

Note on Fossil Plants from
the Carboniferous of Nova
Scotia.

By Wm Dawson, M.S.

The plants referred to
in this note are in part spec-
imens submitted to me some
years ago by the late Hon. Murray
F.G.S., Director of the Geological Survey of
Nova Scotia, in part specimens
presented to me some time since
by Mr. P. Patterson of
Halifax, but principally from
recent collections of
Mr. P. Hawley & Co., New Brunswick
of the New Brunswick Survey.
They are ^{mostly} of a ^{family} ~~kind~~ ^{character}
of the Coal Formation as it occurs
in Nova Scotia and Cape Breton
and especially of the Lower and
Middle portions of ~~the~~ ^{the} same
of them seem referable to
the Lower Carboniferous or Victoria
series as to the Upper Coal
Formation or Permian Carboniferous.
The strata in which they occur
are similar to those of the Coal
Formation of Cape Breton and
around of the highly carboniferous
several productive beds of
Coal.

* A few are
new and
some others
have interesting
general
features.

The Carboniferous of St. George's
Bay in Western Nova Scotia
may be regarded as the North
Eastern outcrop of the

beds which dip under the
waters of the Gulf of St Lawrence
on the eastern and northern
Cape Breton, and it is
chief that large areas of
Coal measures exist under
the Gulf of St Lawrence
on the intervening spaces
as exhibited in St Johns Bay
The Carboniferous rocks include
Conglomerates, sandstones, green
red shales with bands of
limestone ^{& dolomite} and beds or masses
of Gypsum, also about seen
sandstones and shales re-
presenting the Millstone Grit
and Coal = formation and
holding the buckhorn leaves
of Linnaea.

In collecting ^{from} the limestone
made by Dr. A. Bell and Mr
Pittston I secured eleven
species bearing records from the
Lower Carboniferous of Nova
Scotia, and two new species
Serpulites Menziesi and Maerchertes
Tennantensis. There were described
the report of the Peter Redpath
Museum for 1883.

The fossil plants are of
course as extending the flora
of the Nova Scotia Coal = fields
a little farther to the north =
east and as indicating the
vegetation of the parts of the
Island of Newfoundland then
above water, and which

constitute the nearest part
of some continents and the
American to the great coal
fields of South Wales and of
England.

I shall begin with the
description and the names
of certain plants which
have new points as are
new species and shall
then give a list of the
better known species with
their localities elsewhere.

Symnopermeae
Leave remainder blank

Lepidodendreae

The genus *Lepidodendron* and its allied genus *Sepidopteris* are at present much involved in that confusion which must necessarily result from the description of mere fragments of large trees. The trunk of a *Lepidodendron* retaining its cortex tends to more or less flattened showing the outer surface on the inner surface of the epidermal layer, or the surface of the wood zone or the inner surface of the axis, will under all these different conditions present by different appearances while twigs or leaf branches or handlets in like manner are extremely different from one another. Hence the description of mere fragments of stems without leaves or fruit has encumbered the subject with a load of uncertain synonymy.

My Newfoundland collector contains at least one species which shows the character of the old stem the branches and the leaves and which besides belongs to a type of great interest in its relation to the *Lepidodendron*. It may be

Leaves about 2 mm ~~long~~ wide
and ~~about~~ three inches or more
in length. Some leaves, probably
of the same species are straight
pinnate and three to four in-
ches in length.

The fruit has not been
seen though there are in the
beds certain flattened ^{strobili} ~~Sepidolites~~
which have been long and slender
and also two forms of *Sepido-*
phyllum, some of which may have
belonged to the present species.

~~There is in the Nova Scotia~~
~~series~~ In the Coal-formation
of Nova Scotia there is an
~~undescribed species~~ which
I have named ^{described} ~~provisionally~~
L. Cliftonense from its locality,*
and of which I have found
a very perfect specimen. It is in
some respects so near to the stone
that I have doubted its specific
distinctness. I therefore ~~provisionally~~
This species also, ^{which has not been} ~~is especially~~
as it shows the fruit and
habit of growth.

* Geol. Magazine
History of Plants,
p. 164.

Though in
Canada can
I am sure there
be no sufficient
grounds for a
difference
of name

which are however
under and
as much
as 5 inches
in length

It will be observed that
the two species agree very closely
in the form of the strobili
and the length of the leaves.
The leaf ^{bases} ~~stems~~ however are
somewhat different in ^{shape} ~~form~~
and more spread out
and the leaves larger in
L. Cliftonense. Additional

specimens might however
show them to be branches of
one species. *

* *Inula repens*
The spec. from
Lappula
cut differ
with the markings
on the stem.

* *Sceloporus*
History of
Plants
p. 162
also Academic
Geology p.

Deltheimianum

These plants I am however
entirely sure in regard to
Lepidodendron, etc. I have elsewhere
pointed out * the growth of
stem in diameter in *Lepidodendron*
takes place in three ~~not~~ different
ways. In some as in *L. Stem-*
keupii the bark retains its
integrity in such a manner that
the leaf-bases remain in size
and do not become separated
from each other. In others as
in *L. ~~Stem-keupii~~* and *L. Pictetense*
the leaf-bases remain small
and the intervening bark becomes
thin in steps leaving wide furrows
without any scars. An other
mediate type is that which
we have in *L. Dinorthis* and
L. Congestum in which the
scars remain in steps as
are and the leaves separated
by lines of slightly wrinkled
bark. It would appear from
the observations of Williamson
and others that the first
Arctostaphylos of these
Lepidodendron that possess
a very slight development
of the woody axis
while the second occurs
in these species in which

The wood frame becomes that
and stem.

The two species above
~~referred to~~ & evidently belong
to the first category and
as the stems found are
not large still older stems
have probably shown large
leaf-bases. Such species
of *Lepidodendron* approach nearer
than these to *Lepidophlois*
in the expansion of the old
leaf-bases and the small
development of the woody
axis, and it is interesting
to note that they also
resemble them in the
great length of the leaves
and the thickness of the
branches. The *Lepidodendron*
whose branches end in
slender sprays are usually
of not always thin in
shape the woody axis is
large and the base
of the old stems torn
and wrinkled.

I may add that these
differences are most important
in the discrimination of
Lepidodendron & the markings
on the stems though they
have been too often
overlooked.

Another noteworthy
point is the manner
in which the fruit of
L. Clifflense is borne on
slender branchlets with
few and short leaves
extending from the thick
branches. Such branchlets
might, if alone, readily be
mistaken for branches of
other species. My aim
is to help & explain the scars
of prothecium often found
on *Lepidodendron* as well
as on the so called *Ulodendron*
and other names are not
generally distinct from *Lepi-
cladon* and on *Lepidolepis*
In some species, these scars
are seen from their form
to represent simple cones
but in ~~the~~ ~~other~~ ~~cases~~ ~~of~~ ~~large~~
size; but in other cases
they are merely round marks
as if indicating the position
of branches or buds. The
little fertile branchlets of *L.
Clifflense* which would probably
die after the maturity of
the fruit, would leave
such scars, and may
probably account for some
of the *Lep* cuticle of
them.

+ especially of
the *Cattin*
Genus

If now we compare
on two species above described
with others found in America

Gymnosperms

In the original collection sent
by Mr Murray there was a
fragment of Calyptra wood
many its times used, dis-
tinguished by its cellular structure
that in longitudinal section
the wood fibres appeared as
irregular tubular tubes, resembling
one of those of the Deciduous
Nematopteris. On treating
fragments with Hydrochloric acid
however it was possible to
see that the wood fibres
had two to three rows of
bordered pits and that there
were simple medullary rays
I therefore concluded the wood
to be probably that of *Dalmanella*
Materniana so common in the
Coal formation of Nova
Scotia.

In Mr Brooks' collection
there is a large fragment of
a trunk in a much better state
of preservation and which is
not distinguishable from the
species just named. *D.*
Materniana is very abundant
in Nova Scotia and Cape
Breton and extends from
the Middle Coal formation to
the Permian where it is as-
sociated with leaf branches
of *Walekia* in such a manner

Upper Coal
formation
and

as

to render it probable or certain
that it is the wood of
that genus.

That I prefer the name *Dalrymple*
to the more recent *Mancaurupia*
as the latter implies a false
theory of the appearance of the
wood. ~~That~~ that I do not regard
the criteria of structures of fruit
cups &c. as sufficient to
establish good species. They vary
much in different states of
preservation and in stems
of different ages and the
differences of the wood
structure in fruit
woods of different species are
too minute to be infallibly
ascertained. In this way
it often happens that the
same wood in different states
receives different names and
that the woods of different
species are confounded under
one name. As an example
of the latter case which I deem
certain that the wood called
Dalrymple has belonged to *Walckena*
yet there are two or three species
of *Walckena* and I have ~~been~~
not been able, after examining great
numbers of them to ascertain
a similar specific distinction
in the woods showing structure
The Kew's collection also
contains a small stem about

Two inches in diameter, showing a very distinct radial wood structure with indications of a pith destroyed by decay and compressed. The wood of this specimen is more than twice as thick as the former with short unequal medullary rays and the thickened pith of constant and continuous. These characters ally it with the wood of *Cordia* which I believe can always when well preserved be distinguished from that of *Dadoxylon*, *Sassafras*, *Cordia* *brassia* *Aloha* and *um* in the collection.

Another remarkable specimen is a quantity of wood with fibrous carbonaceous matter resembling the mineral charcoal of coal. It contains a small amount of calcareous matter but not enough to give it coherence and can be flattened up after treatment with nitric acid when it presents detached carbonaceous fibres. There show two or three rows of thickened pith and traces of the medullary rays and I imagine it must have been a wood similar to the *Cordia* *oxylon* mentioned in the last paragraph. Mineral

of this kind as I have elsewhere seen consists made of the mineral charcoal from coals*

* *Journal Geological Society of London* XV. p. 626.

Still another specimen from
Cody River presented to me
some years ago by Dr A Bell,
is a black chert which when
sticed proves to be a lumped
mass filled with shreds of
appreciable organic matter. It is
in chert

3

chert is a congeries of fragments of herbaceous
plants appearing as if chopped up finely and
disintegrated by maceration, and imbedded in
a clear silicious paste. The tissues observed
are scalariform vessels, delicate fibres and
elongated cells, and parenchymatous cellular
tissue with occasional remains of spore-
cases or macrospores. The mass may be
characterised as a silicified vegetable mould,
and is remarkable for the state of preservation
of fragments of the more delicate tissues not
usually found to be preserved. In this it
resembles the specimens found by Mr. Schuchert
under the Rappahannock beds of Burdett Island in
Scotland, and described by Prof. Williamson.
I hope to make further examination of this
material; and in the mean time would
direct attention to it, as possibly affording,
in some parts of it, more complete organs
of plants than those in the specimens
in my possession.

Adams

Feb 2, 1877

and lumps, and most of which
 are characterized more by the
 form of the leaf-bases and
 scars, we may exclude
 from consideration all those
 in which the leaf-bases
 do not expand in front
 and confine ourselves to
 those having living and expanding
 leaf-bases. At first sight
 we might imagine that
 there would be the oldest
 as being simpler than the
 others in structure; but that
 some of the Eocene or Senonian
 species are probably of this
 type, in the Lower Cretaceous
 period, when the Lepidodendron
 first became important,
 the species with leaf-bases
 separated by wrinkled bark
 or ^{expanding} ~~leaves~~ of the Carboniferous
 are apparently predominant
 though they also exist,
 and the type which we
 are now considering perhaps
 culminates in the coal
 formation.

between
 the leaf-bases

We may first refer to *L.*
Costatum of Sequoia with vertical
 rows of wrinkled leaf-bases but
 separated by a distinct ^{expanding} space of wrinkled
 bark. This is a Lower Cretaceous
 species, and is compared by Sequoia
 with his *L. Brittoni* and with
~~*L. Brittonianum*~~ *Strobilifera* of the
 European Cretaceous, both of

Volkmannianum

which have ^{strong} some points of
resemblance in the characters
of the leaf bases, though
differing in the scars on the
leaves so far as known. *L.*
Walthamii of Sequoyia is also based
on fragments closely allied in general
form to our species. So also is
S. deploteoides, a species found in
the lower coals as far west as
Arkansas. None of these
species are I think sufficiently
near to be identified with
our Newfoundland and Nova
Scotia species, though as
most of them are known
only by the back of old
stems this may admit
of doubt. In any case
Lepidodendron of this general
type and aspect were
widely distributed both in
Europe and America in the
Carboniferous and especially
in the lower portions of the
Coal formation, & which in all
probability the Newfoundland
specimens belong.

I may add here that
Leider* figures a species as *L.*
Walthamianum which can scarcely be
that species and may be a hand
of *L. Murrayanum* with which it agrees
by Clere. The same plant is figured
by Renault**

* *Vegetation fossile de Senain* Houllier Pl. XXII
** *Cours de Botanique* Linné Pl. V. fig. 2.

Another interesting question here is as to the limits of *Sepidum*, *Aletrisium* and *Syllaria*, as determined by their scars & impulse markings. The latter have usually been considered as characterized by the leaf scars being placed in vertical rows and often on continuous prominent ribs, and also by the fact that the lateral vascular scars are much larger than the central one; but in such a case as *Lesqueremus* species, *S. cristatum* the confluent leaf-bases in vertical rows have the effect of W_3 , and in a few species the same remark applies to *S. Murrayanum*. I may add that when one happens to find dry stems of *Syllaria* not compressed, the leaf bases are seen to project in the manner of those of *Sepidum*, and that in some *Syllariae* as in *S. elegans* the very young branches have the scars arranged spirally.† In connection with this I may mention that *Smurson** has described *Syllariae* two species, *S. angulata*^{stata} and *S. undulata* which are scarcely distinguishable so far as the old herb is concerned for *S. Murrayanum* and *Goldenberg*† has two similar species, *S. aspera* and *S. coarctata*.
 * *Vegetation Fauna de la Belgique* PL. VI, LVIII.
 † *Flora Fœnalis Sula-pontanae*, PL IX

Non-ribbed

xx *Aletrisium*
Geology p. 435

Goldenburs two species, one
of the character of them seems
unquestionably *Syllaria* but
S. angustata and *S. undulata*
of *Sammum*, especially the
former, might well have
been *Lepidodendron* trees
very near to *S. Murrayi*.
This however could be cer-
tainly ascertained only if more
complete specimens could be

found. On the whole one might infer that
as the spiral and *Lepidodendron* characters
of *Syllariae* appear most prominently in my branches
the true *Lepidodendron* & spiral *Syllariae* are the limits
in type and the *Lepidodendron* among the highest
of these species. But such a conclusion must be received as *

+ likely to
many
specimens

Stigmaphyllon *firoides* of *Playe* *Stigmaphyllon*
occurs in the collection, and as
no specimens of *Syllaria* are found
there may possibly be not of
Lepidodendron. It would seem
likely however that *Syllariae* will
be found in this *Conia* field as
in others in *Suttons* *Chewee*,
and *Murray* indeed mentions the
occurrence of such trees, though ~~there~~
he does not seem to have collected
specimens. Perhaps, as often occurs
they were too imperfect to deserve
preservation.

* *Lepidodendron Putnense*, Dawson
Canadian Naturalist Vol VIII, 1863
Canadian Geology P 487, Fig 169A

Specimens somewhat imperfect
preserved by it in general aspect
and form of the leaves and
lines, especially the species are
not important in the Newfoundland
shales. I see that my friend
Mr Hudson in the British Museum
Catalogue of Fossil plants refers
the species doubtfully to *Lepidodendron
Rimmon*. The latter is
known to me in Nova Scotia
only by the back of mature
stems but this is entirely
distinct from similar parts of
L. Putnense in which the leaf
traces remain small but occur in
sharp lines placed together and
separated by deep clefts in the
back. He thought it belongs to
a type altogether different from
that of *L. Rimmon*

Filices

- * *Neuropteris lammeris* Brongt
- * *N. acunulata* Brongt n allud

* *Heliopteris Sachetreea* Brongt
Spure as this

- * *Peopteris abbreviata*, Brongt
- * *P. oreopteroides* ^{Brongt} n allud
- * *P. arboreus*, ^{Brongt} This shows rounded impression of sori on the upper surface of the pinnules,
Spure as this

(*Cheilanthes*)
* *Sphenopteris Hoenigshausii*, Brongt
This is the most abundant fern in the collection. Several of the specimens show the outer edges of the pinnules strongly reflected in the manner of *Adiantum* when in fructification

Sphenopteris sp. a large broad-leaved species but imperfectly preserved.

Spure

* *Dictyopteris* sp. - a single pinnule but well preserved. It may be *D. obliqua* Brongt which is found at Spring C. Metu.

Spure

Pearsonia sp. A stem about four inches thick curving outwards & numerous aerial roots and probably the base of the stem of a small tree fern

Calamites etc

- * *Calamites Suckewii* Brongt
- * *C. Curtii* Brongt — some of the specimens from these cylindrical form would seem to have been erect.
- * *C. Caninaeformis?*
Space as this
- * *Amularia sphenophyllodes*, Zanker
- * *A. longifolia?* Brongt
Fragment of stem and branches of *Amularia* or *strophylites*
Space as this

Animal remains

The only animal remains seen in the collection, are specimens of *Naiadites Carbonarius* & *N. elongatus*, *Spirorbis Carbonarius*, and a few ostracoid shells. There are also in a single band some *Cephalites* containing scales.

~~to~~ The species in the above
notes marked with an asterisk
are all found in the lower beds
of the Carboniferous and Cape Arden
The collection is small and some
of the more common forms of the
Carboniferous as the *Syllacanth*
are absent. This is however
^{no doubt} probably accidental, and
dependent on the imperfection of
the collections. Mr. Hurley informs
me that Lord Dearn has hopes
to collect more extensive.

As Mr Murray
in his report
of 1873 mentions
Syllacanth as
seen in the beds.

The species present cannot
be said to ~~show~~ ^{show} any special
character of climate or locality,
other than the fact that as
in ~~the eastern American generally~~
the assemblage
of species is more abundant
with that of Western Europe
than with that in the
Carboniferous west of the
Alleghenies.

Such details as are known
of the structure and distribution of the
Carboniferous system in Western New
Guinea will be found in the General
Report on the Geology of New Guinea
by Murray and Hurley*. Murray estimates
the whole thickness and in the Hurley
short report of 1889 † Murray
estimates the whole thickness of

* London 1887. pp 85 ob sep and 809 ob sep
† 85 Johns N.Y.

27

[Faint, illegible handwriting, likely bleed-through from the reverse side of the page.]

New York
1890

[Faint, illegible handwriting, likely bleed-through from the reverse side of the page.]

[Faint, illegible handwriting at the bottom of the page.]