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Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

The phyllotaxis on compound leaves

III XI. 3 (p 231 - I. Hart

Ash.

"The whole leaf (if one may consider this as a 'leaf' because it is all shed at once) grows on a single stalk; ... the leaflets grow at joints in pairs,"

~~III~~ III, XIII 5 p 247

Elder.

"The whole leaf is composed of leaflets growing down a single thick fibrous stalk, as a vein, but these leaflets are attached in alternate pairs at each joint; if they are separate from one another, while one is attached to the tip of the stalk: ... the whole is shed in one piece; wherefore we may consider the whole structure as a 'leaf'."

Euphorbiaceae. Völäufige Mittheilungen  
aus dem für De Candolle's Prodrömus  
bestimmten Manuscript- über diese Familie  
J Müller (Müll. Arg.) nov 18. 37

Linnæe. Bd 32. Halle a. d. S. 1863

pp 1-126 Q. 370. d. 8. 32

Ph. fluitans Benth. in R. Spruce fl. bras.  
exs. e pw. Pardiensi caule fluitante parce  
ramoso brevi subtis radicebus numerosis elongatis  
paucis, foliis orbicularibus basi cordatis apice  
subemarginatis horizontalibus distichis incumbenti  
imbricatis tenuiter membranaceis laxe

cellulosis pellucido-punctatis juxta nervum  
medium utrinque late ampullaceo-convexis,  
floribus 3-4-nis sexu mixtis, glandulis fl.

mascul. liberis, urceolo fl. foem. subintegro,  
stylis gracilibus bifidis ramis apice incrassatis,  
seminibus dorso laevibus. O. Prope Santarem

ad Rio Negro in aquis fluitans cum Azollis  
(R. Spruce absque no.) - species hebra  
summo pere peculiaris, Salomonian natantem  
(excedendo)  
similans.

p 25 Coma und monoceros specis, flament semit  
fla

Diese Uebersicht der Sectionen von Phyllanthus,  
 ... zeigen, wie sehr die Charaktere bei den  
 Euphorbiaceen <sup>multiform</sup> ~~vielfaltig~~ auftreten und wie wenig  
 hier überhaupt von Fattungsdifferenzen zu  
 halten ist, die bloss auf dem Zahlenverhältniss  
 der Elemente der Blüthenquirle beruhen. Einige  
 früher generisch aufgefasste Unterschiede werden  
 durch das specielle Studium der Arten auf das  
 Deutlichste reducirt, so der Monadelphismus  
 durch -----  
 Denn hat in einer so natürlichen  
 Gruppe irgend eine Fattung über einen generisch

sein sollenden Charakter auf's allerdeutlichste  
 den Stab gebrochen, so dürfen wir als  
 folgerichtig ihn allein nicht mehr als  
 solchen ~~zu~~ verwenden

[This may be important (in?) I understand it.  
 Does he mean that the characters by which the  
 genera are divided are purely artificial? A.A.]

McVeigh, I (1938)

4

New plants are produced from entire detached  
leaves or portions of leaves of Cramule multicaeva  
after about 3 weeks in moist chambers.

Both roots & buds originate from epidermal cells not  
far from the wounded surface. As far as is known  
this is the first species in which it is ~~not~~ recorded  
that an entire new individual arises from mature  
epidermal cells.

[This must mean that the  
genes are all there ~~rather~~ latent despite having  
undergone all ontogenetic changes — they are not  
lost in the process A.A.]

Chesters, A. E (1927)

Have not read in detail.

~~Can~~ have I then of summary is:-

The vascular anatomy of the bracts & the base  
node of these species of Anemone appears  
support the view of the homology of the  
involucre of A. Hepatica & the calyx of  
Ranunculus Flacis.

Naylor, E.E. + Johnson B (1937)

Saint paulia ionantha hill from center

new plants from leaf cuttings.

Shoots arise exogenously on the cells, the  
epidermis of entire petiole + lamina.

Roots are produced endogenously from thin-walled  
cells lying between the leaf-stems.

There is no evidence that any of the new  
plants arise from dormant meristems.

Vavilov, N. I (1930)

7

Land  
The concept of a species must not be obliterated.  
Through our knowledge of the multifariousness  
shown by cultivated plants & by their relatives, of  
plant groups where the chaos of diversity seems to be  
boundless, we have come to conceive of a species as  
a regular system which may embrace categories of  
different compass. The species, as a concept, is  
necessary not only for the sake of convenience, but  
for a real comprehension of the essence of the  
evolution process. The process of evolution may proceed  
without interruption on its fundamental lines, but it  
has nodes in its chain, which are the species  
representing systems of hereditary forms.



Anderson, E. & Diehl, D.S. (1932)

8

p 227

The tetraploid *Tradescantia* are more numerous than the diploids. Anderson & Diehl report other cases for the literature in which tetraploids occur in the cold parts of the range. Tetraploids have also been produced experimentally by exposure to low temperature.

p 222

An entire meadow is occasionally colonized by a single clone of *Iris*.

Maudslayi-Tweedy em - Durill W B (1931)

9

ps 15  
Pan. acris ~~Rebellus~~ sex sex types  
♂, ♀; ♀ reduced in ♂ ad; essentially ♀ in  
prody. - white oralk pollen; enter ♀; enter  
♂; neuter.

ps 20  
Species, as commonly accepted, are more more  
variable, much more complex, & much  
more heterozygous in intra-specific characters  
than is generally realized.

Andersen, E (1931)

10

p147  
It is difficult even in an experimental garden, to keep a partula clone alive for more than 4 or 5 years.

pp 146-7  
In the *Salix* hybrids or sterile stems in the  
pups, plants they could not survive for more  
than a season or two, but by vegetative propagation,  
live for centuries, & even spread across continents.  
The *Salix* does have polyploid series  
(p145). Men's transfer (p147) the  
opportunities of the products, complex  
intergrading forms, & of them several  
propagated. Menton & Darlington have  
shown that certain common sterile  
sterile polyploid clones. Many of the  
beards ~~are~~ are complex polyploid  
& are sterile. Hybrid between *I. virginica*  
& *I. versicolor* are practically sterile, yet in  
certain localities, by vegetative propagation,  
they occur in the exclusion, the parent  
series.

Anderson, E. Schaffer B. (1931)

11

p 642  
Species crosses were made in Aquilegia  
In all but one A. vulgaris was one parent.  
All the first generation hybrids were more like  
A. vulgaris than would have been expected.  
This was true even in the cross in which A.  
vulgaris was not a parent, which has been described  
by Corbierell in the cross of 2 American species  
(not including vulgaris)

Anderson, E + Whitaker, T. W. (1939)

This <sup>p 41</sup> paper is statistical <sup>comparative</sup> history of two species, throularis - It is shown that it is possible to separate the two species by a combination of characters, no one of which would suffice if considered separately

p 39  
The acknowledged discontinuity between the two species, taken in their entirety, is discontinuity of combinations, reinforced by a few discontinuous differences in single characters.

p 40  
The authors "they may show overlapping differences between species on most characters than the few sharply discontinuous ones."  
Tendencies not stated A.A.  
I criticized this paper by E.A.'s request of point on which they were really on the same lines as Swanton H.H. (Outlines, Paleontology) 1930

p 31  
ear heurtelet unit - represented by a letter, e.g. A, B, C, etc., then the corresponding series will be A, 0-100; B, 0-100; C, 0-100, etc. If in any individual A has attained the expression stage 15, B to stage 30, & C to the stage 25, B 30, C 25. This will be described by the formula A 15, B 30, C 25. This will illustrate the fact that an expression of a combination of stages in the expression of a series (than as a series) characters.

Anderson E. & Albe, E. C. (1934)

<sup>p43</sup>  
An attempt to work out a commensurate method for dealing with morphological & taxonomic problems. "an attempt to carry on conservatively & methodically the same sort of process which with a few notations is subconscious & unmathematical."  
p44.

Six measurable characters are chosen & applied to 60 species of Betulaceae

<sup>p48</sup>  
A three dimensional model is constructed giving the ~~difference~~ <sup>distance</sup> apart of the genera.

[The point which seems to come out of it, is that even if you take measurements of characters in this systematical sense, you are concerned themselves, with the basic chromosome number & the maximum number of cell rows in the rays of the secondary system, ~~you get~~ your results confirm the findings of the systematists. AA)

Anderson, E. & Albee, L.B. (1933)

An anatomical study, the "Compacta"  
mutants of Aquilegia vulgaris has shown <sup>pp 380</sup>  
that the gene mutation produces a whole <sub>5384</sub>  
series of effects which can be traced back to one  
feature — the precocious "secondary" thickening of  
the cell walls. Upcurved, the flower; dwarfism;  
a body composed of <sup>granite</sup>; a four sided  
suggests repeated ~~bearing~~ cells, bark; + stem  
brittleness.

14

Letby J.P. (1930)

15

"The term 'species', when originally meant  
"all of one kind" is now used by taxonomists  
for groups of individuals which are only similar,  
there is a group that embrace various biotypes,  
the most common one, which is, a rather  
should be considered as the morphological type,  
the group. This has led to the mistake of dividing  
within the species for evidence of variability  
of the species



Stypledon P.S. - Cochofort from (Docty's  
glomerata L): Ecolyptis - Relation to the  
Factor. Jan Ecol. 1928 + Vol 16 pp 71-

M.K. 4.13

"In the present state of our knowledge we write  
stems - terms, phenotypes - types, which we  
can easily recognize + describe; it is  
highly probable however, that with the  
phenotypic reaction in perhaps many, perhaps  
few, "response + differential-behavior"  
types that are present we are unable  
to recognize"

Speculation

Ettinghausen, C Ritter von (1866)  
 has devised a numerical scheme for denoting  
 from pairs for the form of vein, nervatur.  
 He distinguishes 5 grades of strength - the  
 number of major lateral  
 nerves - minor lateral nerves, their strength,  
 of which he distinguishes 4 grades in both  
 types, their distance apart, & the  
 5 grades in the main lateral & 6 in the minor  
 lateral. (See table before p. 433)

Chapter II

18-33

~~Sept 17 1877~~

18

quotation checked  
Ap 10.26  
mk p 19

[Ad secundum dicendum,] quod generans  
generat sibi simile in specie: <sup>fit</sup> ~~fit~~ tamen  
aliqua dissimilitudo generantis ad genitum,  
quantum ~~ad~~ ad accidentia, vel propter materiam,  
vel propter debilitatem virtutis generativae.

S. Thom. Aquinas (1854) Summa Theologiae

Part III Qu. LXXIV Art III p 339

S. Thom. Aquinas in specie

S. 17. 6 p 339

Fernald, M. L. (1934)

19

~~ps-77~~  
In the mudflats of the Lawrence,  
submerged by the tide twice a day, there is an  
Ephedra, in Latin, foliage & flowers inseparable  
from the common variety of E. glandulosa.  
But - it has seeds with no hairs, - is unique in  
this fact among the var. epithemifera.  
Fernald points out that the hairs, useful for  
wind dispersal in a dry atmosphere, would be  
useless in these tidal flats. It is called Ephedra  
to ecomosum. There is dis. spec. 1

Bidens with no awns such as regularly  
characterize the terrestrial species. Bidens;  
again he points out that there are no parasitic  
animals to catch on to, so the awns would be  
useless.

[probably a ~~down~~ effect of the  
conditions these are various  
which happen on the  
condition ~~the~~ all live trees  
& the harshness & awnlessness are  
expressed, the character, not  
"adaptations" NA]

Metcalfe C.R. (1936)

Feb. 6. 38

20

p 115  
Cot. of R. Fraxin is believed on basis of  
extant morphology, seedly anatomy - late stage  
in embryology, etc a single foliar organ.

A small parastylometas hump, which is  
supported into provascular strand, is found in  
the position in which a second cotyledon would be  
expected if one were present. [One see Ragnon's  
apparently just - utrum inserted in Metcalfe's  
paper]

Read April 15 38

Metcalf CR (1938)

*Ranunculus ficaria*

A rather confused account of the tubercle det. It does not seem however as though there is anything really unusual in the morphology p. 149 "Sectum simple & very young simple tubercle of hirtic structure which does not differ from that of a normal axillary bud, but very soon a root-initiated is laid down in the course of one of the young leaves or in the parenchyma behind the stem apex. ... Later on, the root-initiated elongates more rapidly than the bud in association with which it has arisen so that the latter becomes progressively less conspicuous during the subsequent development of the tubercle. The bud may eventually be seen as a small, obliquely directed structure at the base of the tubercle. A simple tubercle, this bud may therefore be regarded as an inverted adventitious plantlet."

p. 157 The root may be unkenel complex by a group of buds replacing the simple bud in the leaf axil. "In both categories, tubercle additional buds arise adventitiously from the root tissue."

One may describe the bud-formation in the leaf axils for the root tubers. A. A.]

~~... complete the simple tubercle condition due to necessity to do adventitious buds~~

Feb 6. 38

22

Schantz J.C. (1935)

<sup>Indubitable</sup>  
The corolla is the five-flued bell - into the typical fluted whorl formation. The calyx is phyllotaxis more akin to the vegetative region.

p 3  
in a considerable number of the Dicotyledons we have no perfect whorls but intermediate conditions between spiral whorled arrangements. These intermediate conditions show in many grades from any arrangement in an uninterrupted scale of gradual transits between the two extremes.

In the pure spiral form the different belts have an undetermined number of members & the limits between the successive organ categories is not sharp etc.

He appears by a false whorl to mean a whorl of a segment of a spiral

p 4  
In the majority of cases the corolla shows no traces of a spiral origin

The calyx spiral even when weakly expressed, always forms the continuation of the phyllotaxis of the lower phyllomes. The floral cup is the terminal flower which continues the phyllotaxis of the foliage leaves, in lateral flowers that is the prophylls.

p 7. Schrantz evidently has no belief in developmental evidence.

p 72

The corolla is said Jan in *Diosyledon* in c  
 spread over, in the whole-forming part as are  
 20 they <sup>trans in</sup> in most cases hardly any or no  
 roses } the spread an left, not even as thin  
 moment - which is great value is attached by  
 may be seen, the first moment, appearance  
 of the premise.

Summary (p 73)  
 1. It has been tried to explain the intermediate  
 condition between spread & whorled flow, but as  
 in *Diosyledon* flowers = false whorls, formed  
 by spread whorl-forming part as an irregularly  
 land Jan <sup>phyllome</sup> transformed part  
 floral whorls are thus transformed part

p 74

13. From all the related facts the conclusion  
 is drawn that the *Diosyledon* corolla  
 probably land Jan in the same spread order  
 as the calyx

[I have explained to the paper which is not  
 the kind of thing I can understand. But I  
 think is particularly true - Schimper's argument is  
 sound. A.A.]



Lawrence W J C (1933)

24

The garden Dahlia (<sup>p 49</sup> D variabilis) was  
introduced into Europe from Mexico in 1785. A  
Spanish variety: Mexico described - figured semi-  
-double flowers in 1575. (p 51)

<sup>p 50</sup>  
D variabilis is a hybrid octaploid species  
that has arisen from a crossing of hybrid  
tetraploid species. Due to its being both  
highly polyploid, - a hybrid between hybrids.

Schubert EJ (1932, 2)

25

p 88

Schubert's experiments show that mortality  
of plants is very high, & practically confined  
to the juvenile stages (my tab — the point  
is the thesis, the paper)

Went PE (1932) [Two papers densely some things, see slips & back]

Went has found an axillary  
♀ catkins, Corylus (common) 6-8 pairs  
{ ovaries } each with 1 or 2 small ♀ oviduct  
flowers, when hazel bushes are cut back in hedges,  
they produce numerous vigorous unbranched shoots,  
terminating sometimes in ♀ catkins, 1-20  
& 30 bracts, in ovaries in groups of 3 (median  
fls usually ~~being~~ being developed in the top  
resemble Betula, - also in to bract-venation  
each group) flowers being tripartite.

p109

The A. Sprague considered them where redent  
had occurred in the case of evolution, cutting back  
frequently causes reversion, any other number  
(common) sap available of the reduced number  
of growing points. Mutation to common and  
frequently resulted in to produce a short  
bears leaves in shrubs, 3 each; & he has been  
in India, short of coppiced Pyrus paehia  
bears frondified leaves in place of the  
usually unduried ones

Bynum P (1924)

Useful historical study (discourtesy start on Chauveaud) of human postcapillary arterioles

p 149

of all the vascular elements are found at the expense of secondary arterioles, but their is clearly a center of differentiation for the occupied elements of calibre narrow in relation to the rest, it will still be legitimate to consider the small vessels, first diff. as primary.

Metartery is essentially primary vessels. elements are larger than the first diff. arterioles.

It may be impossible to distinguish metartery from all the primary elements are alike or very reduced in number.

In all cases there is a center of differentiation can be clearly observed, if elements of narrow calibre are few in number, whether they are primary or secondary & whatever may be their histological ornamentation, one can recognize them as postcapillary

Pantun, C.F.A. The Physiology of  
Variation (1930-31)

28

p 109  
"Consideration of the numbers of amino-acids  
known & of the size of the protein molecule  
indicates that a definite number of kinds of  
protein molecule are ~~known~~ possible. Approximately  
this is the immense number  $10^{3000}$ .

pp 109-5  
Complex structures exist as protein molecules  
& even morphological structures are severely  
limited in by materials as the disposal of the  
various parts which they can be constructed.

Lots, R. Rydberg (1935)

29

In 1907-8 the mutant *Oenothera lutea* was  
 recognized as a cell strain which had double the chromosome  
 This was the beginning of the study of polyploidy.  
 "While rare in animals, polyploidy is widespread in  
 flowering plants. In a few cases it is not known as exceptional.  
 In many all are cultivated plants, such as wheat, oats,  
 sugarcane, cotton, apples, cherries, tomatoes,  
 potatoes - pineapples, are now known to have varieties  
 or species which possess different multiples of a particular  
 base number. Among wild species, roses, chrysanthemums,  
 maples, horse-chestnuts, docks, oaks, pines, clematis,  
 reweeds, strawberries & many others, similar conditions  
 prevail. When 26 is the base number, 52, 78, 104, or  
 some species may have 46, 56, 68, 106 or  
 occasionally even higher multiples. Thus in the genus  
*Psaraleia*, when  $b=7$ , species are 26, 46, 86,  
 106, 126, 146 & 166 are known.

p 3 (reprint)  
 In 1922 Blakeslee discovered haploidy in  
Datura i.e. an egg cell may develop parthenogenetically  
 to produce a plant having a single set of chromosomes in its nuclei. ~~Such~~ "..."  
 "it is significant that [the haploid plant] has the  
 morphology of the sporophyte."

# Inverte, W. Wright (1933)

p152

"In dealing with the floras of areas where Hooker was sometimes the pioneer, we naturally come to conclusions as to his method; his forms, new in the resumption of species. ... Supplementist in general were unimpaired [by the new outbreak of the Darwinian period] + continued to anchor the enormous collection & could do no other than he did. Consequently, his conception of what constitutes a species is wide one ... he was attracted more by resemblances than by differences ..."

pp152-3

His later date than to learn of the new ideas beyond a work. "An analysis became much more detailed. Differences took precedence over resemblances. But the main mass of systematic works before 1860 + 1900 - + even later - did not show much change of the pre-Darwinian period."

p162

"The cytological characters have their expression in the morphological equipment - + the latter represents the meaning of these characters."

p173-4

[In the whole paper W. G. Smith's company the class? the genus Persea recorded in morphological & cytological grounds] "The record shows how very moleady the new record of chromosome numbers"

Wright's cont.  
would be for phyletic purposes of additional karyological data had not been available. 31

p. 156  
In Bruen's cytological study of *Pinnula* be used :- (1) number of } chromosomes  
(2) size }  
(3) shape }  
(4) relative non-conformity }  
(5) location & appearance of satellites.

[These characters may all be treated as morphological  
They are morphological, though they require  
microscope & they taken into view A.A.]

See Bruen, H.S. Cytological studies in  
*Pinnula*. Symbolae Botanicae Upsalenses,  
1; 1932



Eames, A J + Mac Daniels, L. H.

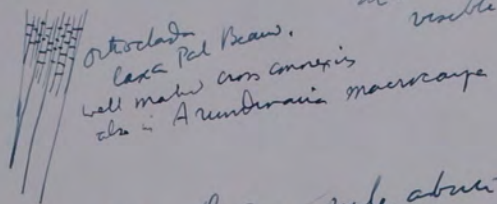
32

An Introduction to Plant Anatomy. 1925. New York

p 269  
"As the bundles branch successively + become smaller - smaller, there is usually a reduction in the relative number of well-developed vessels + sieve tubes as compared with the larger bundles, + also a reduction in the relative amount of secondary tissue as compared with the primary. In the smaller bundles there are no secondary tissues whatever. In fact, secondary tissues may be lacking in all parts of small leaves, even to very secondary growth occurs elsewhere in the same plant. The primary elements of such small bundles are smaller than on those of vascular tissues of the stem, + adjoining a layer of parenchyma is present in the leaf. This is especially true of the phloem, which in the smaller bundles may consist wholly of parenchyma. The very tips of bundles may be composed of a single spiral + reticulate element - abutting upon parenchyma.

Ettingshausen, C Ritter von. Beitrag zur  
 Kenntnis der Nervation der Gramineen.  
 Sitzungsber. d. Math.-Nat. Class. k. Acad.  
 d. Wissensch. Bd 52 Abth I 1865 fr 1865.  
 (his paper 1865) pp 405 - 432

Very good series of nature print of grass leaves.  
 In some there are very numerous cross connexions  
 more or less at right between the principal nerves  
 in them than are no  
 visible cross connexions



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There does not seem on any rule about breadth of  
 leaf - cross connexions e.g. Panicum vulgare  
 which does not appear to have any basal  
 Occasional free ends are shown at basal  
 end of some longitudinal veins e.g. Olyra of  
 (leaf II, 1) but it is conceivable that this is defect  
 of the nature print.

Panicum clandestinum (Tab. 7)  
 free endings both basally & apically in the  
 lamina. Both Olyra of Panicum  
clandestinum have cross connexions, so a vein  
 would not be useless because it is not a free end  
 He does not discuss any nerves higher than the  
 quintenary, but his figures suggest that in Drosera  
 the quintenary may branch again

Dalitzsch, M. Beiträge zur Kenntniss der  
Blattanatomie der Ardeeen. Bot. Centralbl.  
~~Vst 7, 1886. Bot.~~ Bd 25, 1886, pp 153 -  
156, 184-187, 217-219, 249-253, 280-  
285, 312-318, 343-348

[P. 370. b. 54. 13]

p250. *Momotera delicosa*. <sup>one layer</sup> Palisade cells <sup>of leaf</sup> 4 times as  
high as broad.

p252  
The cells of the spongy parenchyma of Arde leaves have a  
characteristic star shape. In most species the rays of the  
star are in one plane // to the leaf surface. The cells are  
flat star shaped, limited above & below by parallel walls.  
They lie flat on top of one another, arms on  
arms.

p253  
Raphide cells in the spongy parenchyma of Richardia  
spiciosa. Very few in Momotera delicosa

p314  
In the cushion which occurs below the transition from  
petiole to lamina in Momotera delicosa, there are  
collenchyma strands outside the peripheral pts.

p317  
V. Tupper Confers Haeckel's description to  
latic tubes occur on both sides of the vascular bundle  
in Richardia spiciosa; Arum vulgare

This is wrong in this paper due to the venation - general

Bay, A. de (1884) *Comparative Anatomy*  
 of the Vegetative Organs of the Phanerogams & Ferns.  
 Trans by Dava = O. Scott D.H. 1884

p 201  
 In the striated type numerous bundles run separately &  
 parallel along the leaf-expansion, the median ones  
 being changed to the apex, the rest diverging the more  
 for the shape cause the nearer they are to the margin,  
 the more the boundary lines of the latter depart  
 from parallelism. Many of these bundles curve towards  
 one another. One of the margin, & unite so that each  
 one opposes it and on to the side of the one next  
 to it in the direction of the median line. Free ends are  
 rare, though in their course the bundles are connected  
 by ladder-like manner by transverse branches.  
 The arrangement of bundles in transverse sections, and  
 but some few families, & *Desmodium*,  
 the typical *Ardeacea*, *Desmodium*,  
 many *Smilacinae* are exceptions. Many narrow leaves  
 pass *Eryngium* sp. *E. pondanifolium*, *E. junceum* et  
 belong to this category or are an exception.

p 202  
 The transverse branches which connect the longitudinal  
 bundles like the wings of a ladder are of the same  
 equal & thin - *Phrygia* (cf. *Rhaphis*) *Labelliformis*  
*Vanda fovea* but usually much weaker. These  
 transverse branches pass either for one bundle or the  
 next, or in very many cases they pass the next bundle,  
 or pass it at an angle & unite to the second or third,  
 or fourth bundle. It is often seen especially in leaves with  
 alternate sheath-like bundles, that they connect  
 those of equal strength, many pass the intervening ones  
 of unequal strength.

It is as early to as leaves of Monocots.  
Large transverse bands end finally in the  
surrounding tissue.

2. the reticulate type the bundles run into the leaf  
underlying bands of higher or lower order, the  
bands are distributed over the whole surface, are  
in different directions, & in some cases connect  
peripherally or axially.  
The marginal veins, all marginal veins form  
together in flat leaves - symmetrical bundle, run  
together in the bundles run end free unless axially  
the margin. The bundles run end free unless axially - the  
are enclosed by tissue after spectra, here  
barely. All Diactylodes (except the narrow  
leaves) Synjium belong to this type, many monocots  
(leaves) Synjium belong to this type, many monocots

p304

the Dicotyledonae, Pharosa etc.  
Sapropyrus, Pharosa etc.  
The typical Aroids, the broad leaves Potamogeton,  
Hydrocharis are intermediate between the type  
the strict type.

2. the reticulate type - rare instances there is  
reticulate connection between all bands, free  
and occur at most of the gaps, the leaf.  
my succulent plants - all free ends are clear so far  
Mesembryanthemum & the Primula. Any  
as analyzed up to the present. Any  
Monocots, these Aroids have been investigated  
belong to this series (Anturium, Potamogeton,  
Colo, Richardia) & Hydrocharis  
Both internal & peripheral and occur  
in numerous species, Smilax & Dioscorea  
small branches go for the symmetrical marginal bands  
toward the margin - Smilax - Dioscorea

p305

Both internal & peripheral and occur  
in numerous species, Smilax & Dioscorea  
small branches go for the symmetrical marginal bands  
toward the margin - Smilax - Dioscorea

De Kay

p 303-4

Reticulate venation. Dicot.  
 Smilacaceae more completely of Dicot type than  
 Araceae which form transition to striated type, as  
 do Hydrocharis - broad-leaved Potamogeton.  
 In some instances reticulate venation; without free  
 endings. Centon succulent Dicot, Hydrocharis, Potamogeton,  
 + Aroid. In latter there is a network of sheets  
 prominent &  
 the course of the main bundle remains as if there  
 is a striated network. Between two bundles  
 may arise from a complex angular network.  
 free internal ends, an absent, a fusion of rays  
 here other.

p 307

Leaf expansion in anastomosing bundles as sheets  
 or reticulated.

In the striated type numerous bundles run separately &  
 along the leaf expansion, the median ones running  
 straight to the apex, the ones diverging to the margin,  
 the nearer they are to the margin, the more they curve toward  
 the more the boundary lines of the latter depart  
 from parallelism. In some of these bundles curve toward  
 one another close to the margin, i.e. free ends are  
 rare. In some cases the bundles are connected  
 in a ladder-like manner by transverse branches (like the  
 ladder).

In longitudinal section all the bundles run  
 separately for some space. In pinnate sheet-like nerves  
 bundles enter the midrib + pass one after another

into one, the halves of the leaf join at  
 numerous laminae into one; few colored <sup>the green</sup> the  
 leaf leaf. Permit <sup>arrogant</sup> change, long-land  
Procoenos, Cuculigo et. The large bundles of  
 strobilous may be of almost equal strength.

Fig 174 p 373 strob. leaf bundle?  
Zea hairy from base? should call x2

A de Bary (1884) Comparative Anatomy of  
Phanerogams - Fasc.

"Vegetative Organs"  
 p 200

Bundles in separate courses - free ends in leaves  
 } all forms in ceptifunctum - Stangeria puber. longho  
 } Andromeda seede leaves) Angiosperms of the herc  
 then bundles thus arranged

Submerged leaves Botrochium Ranunculi  
 unbranched bundles in the segments

David Taro 1875 - Cms  
Cmms, buds & young leaves of  
phloem disc + connect to phloem disc  
of Quercus in Kuchin low v  
Schubert



Purvis, D.N. & Gregory, F.J. (1937)

p 583 ~~text~~ (Rye)

The main axis produces a minimum number of leaves before flowering begins, & a maximal number beyond which lateral primordia are always differentiated as flower branches (spikelets) under any conditions. In Petkus spring winter eye the minimal number is approximately seven, the maximal, though less clearly defined, approximately 25. This can primordially be seen in the eighth & twenty-fifth leaf primordia, either clear or a spikelet according, in both varieties, the conditions of day-length & of temperature.

During germination in the winter variety. It may not, however, be supposed that either again can be produced in the same cell-range in the primordia, & in the course of the stem structure (Purvis, 1934) as if present in the early eye. In both varieties a double structure presents at one stage in its development - a double structure which Purvis interpreted as the winter eye branch as an axillary flower haul.

Summary p 590

In both spring & winter eye there is a minimum leaf number, seven, which cannot be further reduced, & a maximum, twenty-five, which cannot be further increased.

The primordia between the eighth & twenty-fifth are indeterminate & can produce either leaf or spikelet; this is related to the stem structure (Purvis, 1934) as if present in the early eye. In both varieties a double structure presents at one stage in its development - a double structure which Purvis interpreted as the winter eye branch as an axillary flower haul.

Purvis - Frey (cont<sup>d</sup>)  
of ferment<sup>s</sup>.

42

[This seems some } from interest in connection  
with the idea that primordia are determinate  
for ~~an~~ a very early stage. The apparently indeterminate  
relation to primordia between the 8<sup>th</sup> & 25<sup>th</sup>,  
she ~~appears on a general inspection~~ ~~to be~~ ~~real~~ ~~indeterminate~~,  
is shown by Purvis's work to be - on the  
hand - a case of alternance dev. acc. & condit<sup>s</sup>  
NA 13.38]

(See also Purvis (1934))

Search A (1919<sup>2</sup>)  
mus. belat about leaf cuticle bundles.

43

p 113

Homologous leaf, Cyperaceae with  
framineae

p 113

The ligule is of epidermal origin

p 114

The apical region is interpreted as framineae  
leaf of Cyperaceae. The limb is homologue of  
a complete dist leaf, is formed primarily  
for the sheath, is developed chiefly by intercalary  
growth of the sheath, while the terminal  
portion, corresponding to the limb, suffers  
an early stage of differentiation &  
development. The sheath is a new formation,  
with homologue in the vegetative leaf of  
normal Dicot.

p 73

"On peut rattacher à l'activité cambiale  
des faisceaux libérolyneux l'apparition des  
anastomoses transversales qui relient ces  
faisceaux entre eux.  
The anastomoses develop later than the sclerenchyma  
fibres, but before the bundle sheath. They  
often ~~appear across~~ traverse mesophyll  
of relative advanced differentiation, going from the  
cambial region of a bundle to the cambial region of  
a neighboring bundle. A sort of bridge of secondary  
meristem is established; forming a lateral continuous  
between 2 interfascicular zones of cb.

44  
Limb <sup>p 35</sup> found before sheath (Surchaw cont.)  
p 36  
The first rudiment, the leaf does not surround  
the axis completely.

Surchaw, A. (1929)

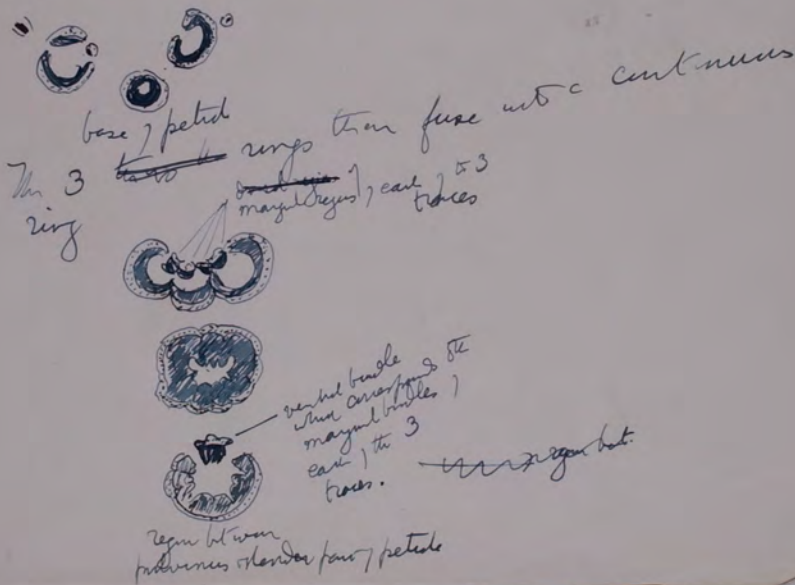
The limb of *Carx glauca* first appears. It  
does not completely surround the axis. The sheath is  
later dead. The early growth of the leaf is terminal,  
but the joint above can be replaced by  
intercalary basal growth going over the mature  
leaf.

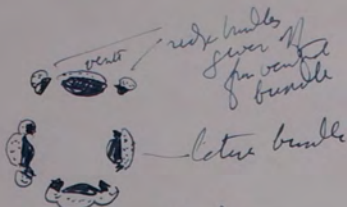
Watarai, S (1939) - Aray Thorne study 1 45  
 of Leguminosae leaf structure (anatomical)  
 p232  
 mostly a comparative study of mature stipitoid

p232  
 He uses "nodule" of the places, attachment, the  
 pinnae of compound leaves. ~~the nodule could be~~  
 better A.A. + internode. (the "node" is  
 "internode" in lower classes would be better AA)

p233  
 The example the fun can be describes - Albizzia  
 Dulacq. Bepinote to 6-11  
 Tubebresser numerous leaflets (the

pass of pinnac cavity of  
 goes no hole drawing)  
 Three filia traces leaving the stem system separately  
 enter the base of the pinnules, after a single stipular  
 fornicle has left the outer lateral side of each lateral  
 trace. Each filia trace closes up into a ring.





muscle of slender  
 pair of petiole  
 p235

To supply the latent pinnae contribute to each made  
 by the lateral + ventral bundles + the arc lines  
 formed cross into a ring partly by curvature  
 by the addition of branches for the ridge bundles  
 at the margin of each margin

The tendency towards radial structure is very  
 strong, being repeated both in the supply of the  
 whole leaf for the pinnae. The 3 leaf traces  
 in the first <sup>traces</sup> each of the 3 leaf traces  
~~traces~~ when starts as an arc becomes  
 a ring. ~~AA~~ The  
 individual leaf traces <sup>in</sup> no homologous with  
 the leaf, have the same tendency. AA.]

*Acacia villosa* Willd. p238 Here to 3 foliar  
 traces are rings <sup>of</sup> primary  
 ring at the base of the pinnules  
 they fuse into one

Stipules are always supplied from a lateral foliar<sup>3</sup> trace situated far from the median one.

[It seems some two-radial dist<sup>n</sup> in a petiole, though in general a necessary precondition of peltation is not its cause. Radial arching may occur without peltation.]

Both radial arching of the petiole & peltation / the lamina are symptoms of the same thing — the breaking up of the parted-radial structure of the leaf & become the complete itself into radialness. This may occur to petiole only; it is less easy (? does it ever occur) for it to happen in the lamina only, as vascular arching is disrupted.

AA Feb 22. 38

petiole does not not upt of purpose the

pp 272-4.

petiole & leaflet bases of *Lupinus* has not been described & figured in great detail

The paper is immensely detailed & very well illustrated. It deals with 133 species belonging to Mimosoideae, Caesalpinioideae & Papilionoideae

Makeshwar, P (1937)  
An immense detailed comparison in Angiosperm  
embry sacs.

A confused conclusion. <sup>p. 402</sup> to read that the  
Hecht & Pridmore (1907) includes 2 archegonia  
embryo sac, Angiosperm includes 2 archegonia  
instead of 1. <sup>to read that the</sup>

hypogard = near cells  
upper polar nucleus = ventral canal cell  
egg = egg

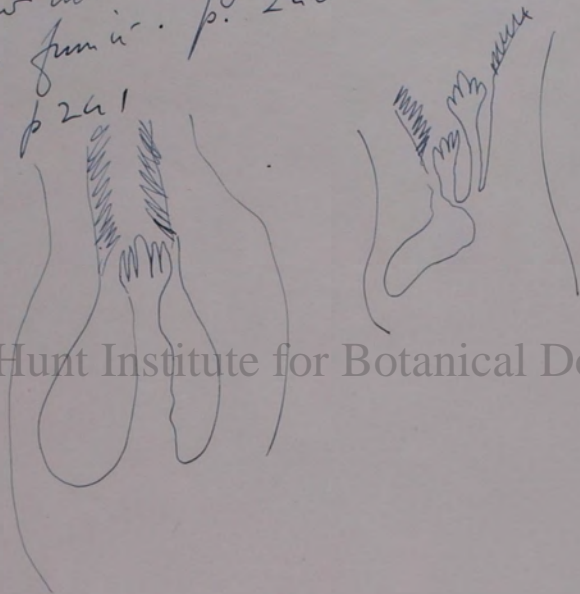
Points in that several recent workers have reported  
that the synergids are found for one nucleus  
+ the egg - upper polar nucleus for another  
nucleus, the 4-nucleate stage (1) # (2)  
always believed to be generally true! (AA)

[That the e.s. can be found either for 1,  
2 or 4 spores, than the 8-nucleate  
type can arise in each of these ways, seems  
to preclude a comparison in the lower  
plant altogether. A. A.]

[This may also be related to Jost's theory - the  
same form constitutes one, two or  
four spores AA]



Capoa, S.P. (1937) *Hiptalea integrifolia* Planch. 49  
 p 238. single andropous ovule - round  
 cases. But in many abnormally to  
 atropous, & the funicles elongated,  
 + grew into the style canal or even  
 emerging from it. p. 240  
 fig p 241



White, P. R. (1938) "Root-pressure" 250

By experiment on excised tomato roots growing  
in water the author reinstates root pressure as  
an important factor in raising sap  
p. 220

These roots secrete sap continuously & rhythmically  
from their proximal ends. Methods, measuring  
the force, this secretion have been developed.  
It is not retarded by opposed pressures of 90 lbs per  
sq. inch; the pressure is sufficient to raise water  
to a height of 200 ft.

He does not suggest that transpiration pull, cohesion,  
capillary etc. are as important  
p. 220

Holds 200 years ago believed that it was <sup>how</sup>  
tissues within the movement of water in the  
stem was due, but he did not recognize the  
drawing power of the leaves. More modern  
views are associated with the general rise of  
mechanistic theories.

---

(P. Clifford Evans holds me that there  
is some doubt as to the identity of ~~the~~ <sup>the</sup> ~~water~~  
the explanation, White's results A.A.)

Stebbins, J. L. (1938)

51

P157

Basic chromosome numbers are significantly higher in woody than in herbaceous dicots. Polyploid series are more frequent in perennial herbaceous genera.

The great majority of woody genera have small chromosomes, but large chromosomes are relatively frequent in any herbaceous genera among those containing woody herbaceous genera.

The relatively high basic numbers of the woody genera is explained partly by the polyploid origin of many of them. [This seems inconsistent]

He said that there were fewer polyploids in woody than in herbaceous genera. AA) he speaks below of "the infrequency of polyploidy in woody genera. AA) regard woody genera as cytologically stable.

Cross, J.-L. (1938)

52

Viburnum Opulus

p 257 (summary)

Comparative studies of young cataphylls + foliage leaves show conclusively that histogenetic divergences occur at a very early stage; - staining reactions indicate that these divergent stages are conditioned by even earlier phases which are characterized by physiological differences. No evidence of an ontogenetic metamorphosis could be detected in the development of the promordium of the cataphyll.

Evidence of the homology of the cataphyll to any part of the foliage leaf was not obtained. It is suggested that the relationship of these organs might be expressed in terms of parallelism (Gibber, 1937) - i.e., that they have experienced parallel phylogenetic + ontogenetic developmental careers.

Evidence is presented that the stipular appendages are not stalked glands as interpreted by Siebel (1934) but are vestigial lobes of the leaf.

p 252 (more detailed account) of diff. of cataphyll + foliage leaf

Exam. of differences in staining the promordium of the foliage leaves somewhat resemble those of the cataphylls + transitional forms ~~that~~ until harvest of approximately 80  $\mu$  hrs. have attained (measuring along the adaxial surface). At this stage central median, proximal, adaxial subepidermal cells undergo periclinal divisions. The derivatives of

Cross, S. L. (1925) cont.

These cells continue to divide, forming an adaxial meristem of the type described for many species of Angiosperms. There is a comparable meristem, not found in the primordia of the cataphylls at any stage, this phenomenon serves as a useful but critical criterion of distinction. A similar histogenetic divergence between cataphyll & foliage leaf primordia has been reported by Foster (1935) & occurs at the 90 μ stage in Carya Buckleyi var. arkansana.

In addition to serving as a critical method of distinguishing the primordia of foliage leaves & cataphylls, the formation of an adaxial meristem is of further significance in that it provides the first indication of the differentiation of the petiole, - midrib. The enlargement of the adaxial meristem causes a slight swelling of the adaxial surface which supplies the first external evidence of a petiole. ... Comparable modes of petiole-midrib differentiation have been described by Schüpp (1925) for Acer pseudoplatanus, by Foster (1935) for Carya Buckleyi var. arkansana, by Cross (1937) for Viburnum repandum. The phenomenon is probably widespread occurrence in Dicotyleds.

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Maheshwari, P (1937)

54

p 102

M. considers the various theories on the homology of the Angiosperm embryo sac & concludes that "The Angiosperm embryo sac cannot be compared with any living group".

[One may say that his conjecture about the types of embryo sacs in Angiosperms leads him to stress the isolation of Angiosperms (AA)]

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Maheshwari P (1938),  
Useful to regard it as a  
Supplement to Schnarf "Embryologie der Angiospermen"  
(1929) p 125 He favors to view that there is an  
active movement of the generative sperm cells in the  
pollen tube

Hunt, K. W. (1937) A study of styles & styles  
stigma emphasizing Eames' conception of the  
carpel as derived from palmate structure of three  
main lobes.

55

Skatch, A.F. (1927) *Andry (leaf) Maron*,  
*Musa sapientum L. var. hort. flos Michel*.  
 Bot. Jaz. v. 84, pp. 337-381, 44 text figs

p 357

The commissural bundles connect with the small  
 tracheids (commissural connectives) of the  
 longitudinal bundles (veats)

p 378 (Lamina)

The large bundle contains a single large tracheid  
 and several smaller tracheids (commissural  
 connectives) <sup>below them</sup>  
 [He does not figure the connectives to commissural  
 bundles (the large bundle, but it is clear from his  
 descr. that they arise from the xylem on the  
 phloem side of the bundle)]

See Trübner p 59  
 of my *Trübner* note bundle  
 - Journal IX

p 341

Lateral buds do not occur on the axis but are  
 situated opposite



Sketch cont.

The leaf sheaths of banana entirely surround the stem, & the insertion is sometimes markedly oblique. The vertical distance between the higher & lower joints of the stem was found in one instance to be 8.8 cms where the stem was only 5 cms in diameter. Even large obliquities have been recorded by Wittmark (Linnaea. 35. pp 205-90. 1867)

<sup>p 34</sup> The epidermis of the stem surfaces all leaf sheaths & of the surface of the stem, is never ~~separated~~ <sup>loosened</sup> from the atmosphere, since the sheaths fit very tightly together indeed they may adhere strongly (p 35-1). Nevertheless stomata occur on these sheaths when they apparently serve no purpose.

<sup>p 354</sup> The later ~~of~~ <sup>of</sup> elements of the Malayan banana have spread to America. The spread bands pull and ~~are~~ <sup>are</sup> readily <sup>used</sup> as a cutlass used in cutting up the banana plants (especially if it is not very sharp) is soon enveloped in a thick wall of them. (See Paxton J. <sup>Paxton's</sup> <sup>Magazine</sup> of Bot. 3. 55. 1837 on their being used as tinder) Maximum growth leaf 21 cms per day (Maxwell)

Hutchinson J (1935)

58

(Dem: ex-Sauraceae)

The evolution of an unwoolen of bracts for foliage leaves was demonstrated in the small <sup>Sauraceae</sup> apetalous family -  
most primitive - Saururus cernuus L. (Florida)  
in normal green leaves. S. chinensis (Tour.) Bail.  
(China) - apparent leaf or bract white. Gymnostele  
chinensis ~~De~~ Dene (China) the most reduced white bracts  
attend the inflorescence. Found stage Houttuynia  
cordata (Thunb.) (China) + Arenopsis  
californica Hook & Arn. (California), each in a  
whorl of white unwoolen bracts - reduced  
spike, resemble a Ranunculaceae flower.

Cordelle, A P de. *Orymyza vegeta*

59

V. I 187 p 38

"La tige du bananier paraît presque entièrement  
composée de trachées lorsqu'on la coupe en  
travers; les trachées y sont si abondantes  
que, dans les Antilles, on les recueille à  
poignées, et on fait une espèce d'amadou  
qui s'y vend publiquement depuis long-temps.

ref Hoppelle la Chesnaye. Ann.

Mus. 9 p 296 quoted from (1820) text  
trachées. — acc. 5 Skutch the spiral

In the discussion (p. 87) Fisher said  
 "He did not accept the dogma that the majority of  
 specific differences were non-adaptational, but thought,  
 on the contrary, that differences of genera or ordinal  
 value must have been built up by continuation  
 of the same process by which specific differences were  
 produced. The adaptive character of these larger  
 differences was universally recognized, & he inferred  
 that they were largely due to an increase in the ecology  
 + life-history of natural populations that we were  
 often, though not always, unable to demonstrate  
 the adaptive significance of specific differences."

Avery, J. S. (1933)

Northiana Tobacum L.

p 568 In Tobacco leaf  
 The primordia leaf is at first mere humps of embryonic tissue project laterally from the growing point of the stem. The leaf is little more than an embryonic midrib until it is 0.6 mm or more in length, at which time laminae development is initiated. At this length two ridge-like projects appear, one on either side. These projects are initiated by the activity of a row of subepidermal cells ("marginal meristem") which extend along either side of the midrib primordium.

p 569 All cells have been of the marginal meristem an morphologically mother cells, the mesophyll are potentially pro-vascular

p 568  
 The leaf apex at first grows quickly until the primordium is 2-3 mm in length, then special growth ceases - elongation of the midrib continues basipetally, together with basipetal enlargement of the lamina.

[This quiet growth] the leaf is a temporary axis-like phenomenon A.A.]

p 569  
 When quiet growth ceases the primordium is 1/30 or less of the size\* of the mature leaf.

\* ) then he means length  
 p 584 Many writers have reported that certain leaf primordia possess in the beginning an actual growing tip, which is of the four part mature

Arvey (1933) cont<sup>d</sup>.

62

p 570  
Although in the epidermis, both upper & lower, in which  
a cessation of cell division first takes place, evident  
cell enlargement continues longer than cell enlargement  
in any other tissue. It is the strain of the expanding  
epidermis on cells of the middle & lower mesophyll,  
together with the fact that these mesophyll cells cease  
dividing & their rate of enlargement is insufficient  
to meet the strain, that causes them to pull apart,  
the uniform spongy condition to result. The reciprocal  
stresses of the developing spongy tissue on cells of the  
lower epidermis cause a lateral wall to become  
distorted & wavy. A similar relationship exists between  
the upper epidermis & palisade layer, but to lesser  
degree. [The palisade cells are the last to cease  
dividing. p. 571]

Eryngium notes

Urban I und Miibus M (1884)

p 100  
~~The grass land Eryngium an American~~ further  
 U.S.A. & Argentina. Man fully dis. to  
 Pampas of La Plata + is <sup>1884</sup> ~~Antistaria~~.  
 see Miibus PJ VII 14. p 375 - 425 X VII 1886 p 51  
 Untersuchungen ... Monoclyen-ähnlichen  
 Eryngien.

Eryngium eriophorum Cham. is extremely like  
Schlechtendahlia luyulifolia Less in vegetative habit,  
 of herbarium material used S. Prager

Digitized by Herbarium Institute for Botanical Documentation

p 103  
 He found no oil ducts in Eryngium eriophorum

Both these forms are found in one row, bundles.  
 The anatomical comparison which is made in  
 detail seems due to interest. Both  
 species have a few many fibres

ref. in  
 herbarium  
 Pflanzensamml.  
 Si. Boissier Bull. Intern. Acad.  
 XIII. 1508 pp 35-44



Mitris (1824)  
The moment the Erygia Delaroché fun. cald  
the leaves petioles, (but an short) dev. it is connected  
with the suppression of the other part of the leaf

Delaroché, F. Eryngium ... histore.  
Paris 1800  
Accepté de Candolle Prodr. Paris 4,

Paris 1830  
Decisions. Voul. de la Soc Bot de France 7. 20  
p. 1873. 200 petioles a medio (opposed  
alt. but this idea mistaken) (de Candolle)

p. 386  
E. Canystris palvate on bit sides  
inverted bundles - medist

Digitized by Hunt Institute for Botanical Documentation

p. 22. Inverted vascular bundles may be considered an  
argument of the petiole view, but in those Erygia  
which have scandent leaves & in many petiole-like  
ex. E. Scarpinum, junceum etc. the bundles are  
all normal. [I wonder if this is true. He  
says Scarpinum as so. ~~AA~~ - anyway the bundles  
are all normal - some Lemna'd Erygia AA.]

p 394

Möbius, M. (1884). Describes in E. lanseauxii  
the occurrence of inverted buds ~~and~~ associated  
with round buds, in the caption, the two anterior  
as the margins. [This would fit in in practically the  
whole leaf bay ~~is~~ reaches AA)

These inverted buds occur also in other species

p 421

mentions them in the similarity to Monocots  
is ausgedrückt in my specific name

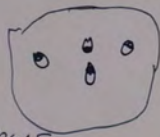
E. pandanifolium. Chamisso says that  
the broad leaves may be only 18 lines <sup>wide</sup> ~~long~~ on the  
base ~~but~~ ~~down~~ 5 feet long. [Dee Korman I 49  
1826]

p 422

He disagrees in the idea that the inverted buds  
imply a pedicel structure, but has no suggestion  
account for it

p 404

The large spaces repeat in a small scale the  
whole structure of the leaf



Thomson of E. lanseauxii  
pl. XXIII fig 5

p 405

In a younger species, not merely the anterior, but the  
2 or 3 anterior buds, the leaf den Zahn  
versorgen, strong to anterior end entering into the  
space. At the insertion place, the space to  
anterior buds, the leaf anastomosis, for the  
anastomosis are a mere buds enter the spine

Milneus, M (1886)

67

<sup>p 629</sup>  
The leaf members of the <sup>narrow</sup> ~~small~~ leaved Eryngiums  
(Schmal = narrow)  
are more singly explained if they are  
regarded as ~~the~~ analogous to the leaf-radiis or  
midrib. The radiis has broadened while the  
~~leaves~~ <sup>pinnae</sup> have reduced, on the extreme four  
an represent of 4 teeth

Drawn mayr 7 E. sericea well - XXXVI 5, 6, 7  
Follows the change - another for sheath with  
thicker part of leaf: Esericea p 599-5

V. Hoff H (1913)

[I will draw not  
from the <sup>most</sup> <sup>like</sup>  
Eryngium but refer  
to Hoff.] 68

p 211

*Eryngium sanguinalis* Cham. ex Schlecht.  
may have margin "subintegra" or spinuloso-  
serrata (more is entire) (*E. crehnum* is dead p #131)

The names show how the leaves simulate other  
genera. es.

*E. ilicifolium* Lam (p 117)

*E. aquifolium* Cav (p 118)

*E. alismifolium* Greene (p 165)

*E. pilularioides* Hemsl. (p 175)

*E. ranunculoides* Hoff. (p 105)

*E. plantaginifolium* Gussel. (p 223)

*E. bromelii folium* Delar (p 228)

*E. alorifolium* Mart (p 238)

*E. spayanifolium* Hemsl. (p 256)

*E. scarpinum* Cham p 258  
Cham. ex Schlecht. (p 261)

*E. junceum* Cham. ex Schlecht. p 262

*E. eriophorum* Hoff (p 283)

*E. zosterifolium* Cham ex Schlecht. p 264

*E. luzulefolium*

W. Hoff cont.

69

<sup>129</sup>  
Complete unbewehate leaves occur seldom in  
(of species)  
the monosylid Eryngia ~~and~~ e.g. E. Hassleri

Except in E. eriophorum the sheathing base  
is always naked; in E. eriophorum it is clothed  
in uncellular tuberos.

Domin, K. Morphologische und phylogenetische  
Studien über die Familie der Umbelliferen. I Teil.

70

K. Domin.  
Bull. Internat. Acad. d. Sciences  
de l'Empereur Francois Joseph I. Prague  
Année XIII. 1909. pp 100-153 A. 1. 72. 6  
(Vols X<sup>II</sup> & X<sup>III</sup> bound together)

Describ. ferns, under format<sup>2</sup>, - the stipe characters  
p 123

Hydrocotylodeae leaves  
p 132

Hydrocotylodeae laminae

ref. & picturs Urban. Man. Pl. Brasil. Plate 73-75  
p 148

Notes on species names recall the Monard. appearance  
to accept Gribner's view that the Monard-like leaves  
of Eryngium are the flattened & expanded of the leaf rachis  
or rachis

Domin treats that even in the complex Eryngium  
sheath as well as lamina as included

p 150  
The leaf insertion in Eryngium may be spiral & so more than one  
round the stem.

[There is no great deal done Eryngia]

See also pp 39-44. 1900  
[A. 1. 72. 6. 5]

Zy VI x IV A. 1. 72. 6. 6

Donner p 147  
 "w/ as die morphologische Bedeutung dieser  
 Lehaft an die Barmelcharen erinnernden Blätter  
 ... so kann wohl niemand, der eine Anzahl  
 verschiedener Engyken - Arten verglichen hat,  
 bezweifeln, dass es sich hier um stark reduzierte,  
aber wahre Blätter und nicht etwa um  
Phylloiden - blattartig erweiterte Blattstiel -  
 handelt, wie Delarocque und nach ihm andere  
 meinten.

Allerdings sehen wir, wie sich die Spreite, die bei  
 vielen Arten handförmig oder federförmig tief  
 zerteilt ist, reduziert, bis endlich nur kleine,  
 federförmige Abschnitte übrig bleiben, welche  
 welche auf der erweiterten Mittelrippe

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des Blattes setzen, aus welche dann bis zu  
 ganz schmalen, stachelähnlichen Bildungen  
 herabziehen können. Gleichartig ~~verändert~~ <sup>verändert</sup>  
 verkürzt sich auch der Blattstiel, welcher ~~stark~~  
~~sich~~ endlich bis auf Null reduziert; die Stielver-  
 schnürung verschwindet und auf diese Weise  
 fließt dann der bei- lineale Spreitenkil  
 mit der Scheide vollkommen zusammen.

p 150  
 In ~~der~~ <sup>der</sup> ~~Streckung~~ - E. Canebre is spread ~~to two leaf~~  
~~may go right~~ - my go 1  $\frac{1}{2}$  times round to stem.  
 In two mayus my be 1 um gran.

p 147 - I  
 Henry treat ~~Metrus~~ find ~~to~~ <sup>to</sup> ~~larva~~ anatomical  
 to be sheath - blank in notes = petiole

Recd Jun 1938

Chodat R. Vischer, W (1916-1927)  
La Végétation du Paraguay.

Les Umbellifères R. Andrieux pp 381-410

Crantzia lineata Nutt. p 383 et seq.

Eryngium resurrexum & Littorella caerulis. family

considered as monotypic  
very variable. Exists in the following forms (p. 385)

1. Isoetes - leaves narrow, cylindrical & elongate  
the Ptilonotus pectinatus or Isoetes.

2. Littorell - cylindrical leaves and a pointed  
narrow ribbon-like moss or

3. Lamin - narrow ribbon-like moss or  
as distich leaves, usually Alisma paniculatum

forme angustissimum

4. Spathifolia - leaves relatively short,  
ribbon-like in lower half & = luteo-spathulate &  
obtusely in the lower part.

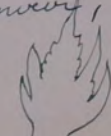
5. Echinodorus - with lanceolate leaves.

6. Andrieuxi - large  
in thick rosettes & pointed leaves

7. Natans (Does not describe them the leaves are  
like, they are in rosettes & the flowers float.)

p 350 Eryngium paniculatum Cav. the

leaves bear a single series of spines. In the  
young leaf on the young point, however, the  
underneath leaves are densely branched





Chodat (ant<sup>o</sup>)  
qui se développe dans un nœud au-dessus de la tige  
du phyllospode p 250

73

404  
Nous avons supposé plus haut que la feuille  
monocotylédonnée des Eryngium américains  
était une morphose induite par la vie  
chaméphyte xérophyte, imitant ou fixant d'un  
type adéquat à ce mode d'existence, par  
réduction des ramifications (perte de gènes) et par  
le développement rebanni du phyllospode.  
405 Or dans ceux des Eryngium qui développent  
sur une feuille de ce type, on habituellement  
les nervures ne sont pas saillantes et on elles  
sont parallèles et égales, un épaississement  
médié dans lequel s'adhèrent les faisceaux  
en corrélation avec cette structure progressive

Nous avons certainement une mutation progressive  
en ce sens que cette nervure est une nouveauté  
par rapport à ce que nous sommes fondés  
de considérer comme le type général des ombellifères,  
donc le type plus primitif.

406 N'oublions pas que dans l'analogie que nous  
pouvons constater entre la feuille de ces Eryngium  
et celle de beaucoup de monocotylédonnés il  
ne peut s'agir que d'un phénomène de  
convergence.

407 Les sores, les piquants, les piquants  
agregés sont les homologues des ramifications d'une  
feuille ramifiée sur le type penné ou bipenné.

homologues piquants

Chodat cont'

74

Nos analyses microscopiques nous ont  
montré dans ces organes le même structure  
que dans le limbe; les nervures ~~se~~ s'y prolongent  
en les plus robustes (*Eryngium flourensianum*  
var. *seroides* Urb.) y laissent reconnaître  
un parenchyme lacuneux, des bandes fibreux,  
des zones de stomates alternant avec ces  
dernières.

12408

"ces poils" ... forment un rôle qui est tant  
insoupçonné jusqu'ici. Chez beaucoup d'espèces  
... ils fonctionnent à en juger par toute  
l'anatomie comme des exutoires, émettant  
une évaporation sensible au moyen d'~~de~~ épithèmes  
situés souvent à leur base même, souvent au-  
dessous de leur base, sur la partie immédiatement  
adjacente de la marge du limbe que les poils.

Du Rietz, J. Einar: The Fundamental Units of Biological Taxonomy. Svensk Bot. Tidskrift. Bd 24, H. 3, 1930 pp 333-428

p 335. In the latter half of the last century species were mostly regarded merely as arbitrary divisions of the continuous & ever changing series of individuals found in nature. Thus the rediscovery of Mendel's laws & de Vries' mutation - they then broke the principle of descentism & full again

p 334 The International botanical nomenclature shows serious attempts to define the species concept

p 336 See Plate. Prinzipien der Systematik Die Kultur der Gegenwart, ed by Paul Hirschberg, Paul III. Berlin 1914

pp 115-8 give a good summary of the concrete or abstract nature of the various units of taxonomy. He regards species as concrete units while all the higher units are abstract.

Plate says that species, genus - family are <sup>analyzed</sup> ~~used~~ in 2 senses: (1) concepts, i.e. complexes of individuals of which they are composed. He considers that only species has this real existence. "In diesem Sinne ist die Art etwas Reales, während die Gattung, die Familie, überhaupt die höheren Gruppen abstrakter Natur sind."

p 337 Du Rietz treats all the various units of taxonomy as concrete populations

p 337 The main criterion for an individual should be its physiological autonomy. (He does not consider a clone as one individual)

p 338  
A clone (Webber 1903, Skull, Johansen)  
= population consisting of the vegetative (asexual)  
descendants of one individual.

use expression "pure clone" when genotypical  
homogeneity is postulated.

A clone = taxonomical unit of extreme  
homogeneity. At least many of the "species" of  
Taraxacum probably are pure clones.

pp 338-9  
A pure line (Johansen 1903) = population  
consisting of the individuals found of which a few are  
reproductive of one homozygous individual.

Jordan's "petites espèces" of *Eriophila* are pure lines

p 340  
A biotype (Johansen 59) = population consisting  
of individuals with identical genotypical constitution  
[there does not seem to be any difference between this or  
pure line. A. A. —] see his paper on page 59  
the only really homozygous biotypes exist  
be these four pure lines.

p 342  
The form = population of one or several biotypes  
or many individuals = species-population (no form = distinct  
regard or local forms) — differ from the true biotypes  
the species population in one or several distinct characters.

p 343  
A variety = population of one or several biotypes, forms  
more or less distinct local forms to species

Var the variety we have reached the lowest unit in the series of taxonomical units forming more or less closed intercrossing populations a Syngameous

p 351. The word variety has been used in taxonomy of units the min-different rank. It is de Rety's own idea to give a local meaning

varieties in his sense or forms are species units, comparative stating individuals. The diff varieties mean this to be due to certain amount of inbreeding

p 352 Hagedorn has shown that the explanation to automatic reduction of potential variability a polymorphic locus place quite independently of any sort of selection in any allogamous population more or less effective out of four causes in our populations) - different genotypes constituted in

wherever the frequency of individuals, or the number of individuals, (strong or a majority) heterozygotes & that with the chance of the heterozygotes be included

- the group's proportionate chosen of fate become the parent the next generation is usually considerably smaller than the number of individuals than species. Every case is when

rare individuals with some unusual gene, or gene lack happen to be excluded from the number of individuals, means that the total potential variability is lowered.

p 353 Reduction of potential variability thus automatic & not dependant on any sort of selection.

A subspecies = a population of several biotypes forming more or less distinct regional forms of a species.

The various subspecies of a species intergrade continuously into each other, their delimitation thus being infinitely more arbitrary than that of the species.

pp 357-8

species. The smaller-natural populations permanently separated from each other by distinct discontinuities in the series of biotypes are called species. A species thus = a population consisting of an asexual biotype, or a group of biotypes; or of many sexually propagating biotypes forming a syngameon separated from all others by more or less complete sexual isolation, or by comparing small transitional populations.

(It is difficult in species definitions to define what sexual & asexual populations)

p 360

De Ruyt rejects the principle of size = polymorphy as a basis of the delimitation of species. He also the idea that species should be delimited from (the basis of the magnitude) the differences between the forms concerned. According to his species concept, two forms may be very different - still being to the same species if connected by transitional forms. He also states that forms may be much less different - still being to 'different' species.

p 361

in strictly allogamous species even every individual probably represents its own biotype.

p 371

But Reticularis longipetala fruit water is  
the primary thing in comparison with their herbarium taxonomy  
→ garden genetics take account place.

p 383

In some cases of hybrid populations there is no possible  
natural division into species hybrids. It sometimes  
appears equally probable that the "species" are segregates  
of the hybrid, or that the hybrid was formed by the  
meeting of two species originally isolated.

p 384

Species of the tangle formed by <sup>these</sup> species (Colomesia he  
says) in the most central parts the synergism presents, as  
least the botanical world of China is like myself, the picture  
of more intricate network of rather different forms  
mixed into each other & apparently all crossing. If this  
extremely polymorphic synergism has been found by  
hybridization of a number of more uniform species, the  
latter appear to have got lost at least to the same degree  
as many of the arctic species) Salix - but if any  
very incomplete synergism, the vast synergism may be  
of any value I could believe than the small more  
uniform local populations commonly found are simply  
secondary segregates of the highly polymorphic synergism.  
How this synergism from us formed is another matter -  
of course it may have been found by the crossing of species  
differing from all these local populations presently found. But  
about this matter we had better confess our complete  
ignorance.

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Dr Riety uses Litoy's term "syngameon".  
 in a rather wide sense for any intermingling population  
 not divided by distinct lines or zones of discontinuity.

p 387  
 An argument favoring pointed out by Dauser is the  
 possibility of exchange of genes of two distinct biotypes  
 even if they are not fertile into each other, but both form  
 fertile crosses into a third biotype.

p 388-5  
 He tries to show that the monogenetic theory of all species is  
 Jaussou's claim that the old descriptive taxonomy can be  
 replaced by experimental taxonomy

p 389  
 mostly consisting of the present recognition of species = populations,  
 grouped & distinguished local & even regional races  
 (varieties = subspecies), makes revision of the traditional  
 method of describing species rather necessary.  
 1 - species may be founded upon one undivided or upon  
 several individuals belonging to one or several forms, varieties  
 or even subspecies - & from this mostly rather as all is told  
 in the diagnosis ... The best method would probably be to give  
 (1) one diagnosis of the type-individual (2) one description of  
 the polymorphism of the type-variant (i.e. the local population)  
 when the type-individual belongs to (3) one description of the  
 variability of polymorphism in the whole species.

= [Dr Riety considers isolation in itself as capable of  
 producing new species, but if it is rather different of a  
 clear doubt's argument - claim depends on the effort of  
 isolation or genetic constitution A.A.]  
 in Hagedorn's new p 177



p 397

De Ruyt considers two <sup>high</sup> polymorphic  
 synergamers may differentiate into species. If  
 is hours - independent than = number, species  
 have been differentiated on, one age synergamer,  
 these should be united into = unit, & kept rank.  
 If - sexes of vicarious species occur, into of  
 one species in each isolated districts, true  
 form or Artenkreis in Formenkreis of the  
 vicarious species, ~~Formenkreis~~ Formenkreis in the  
 subantarctic islands, New Zealand.

p 398

the method of grouping geographically vicarious  
 species and ~~Formenkreis~~ Formenkreis for Botanical Documentation  
 species loss. De Ruyt says that he has only talked  
 of the process of differentiation of autonomic selection  
 polymorphy, because no other process appears to be  
 needed to explain above seen in nature, because the  
 is the only process done there we know anything with  
 full certainty. He is sceptical about the ~~form~~ form ~~induced~~  
 or non-induced mutation plays any important part,  
 & he also thinks that the role of selection has been much  
 overrated, + considers many of the dominant but types  
 absolutely unvariable in a certain habitat.

p 402

Hutchinson. The Fagus populifolia, the Turkey  
 period appears found in distributed & very  
 polymorphic synergamer (Fagus Feroniae (Long).)  
 including all the forms, the present Fagus-species

Erna da Nelly  
 but dominant & other forms of appearing accidentally  
 in the present Fagus - populations ("character forms" - the  
 sense of Ettinghausen & Krause (1888-9) By  
 isolation & reduction of polymorphism the highly polymorphic  
Synonymy has become differentiated into the less  
 polymorphic present species of Europe, Western & Eastern  
 Asia, & North America but still the characters of the  
 dominant & tertiary forms as well as those of the other  
 present species may crop up accidentally in some of these  
 species.

p 427  
 In the present work he quotes some new work of  
 Heiber - Nelson (Hereditas Bd XIV. #1. Jan  
 1930) as casting doubt on whether pure lines exist  
 at all

p 346  
 the remarkable parallelism in polymorphic  
 the more different species, the same class, literature &  
 vegetative system, & distinguished in modern literature &  
 "Vavilov's law" homologous varieties.  
 p 412  
 Homologous forms appear in species belonging to quite  
 different genera or families. By my use the same may be  
 the same in the present but some forms in all  
 these forms. In nearly related species the plants  
 already appear. In generally accepted any form  
 But (if Philpotschentes (1927). Van is soon &  
 we come species belong to different higher units  
 of the traditional system, this the case of "genotypic  
 impossibility to give parallelism", particularly in ~~the~~

Emar de Riet

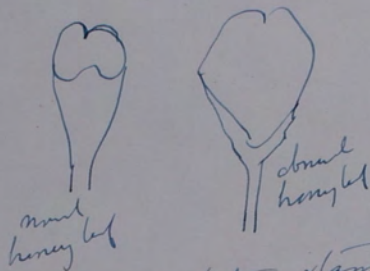
83

principally differ - "morphological parallelism"  
 "auf deren Eigentümlichkeiten der Begriff der  
 Gene und deren genotypischen Struktur  
 überhaupt nicht anwendbar ist" ... B.  
 result of this negative attitude towards the  
 explanation of the "morphological parallelism" Philpott's ideas  
 find a possible explanation of the "evolution of higher  
~~taxonomic groups~~ or "of biotypes, Jordanovs &  
 Linneans" in the "micro-evolution" in the  
 (higher) modern genetics; while he considers "the  
 evolution of higher taxonomic groups" as "macro-  
 evolution" (the complete) "ausserhalb  
 ihres Gesichtsfeldes". My belief is right, but  
 my own experience makes me more  
 inclined to believe in looking for the explanation  
 also of "morphological parallelism" in genotypic  
 resemblance.

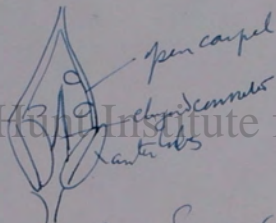
Turrill, W.B. (1922)

84

Abrupt flaves of plant) *Erantia humilis*  
show honey-glands some thin ~~was~~ had a  
better-developed slender stalk on expanded base



dis. basilar between stamens & carpels, etc.



~~Other carpels~~ Some carpels were split down the  
adaxial suture

Barnes, BF (1927)

85

Develops a pinnatifid leaf occurring in  
normal series of leaves on lateral branch &

Helianthus annuus

Joshi, A.C. (1933)

86

Suggests that the advantage of vivipary is that it  
overcomes the difficulty that many seeds cannot germinate  
in saline soil, even if they can afford to grow in saline  
soil, as the plants of viviparous habit have now  
become grouped on the sea shore.

Dauphiné, A (1933)

p 206  
Accumb & Chauveaud te "phyllé" = feuille + caule  
rhizé = root  
together make the phyllorhizé  
Chauveaud's ideas & show

[This is clear accumb] AA  
trien artificialité vag. distincte

Chez les Monocotylédons, comme chez les Frujers,  
les deux premières phyllorhizes sont successives  
dans le temps et dans l'espace. Il n'en est pas de  
même chez les gymnospermes et les Dicotylédones.  
Le massif initial d'une Dicotylédone produit dès  
le début deux phyllorhizes simultanés. Ces deux  
phyllorhizes sont longitudinalement soudées entre elles  
par leurs caules et par leurs rhizes; les deux feuilles  
ou cotylédons sont liées ensemble et elles se trouve  
la partie du massif initial restée à l'état  
de tissu embryonnaire; l'ensemble des deux  
premières caules unis dans leur longueur constitue  
la tige hypostylée; l'ensemble des deux rhizes  
également unis dans leur longueur constitue la racine.  
Les phylls suivants ont de même une longueur  
clément par leurs caules, mais il ne se forme pas  
de rhizes distinctes; les rhizes sont représentées dans  
la racine principale par le prolongement vers le bas  
de l'appareil conducteur de chaque phyllé. Quel que  
soit le nombre des phylls qui peuvent se produire  
ultérieurement, et ce nombre est illimité lorsqu'il  
s'agit d'un arbre, la formation de nouveaux  
éléments conducteurs dans les caules inférieures

Danglione (cuv') 88  
et dans la racine est toujours rendue possible par  
le jeu des formats secondaires équilibrés.

[The theory, though anathematized possible way, describing  
Mmoub. will not hold at all for Dicot SA]



Law HJ (1938)

89

p115. A taxonomic scheme is the expression of relations at one moment - is *terrefirma statio*.  
It may be symbolized by a two dimensional figure.

p116

Taxonomic units are delimited by discontinuities or by more or less sudden "gradients" of the parts number / their fundamental characters.

If taxonomic schemes are symbolized by two-dimensional figures in a plane, the time factor may be treated as a perpendicular to that plane. ... This Time coordinate, which is considered as constant, is crossed by unnumerable Time levels, in each, which momentary taxonomic schemes may find its place.

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p117  
"genorhetherum" = stream / potentialities  
[I do not think this paper is worth very much.]

Varley, EF (1538)

p130 footnote  
Points out that he uses cytology in a modern  
restrained sense of which karyology is perhaps the correct  
term.

p131  
An attempt is made in this paper to show that cytological  
characters in their range, variation, & type, variation within  
groups, different taxonomic value are analogous to  
ordinary morphological characters. There seems ~~to be~~  
therefore no valid reason why their use as criteria of  
relationships should not be extended to groups, comparing  
remote relationships, provided it is recognized that resemblances  
may be due to convergence - just the same way as similar  
resemblances in morphological characters.

p135  
If any arbitrary morphological criterion is considered, it  
will be found that in value of a group or a  
similar way & term, any, the cytological criterion  
seen in above. As an example, the four or number of carpels  
in the gymnosperms may be taken. In some families (e.g.  
Sagittariaceae, Labretae, Cupressaceae) both the number of carpels  
their arrangement constant throughout the family.  
Opposite and the scale as seen families as the Rosaceae,  
where both the carpels, the number of seeds can be free  
vary for one or many. The carpels of the family may be free  
a fused to the four deep-seated, farnaceae, foliolar  
or actinoid. Here, too, there is variation parallel  
to the gymnosperms in character  
in their families different groups in respect to chromosome  
number.

Warburg (cont.)

90  
91

1538  
p. 126

Weyr Smith sees regard cytological characters  
 singly as additional morphological ones.

Cytologists have tended to other than extreme, &  
 regard cytological characters as } predominantly important,  
 because they are more closely connected with the mechanism  
 of heredity. This is some extent true, but it should be  
 emphasized that the visible cytological characters are not these  
 most directly concerned in the mechanism of heredity. ... ~~the~~  
causes: The causes of heritable factors are the  
 genes, but are not necessarily altered by new chromosomal  
 characters as are distinguishable by selection [partially  
 my wording A.A.]

The character of chromosome number & chromosome  
 morphology are particularly important as being directly inherited.  
 My own theory of the origin of new characters of  
 certain forms also comes to mind for these characters.

Huxley, J. Clines: an Auxiliary Taxonomic Principle 92  
Natura VI 192. July 1938 pp 215-220

Cline = a gradient - measurable characters

Genocline = gradient in genes

Geocline = (geographical cline)

Chromocline = paleontological trend

Geog - Plants maintain less than ten - each ecotype  
habitat selects one or particular assemblage of genetic types,

is there a regular ecocline with run for more steps

selene surroundings.

(Ransbottom suggests to term cline)

Leavitt, R.S. (1909) *Vegetative Meritism*, & the 93  
Principle of Homöosis in Plants. Bot. Gaz. Vol. 47

1909 pp 30-68

p 31. Notes on the ~~the~~ leaves of Horse chestnut  
Disarticulate neatly — to discuss paper on the  
petiole foot is repeated in all or details at the  
base, the petiole. He is a scholastic in his (bored)  
by the scholasticism, the petiole disarticulates, in details  
than in homöosis (Bateson) — however the  
useful character of leaves then is useless

p 32

Disarticulation, the leaves occur in remote families  
& natural system — Juglandaceae, Berberidaceae,  
Annonaceae, Rosaceae, Rutaceae, Guttiferaceae, Vitaceae,  
Urticaceae, Bryoniaceae, Caprifoliaceae.

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"Then ... in plants a recognizable characters, a  
morphologic translocation, mobility of characters, a  
homöosis (Bateson) & such the phenomena  
my very well be referred.

p 33

"The Boston fern" has simple pinnate fronds in the  
Pinnate fern (beleged on) but part for the Boston fern)  
the pinnate have become elongated & divided into pinnules  
show an in fern very good copies, the original pinnate  
"if we take a well-developed pinnate" & the Pinnate fern by  
the side of a small fern, the Boston fern, we shall be struck  
by the fact that they are almost identical. This comparison  
is most determined than in the original pinnate & more  
like than of the fern. The great pinnate of pinnate  
is most accurate like the right fern, but the  
pinnate of the Boston fern are not at all accurate  
The pinnules of the Pinnate fern have also layers like  
the Pinnate of the Boston fern

Lenth cont?

p35  
2 variants "elegantissima" & "superbissima"  
The process has gone further & we find a ternate - compound  
leaf, the symms in 3<sup>rd</sup> order some to four like character,  
even the circinate apical fruct.

p45

Gleditsia triacanthos Character leaf } species simply  
paripinnate. In the leaves of vigorous young shoots some  
of the leaflets were repland by segments imitating the round  
leaf in all its main features. The segments are, in effect,  
character leaves, (the second order). In one specimen  
homocyclic compound. In the second degree, a few pinnules  
being perfectly compound.

see C.S.

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p51 In umbels, a radial flower may be  
repland by an umbel

p61

Anisament. of stipules in Xanthoxylum, Staphylea,  
Escaphis, Turpinia, Robinia, Bradburge, Desmodium,  
Selaetia, Dolicholobos, Vigna, Amorphia, Sambucus,  
Among suggestions that stipules have arisen as echoes, the  
antecedent structures, stipules, ... they follow pinnules  
the greatly varying character to stipules

Newton  
Exhibition at B. A. Cambridge.  
New-Libry. Aug 17. 38

95

Ms [Add 4005<sup>2</sup>] [various drafts in  
Newton's handwriting]

A Scheme for exhibiting the Royal Society.  
fellows skilled in any one of the following branches  
of Philosophy.

4. Philosophy relating to vegetables, & particularly the  
knowledge of their species, parts, leaves, flowers, ~~fruits~~  
seeds, fruits, juices, virtues, & properties, & the  
manner of their generation, nutrition & vegetation.  
[shows variants in the different drafts].

"The term Embryology is not  
 applied" covers the anatomy &  
 physiology of the organism  
 during the whole period understood  
 between the first cleavage and  
 the attainment  
 of the adult state

A) notes on Comparative  
 Embryology P.M. Balfour  
 Vol. I, 1880  
 p. 1.

(Balfour del.)



p 20, 21

Direct competition between the representatives of one stage & the next seems rarely to have happened. The great Land Reptiles, for example, which dominated the world during the Triassic & Cretaceous periods can scarcely have been exterminated by the competition of the Mammals, which were all very small & scarcely came in contact with them. x x x Similarly, the great Sea Reptiles which lived until the end of the Cretaceous period were not exterminated by land mammals, which eventually took their place. We now know that land mammals <sup>appeared</sup> ~~appeared~~ only after the Ichthyosaurs, Plesiosaurs & Mosasaurs had vanished, & that even the comparatively small ancestors of the Mammals <sup>never entered into competition with their fore-runners in their sphere of life.</sup>

[I don't think this idea can be worked out in plants - see my notes p 21 of this paper - the ~~direct~~ <sup>direct</sup> flow of plants appear to show lot going on - would direct people in Cycadophytes, Plus Gymnos.]

Suppy, H. B. (1907)

98

p<sup>1</sup> observation can only discover the differentiation of types, the genesis concerned in type-creation being not evident to us.

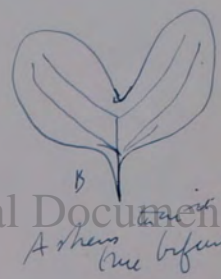
p<sup>3</sup>  
If behind the facts of distribution lies the cardinal principle that the factors we trace to a type back, the more generalized are its characters & the wider its range, then we should be justified when working on the history of a family in postulating a well-ranged primitive parent-type with the subsequent development of centres of differentiation over its area.

Huxley in *Jentham's* *Lessons in Zoology* Bot 1888, xxiv  
much to read. He apparently did take this view.

Seibold, A (1927). It's difficult to  
make any of any type theoretical comparison of this paper  
really. In this, it seems to be the theory one  
two-type of the type of leaf form is repeated in family  
of the family.

He talks of including the "diocoreoid-piperoid type"  
dominant in the Ardischiaceae, of ~~Ardischioid~~ ~~Ardischioid~~ &  
prenoid, panacoid types also occurring in  
the family *Ardischia bilobata* Linn

of cymose growth  
A.A.



B  
A shows ~~two~~ ~~one~~ bifurcated

Here the latent  
nerves dominate the  
m.b.

[Is the tendency for latent nerves to dominate the  
m.b. comparable with the tendency of the comparison  
dominate the main axis? The comparison  
between the leaf skeleton, the formal beam system  
is one / the tertiary comparison which on all  
in the nerve morphology and would be rejected by the  
did rigid phylogenetic morphology. A.A.]

He gives main elements that which comparative  
stems of the leaf forms more in all the  
families? Diocoid ~~Ardischioid~~

Symbol cont. Tendrils & not clearly differentiated groups.

100

p23 He concludes ten  
Droets have 70% simple; 16 pinnate & 14 palmate  
Mmouets 97.7 simple; 1 pinnate; 1.3 palmate

p 20  
He divides leaf types into leaf forms into 27  
types called "graminoid", "alesmoid",  
"dactyloid", "taraxacoid", "ranunculoid" etc

p 42  
He further divides the graminoid types occurs in  
95% of Mmouet families & ag  
12.5% of Droets; the paperooid type is  
5% of Mmouet families, & 22% of

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He says in his series peculiar  
Mmouet leaf types in his series peculiar  
Mmouet leaf types in his series peculiar  
Droet leaf types in his series peculiar

The definition of droet type seems  
descriptive, but relates of  
Pleura. Graminoid is  
description, but it is applied out of  
leaf & members of 30 Droet families. This  
is possible & thus by classifying leaves  
types are fundamentally unlike. (A.H. Sept 14 38)

Convergence  
in very  
Mexi



As in human hands  
the same type may  
occur in individuals  
who are not related  
— or not men relation  
people, the next  
above necessary

leaf of *Plectranthus excisus* (Labiate)  
in *Boehmeria japonica* Max.  
*Boehmeria japonica* Max. (Urticaceae)  
var *tricuspidata* Max.  
He points out many had for the convergence  
to families than; whereas they relate & dead  
probably this means some  
fundamentally similar

Turesson, J. (1932)

107

p. 1  
Dear Dear: Vavilov's *Semenzanthus* theory,  
& mentions cuticulus of it, & proceed stem  
is not on cold plants (Vavilov states) & all works  
without really it thoroughly, I cannot make out precisely  
what his conclusion is

Turesson, J. (1938)

p. 413

The present study shows that the chromosome number is  
remarkably stable & constant within Luranean species.  
The cytological analysis of 1-number types, including  
extreme habitat climats, has also shown that these types  
do not differ in numbers of chromosomes for those  
types of the same species, but which less extreme habitats.  
These findings give no support to the ideas expressed  
by Hageny & Tschuler that the species react upon  
severe habitat conditions with polyploidy, & that the  
polyploid are better adapted to extreme environmental  
conditions than the diploid. On the contrary, the data  
presented here confirm the belief that, as a general rule,  
species react upon severe habitat conditions with the  
differentiation of ecotypes, without any change in  
chromosome number.

Seefing, W (1935)

p 33

"To fully interpret cellular or protoplasmic organization in physical terms is, in the present state of our knowledge, impossible. The living system is too intricate; it is life itself. We believe however that the more fundamental characteristic of organization is structure. A study of chemical constitution alone will go no further in revealing the mechanism of even the simplest processes in protoplasm than it has in non-living systems. Structure, as well as chemical constitution, & the dynamics resulting from both, are necessary. The structure responsible for protoplasmic organization & most other physical properties of protoplasm, is a continuous  $h\nu$ -lattice framework. Life as a discontinuous system is unworkable. Aggregation, not dispersion, is the rule in living, as in non-living, colloidal phenomena. The phenomenon of functioning of a cell, such as another name for life, is possible only because of the structural continuity of protoplasm."

[One need then be any sharp line between ~~chemical~~ <sup>as the other</sup> chemical constitution <sup>to some</sup> structure or organization; or not the two latter merely ~~distinct~~ to form developed a higher degree of complexity. (k) - structure. Perhaps one might say that essentially <sup>may further</sup> development of organization of ppm may prove to be <sup>in a</sup> ~~then~~ can be handled in chemical constitution, but at present <sup>the two</sup> does not show a continuity between the two. Sep 30 A.A.]

~~Smith to B (1925)~~  
Bather F A (1928)

103

p XCVI  
pans in had many phyla & large groups had persisted  
before the Mesozoic began, e.g. Forams, Rugose  
Corals etc.

"How can we suppose that these classes & Orders,  
prolific; but individuals & species, were not suited  
to the conditions in which they lived? Many of them indeed  
were marvels of ingenious adaptation. How was their trouble;  
they had specialized in such success that they had not retained  
the flexibility, the power of variation, with which they were met  
conditions. Thus is true the fossils; the Trilobites represent of the  
world of the Mesozoic Era. The animals that were found  
an all derived from single Invertebrate, the sea-urchins are, the  
unspecialized colonial type, the star-fishes & brittle-stars are an  
the normal plan. Among Mollusks some Gasteropoda still retain  
a diminished head, but is for the simpler forms than many of the  
Jurassic - Cretaceous species with spiny. It is not all the  
other groups; & much the same story is repeated when we pass  
from the Mesozoic to the Känozoic, for the Age of Reptiles & the  
Age of Mammals, for the Age of Ammonites & Belemnites & the  
Age of Squids - Octopods.

T D.

Batter, F.A (1928)

PLXX

The somewhat beyond  
mechanistic  
description

104

" the real interest of the concrete facts related  
lies, not in their illustration of ordinary mechanical  
forces, but in the unapprehended something that  
lies beneath."

p LXXIV

after describing two ~~series~~ ~~of~~ ~~adapted~~ forms of <sup>sifting</sup> deservability  
among echinoderms he says:

" You may say that the two series followed the same  
problem — of adaptation to a horizontal life — in two different  
ways; but may you not equally well say that a problem —  
how to live with a flattened body — was solved in the  
same way in the same habit."



La vieille querelle du mécanisme et du vitalisme existe ~~entre~~ ... provient de l'opposition de deux conceptions incommensurables, l'une métaphysique et suprasensible, l'autre physique et sensible. Le naturaliste peut, en toute tranquillité, reconnaître qu'il y a des problèmes que les observations, les expériences et les concepts qui en ~~font~~ de contenu, ne résolvent point. Ces "questions dernières" sont du domaine de la métaphysique. Mais le naturaliste doit se garder de lasser pénétrer ce domaine dans ses réflexions.

(*Manuscript 2*) Il semble être en état stable, in-  
 manent ~~à terre~~ <sup>sur un plan</sup> ~~à terre~~ <sup>de référence</sup>. Une  
 biologie sans ~~rien~~ <sup>à ce point</sup> ~~à ce point~~ <sup>est métaphysique,</sup>  
 instead of ~~limiting itself~~ <sup>to an elementary mode</sup>, ~~travailing~~  
 which lies below the metaphysical plane (A.A.)  
 Sept 11. 38

p5

La vie, seule, nous paraît, à nos autres hommes qui nous en tenons à vivre, si précieuse que nous comparons les unes aux autres ses diverses formes et manifestations et considérons comme utile et conforme au bien tout ce qui sert à la conserver.  
 "Une chute d'eau est un cours d'eau qui présente une conservation constante de leur forme et de leur masse malgré le changement continu de leurs parties..." Ces faits prouvent qu'une conservation de l'être peut être observée dans des formes très simples parfois dans des processus organiques.

Shreve J.C. (1937)

Phyllotaxy Elnor  
p 621

Jacob's conception that the distichy of the foliole leaves of the elm tree is due to the position of the two upper leaf rows of the dormant shoot is not supported by the facts. The main axis of the seedlings which ~~follow~~ Schreute investigated were radically symmetrical; all ~~side~~ lateral, the ~~primary~~ terminal ~~shoots~~ sympodial branches included, are dorsiventral. In the basal region of the main axis the divergence is about  $135^\circ$ , increasing in some specimens in the higher region up to  $180^\circ$ . In all regions where the divergence is not increased, in all shoots are found in a decussate arrangement. In all lateral branches the divergence is about  $180^\circ$ .

p 616  
The terminal bud of all annual shoots includes the main shoot, but at the end of the season (this is p 617 well known; Schreute merely confirms it) all lateral shoots are invariably laterally distichous, a feature true in any elm seedling for its second year onward and bears distichous leaves.

The transition from decussate to distichy may occur in the main axis. In such cases both decussate & distichous regions are of the same symmetry, all leaves of the main axis expanding from the same point in the same way, the upper side facing the shoot apex & all leaves being equilateral.

[This then is a very good case of transition from radial symmetry in the main axis (associated with decussate) to distichy (possibly followed by spiral arrangement) & dorsiventral symmetry (possibly associated with distichy) in the lateral branches. AA



Rauch, W. (1938)

108P

Points on the investigation of the growth forms of plants has been approached from a descriptive rather than an exact analysis of the dev. of the plant & its mode of branching which have been studied. But one must first have a thorough knowledge of the general organization of a plant before one can draw conclusions about the influence of the environment.

Stauden = herbs perennating by bulbs, rhizomes, runners etc. includes Chamaephytes, Hemiepiphytes & Geophytes

Charaktere of many Stauden is the formation of Erstarkungs- sprossen (cf. Bull 1537 p 62). The main axis of the seedling & the shoot of the early years are weakly dev., & merely vegetative. They form shoots which develop of leafy shoots which unlike those of previous years increase in thickness. He calls them "Erstarkungstriebe".

[It is very different - By line, quite an analytical view of the range of growth forms between the herb & tree because we have not for the vocabulary. We have no two words such as Stauden & Sträucher to represent contrasting types - (bush & shrub are far from being equivalent terms) - & it is different than the translation such as a term "Erstarkungstriebe". HA Apr 22. 38] (Call me an adult shoot & an herb with the weak juvenile shoot: "herbs" & "perennial herbs" of Stauden & Sträucher for Sträucher?)

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p185-190

The stinger characteristics of Stauden are:

1. Annual dying off of all <sup>acid</sup> ~~over-cast~~ shoots & the basal generally in cartilag axis part which store food.
2. Renewal through basal axillary buds
3. Appearance of Eslerkumpstreiben
4. Dying off of the main root + formation of numerous adventitious roots.

p190

Trees have an axis developed for the primary axis of the seedling. The axis produces no branches (a few branches which die off for the first years).

Trees lack a renewal zone at the <sup>early</sup> ~~early~~ <sup>terminal</sup> ~~terminal~~ region or in the cortex.

p190

The Shänker (shrub type) <sup>no single main stem but many evenly developed shoots. The trees the acid shoots are permanent, & the main wood is important</sup> Adventitious roots almost absent. The primary shoots reduced

Much detail about different forms of shrubs & half shrubs, you find pictures analyzing them

Woodward, A. Smith (1906)

110

p 267

Fin many well-preserved specimens it is clear that the  
hard skeletal parts of the Ostracoderm were confined  
exclusively to the skin; + in most of the earlier representatives  
of the group these hardenings are merely scattered granules or  
tubercles of limy matter drawn from a flexible external  
armor. ... the armor is essentially a scattered deposit  
or segregation of superfluous mineral matter in the  
normally soft tissue, suggesting that the Ostracoderm  
toward the end of their lives had experienced precisely the same

p 268

affliction as that now experienced by some of the higher  
mammals in the latter part of their individual life, namely a  
kind of "four"

Rignano, E (1929) *Spongiaria*

111

"les activités physiologiques, constituant le corrélat  
des phénomènes psychiques qui nous apparaissent  
introspectivement sous forme de "besoins" ou de  
"désirs", sont dues à la tendance qu'a tout  
organisme à conserver, sans variation, son propre  
état physiologique stationnaire, ou à y retourner  
chaque fois qu'il vient à être troublé  
p 11

Le biogéographe constate que la matière vivante d'un  
organisme quelconque ... se conserve ... presque sans  
aucune variation ... en dépit des forces extérieures  
multiples les plus variées, qui lui sont adressées au  
moment, et auxquelles, elle doit faire front.

Petronevics, B (1918)

Olycen) propre à leur tra- Cuvier's law of  
correlation is not valid except statically, that the  
actual evolution of organs being in the plane of  
divers opposition to this law.

Cuvier, S. Recherches sur les ornement fossils,  
t. I, p 178, 1834 "L'ensemble organisé forme un  
ensemble, un système unique et des, dans les parties  
se correspondent mutuellement et concourent à  
la même action définitive par une réaction  
réciproque. Aucune de ces parties ne peut changer  
sans que les autres y changent aussi; et par  
conséquent, chacune d'elle, prise séparément, indique  
et donne l'acte des autres."

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Petronevics' statement:  
"Les parties des organes d'un organisme  
même ne suivent pas dans leur évolution  
phylogénique la loi de corrélation; mais,  
tandis que certaines parties évoluent rapidement  
et deviennent très avancées, d'autres parties  
n'évoluent que lentement et ~~restent~~ restent peu  
avancées, et il peut y avoir même des parties  
qui n'évoluent presque pas, qui restent primitives."

pe pour, any other examples, head & Archaeopteryx  
in the head, tail & tail. regard reptile.  
T. O.



Petrucci (cont.)

[It is true that Currier's law can no longer be held in the  
 crude form in which he enunciated it. ~~But each law~~  
~~is an~~ ~~integrated whole~~, <sup>But</sup> ~~perhaps~~ Petrucci's  
 law is an <sup>equally</sup> ~~equally~~ ~~crude~~ ~~statement~~; ~~though~~ it is <sup>more</sup> ~~current~~  
 than Currier was merely approximate, but is also <sup>more</sup> ~~approximate~~  
 than Currier was current. It misses the point that each  
 law certainly is an integrated whole, when it speaks of  
 Archaeopteryx <sup>having</sup> ~~having~~ ~~for~~ ~~its~~ ~~origin~~ "the head <sup>of</sup> ~~of~~ ~~bird~~," <sup>is</sup> ~~is~~ ~~the~~  
 expression <sup>is</sup> ~~is~~ ~~highly~~ ~~generalized~~ rather than exact. A complete  
 knowledge of Archaeopteryx would probably reveal ~~that~~ ~~there~~ ~~is~~ ~~a~~  
 closer correlation of ~~fact~~ ~~than~~ ~~to~~ ~~elements~~ of ~~them~~ ~~is~~ ~~found~~  
 than Petrucci suggests, ~~that~~ ~~there~~ ~~is~~ ~~a~~ ~~relationship~~ ~~as~~ ~~a~~  
~~mosaic~~ ~~of~~ ~~elements~~ ~~drawn~~ ~~for~~ ~~two~~  
~~parts~~ ~~of~~ ~~the~~ ~~same~~ ~~whole~~ ~~not~~ ~~in~~ ~~the~~  
~~same~~ ~~way~~ ~~as~~ ~~the~~ ~~mosaic~~ ~~of~~ ~~the~~ ~~same~~ ~~whole~~ ~~not~~ ~~in~~ ~~the~~  
~~same~~ ~~way~~ ~~as~~ ~~the~~ ~~mosaic~~ ~~of~~ ~~the~~ ~~same~~ ~~whole~~ ~~not~~ ~~in~~ ~~the~~  
~~same~~ ~~way~~ ~~as~~ ~~the~~ ~~mosaic~~ ~~of~~ ~~the~~ ~~same~~ ~~whole~~ ~~not~~ ~~in~~ ~~the~~  
 that ~~there~~ ~~is~~ ~~a~~ ~~relationship~~ ~~as~~ ~~a~~ ~~mosaic~~  
 does not fully into ~~the~~ ~~class~~ ~~any~~ 7 & classes, when ~~there~~  
 mind does suggest AA [Lyn 11. 38]

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of the Peter & Partner  
 Currier's Law  
 Non-correlation  
 Holism.

Draw W B (1926)

114

p 90

Phylogeny first employed by Haeckel  
(Generelle Morphologie Berlin 1866) - defined  
as "the science of the form-changes during the  
phylogenetic process ~~pass through~~ during the whole  
period, their individual existence."

5126-127

Protococcus vulgaris ~~Naeg.~~ Naeg. (= P. Naegeli  
char.) = Protococcus viridis Ag. which forms green  
dust-like coats on trees & plants, is redly-colored  
member of the Alveolales, a filamentous  
family. The genus does not represent a very  
primitive type as may be inferred by  
the name Protococcus

[The whole thing is a defence / the  
phylogenetic method, in their does not  
appear (or much in it)]  
A.A.

Crow WB (1928)

115

p 210  
At an early stage in the history of botany ...  
It was recognized that the longitudinal bodies of  
anatomical, as well as certain parts of plants such as flowers &  
fruits could be divided into types in which the parts were  
arranged in a radial manner about a number of axes  
extending outward from a center, & those in which the  
constituents were joined about a central axis in such a manner  
that one half was the mirror image of the other.

[This subject is given the idea that it is only certain  
selected relative compound shoots in the floral  
plan which are found in a close knit plan of  
symmetry. AA Apr 11. 38]

Johs R S (1932)

116

p 11

It would, then, appear probable that virus particles & genes are of the same order of size \* each of containing probably not more than a few hundred gamma molecules. It occurs why these particles of this size are the smallest in which vital phenomena can be exhibited, & in the display the essential vital phenomena of growth & fission \* If a different understanding that evidence in favor of an — genes appear be 2-7 m $\mu$  & virus particles 25-150 m $\mu$ .

p 12

E.S. Russell (1930) attacks the concept of the unit character, i.e. that each gene represents a single essential character. This idea perished in the mind of geneticists a decade ago. ... It was ... the law in the long line of representative particles concepts, which began in the pages of Darwin, having played various useful parts in the history of biology, has now become extinct.

p 13

Each gene affects many parts of the soma in its development.

Stefanoff, B (1936)

117

(~~Describes~~ Thomas & makes the Adellebore caepel,  
Describes Thomas & makes the Adellebore caepel,  
for instance, a complex structure and he himself  
with <sup>the passage</sup> ~~the passage~~ cone. ) Give the initials with both sides down  
AA)

Juny, J. Z. (1938)

<sup>p180</sup> Lewis Henderson, L. J. (1913). The Fitness, the Environment. New York. as says: - *Spencer*  
living things preserve or tend to preserve an ideal form, which through them flows a steady stream of energy & matter which is ever changing, yet momentarily molded by life; organized in that.

<sup>p180 181</sup> (The manner of) organisms may be considered as in unstable equilibrium with their environment. Their organization is such that in their energy changes are continually brought about which are so directed as to prevent the dissipation of the organism into its surroundings. ... in the constant presence of these processes which are so adjusted as to keep the organization intact, & even increase by further reproduction, the amount of matter thus organized. He studies of living organisms, therefore, realize themselves largely as an examination of the organization which makes this self-maintenance possible. This is to say that all biology is - essence morphological & deals with the organization of matter as a flux of energy.

<sup>p183</sup> We can, then, properly, with clear meaning speak of environments as presenting varying degrees of difficulty of the maintenance of living organization. But an attempt at specification of the relative states of any two given types into lower course as this is impossible to evaluate the degree

Yang, J. 2. (1938) cont.

of difficulty exactly, though in general the organisms themselves refer to as 'higher' maintain themselves in more difficult environments than do the lower. They do so by virtue of their greater number of special mechanisms of adjustment, their greater complexity, their greater ability to recognize, & which often necessitate the transformation of greater amounts of energy for the maintenance of a given mass of living substance. In the physical sense terms we may say that some organisms (the higher) are even less probably systems than others (the lower). Thus organisms similar to each other in many respects maintain themselves each by special traits under different conditions. ~~Two organisms are not at all easy to estimate when the environments are not at all easy, nor is it readily profitable to do so.~~

Of course it cannot be maintained that all lines of evolution proceed by increasing complexity of organization from easier to more difficult environments. In numerous cases the reverse change takes place we speak of 'degeneration'.

p. 152

There is a type of interaction in the central nervous system which "makes possible the integration of the changes which go on at various sensory surfaces, so that the animal is enabled to react to a unified 'world' instead of to a series of discrete stimuli"

Hollism  
= Gestalt

T.O.

Young J.Z. (1938) cont<sup>d</sup> *Adrian*

The central nervous system, then, by providing opportunities  
of the interaction, the impulses generated in the various  
parts of the receptive field makes it possible for the animal to  
react to various aspects of environment. Change itself are  
greatly significant to it. In order ~~to~~ to be able to fulfil  
these functions as co-ordinates the system must  
provide of abundant interconnections, so that the functions  
of any one part of the receptive system is affected by as  
much as possible of the rest of the system. For this  
interconnection the possible the nerve-cells are usually grouped  
into compact masses, tissue, & this is probably one of the  
features which have permitted to produce the progressive  
evolutionary lines of the C.N.S. which has occurred in many  
echinoderms, platyhelminths, & some molluscs probably  
consist mainly of connective paths between afferent &  
efferent, whereas in the great masses, cells in the  
concentrated nervous systems of cephalopods, arthropods, &  
vertebrates there are mechanisms of ensuring that the  
functioning of each part is influenced by that of its  
neighbours. \*

\* p 202  
" Ecological, physiological, histological, & physico-chemical  
investigations can thus meet in the combined study of the  
essentially morphological problem of finding how the  
organization of living systems is preserved.  
\* p 203 The large masses of nervous tissue



Yang J-2 (1838)

come to be continuously active, the neurons probably  
re-excite one another in regular ways & thus build up a  
pattern of activity which continues for considerable  
periods, hence the existence of these continued  
activities may be the factor which makes possible  
the effect of past activity & influence present behavior,  
that is a way for learning of behavior.

121

4

Haldane, JBS (1938)

122

psd - dd  
The distinction is sometimes made that nuclear differences may occur for variation within a species, the deeper differences between species depend on the cytoplasm. In a few cases it can be simply & conclusively shown that all or almost all differences are determined by the nucleus. In few different pharyngome species crosses (male parthenogenesis) has been recorded. For example, Bleier found that the pollen of Vicia sativa in Lens esculentum gave plants indistinguishable for the paternal species, the maternal nucleus being excluded from the cell. In no case of (male parthenogenesis) is any hybrid character recorded in the adult progeny. [But its primary characters, the layers, are not merely specific characters, but are determined by the cytoplasm A.A.]

Beer, J R de. Embryology & Evolution. 1231.

Evolution. Essays on Aspects of Evolutionary  
Biology presented to Prof. E.S. Goodrich on his seventieth  
birthday. Oxford 1938 pp 57-78

p 58. Shows that the claim that the visceral  
pouches of the mammalian embryo represent the  
old state of an adult fish is unfounded. "On the fact  
as they stand, the only justifiable conclusion is that the  
visceral pouches of the mammalian embryo represent the  
visceral pouches of the fish embryo, for the resemblance goes  
no farther. This is a repetition of ontogenetic events; true  
is the same, true in the theory of recapitulation. What is  
not true is the assertion that the specific ontogenetic features  
represent adult ancestral characters.

History cannot represent the phylogenetic history of the  
organism. It can be proved that the developmental  
resemblance of the adult ancestor resembles the  
embryo, it could not have been functional.

[The embryo has an undoubted <sup>shape</sup> of its own, which is  
not identical with that of the adult — it is not merely  
the adult in an ~~embryonic~~ <sup>embryonic</sup> form. In one sense the  
embryo is more than the adult as, in another sense, the  
adult is more than the embryo. A. A. Aug 30. 38]

See de Beer. Embryology. Evolution. Oxf 1930  
p 63 "A developing organism is thus a system  
struggling with the help of its ancestral tendencies to survive &  
& convert itself into successive viable shapes. Sprague

De Beer on homology

124

"The usually accepted view of homology between structures bases the resemblance between them on genetic affinity underlying them as structures descended, however modified, from a representative common ancestor. This concept is at the root of all phylogenetic schemes, for it is by means of their homologous structures & the modifications arising therefrom that organisms are classified.

p 67

The analysis of the concept of homology - (ans of analyses therefore breaks down:

p 68

Another aspect of the importance of morphogenesis is shown by the fact that many structures are their existence & a process of induction by special regions, the embryo known as organizers. ... the neural tubes have been regarded as themselves as homologous to the chordates, as no doubt they are. But in addition to the correspondence between these parts of ectoderm forming the neural tubes there is a more deep-seated correspondence between the organizers, the primitive gut-roofs must have been shown in fishes, amphibia, birds, mammals to be active in inducing the formation of the neural tubes and the ectoderm overlying them, & within which there would have been no neural tubes at all.

Clearly, the homology between the neural tubes in these classes of chordates is partly a result of the homology between the gut-roofs.

It may seem, then, that in considering the homology of any given structures it is necessary to consider not only the neural tube

which they arise but the organizers which have induced their formation. This does not mean, however, that the homology between structures is nothing but the homology between their organizers, or would be a fatal mistake to deny any significance to the reacting tissue for the form & view of homology. 125

p 70  
~~The correspondence between homologous structures cannot be pressed back to simultaneous & position of the cells in the embryo or of the parts of the egg and when the structures are ultimately composed. It follows, therefore, that the best criterion for homology is comparative anatomy, & it is still possible to hold as did Etienne Geoffroy de St. Hilaire more than a century ago: "the only general principle which can be applied is given by the position, the relations, & the dependences of the parts, & is a way by their name & include under the term of connexions."~~

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p 71  
The germ layer theory. In the course of development from the egg the materials out of which the various primary structures arise are disposed simply in layers, & homologous structures have been consistently found to arise from corresponding layers.

p 75  
(exceptions to germ layer theory) The tissues of the germ-layers at early stages are plastic, & organizers have the power of inducing the differentiation of structures out of whatever tissues are available to them.