

- 1 The Laurentian Flora
- 2 The Cambrian Flora ^{& Cambrian Silurian or Ordovician}
- 3 The Silurian Flora
- 4 The Erian or Devonian Flora
including the following
sub-floras
(a) Lower Erian
(b) Middle Erian
(c) Upper Erian
5. The Carboniferous Flora
including the following sub-floras
(a) The Lower Carboniferous
(b) The Millstone Gub
(c) The Coal Formation
(d) The Permian-Carboniferous.

I showed in that paper that these
Floras, so far as known, are suffi-
ciently different to be distinguished
from each other and to serve
as marks of geological time,
though all bearing a common name
distinguishing them from other
modern periods; and subject to
some local modifications they
are important in comparison.

with those observed in Creta flows
 The same substance may serve
 our present purpose.

1 The Laurentian Flora. I have
 shown in my paper on Laurentian Graphite
 in 1870, that the abundant graphite
 Carbon existing in a disseminated
 form in the Laurentian Schistose area
 in a bedded form in certain Schistose
 and gneiss beds if interpreted by
 the analogy of Creta formations would
 warrant the conclusion that abundance
 of vegetable life existed on that period
 either on the land or in the sea.
 Further as we are familiar in the
 German basin in the Carboniferous
 with remains of land plants wholly
 changed into graphite and yet pre-
 serving their forms and structures
 and as we have not been able
 as yet to detect such forms or
 structures in the Laurentian graphite
 we might also infer that the

Ordinary vegetation of that age was not of a woody but rather of a cellular character. This is however one of those negative conclusions which any new discovery may overturn.

2 Cambrian & Ordovician

In these great groups many forms referred to Fossils occur. Some of these are undoubtedly aquatic plants. Many others are more properly referred to trails and tracks of animals and I believe this should be the interpretation even of the *Lophyton* which has been referred to land plants.

X The oldest plant probably of higher grade and as yet known to me is the *Pitcairnia Harknessii* discovered by Nicholas in the Sheddian States of England. After careful examination of this specimen commented by the discoverer and of others subsequently collected for me by Dr. M. Dawson I feel compelled that this plant

can be an ordinary stupa. It
 may be an early representation of
 the Neurocarpean type subsequently indicated
 by the Sphenophyta as it may have
 been a characean plant. Plants of
 this form have not yet been found
 in so early formations in Canada; but
 in the upper beds of the Potomac
 formation and bottom of the calcifers
 in Lower Canada there are many
 Carbonaceous fragments which from their
 apparent density and flimsy character
 I cannot help connecting with
 with the Rotostachya of the Silurian.

In the upper beds of the
 Ordovician which in Eastern America are
 often of shallow water character
 Lesquereux has discovered the forms
 referred by him to Potostigma, Sphenophyta
 & Prileptyton. The specimens representing
 them are somewhat obscure and they
 have not been universally accepted as
 veritable land plants. Potostigma might
 have been a predecessor of the Leptophloem
 of the Devonian and the form of Sphenoz

Phylloids pinnaculum could certainly seem
 to indicate a verticillate-leaved *Phylloides*
 form. The *Polypodium* could seem to be
 more uncertain as specimens collected
 for me, by a friend in Cincinnati, pushed
 to the branches of *Graphites*; but they
 may not have truly represented *Leptodermis*
 specimens. The Eoptera of *Saprotis* which
 was supposed to carry the ferns back to the
 Lower Silurian has now been very &
 found in the evidence of specimens obtained
 from that horizon & to be merely
 an imitation form produced by the
 crystallization of pyrites. On the whole
 we have in the Ordovician & Cambrian
 periods little more than indications
 of plants especially *Microscopus* and
 young *Synpoda*.

3 Silurian Flora. — In the
 earlier portion of the Silurian notably
 in the Clinton & Niagara formations
 of North America there are numerous
 fossiliferous forms more especially belonging
 to *Spiraea* *Buttholepis* of Wall and

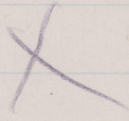
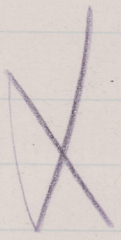
and Sphaerococites of Gueppert, genera which appear to be equally represented in rocks of similar age in Europe. Besides these are double algal there are other

X forms as *Orthopyrus* and *Rauophycus* which which probably belong to tracks and trails and should have the termination "ichites" substituted for that of "phyces". There are also the beautiful ^{leptocapsa bifurcata} stems of *Prooculus* with pointed leaf-like cells and which have often been mistaken for plants, though really allied to Graptolites

There are numerous in these beds the remains of very different characters. In the Mayhill Mountain of England *Wolke* has found many fragments associated with the ~~rocks~~ ^{slates} rocks named *Pachytheca* of *Wolke* as *Thamnos* a genus associated also in the Ludlow beds and in the Lower Helderberg of New

X

Summ. I am aware that these
 remains have been attributed to
 some plants & algae but I hold
 that their structure, apocary, mode
 of occurrence and state of preservation
 from them to have been very
 structure and that the veins
 is comprised of the large and
 better preserved specimens found
 on the Devonian. I hold there-
 fore that these remains which I
 have referred to the genus *Pectocarya*
 represent a large & woody tree with a
 fine bark many times into
 coal - and of exogenous mode
 of growth and probably seeds or
 nutlets with a thick film, outer
 coat similar to that of the genus
Chelonicaria of the Carboniferous.
 It is further to be observed that
 the trunks of these trees when
 flattened & carbonized present the
 appearance of the veins from the
 Mayall sandstone of England to which
 the name *Beugnia* has been given



but what is particularly affords little information as to extensive markings of veins except a presumption of leaves like those of certain well developed plants of the genus *Gleichenia*. Whatever the nature of these plants there can be no doubt that they were extremely abundant and widely distributed on both sides of the Atlantic in the Silurian period.

In the Clinton group the *Glyptodendron* of Clapp's would seem to represent a *Lepidodendroides* form and specimens found at Galesburg leave no doubt that the plants of the genus *Psilophyton* existed already in the Silurian. I have seen from the rocks of this age in which the central axis of *Scolopendrium* veins is still preserved. While speaking of these plants Gray could have two specimens of *Rensselaeria* *Claytoni* Remant in his lectures speaks of the first specimens of *Psilophyton* as if they

Could they belong to the plants. It
 has thus to be noted. To show that the
 Sme-like Sporecaps have been found
 actually attached to the branches of
 two of the species, and that the
 fungus allied ^{Centropogon} ~~per~~ *chittwoodiana* has
 a similar Septoidenoid aspect along
 with Sme-like Sporecaps that differ
 amongst. In that in the Upper
 Silurian and Lower Devonian there
 were plants of *Leptopneustes* *Neubergii*
 which were quite allied
 to that of the Rhynchocarpus. If Volkmann
 will deny these apparent analogies
 on very analogous grounds, there
 must seem to be an *act of*
divergence in paleobotany.

The second error to which
 I must refer is that of Stein
 with regard to certain plants of
 the Silurian of Bohemia. In his paper
 of July 1887 in the proceedings of the
 Royal Academy of Sciences he has
 described a number of supposed
 algal plants ~~from the~~ *from the* Upper Silurian

I have not had the advantage
 of seeing his specimens ~~but~~ and
 they must appear to him to be
 for the most part flattened &
 structureless but I have no
 hesitation in saying that in
 his genera *Chamaea*, *Sporochium*,
Hortmella and *Barrandeina*
 he has included ^{land} plants of the
 genera *Dicranophyllum*, *Atthostyles*
 and *Psilophyton* and even
 probably of *Cordaites* and
Ferns. In short he has
 given to the world evidence of
 a rich land flora in the
 situation of Arheimia that that
 as yet remained slender, though
 ascending the whole to the grade
 of Algae. Barrande's knowledge
 of the state of preservation & mode
 of occurrence of these plants
 enabled him more correctly
 to divine their affinities

(b) Middle Swan Flora.

In this period there appears as yet little correspondence between America and Europe, the richness of the Middle Devonian flora being limited apparently to the former. Whether we regard the best plant beds of N. York New Brunswick only Dadoxylon, Sphenoceras, Lepidodendron, Cordaites, Calamites, Sphenophyllum, Sphenophyllum & Ferns of many genera and species as the Maine beds of New York and Ohio hold the richest number of tree ferns & Sphenoceras & Lemnites and abundant steles of ferns, ~~we have~~ ~~and~~ in the beds of shale made up of Sphenoceras probably of Rhynchocarpus plants we have evidence of the existence in America of in the Middle

at a date ¹⁴ by comparison to those
of the Lifer Semesters, and
must older than the Upper
Old red for Flora comparable
in variety and elevation with
that of the true Coal-measures,
but distinct in its species. This
fact has appeared to unnumbered
European botanists that since
of them despite the geographical
evidence have persisted in classifying
the Middle Devonian as Lower
Carboniferous, though as I shall
show immediately we have that
formation and its characteristic
plants in their proper place
as an series. As an instance of
the richness of this formation in higher
forms of high grade I may mention
that there are only few distinct
species of Conifers, woods ferns etc
and that it has afforded besides
Sporophyllon ^{Palaeozoic} unlike the ^{up} ^{level} ^{with}
Linn that presents the structure of
an angiospermous exogen.

Upper

Cupper Swan Flaa.,

This is unparallelled form
but is the same as that of the
Amantulla form of the genus
Archaeoptera which in both
Riles of the Cretaceous came in
with the Middle Sierran and
disappear at the close of
the Upper Sierran. In Bay de
Chaleur beds widely these forms
and the G. leptus others
and Pterygopleura Bonini also
with Pterichthys and Glyptolepis
are the same as the equivalents
of the Kalkwasser beds in Ireland
of the Kalkwasser beds of the United
States and they include un-
commonly the bottom beds
of the Carboniferous.

In a paper on *Ediacara* ^{Dec 1894}
Leach has named 9 or 10 genera
as well as *Emphyloia* *Pleurodon* and
most of them are species of which species

5 The Carboniferous Floras

The lowest beds of the Carboniferous called Sub-carboniferous by some American geologists the same is false and measure of them. The column of secondary the carboniferous sandstones a Tertiary group of British geologists are very well developed in Nova Scotia & New Brunswick and include footprints of *Dalmanites* and numerous remains of fishes of Carboniferous genera as well as fossil plants. In the Mountain Province of Canada these beds are unquestionably of the same but in western America as in some parts of Europe the thickness is considerable. There appears however in every case to be a great and somewhat abrupt transition in animal and vegetable life.

The plants ^{species} *Calamites* *Radiatus* *Stemmatites* which in America is

Suen extends upward into the
 Suen Culinifera in Suen
 but the same all the species
 seem to be different. An interesting
 cut of butter plants of this
 age shows a very marked cor-
 respondence between the forms
 of the age in Scotland and
 America and a similar relation
 appears in the Super Polynesian
 of Lichard and in the
 plants of the fernian Culin,
 Lepidodendra of the pres branched
 small axed and unbranched leaf
 bare heavy species allied to
 L. Bethmann and with
 Rhymaria roots appear to be
 eminent ~~character~~ characteristics.
 The Phlophyta called plants as
 fern of the type of stracheyles have
 disappeared and certain peculiar
 Sphenopterid fern have taken their
 places. Cordaites are also abundant
 and there is a species of Dactylopteris
 D. Polaeoglan antiquus

* This seems
 this species of
 Lepid appear
 closely L. lithogram

19
In Scotland according to the Redoubt
there are many species, but this is prob-
ably related to the occurrence of
of plant beds in association with
the Mountain Limestone layers in
Wales & Northumberland. The Mountain
Limestone contains cuts of the
flora in ascending order. In Salloway
Lepidophlebes affinis in this series
and there are also two species
of Hyalmaria.

(b) The Millstone Grit formation may be
arranged on its flora as an
anticipation of the Coal Measures of
the Coal formation, and that its
plants are of some interest may
refer to my published notices of them.

(c) It is in the Coal formation that
the great interest of the Carboniferous
century; but here the richness of
the flora probably exceeds more than
a title of some prominent species.

+ Republished the plants of a Coal as
Millstone Grit 1843,

1 True nature of Dactylo

On both sides of Atlantic the
Genus seems to be named *Strucarurep*
has been recognized in middle
Seneca up to Penna. Franks
of. *Stenohya* *putt* — *Disapens*
and cells of tissue rather than *Struc*
Carian type. *banes* with *Scalup*
une *venel*. Not to be compared
with *Dactylo* & *Struc*,

Connected *capitulum* with

(*one of these*
capitulum) *Walchea*, *Ulmanus*
Volva of Penn & Penna *cell*
also with *Hymenocaps* of
Carbrufus

Also with *Cordates* — These
Scalup are & *depl*
hil *fund* *cells* *une*
Genes *Spide* *Subspic*
for *True* *Dactylo*

Remarkably say date and great
number of these trees — numbers
in Seneca but still much in Penna
such trees in New York & *Delaware*
in present days

Believe that have found Packed
Pollen in some species of *Syzygium*
But in this this appears to
just form an inward leaf
bunch in ventral - repeated
In bracts but inward leaves
= under seeds,

Inland Plant Orchids
General plan but in lighter
very glabrous and developed
And often with reticulated
upper cut-cells and
will also Med. Ray - Some
plants included for but
in form in Syzygium in partly
reproducing and this with
Plan plan of very gland but
let to compare There are
thus probably two grades
of plants included under the
general name of Syzygium
the Cyrtos and allied to
Sepaloid short cut Ray
Opposite part to Grade

3. Nature & Relations of Cordates

The leaves ~~are~~ included
in ferns Cordates and Psalms
Ptychomnium, seen seen to
Palaeobotany and ends many
from up started ~~structures~~
of a stem of the same with
a simple area of Scala p. h. h.

The Culland structure
found by Van der Meer a new
light in their plants. It was
seen that they had a stem
cup joint and cross was
area grad. wood cells with
arcs, and then from 2
Cardiocarpium. The fact, was
Cordates are of type to
Cycadaceae plants. C. lamp-
C. lamp. but seen the type
between sub-genus form
related to middle
in to Permian. And seen
under certain circumstances
to have been extremely
abundant.

(2) Remora carlinifera Flemer,

The fluke is represented in Canada
as abundant in the red sandstone &
adjacent beds of Lake Ontario
& R. Glauca in about the
find a small number of
Anura like specimens were
a few new species Calamita sp.
Walden and Cudatory superes
In Lake Ontario the few
specimens passing along into
Chazy local Meares and
Wade the great decay of
great Paleogene beds
the interest of the Museum
Journals.

An article that the
life history of Remora by
perfectly represented in
and in any case the
fluke as far as specimens
found were Meares that
that decided & prepared
in central Europe.

Mr. Maggs

45 miles
Col. Shuman

Camp Flans
Sage &
Shuman

Call Plans of Sage & Shuman

Meets & Plans. Temper

Rhinoceros =

Insects of
Flans
Mr. Shuman