. 4 *a-e*.

Head shield subelliptical, with rounded corners, strongly vaulted, the front slope nearly at right angles with the posterior part of the shield.

Middle piece of the head shield subquadrate, rounded in front. Anterior margin greatly depressed, and bordered by an inconspicuous fold, front area very wide and long. Glabella cylindrical, somewhat expanded and curved downward in front, faintly impressed at the sides by four pairs of furrows, of which the anterior is short and sometimes obsolete. Occipital ring convex, curved forward at the ends, and separated from the glabella by a strong furrow. Fixed cheeks convex, sloped downward at the sides and depressed before and behind; ocular fillet slender, extending from the dorsal furrow to the eyelobe, which is moderately arched. Dorsal suture directed outward and forward in front of the eyelobe, but behind it extends direct to the posterior margin. Posterior fold and furrow distinct.

Thorax of 11+ segments; rachis prominent, pleura shorter than the ring, obtuse at the ends, crossed by an oblique furrow.

Sculpture. Under the lens this is seen to consist of numerous, minute granulations.

Size. Length of the middle piece measured parallel to the axis of the body 11 mm.; measured around the curve of the head shield, 14 mm.; width, 14 mm.; Length of the movable cheek, 7 mm.; width, 2 mm.; length of a segment of the body, 13 mm.; width, 2 mm.

Horizon and Locality. The gray sand stones of 1, b, ³, at Hanford Brook, St. John Co., N.B.

A variety, *agrauloides* has a flatter shield, and an area, narrower and less bent downward in front.

ELLIPSOCEPHALUS ARTICEPHALUS. Matt.

Agraulos (?) *articephalus*. Trans. Roy. Soc. Can., Vol. III. Sec. IV. p. 75. pl. VII. figs. 14 a & b.

Of this species originally described as *Agraulos* (?) *articephalus* much better examples have been found than were known when the species was discovered, and the description of the species is here restated.¹

¹ Where the characters are at variance with the original description the words are in italics.

"The cephalic shield between the sutures is oblong-subquadrate. Glabella large, long ovato-cylindrical somewhat pointed in front, marked by three pairs of furrows, which are directed backward. Fixed cheek *rather narrow*, eyelobe *distant from the glabella about two-thirds of the width of the latter, beginning* opposite the third furrow; the cheeks are depressed in front of the eyes, and are united in front of the glabella; the united cheeks descend and are depressed toward the anterior margin, and there is a *low marginal fold*.

"The facial suture is parallel in its general course to the longitudinal axis of the shield; it cuts the margin obliquely, curving inward *slightly* between the margin and the eyelobe * * * it then curves outward along the eyelobe and returns again and cuts the posterior margin as far from the glabella as the space from the *ocular fillet to the front of the head-shield*."

"The thorax tapers regularly toward the base; only the first seven segments are known; the axis is wide and high, and the rings strongly arched; the pleuræ appear to be shorter than the ring, they are strongly arched, and bent downward at the extremity."

"The pygidium is unknown."

Sculpture. The surface is smooth over most of the crust; but the area in front of the glabella is traversed by branching and anastomosing raised lines.

Size. The specimen originally described was a young, incomplete head. The following is given as the dimensions of the adult: Head shield between the sutures, length, 11 mm.; width, 12 mm.

There are other features of the surface contour of this species worthy of notice; there are distinct furrows about the front and sides of the shield unusual in species of the genus *Ellipsocephalus*; beside the dorsal furrow, which is distinctly impressed around the front of the glabella, two furrows branch on each side from the anterior lateral angles of the glabella and extend, the one along the front of the ocular fillet and the other along the back of it, the latter.

quite around the outer margin of the cheek; a lighter furrow crosses the ocular fillet diagonally causing the fillet to assume in some examples a tubercular form. There is also a minute tubercle on the occipital ring.

The ocular lobes were wanting in the specimen on which the original description of this species was founded, and it was not recognized as an *Ellipsocephalus*, and even now that the head is completely known, the agrauloid features of the glabella are remarkable; this part of the head is slightly conical, is somewhat angulated in front and has furrows, all of which are directed strongly backward. The posterior glabella furrow, in well preserved examples, shows a thread-like extension, which turns backward and outward and reaches the occipital furrow: the second furrow is prolonged backward until the two parts almost meet on the axis of the glabella at an acute angle.

There is considerable variation in the surface markings of this species; sometimes the raised lines on the front area are absent, the glabellar furrows are obscure and the surface of the test generally smooth. This may have been caused by the wear of the crusts as they lay scattered on the sandy bottom; for as the heads of different species are found packed within each other, they seem to have been rolled or washed about on the bottom of the sea before entombment.

Comparison with other species—Protolenus.

Under the name of *Olenus*, Prof. G. Meneghini some years ago described two species of trilobites from the Cambrian rocks of Sardinia, which resemble the species the writer here places under the generic name *Protolenus*. Although referred by Meneghini to *Olenus*, in many respects these species of Sardinia differ from that genus, yet both are evidently of the family of the *Olenidæ*. Their long eyelobes associate them with the Acadian species described above; one (*O. armatus*) is rather imperfectly known, but the other, *O. Zoppii* (Fig. 3), is well shown by various figures

and one or two complete examples.¹ To the writer it appears that the latter species, if not both, belongs to *Protolenus*. The eyelobes in the Sardinian species are not so continuous as in the Acadian, but this may indicate merely a later development of the type, similar to that which occurred in *Paradoxides*, whose earlier species, and also whose embryonic forms show more continuous eyelobes than the later species and the adult forms.

Under the names of *Solenopleura* (?) *Harveyi* and *S.* (?) *Howleyi*², Mr. C. D. Walcott has described two species of trilobites from Newfoundland, which are evidently closely allied to *Protolenus elegans*. In fact *S.* (?) *Howleyi* appears to differ only in the more advanced position of the eyes, the peculiar occipital furrow, and the absence of spines at the ends of the pleuræ. The spines of the pleuræ in this species may have been overlooked, for in the Acadian species, *P. elegans*, they are quite slender. There can be no doubt but that *S.* (?) *Howleyi* is a *Protolenus*.

Under the name of *Olenellus* (?) *Forresti*, Etheridge, Jr.,³ Mr. A. H. Foord has described a Cambrian trilobite from Western Australia, which also apparently may be included in the genus *Protolenus*. This, like the Acadian species, has a conical glabella and continuous eyelobes, but the eyelobes are close to the glabella, leaving a very narrow fixed cheek. The eyelobes and margin of the middle piece of the head-shield are well defined, and give no reason for supposing that the outer cheek was fixed, without which the reference to *Olenellus* is inadmissible. In fact the author who described the species implies that the outer cheeks were free. The pleuræ figured by Mr. Foord is evidently one belonging to an olenoid trilobite.

¹ "Fauna Cambriana—Trilobiti," In memoirs of Geological Commission of Italy, vol. iii. pt. 2nd.

² Fauna of the Lower Cambrian or *Olenellus* Zone, p. 657. N.B.—There is an error in indexing the Plate xvii, in which this species is figured; the description in the text shows that Fig. 7 represents *S. Howleyi* and Fig. 8 *S. Harveyi*. Reverse also the page references.

³ There is an obvious error in the description of this species, where at the sixth line "widening" should be *narrowing*.

In the later of the two Acadian species of *Protolenus* (*P. paradoxoides*) there is a narrowing of the fixed cheek and prolonging of the glabella (as compared with the earlier species, *P. elegans*), which, carried further, would give rise to a trilobite similar in the form of the head to *O.* (?) *Forresti*. It appears to the writer therefore that this species should also be included in *Protolenus*.

Ellipsocephalus.

As already remarked no species of this genus has hitherto been satisfactorily shown to exist in America, and it is necessary to look to the Old World for species which may be compared with those existing in Eastern Canada.

In the Holmia Kjerulfi beds of Sweden are two trilobites which have many points of resemblance to the two *Ellipsocephali* described in this article.¹ It is true that one of these species is referred to *Arionellus*, but it possesses an extended eyelobe and in other respects does not fully accord with that genus; the points of departure are all in the direction of *Ellipsocephalus*, and thus it appears to correspond with *E. articephalus*, only it has a much wider glabella.

Similarly the other species is a counterpart in many respects of *E. galeatus* only the Swedish form has not so wide a front margin, nor the cylindrical glabella, bell shaped in front, of a typical *Ellipsocephalus*. Still these two trilobites not inadequately represent the two *Ellipsocephali* described above.

It may be mentioned in this connection that Mr. Walcott has described a new genus of Cambrian trilobites under the name of *Avalonia*, which by the form of the glabella and fixed cheek is allied to *Ellipsocephalus*, if indeed it be not a sub-genus of that group.² It will be observed that the species *E. articephalus* has a furrow across the shield in

¹ De Undre *Paradoxides* lagren. Stockholm, 1883, p. 20, tab. iv. figs. 1, 2 and 4.

² The cyclobes on the figure appear to have been introduced by the artist, as they are not mentioned in the description of the genus.

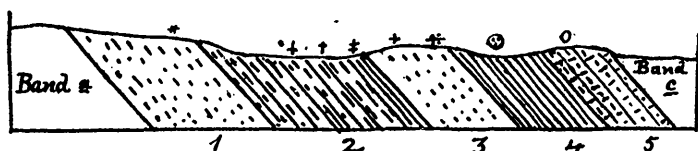
front of the glabella, similar to that of Avalonia, and also a similar furrow inside of the eyelobe.

Correlation of Faunas based on these four species.

A visual representation is often an important aid to the memory, and as preliminary to remarks under this head, I may here introduce a section of the Band *b*. of Division 1, in which the Ellipsocephali and Protoleni have been found.

The section is enlarged from one which appeared in the Transactions of the Royal Society of Canada, 1889, and is presented for the purpose of showing the position of the fossiliferous layers discovered by W. D. Matthew.

Section of the Band *b* of Division 1 of the St. John group at Hanford Brook—Scale, 80 feet to an inch.



* *Hipponicharion Eos*, *Ellipsocephalus* (?) *c. f. polymetopus*, etc.

† *Protolenus elegans* and *Beyrichona tinea*.

‡ *Protolenus elegans*, *Ellipsocephalus grandis*, *Beyrichona*, etc.

+ *Ellipsocephalus galeatus*, *Acrothele*, etc.

⊘ *E. galeatus* and *E. articephalus*, *Protolenus paradoxoides*
Conocephalites (?) *Beyrichona tinea*, etc.

⊙ *Beyrichona tinea* and *B. papilio*.

○ *Acrothele*, *Acrotreta*, *Linnarssonina*, etc.

Fossiliferous horizons of Band *b* of the Acadian Division (Div. 1) chiefly as determined by W. D. Matthew. The section shows also the relation of Band *b* to the Paradoxides beds above (*c—d*) and to the barren sandstones or quartzites (*a*) at the base of the St. John group. It is enlarged from one at page 139, Vol. VII. (IV.) Trans. Roy. Soc. Can., where further relations of the St. John group are exhibited, and where, at page 142, the original description of this section is given.

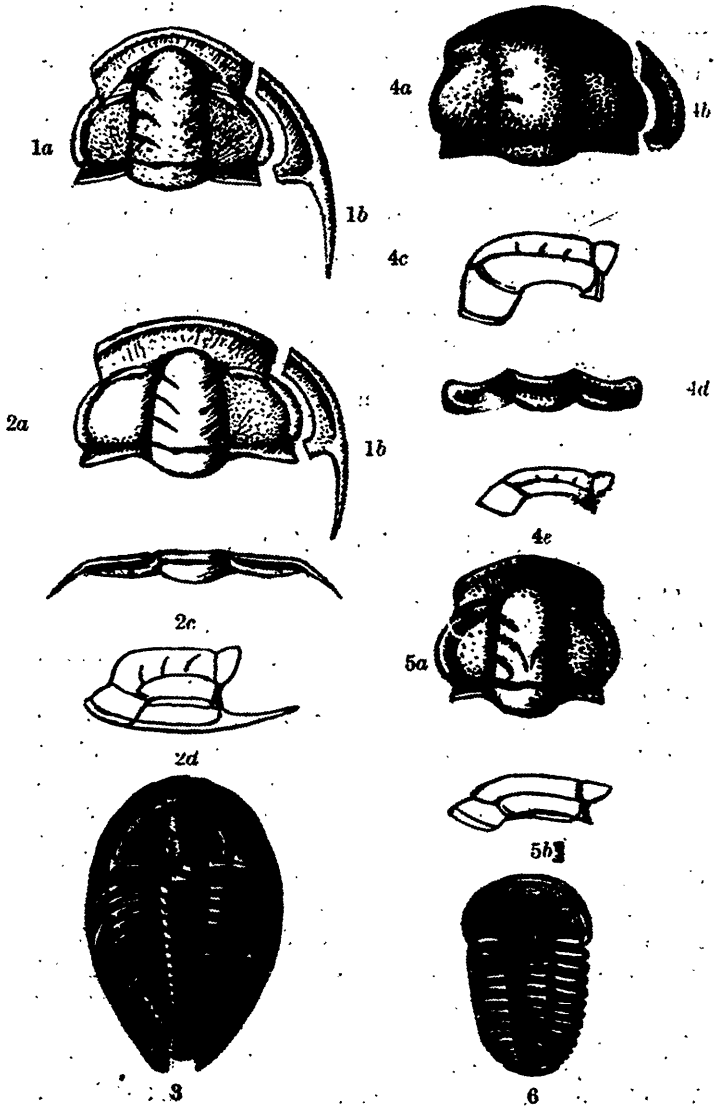
Protolenus (*P. elegans*) is first found in the middle of the shales of 2 (see section) but it becomes more abundant in the upper third of this number of Band *b*, and is accompanied by an ostracod, *Beyrichona tinea*, which also occurs in the next two numbers, 3 and 4. Near the top of the "2" shales, *Protolenus* is accompanied by an *Ellipsocephalus*, not, however, the species of the sandstone number 3, but a larger species *E. grandis*, (M.S.) In the sandstones the *Protolenus* has disappeared and these beds in the lower part have yielded no trilobite. But about the middle of the sandstones *Ellipsocephalus galeatus* comes in and toward the top there is a somewhat diversified fauna of trilobites including *E. galeatus*, *E. articephalus*, and *Protolenus paradoxoides*. On account of the abundance of the *Ellipsocephali* in the sandstones of 3, this member may be regarded as the zone of *Ellipsocephali*.¹

And as *Protolenus elegans* is the characteristic species of the shales which constitute 2, these shales are to be regarded as the zone of *Protolenus*—a new horizon between the two sandstone numbers 1 and 3, whose faunas have already been to some extent known.

In conclusion a synopsis may here be introduced, suggestive of the bearing of these discoveries on the probable chronological relation of several species of the genus *Olenellus*, as inferred from their companion species (of which representative species occur in the subfaunas of the Band *b*).

	<i>Acadian Species.</i>	<i>Eastern Species</i>	<i>Olenelli.</i>
Band <i>b</i> 3.	<i>Ellipsocephalus</i> { <i>galeatus.</i>	<i>Ellipsocephalus</i> { <i>Nordenskjoldi.</i>	{ <i>Holmia.</i> <i>Kjerulfi.</i>
Band <i>b</i> 2.	<i>Protolenus</i> { <i>elegans.</i>	<i>Protolenus</i> { <i>Howleyi.</i>	{ <i>Holmia.</i> <i>Bröggeri.</i>
Band <i>b</i> 1;	?	?	{ <i>Mesonacis.</i> <i>Mickwitzi.</i>

¹ Band *b* has already been spoken of as the zone of *Agraulos* [= *Ellipsocephalus*] *articephalus*. See Trans. Roy. Soc. Can. vol. viii-iv. p. 129.



REFERENCE TO PLATE.

N.B. The reader should notice that numbers are not always nearest to the figures they designate.

Fig. 1.—*Protolenus paradoxoides*—*a*, Middle piece of the head-shield—*b*, Movable cheek. Both natural size.

Fig. 2.—*Protolenus elegans*—*a*, Middle piece of the head-shield—*b*, Movable cheek—*c*, A pleura—*d*, Head-shield in profile. All natural size.

Fig. 3.—*Protolenus Zoppii* (*Olenus Zoppii* Meneghini.)

Fig. 4.—*Ellipsocephalus galeatus*—*a*, Middle piece of the head-shield—*b*, Movable cheek—*c*, Middle piece in profile—*d*, A pleura—*e*, var. *agrauloides* head-shield in profile. All magnified $\frac{2}{3}$.

Fig. 5.—*Ellipsocephalus articephalus*—*a*, Middle piece of the head-shield—*b*, Same in profile. Both magnified $\frac{2}{3}$.

Fig. 6.—*Ellipsocephalus Hoffi*. Barrande.

THE FOLK-LORE SOCIETY.

The first meeting of the winter course of the Montreal Branch of the American Folk-Lore Society, took place on the evening of Monday, the 10th inst., at the house of Mrs. L. Fréchette, 408 Sherbrooke Street. The attendance was fair, and several new members gave their names to the Secretary. Professor Penhallow, first Vice-President, took the chair in the absence of the President, Mr. Beaugrand. He gave a brief account of his visit to Boston during the summer, and of the doings and plans of the Society in that city. Arrangements had been made for the holding of a Folk-Lore Congress at Chicago, under the auspices of the American Folk-Lore Society, and of the American Association for the Advancement of Science. One of the latest movements for the collection of popular usages is a scheme for taking the street cries and criers of the large cities by means of phonograph. Efforts are being simultaneously made in Boston, Philadelphia, New Orleans and Chicago, to this end, and the task in Montreal has been undertaken

by the Ladies' Committee of the Branch, who so far have had satisfactory success.

The Secretary, Mr. Reade, gave the substance of correspondence that he had had, since last meeting, with the Societies of New Orleans, Boston and Chicago, with which he had, at their request, promised to exchange reports of proceedings. The chairman then called upon Mr. Reade to give his paper on "Opportunities for the study of Folk-Lore in Canada." The essayist introduced the subject with a brief sketch of the history of Folk-Lore organization and study in Great Britain, the continent of Europe, especially France, the United States and Canada, and mentioning a number of periodicals that were entirely devoted to this branch of research. The Montreal Branch of the American Folk-Lore Society was the result of a movement begun by Prof. Penhallow and a few others, last February, the formal inauguration of the branch taking place in April, Mr. W. W. Newell, Secretary of the general Society, coming to Montreal for the purpose. Mr. Reade, having shown the relations of Folk-Lore to ethnology and mythology, characterized it as the stored-up knowledge of the folk or people, consisting largely of survivals of habits of thought or social and ceremonial customs of a more or less remote past. It included the whole vast background of popular thought, feeling and usage, out of which, and in contrast to which had been developed all the individual products of human activity that go to the making of history. The essayist then gave a succinct statement of the racial constituents of Canada, pointing out that every one of the various groups that composed our complex nationality had its own myths, tales, traditions, superstitious beliefs, ballads, dialects, etc., so that no matter where one lived between the Atlantic and the Pacific, in town or country, among French or British or German or Aborigines, descendants of U. E. Loyalists or people of old country stock, he was at no loss for interesting and valuable data. From Ferland's history and other sources, including the censuses, from those of the 17th century to the last, Mr. Reade

showed in what way Canada had been settled and where the folk-lorist had the best opportunities with regard to each race or nationality. He next gave a summary of what had already been done in the way of Folk-Lore research by Abbé Petitot, Mr. H. Hale, Dr. F. Boas, Mr. A. F. Chamberlain, Abbé Maurault, Dr. G. M. Dawson, Mr. James Deans, the late Dr. Rand, Mrs. W. W. Brown, the Rev. John McLean, Father Iacombe, Rev. E. F. Wilson, Mr. Fréchette, Mr. R. G. Haliburton, Mr. Beaugrand, etc. He also referred to the colonies of Norsemen, Russians, Hungarians, Roumanians, Chinese, etc., settled in Western Canada, all with strongly marked racial features in their social, religious and industrial life. Finally, the essayist called attention to the mass of virtually forgotten lore to be found in the works of Champlain, the Jesuits' Relations, Charlevoix, de Gaspé, the writings of travellers, Nor. Westers (including the Hon. Mr. Masson's excellent series) Mr. Canniff Haight's "Country Life in Canada," the writings of Messrs. LeMoine, Sulte, F. de Saint Maurice, and numerous other works of the past and present.

After a short discussion, Mr. Fréchette read a paper, entitled "La Corriveau," based on a double murder and two-fold trial—the latter of which took place in the year 1763, near the close of the *Regne Militaire*, and was a striking illustration of the legal barbarism of the time. It was, however, in the superstitions that gathered around the unhallowed spot where the murderess was hanged in chains and enclosed within an iron cage, that the interest of the story for folk-lorists mainly consisted. We would gladly give a fuller account of Mr. Fréchette's thrilling paper, which was read in excellent English, had not the author expressed a wish that it should not be published—the publication of it being already arranged for.

After music, conversation and refreshments, the meeting separated, with the understanding that the Society should meet again at a place to be designated by the Ladies Committee, on the second Monday in November, when Prof. Penhallow would read a paper on "Epitaphs."

ABSTRACT FOR THE MONTH OF JULY, 1892.

Meteorological Observations, McGill College Observatory, Montreal, Canada. Height above sea level, 187 feet, C. H. McLEOD, Superintendent.

DAY.	THERMOMETER.				BAROMETER.				† Mean pressure of vapour	‡ Mean relative humidity.	Dew point.	WIND.		SKY CLOUDS IN TENTHS.			Per cent. of Possible Sunshine.	Rainfall in inches.	Snowfall in inches.	Rain and snow melted.	DAY.
	Mean.	Max.	Min.	Range.	Mean.	5 Max.	5 Min.	Range.				General direction.	Mean velocity in miles per hour.	Mean.	Max.	Min.					
1	60.13	67.5	55.2	12.3	29.9988	30.036	29.937	.099	.3628	69.5	50.0	W.	18.4	6.5	10	1	77	....	....	..	1
2	65.73	72.8	54.4	18.4	30.0205	30.080	29.960	.120	.3753	59.7	51.0	W.	17.8	5.7	10	0	76	....	....	..	2
SUNDAY	.....	64.5	56.0	8.5	.....	.....	.....	.....	.....	.....	.....	E.	4.0	.....	.....	.....	82	0.99	....	0.99	3
4	58.22	66.5	52.0	14.5	30.0050	30.205	29.790	.415	.3258	66.7	47.0	N.	12.0	6.0	10	0	61	0.30	....	0.30	4
5	58.73	68.3	47.2	21.1	30.3153	30.358	30.266	.092	.3188	65.2	46.7	E.	5.4	3.7	10	0	96	....	....	....	5
6	64.65	73.5	51.4	22.1	30.4542	30.482	30.409	.073	.3550	59.3	49.5	W.	6.5	4.0	3	0	99	....	....	....	6
7	69.95	77.7	60.0	17.7	30.4330	30.522	30.335	.187	.4753	65.5	57.3	N.W.	11.5	2.0	0	0	90	....	....	....	7
8	71.00	82.5	62.0	20.5	30.1808	30.340	30.069	.251	.5600	74.2	62.2	N.W.	15.5	7.2	10	0	40	0.21	....	0.21	8
9	67.53	74.8	61.8	13.0	30.0207	30.084	29.978	.106	.5632	84.0	62.2	N.W.	12.7	9.7	10	9	00	0.58	....	0.58	9
SUNDAY	.....	81.8	64.4	18.4	.....	.....	.....	.....	.....	.....	.....	N.W.	15.8	.....	.....	.....	77	Inap.	....	Inap.	10
11	75.17	84.8	64.3	20.0	29.9903	30.043	29.936	.107	.5935	67.8	63.8	W.	13.4	2.8	8	0	67	....	....	....	11
12	75.70	84.6	65.3	19.3	29.8547	29.945	29.771	.174	.6173	69.7	64.8	W.	18.9	3.2	10	0	56	....	....	....	12
13	76.25	85.4	71.2	14.0	29.7443	29.797	29.702	.095	.6493	71.7	66.3	W.	16.5	5.7	10	2	35	Inap.	....	Inap.	13
14	74.52	83.6	67.5	16.1	29.8990	29.439	29.842	.097	.5910	68.8	63.5	N.W.	10.3	0.5	3	0	97	....	....	....	14
15	74.65	82.7	64.5	18.2	29.7578	29.902	29.535	.367	.7630	87.3	70.8	N.W.	12.5	7.8	10	0	99	0.02	....	0.02	15
16	57.77	75.2	51.9	23.3	29.8037	29.959	29.512	.447	.3575	72.3	48.8	N.W.	22.8	7.2	10	0	16	0.12	....	0.12	16
SUNDAY	.....	72.2	50.6	21.6	.....	.....	.....	.....	.....	.....	.....	N.W.	20.3	.....	.....	.....	77	Inap.	....	Inap.	17
18	79.47	78.3	59.2	19.1	29.9357	29.970	29.890	.080	.6272	84.7	64.7	N.W.	24.2	4.3	10	0	94	....	....	....	18
19	69.55	73.5	64.9	8.6	29.8660	29.970	29.779	.191	.6357	94.8	68.2	N.W.	18.9	8.0	10	0	22	Inap.	....	Inap.	19
20	64.05	72.4	55.2	17.2	29.9812	30.029	29.907	.122	.5123	84.0	68.8	N.W.	18.7	0.0	0	0	100	0.01	....	0.01	20
21	69.65	79.2	57.8	21.4	30.0032	30.063	29.937	.126	.4583	64.0	56.5	N.W.	23.0	3.3	7	0	93	....	....	....	21
22	71.92	78.7	63.4	15.3	29.8568	29.910	29.814	.096	.5403	69.2	61.3	N.W.	25.4	4.3	10	0	58	0.04	....	0.04	22
23	74.90	83.3	65.6	17.7	29.8125	29.891	29.847	.044	.5647	66.2	62.3	N.W.	18.9	2.3	9	0	98	....	....	....	23
SUNDAY	.....	82.3	62.5	19.8	.....	.....	.....	.....	.....	.....	.....	N.W.	22.3	.....	.....	.....	26	Inap.	....	Inap.	24
25	78.18	86.3	72.0	13.7	29.8493	29.879	29.802	.077	.7123	78.3	70.7	N.W.	20.5	6.5	10	0	65	0.14	....	0.14	25
26	77.23	86.5	70.4	16.1	29.8352	29.855	29.812	.043	.6973	75.8	68.3	N.W.	13.8	4.3	8	1	90	Inap.	....	Inap.	26
27	79.00	87.5	69.2	18.3	29.8630	29.897	29.820	.069	.5323	54.0	60.7	N.	16.9	4.8	10	0	95	Inap.	....	Inap.	27
28	71.28	79.7	67.0	12.7	29.8688	29.892	29.850	.042	.5710	74.7	62.7	N.E.	16.0	8.3	10	0	33	0.11	....	0.11	28
29	71.28	88.5	62.0	26.5	29.8650	29.962	29.783	.179	.6480	83.3	66.0	N.	16.7	4.8	10	0	30	0.43	....	0.43	29
30	68.47	76.5	61.2	15.3	30.1015	30.138	30.058	.080	.4608	66.2	56.7	N.E.	11.0	2.0	3	0	97	....	....	....	30
SUNDAY	.....	79.3	62.0	17.3	.....	.....	.....	.....	.....	.....	.....	S.E.	12.8	.....	.....	.....	61	....	....	....	31
..... Means	69.81	78.4	61.1	17.3	29.9768	.....	.....	.145	.5371	72.2	60.0	.....	16.06	4.7	.....	.....	68	2.95	.....	2.95	Sums
18 Years means for and including this month	68.89	77.3	60.8	16.5	29.8924	.....	.....	.143	.5001	70.9	.....	.....	.....	5.4	.....	.....	59.1	4.13	.....	4.13	18 Years means for and including this month.

ANALYSIS OF WIND RECORD.

Direction	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
Miles	881	526	93	187	127	356	3650	6126	.....
Duration in hrs	64	45	14	10	15	30	232	319	.....
Mean velocity	13.8	11.7	6.7	18.7	8.5	11.9	15.7	19.2	.....

Greatest mileage in one hour was 28 on the 8th, 11th and 16th.

Greatest velocity in gusts, 26 miles per hour on the 12th.

Resultant mileage, 3165.

Resultant direction, N. 56° W.

Total mileage, 11946.

* Barometer readings reduced to sea-level and temperature of 32° Fahrenheit.

§ Observed.

† Pressure of vapour in inches of mercury.

‡ Humidity relative, saturation being 100.

¶ 11 years only.

The greatest heat was 88.5 on the 29th; the greatest cold was 50.6 on the 17th, giving a range of temperature of 37.9 degrees. Warmest day was the 27th. Coldest day was the 16th.

Highest barometer reading was 30.522 on the 7th; lowest barometer was 29.512 on the 16th, giving a range of 1.010 inches. Maximum relative humidity was 98 on the 15th and 25th. Minimum relative humidity was 33 on the 27th.

Rain fell on 18 days.

Rain or snow fell on 18 days.

Auroras were observed on 6 nights.

Solar halos on the 1st and 2nd.

Thunderstorms on 3 days.

Fog on 3 days.

ABSTRACT FOR THE MONTH OF AUGUST, 1892.

Meteorological Observations, McGill College Observatory, Montreal, Canada. Height above sea level, 187 feet, C. H. McLEOD, Superintendent.

DAY.	THERMOMETER.				BAROMETER.				† Mean pressure of vapour	‡ Mean relative humidity.	Dew point.	WIND.			SKY CLOUDS IN TENTHS.			Per cent. of Possible Sunshine.	Rainfall in inches.	Snowfall in inches.	Rain and snow melted.	DAY.
	Mean.	Max.	Min.	Range.	Mean.	‡ Max.	‡ Min.	Range.				General direction.	Mean velocity in miles per hour.	Mean.	Max.	Min.						
1	71.20	80.8	64.6	16.2	29.9963	30.020	29.969	.051	.5720	75.5	62.8	W.	3.5	5.5	10	0	79	...	...	...	1
2	66.85	71.5	64.7	6.8	29.9783	30.006	29.944	.062	.5682	89.5	63.7	N.E.	3.5	10.0	10	10	00	0.02	...	...	2
3	70.12	78.6	63.8	14.8	29.9400	29.971	29.903	.068	.5470	75.0	61.3	W.	9.8	5.0	10	0	61	0.03	...	...	3
4	69.02	77.2	63.0	14.2	29.8545	29.905	29.806	.099	.5278	73.8	60.3	W.	12.9	5.5	10	0	27	Inap.	...	...	4
5	64.43	73.8	55.9	17.9	29.8780	29.942	29.816	.126	.4663	60.7	56.2	N.	6.0	5.5	10	0	69	...	...	...	5
6	63.75	73.8	58.0	15.8	29.7960	29.930	29.731	.199	.4650	79.2	50.8	W.	15.2	6.2	10	0	41	0.21	...	...	6
SUNDAY	7	75.3	52.9	22.4	...	...	...	...	...	...	...	W.	8.7	...	...	...	95	...	...	...	7
8	74.23	83.2	62.0	21.2	29.8427	29.971	29.757	.214	.5243	62.3	60.0	S.W.	12.1	10.0	10	10	33	...	...	...	8
9	72.30	79.3	68.8	10.5	29.7378	29.840	29.701	.119	.6942	87.5	68.3	W.	8.9	8.0	10	3	23	0.04	...	...	9
10	70.07	82.5	64.8	17.7	29.8692	29.920	29.822	.107	.6497	86.5	66.3	N.E.	4.0	9.0	10	4	32	0.61	...	...	10
11	65.42	71.8	60.1	11.7	29.8548	29.904	29.813	.091	.5975	94.7	63.8	N.E.	7.1	10.0	10	10	00	1.04	...	...	11
12	58.83	62.3	58.2	4.1	29.9260	29.940	29.898	.042	.4560	91.8	56.3	N.E.	32.1	10.0	10	00	00	0.75	...	...	12
13	58.35	63.8	54.9	8.9	29.8715	29.878	29.868	.010	.4632	94.5	57.0	N.E.	14.5	9.7	10	8	00	0.13	...	...	13
SUNDAY	14	70.6	57.0	13.6	...	...	...	...	...	...	...	N.W.	9.8	...	...	...	35	0.01	...	...	14
15	68.23	75.2	58.5	17.3	30.0323	30.066	29.989	.077	.4757	69.8	57.7	N.W.	8.9	5.3	9	0	23	...	...	...	15
16	71.17	80.6	58.2	22.4	30.0680	30.112	30.006	.086	.5213	68.8	57.7	W.	16.0	1.0	4	0	97	...	...	...	16
17	72.58	81.5	66.2	15.3	30.0268	30.064	30.002	.062	.5572	71.2	62.5	W.	19.8	3.0	10	0	94	...	...	...	17
18	71.82	78.3	65.0	13.3	30.0560	30.088	30.032	.056	.6330	81.3	65.5	N.E.	14.5	0.0	0	0	95	...	...	...	18
19	71.28	86.2	59.3	26.9	29.9968	30.120	29.901	.219	.6278	81.3	65.0	N.	11.3	3.5	10	0	89	...	...	...	19
20	61.98	77.6	54.2	13.4	30.0388	30.111	29.957	.164	.3792	68.5	51.3	N.W.	11.9	3.5	10	0	82	...	...	...	20
SUNDAY	21	74.6	53.3	21.3	...	...	...	...	...	...	...	S.W.	6.9	...	...	...	95	...	...	...	21
22	64.50	72.3	59.0	13.3	30.1040	30.122	29.994	.108	.3692	64.2	59.3	N.W.	6.6	4.0	10	0	72	...	...	...	22
23	63.07	72.8	54.2	18.6	30.2132	30.228	30.147	.135	.4660	71.2	53.2	N.	6.3	4.5	8	0	87	...	...	...	23
24	66.20	73.7	60.5	13.2	30.0797	30.149	30.012	.137	.4985	78.2	58.7	E.	7.3	9.5	10	0	79	0.02	...	...	24
25	60.75	66.4	59.5	6.9	30.2068	29.951	29.861	.090	.5022	94.0	59.0	N.	11.6	4.2	10	5	90	2.05	...	...	25
26	62.72	69.8	57.0	12.8	30.0893	30.105	29.960	.205	.4452	78.3	56.0	N.W.	12.6	5.5	10	0	42	...	...	...	26
27	56.60	63.7	53.2	20.5	30.1815	30.209	30.102	.107	.3335	73.0	47.7	N.W.	8.6	6.8	10	0	51	...	...	...	27
SUNDAY	28	70.9	51.2	19.7	...	...	...	...	...	...	...	N.W.	4.6	...	...	...	87	...	...	...	28
29	64.57	75.8	54.0	21.8	30.0903	30.143	30.045	.098	.4655	77.5	57.0	S.	3.9	0.5	3	0	82	...	...	...	29
30	67.93	79.9	57.5	22.4	29.9543	30.077	29.838	.239	.5682	83.0	62.2	S.E.	8.1	2.2	10	0	85	...	...	...	30
31	63.37	70.8	58.7	12.1	29.7137	30.813	29.748	.065	.4658	79.7	56.8	S.W.	13.2	7.0	10	0	00	0.33	...	...	31
Means	66.37	74.7	59.0	15.7	29.9680	...	...	.116	.5078	78.2	58.5	...	13.3	5.9	...	...	56	5.24	...	5.24	Sums
18 Years means for and including this month.	66.91	75.4	58.8	16.4	29.9425	...	...	.132	.4824	72.7	...	...	5.4	...	...	...	59.6	3.30	...	3.30	18 Years means for and including this month.

ANALYSIS OF WIND RECORD.

Direction....	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
Miles	778	1596	218	361	240	772	1994	1727	.....
Duration in hrs ..	109	105	37	47	45	70	164	165	2
Mean velocity....	7.14	15.20	5.89	7.68	5.33	11.03	12.16	10.47	.....

Greatest mileage in one hour was 41 on the 12th.
 Greatest velocity in gusts, 50 miles per hour on the 12th.
 Resultant mileage, 3065.

Resultant direction, N. 46° W.
 Total mileage, 7686.
 Average velocity 13.3 m. per hour.

* Barometer readings reduced to sea-level and temperature of 32° Fahrenheit.

‡ Observed.

† Pressure of vapour in inches of mercury.

‡ Humidity relative, saturation being 100.

¶ 11 years only.

The greatest heat was 86.2 on the 19th; the greatest cold was 51.2 on the 28th, giving a range of temperature of 35.0 degrees. Warmest day was the 8th. Coldest day was the 27th.

Highest barometer reading was 30.282 on the 23rd; lowest barometer was 29.701 on the 9th, giving a range of 0.581 inches. Maximum relative humidity was 89 on the 11th and 12th. Minimum relative humidity was 46 on the 8th

Rain fell on 13 days.

Rain or snow fell on 13 days.

Auroras were observed on 3 nights.

Fog on 3 days.

Thunderstorm on 1 day.

ABSTRACT FOR THE MONTH OF SEPTEMBER, 1892.

Meteorological Observations, McGill College Observatory, Montreal, Canada. Height above sea level, 187 feet, C. H. McLEOD, Superintendent.

DAY.	THERMOMETER.				BAROMETER.				† Mean pressure of vapour	‡ Mean relative humidity.	Dew point.	WIND.		SKY CLOUDY IN TENTHS.			Per cent. of Possible Sunshine.	Rainfall in inches.	Snowfall in inches.	Rain and snow melted.	DAY.
	Mean.	Max.	Min.	Range.	Mean.	Max.	Min.	Range.				General direction.	Mean velocity in miles per hour.	Mean.	Max.	Min.					
1	55.85	62.3	49.2	13.1	30.0220	30.204	29.834	.370	.3127	70.2	46.2	S.W.	12.3	6.0	10	0	63	.....	.....	.....	1
2	53.27	60.8	44.7	16.1	30.3112	30.359	30.284	.075	.2632	65.2	41.0	S.W.	7.8	0.0	0	0	100	.....	.....	.....	2
3	62.87	75.5	48.8	26.7	30.2157	30.285	30.161	.124	.3928	68.5	51.7	S.W.	11.4	0.7	3	0	96	.....	.....	.....	3
SUNDAY.....	.....	78.8	58.0	20.8	.....	.....	.....	.....	.....	.....	.....	S.	8.1	.....	.....	.....	67	.....	.....	.....	4
5	66.32	77.7	58.2	19.5	29.8053	29.947	29.674	.273	.4865	76.3	58.3	S.	11.3	6.8	10	0	89	.....	.....	.....	5
6	54.93	61.8	49.2	12.6	29.9072	30.055	29.788	.267	.3490	80.3	48.8	S.W.	11.7	5.3	10	0	85	0.09	.....	0.09	6
7	52.75	61.3	47.5	13.8	30.1737	30.335	30.043	.302	.2988	75.0	45.0	W.	9.1	3.7	10	0	93	.....	.....	.....	7
8	52.00	61.5	42.0	19.5	30.3968	30.442	30.368	.074	.2945	73.5	44.7	S.W.	6.3	0.0	0	0	94	.....	.....	.....	8
9	58.32	69.6	47.7	21.9	30.3640	30.406	30.320	.086	.3300	68.5	47.5	S.W.	6.3	0.2	1	0	99	.....	.....	.....	9
10	60.33	71.3	50.2	21.1	30.2992	30.340	30.256	.084	.3947	76.0	52.2	E.	9.7	6.5	10	0	52	.....	.....	.....	10
SUNDAY.....	.....	70.4	58.2	12.2	.....	.....	.....	.....	.....	.....	.....	S.W.	15.5	.....	.....	.....	48	.....	.....	.....	11
12	64.38	73.8	55.0	18.2	30.0830	30.163	30.023	.140	.4633	77.8	56.8	S.W.	11.2	4.5	10	0	68	.....	.....	.....	12
13	65.40	72.5	60.9	11.6	29.9043	30.026	29.740	.286	.4725	76.2	57.3	S.W.	9.7	10.0	10	0	00	0.16	.....	0.16	13
14	62.30	70.2	61.5	8.7	29.6458	29.700	29.572	.128	.4732	81.8	57.2	S.W.	12.1	6.5	10	0	15	0.82	.....	0.82	14
15	57.93	64.3	54.3	10.0	29.7608	29.815	29.700	.115	.3745	78.0	51.0	S.W.	15.9	8.0	10	0	32	Inap.	.....	Inap.	15
16	54.83	60.9	49.0	11.9	29.9643	30.116	29.877	.239	.3038	70.8	45.5	S.W.	13.1	3.5	10	0	37	.....	.....	.....	16
17	55.75	63.2	46.5	16.7	30.1757	30.221	30.136	.085	.3163	72.0	46.3	S.W.	10.4	2.3	8	0	94	.....	.....	.....	17
SUNDAY.....	.....	72.2	48.7	23.5	.....	.....	.....	.....	.....	.....	.....	S.W.	23.3	.....	.....	.....	95	.....	.....	.....	18
19	53.47	66.3	47.6	18.7	30.0330	30.199	29.882	.317	.2940	71.5	44.2	S.W.	6.2	6.5	10	0	49	0.42	.....	0.42	19
20	51.37	59.8	43.5	16.3	30.3117	30.374	30.278	.096	.2612	68.8	41.5	N.W.	6.2	0.3	2	0	97	.....	.....	.....	20
21	54.83	65.3	43.3	22.0	30.2490	30.373	30.197	.176	.3267	77.0	47.3	S.W.	5.9	1.4	0	0	86	.....	.....	.....	21
22	59.50	69.7	52.3	17.4	30.2463	30.264	30.222	.041	.4225	83.0	54.2	S.W.	7.9	9.5	10	8	00	0.08	.....	0.08	22
23	63.60	69.2	59.3	9.9	30.3113	30.261	30.176	.085	.5422	92.0	61.3	S.W.	9.4	8.3	10	0	00	0.04	.....	0.04	23
24	66.78	73.2	62.0	11.2	30.1407	30.199	30.067	.132	.5923	90.5	63.7	S.W.	4.4	3.5	10	0	29	0.03	.....	0.03	24
SUNDAY.....	.....	73.5	60.2	13.3	.....	.....	.....	.....	.....	.....	.....	S.	7.6	.....	.....	.....	10	.....	.....	.....	25
26	54.77	68.5	50.2	18.3	29.4542	29.571	29.341	.230	.3632	83.8	49.7	S.W.	20.3	8.7	10	2	20	1.17	.....	1.17	26
27	51.68	57.2	45.1	12.1	29.6455	29.624	29.593	.051	.3182	82.2	46.3	S.W.	26.8	6.8	10	0	43	.....	.....	.....	27
28	53.77	58.5	48.6	9.9	29.9601	30.155	29.706	.349	.2502	59.8	42.7	S.W.	13.8	1.2	3	0	94	.....	.....	.....	28
29	44.50	52.2	39.3	12.9	30.3015	30.366	30.240	.126	.1815	62.3	31.7	S.W.	10.2	2.0	10	0	90	.....	.....	.....	29
30	59.60	70.0	43.3	26.7	30.0108	30.203	29.807	.396	.3583	67.5	48.8	S.W.	20.4	7.2	10	3	73	.....	.....	.....	30
..... Means	57.42	67.0	50.8	16.2	30.0613	.....	.....	.182	.3629	74.9	49.3	.....	12.1	4.6	.....	.....	62	2.92	.....	2.92	Suma.....
18 Years means for and including this month.....	58.66	66.77	50.96	15.81	30.0180	.....	.....	.178	.3824	75.1	.....	.....	.....	5.6	.....	.....	150.6	3.19	.....	3.19	18 Years means for and including this month.

ANALYSIS OF WIND RECORD.

Direction.....	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
Miles.....	9	23	539	1001	1451	3943	709	1063	.....
Duration in hrs..	4	3	44	86	171	278	51	82	1
Mean velocity....	2.25	7.66	12.25	11.64	8.48	14.18	13.90	13.02	.....

Greatest mileage in one hour was 36 on the 27th.
 Greatest velocity in gusts, 40 miles per hour on the 27th.
 Resultant mileage, 5146.

Resultant direction, S. 85° W.
 Total mileage, 8743.
 Average velocity 12.1 m. per hour.

* Barometer readings reduced to sea-level and temperature of 32° Fahrenheit.

† Observed.

‡ Pressure of vapour in inches of mercury.

§ Humidity relative, saturation being 100.

¶ If years only.

The greatest heat was 78.8 on the 4th; the greatest cold was 39.3 on the 29th, giving a range of temperature of 39.5 degrees. Warmest day was the 4th. Coldest day was the 29th.

Highest barometer reading was 30.442 on the 8th; lowest barometer was 29.341 on the 26th, giving a range of 1.101 inches. Maximum relative humidity was 96 on the 24th and 25th. Minimum relative humidity was 45 on the 2nd and 29th.

Rain fell on 10 days.

Auroras were observed on 3 nights.

Lunar halo on 1 night.

Thunderstorm on 1 day.