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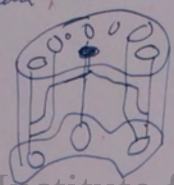
Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the 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.

Gerresheim, E (1913) Ueber den anatomischen Bau und die damit zusammenhängende Wirkungsweise der Wasserbahnen in Fiederblättern der Dicotyledonen. Bibl. Bot. Bd 19 Heft 81 1913 67 pp (MD. 42.69) 1.

His interest seems primarily physiological but many elaborate diagrams & descriptions of the highly complex anatomy of compound pinnate leaves

In Clematis lateral bundles unite to form a median, ventral bundle



Clematis vitalba leaf base

radial structure in leaves

Priestley, J.H. & Scott, L.I. (1935)

p 229

The authors noticed in observations by Foster on Aesculus Hippocastanum L. ~~that~~ appear to hold to lead to the conclusion that during shoot extension, so much of the available food & water is monopolised by the vigorously growing, leafy shoot, that new primordia forming on the apex are restricted in development, so that scale primordia are produced instead of leaf primordia. When the foliage is fully expanded & extension growth is at an end, food supplies for the adult leaves pass to the shoot apex, & then leaf primordia are formed until the onset, probably owing to summer deficiency of water.

The authors made observations on other trees (p 222) too: "in all cases ... come to the conclusion ... scale formation follows closely upon the cessation of extension ... seems reasonable to assume that these are causally connected."

Bud scale in a broad sense = Hemmungsbildung

Foster, A.S. (1936²)

~~tells~~ Describes a paper by S. Lund of 1872 on calyx of the Compositae

p 322

Lund ~~rejects~~ rejects Hanstein's terminology, periblem & plerome in favor of pycnome (= corpus in modern use) & périnome (= tunica in modern use). He considers that the distinction between trichomes & phyllomes rests upon a quantitative rather than a qualitative basis.

See Lund S. Le calice des Composées. Bot Tidsskrift Anden Raekke 2. pp 1-120 continuation 121-260.

Warming Sur la différence entre les trichomes et les épiblastèmes d'un ordre plus élevé. Vidensk. Medd. Naturh. For. Kjøbenhavn. 4 (10-11) 155-200 pp 1 & IX. 1872

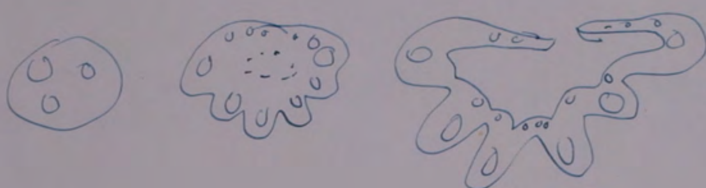
Ruppel, A (1913) Anatomische und physiologische Untersuchungen über die Wasserbahnen der Dicotylen-Laubblätter mit besonderer Berücksichtigung der handnervigen Blätter Heft 81 1913 74 pp

~~Bot Ber~~ 1 Nov 19
Bibl Bot
M D142.69

Liquidambar styraciflua

radial shortening in leaf base for Dormant

Alchemilla vulgaris
Pl ~~F~~ III 13, 14
cut sectn appears to be a real single expansion of radial petiole opposite lamina



This is rather interior, as it were, a real core.

Foster A.S. (1928)
(Bot. Rev) pp 124-5

Bud scales are of frequent occurrence in the Gymnosperms

"It is among woody Dicotyledons, however, that scaly buds seem to reach their greatest development."

Henry (1846) p 212 applies the term Knospenkeim-schuppen to the prophylls of winter buds.
Nova Acta Leop.-Carol. Akad. Naturf. Verh. 22 171-342

Prophylls were first called Vorblätter by Wydler (1843 p154) Linnaea 17. 153-192.

p158 "Apparently in correlation with the characteristic form of bud scale, we find that the internodes between these organs usually remain extremely small and undeveloped in contrast to the situation in the foliage-leaf region, the short."

[In this respect bud scales are comparable with flower parts. A.A.]

Glück, H (1919) 1938 Arber

Preface Glück's general attitude

Names the comparative morphology & nature agains[t] ontogenetic study as 2 methods: abnormalities he regards as less important + to be used in grand description. Disagrees with Velenovsky's insistence on ontogeny.

p V

The tube of a sympetalous flower originates as a single structure & not through secondary union of the separate phyllomes. Nevertheless we must, on grounds of morphological comparison, derive the sympetalous calyx + corolla phylogenetically from originally separate phyllomes, ... in Bot. Dict., their descent is ontogenetically

The leaf sheath of Monocot. is not derived ontogenetically from stipular sheath, & yet the leaf base with lateral stipules, + this from a union of leaf base with lateral stipules, + this is how it must phylogenetically have arisen.

[The mistake is to suppose that structures must have passed through a neat series of stages comprehensible to the human mind, in order to reach their present stage. AA Nov 2. 38]

p V

"all phyllomes are derived from stipulate foliage leaves, which have changed secondarily in various directions." [This is merely phylogeny as the human mind can think the way - Mme the leaf. AA]

Glück H (1919) on

Def. of morphology

[He does not explicitly define morphology but he gets near it, I think, when he speaks of the methods to be adopted" um von dem betreffenden Organ ein möglichst vollständiges Bild zu bekommen" to get.
(p V)

It really is to get a picture in one's mind of the organ in its relation to other organs — a true picture which is consistent with pictures of other organs in one's mind.
AA]

p VI

Regards the leaf sheath as phylogenetically derived from stipules — the ligule ~~a fused~~ of Pot. pectinatus as the tip of fused stipules.
Nymphaeaceae

p VII

Bracts — floral parts are in respect of their stipular organs, often at a more primitive stage than the foliage leaf with leaf sheath.

Glück has succeeded in numerous places in deriving the Blütenblätter in the form of their forms newly derived from the jeweiligen Laubblätter
(happens sometimes!)

Derives flower parts wrongly from foliage leaves

The Blütenblätter are thus phylogenetically derived from the foliage leaves.

p 2

Def. of stipules

Defines lateral stipules as Sprossungen des Blattgrundes, die von dem Haupt-blatt und bei geteilten Blättern von den Endsegmenten in ihrer Gestalt, Grösse, Farbe und oft auch Richtung wesentlich abweichen.

Quite Colomb, G. [illegible] [illegible] stipules & [illegible] shown that the bundles of stipules are derived from the leaf bundle.

Pseudostipules are leaf segments masquerading as stipules.

p.1.
He divides stipules into :— Class.
1. Lateral stipules
2. axillary "
3. interpetiolar "
4. antidromous "
5. ochrea

(4. antidromous are stipules fused into a [illegible] leaf-like member opposite the leaf itself)
3. interpetiolar, union of 2 stipules, one of different leaves.
5. ochrea (p. 6) stipules forming a cylindrical or sack like structure enclosing all the younger leaves.
(adds p117 true typical ochrea, cylindrical, almost or quite closed. eg Magnoliaceae, Polygonaceae
p 7
Cotyledons as stipules in certain Rubiaceae, Polygonaceae
Melastomaceae
p8 He calls vaginal stipules those that are laterally fused to the leaf stalk eg. Rosa
No sharp line between vaginal & free lateral stipules. ~~eg~~ In Pelargonium
p8 Ligularia vaginal stipules, & free stipules in rest of genus, in Astragalus the 2 types within one genus

Glück (1919) cont.

98

p10
Many lateral stipules have ||: nerves, & well devd. nerv. nervation is rare however in the large stipules of Begonia venosa (pp 8-9)

p 11
In reduction of nerves of stipules "kann soweit gehen, dass dieselben überhaupt gänzlich fehlen."

p 11
He quotes a few cases, not from his own observation of ~~stipules in~~ buds in axil of stipules
see Velenovsky Morph. Vol II p 684
Knew Bohlin* (~~team fut~~ ref. dated l.c.)
found axillary shoots in axils of stipules of Alchemilla. Alchemilla aphanoides, alpina, ~~tubercularis~~ & sibbaldiaefolia

Bohlin, K. Morph. Beobacht. über Nebenblatt- und Verzweigungsverhältnisse einiger Alchemilla-Arten. Öfversigt Kongl. Vetenskaps. Akad. Forhandlingar 1899 No 6. Stockholm p 565-582

p12 ~~Can one find examples of heterophylly in leaf pairs at one node~~ p 11 in stipules?
Stipular heterophylly in Vicia monantha (Ervum monanthos described by de Candolle Prodromus Par II p 367, ? germ. tras)
One stipule simple, the other finely divided.
Heterophylly also in Vicia elegantissima
Flacourtiaceae. Azara. 2 differing forms stipules one small & one large.

T.O.

p14
Heterophylly of stipules in Rhamnaceae
Paliurus. The 2 thorny stipules are very different in form & size

Stackhousiaceae also very marked heterophylly in stipules.

p19
All work on the ontogeny of stipules agrees that the lateral stipules are lateral outgrowths of the leaf base | may be paired differently

p25
Stipular thorns in Zanthoxylon (Rutaceae)
Pelargonium spinosum (Geraniaceae)
Euphorbia splendens (Euphorbiaceae)
Paliurus sp. (Rhamnaceae)
~~Celast~~ Various Leguminosae. etc.

p26

p28
Stipules may bear glands, or be reduced to glands alone

= The stipules of Cruciferae were described or ~~lik~~ water cress were known to J. M. Norman.
Quelques Observations de Morphologie végétale. 2 plates (Programme de l'Université. Christiania 1857) Abdruck in Ann. d. sci. nat. Bot 1858. 4 ser. T. X pp 105–141. but no figures.

[Norman was the first to use the term pseudostipules 1857 for the lf-bases simulating or masquerading as stipules] p58

Glück (1919) p 33

No stipular tendrils known.

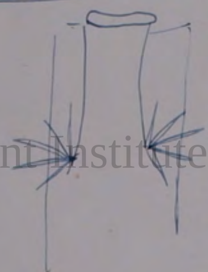
Smilax. Glück regards them as special lateral outgrowths of the leaf base, which may occur as well as true stipules.

p 42

Stipule reduction may go to the point of leaving nothing but hair like structures.

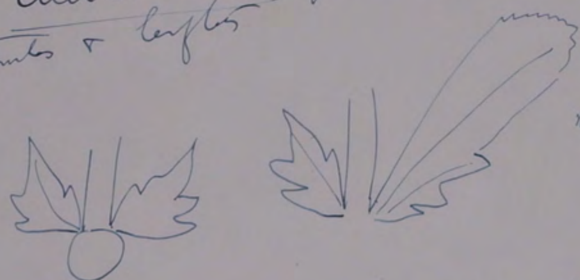
Euonymus europaeus generally 2–3 "feine Wimpern", or even one feine Wimper.

– E. verrucosa very small membranous losthed scales



p 60 Acer arietinum gives many fine transitions between stipules & leaflets.

[This looks more like a fusion between a stipule & a leaflet pinnadum AA)



p 61

In some plants rudimentary glandular stipules are ~~Tetragonolobus~~ combined with pseudostipules e.g. some Leguminosae e.g. Anthyllis polyphylla

p 61 cont.
p 63
In other cases both are leafy e.g.
Batschia laurifolia

[When y [illegible] stipules than pseudo stipules
cf. prophylls filled of some form of juvenile
leaf on a short before mature leaves are
reached. AA Nov 4. 38)

p65
In 0 pea, Pisum sativum, the so-called
stipules are pseudo-stipules — forming
[illegible] leaf ; only in Pisum formosum call
[illegible] true stipules.
[illegible]

p 69
Compositae. Pseudostipules in Senecio scandens
The petiole of the kidney shaped lobed leaf
bears on its base 2 large oval kidney shaped pseudo stipules,
14–21 mm × 8–15 mm.
Less ~~[illegible]~~ conspicuous pseudostipules
in S. candicans, & S. subscandens & S.
stipulatus var glabrescens.
Lots Goebel of pseudostipules of Adenostyles albifrons
& Selloa (species) Chrysanthemum (parthenifolium &
sinense) & Inula & Jurgia & Velenovsky of
Cineraria geifolia & lutea (Maps IV p 66 B 29
1–4

Glück 1919 contd.
p 67

Plumbago capensis has pseudostipules. Demonstrated by a range of species — P. auriculata has 2 lobes showing ~~below stipules~~ which if expanded not stipules of the rest would be like the pseudostipules of capensis (I have paraphrased what he says). The leaf of P. rhomboidea (Curtis Bot Mag. V 156. Plate 2917) is an intermediate type

p 68 Other examples of pseudostipules
Cobaea scandens (Goebel. Organographie p 552-553 Fig 362 A, B)
by J. Schiller (ref. no given) of Chelidonium, Valeriana, Knautia etc.

p 68
Various glands which have been supposed to be stipular are really pseudostipular e.g. Balsamineae + Caprifoliaceae
p 70 "stipules" of Viburnum opulus
p 71
The nectary-bearing "stipules" of Sambucus are irregular in occurrence, + the relations which they show to the pinnules confirm us in regarding these structures not as true stipules but pseudostipules. They represent rudimentary ~~[illegible]~~ modified segments of the lamina. Morphologically they resemble the stipular glands of the Balsaminaceae.
refs. Caspary Bot. Zeit. 1848 p 681
Fritsch Östr. Bot. Zeitschr. 1889 p 214
Dammer " " " 1890 p 261

Gluck 1919 ? cases) prophylla fusion Diagt 2. 13

[When prophylls fuse they fuse on the adaxial ~~side~~ face of to axillary bud — between axillary bud & parent axis; when stipules fuse they fuse on adaxial side of leaf, between leaf & parent axis
(This won't do however as the monocot prophyll is a single leaf!!) A.A. Nov 5. 38]

p 74, 75
Gluck derives axillary stipules from lateral stipules
He shows these then [illegible] ~~axil~~ stipules axillary in position but not fused

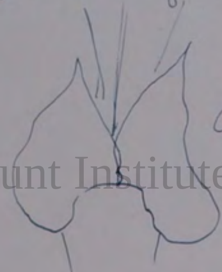
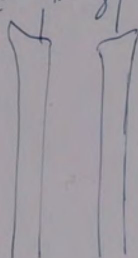


fig 28
Carrigiola capensis

lateral stipules of Nymphaea lotus (below) cf axillary stipule of Victoria regia etc
Nymphaea alba cf p 15

pp 76-77
The axillary stipule of Victoria regia under cultivation is 16 X 20 cm long & 17.5 X 25 cms wide
It is thus the largest axillary stipule known in the Dicots.

p 78
Nymphaea lotus



axillary stipule explained by ~~stipular~~ lateral stipules fused on ~~leaf~~ petiole.

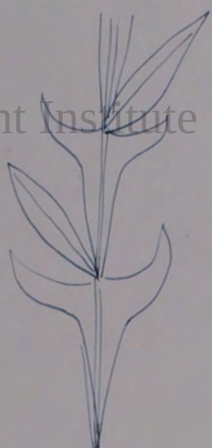
Glück (1919) cont.

Stem wings

p71 *Crotalaria alata*, *stipularia*, *rubiginosa* there are stem wings sometimes called stipular (e.g. Wight – Prantl III 3 pp 227 & 228)

In *C. rubiginosa* they are [illegible] ... [illegible] they both form a triangle. Wight. Icones. Vol III. Florae Indiae orientalis Ref 885

In the 2 other species the wings form two [illegible] like processes. Glück thinks they are simply stem processes.



Crotalaria stipularia

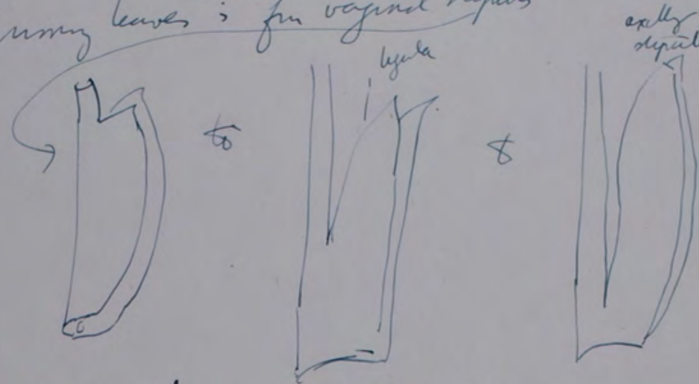
Wight I

Fig 4

p79 On *Lathyrus ochrus* see Goebel Organographie I A p545

The wings of certain *Verbascum*, *Symphytum* & *Cirsium* species are true prolongations of the leaf surface fused with the stem

p80 Glück (1919)
He shows there in Nymphaea alba the development in the primary leaves of four vaginal stipules



p 83–91
Axillary ~~st~~ stipules occur in Dicots in
Urticaceae, Droseraceae,
Artocarpaceae,
Leguminosae, Erythroxylaceae,
Amygdaleae, Euphorbiaceae,
Rubiaceae, Malpighiaceae, Ochnaceae,
Anacardiaceae, Melianthaceae,
Flacourtiaceae, Haloragidaceae.

stipule ~~[illegible]~~ shorter than leaf

p 91
axillary stipules longer than leaf
some species of Anacampseros fr S. America

p 92
In Trapa natans the axillary stipule consists of membranous scales.
The axillary stipules of Anacampseros arachnoides & various Portulaca sp consist of fine hairs. In

Done Nov 11.38

Glück (1919) cont'd

p 90

In the Brazilian *Portulaca* hexagonaria ~~elatior~~ the stipular hairs are so massively developed than the laminas. In many species are covered with a Haarfilz.

e.g. *Portulaca elatior* (Martius Flora Brasiliensis Bd XIV, Teil 2. pl 69) the stipular hairs remain attached to the axis after the fall of the leaf.

p 94

There are rudimentary axillary stipules in Portulacaceae & Apocynaceae.

Axillary stipules in Monocots

p 94

Axillary stipules much rarer in Monocots than Dicots. Numerous Potamogetonaceae, especially *Potamogeton* spp & *Zannichellia palustris*; 3 Hydrocharitaceae, Araceae, *Pistia stratiotes*; *Hydrocharis asiatica*, *Limnobium Spongia* & *Hydromystria bogotensis*.

p 94

Potamogeton. 3 types of stipule.

1. Most frequent, axillary stipules e.g. *P. lucens*, *natans*, *perfoliatus* etc. Often 2-keeled & may be several centimetres long

2. A sheath, open or closed, ending above in a ligule e.g. *P. pectinatus*

3. P. densus with no stipules except lateral stipules attached to the ~~the~~ once two bracts on the base of the inflorescence. (Glück 1919 and)

p56 Fig 40 he traces for the lateral ~~...~~ stipules of ~~p~~ early leaves of P. rufescens up to axillary stipule.

p58
Describes axillary stipule of Pistia but I doubt if this is correct

p102
Antidromous stipules in various families —
Rosaceae, Papilionaceae etc
Astragalus, Onobrychis etc

Longest of any Papilionaceae is Astragalus stipulatus.

p103
In Rosaceae only in Alchemilla vulgaris & related species

p107
The leaf whorls in the Stellatae (Galium, Asperula, Rubia, Sherardia etc) are 4–10 membered. In each whorl only 2 leaves are foliage leaves & the remaining members are true stipules, either free (6 membered) — fused in pairs (4 membered) divided (7–10 membered). That only 2 leaves are present in each whorl is shown (1) by the v. system: Only the 2 opposite leaves

Glück (1919) cont'd

receive leaf traces from the stem. The stipules receive bundles from a nodal girdle. (~~Haustein~~ & Colomb. pp 68–72. Recherches sur les stipules (Ann des sci nat. Ser VII, 6. Paris 1887)

(2) The two opposite leaves alone have buds in their axils.

p 107

Paronychia large interpetiolar stipules

A number of cases of interpetiolar stipules are there mentioned. I only will note p 112 in Umbelliferae where opposite leaves are rare, Bowlesia tenera has divided l.s. have like & in Euphorbia peplis rudiments interpetiolar stipules

[When the stipulation] primary importance & size we may compare Monocots in which the prophyll may attain great importance & then the stipules be almost negligeable. AA Not 6.38)

p 133

Intravaginal scales of Monocots.

These he regards as trichomes & not stipules, since they can coexist with stipules as Irmisch pointed out. The paired scales of the Hydrilleae, which have suggested stipular character, are identical with the intravaginal scales in the nearly related Hydrocharis morsus ranae, in which the scales coexist with stipules. And in

19 15

Zannichellia palustris [Glück 1915] the seeds are paired & combined with an axillary stipule.

p165 etc

He takes the line that Niederblätter & Hochblätter (cataphylls & hypsophylls AA) are Hemmungsbildungen of foliage leaves as Goebel believes

p166

"die verschiedenen ontogenetischen Entwicklungsstadien des Laubblattes identisch sind mit den jeweiligen Formen der Übergangsblätter die sich zwischen Laubblatt- und Hochblattregion einschieben. x x x die einzelnen Hochblattformen ebensovielen phylogenetischen Entwicklungsstufen des Laubblattes entsprechen

[In a sense we may consider the foliage leaf the ~~most~~ ~~fully~~ ~~deve~~ fuller expression of the ~~leaf~~ ~~type~~ (phyllome) but there's no reason to suppose that the less ~~fully~~ ~~expression~~ complete expressions of phyllome nature seen: Hochblätter are ~~phylog~~ descended of foliage leaves AA]

p169

Glück says he has never found seedlings of Umbilicus pendulinus (Cotyledon umbilicus) with spathulate primary leaves tho' he has looked in Wales & West Ireland in autumn ~~autumn~~ at seedlings in all stages without finding any

Glück (1919) contd. 20 16

p 152
The petals of umbelliferae represent two lamina-less stipules. Of the lamina only the small terminal apex (Stummel) (Kronblatt-Spitze) remains.

p 495
The corona is in the form of 2 scales in Lychnis is ligular.
"Die Ligula tritt in Form von paarigen Schüppchen an den Kronblättern auf.

p 224
Certain leaf sheaths are not of stipular nature.
The Compositae have no stipules & their leaf sheath cannot be considered stipular.
The same is true of Plantago.
The leaf sheaths which are non-stipular are recognisable in general by the absence of a membranous margin

p 242
He regards the Gramineae sheath as 2 vaginal stipules united with the leaf base, while the ligule is the free end of the combined stipules.

Glück (1919) p 335 Malvaceae as

Regards the calyx of Malvaceae as eine Hochblattbildung stipulärer Natur; it consists of metamorphosed stipules without lamina rudiment; it is a bract structure independent of the sepals.

p 329. ~~Rosaceae make so ... the bracts ...~~ ~~Rosaceae~~ Outer calyx of Rosaceae = stipules of calyx members

p 343 He regards the petals nowadays as primitive developmental stages of the nowadays ..ge foliage leaves of the same plant.

p 355 There has not ... ... compar... stud... of foliage leaves & flower parts for the p... of view of ...

p 356 Sepals, petals, perianth leaves are in regards as metamorphosed foliage leaves. Phylogenetically all flower-parts are direct Nachkömmlinge of foliage leaves; in other words the flower parts are foliage leaf anlagen which have remained at a young stage of development

p. 371 etc. Glück gives cases in which there is close resemblance between the form & neuration of foliage leaf & calyx. He takes Agrostemma Githago as an example among many others

p 363

He considers that the calyx may belong to the following categories :— ~~a whole foliage leaf; a whole foliage leaf with stipules~~; a whole foliage leaf, without stipules; a petiole-less blade; the base of the blade; the leaf base with intravaginal ~~stip~~ scales; the lower united part the stalk or sheath of a foliage leaf, & the free segments the rudiment of the blade; part of leaf base & part of blade; base of blade or leaf ~~blade~~ base; two stipules united; the base of the united stipules; stipular sheath.

[This long list might be explained by saying that sepals may correspond to either the whole of the stipulate foliage leaf or some part or parts of it. AA]

p 386

The calyx of Umbelliferae mostly rudimentary, but Lagoecia cuminoides (Pl V fig 63 a–c) has large pinnate free ~~sepals~~ calyx segments.

p442

All ~~calyces~~ sepals then correspond to a whole leaf, a leaf with 2 stipules, or a stalkless blade (have a neuration the same plan, corresponding to that of the foliage leaves) the sepals then correspond. The neuration is less developed, 1, 2 or 3 & higher orders. Where absence of the ~~veins~~ branches of 2 stipules, show the sepals there correspond to the fusion of 2 stipules,

nervation of foliage leaf stipules in reduced form; these 19 and ~~are identical~~ correspond with a stipular sheath show the nervation of the latter

p 444

Like cataphylls – hypsophylls the sepals may be regarded as Hemmungsbildungen of foliage leaves or parts of foliage leaves

pp 445–6

Just as for sepals, Glück regards the petals as represent the foliage leaves (or parts of them) in reduced form (so also the perigon p 559

p 44) Schizopetalum Walkeri ^ (Curtis. Bot. Mag V 150, t. 2379) has pinnatifid lobed petals resembling the foliage leaves

[If the petals are sterilised stamens, ~~one would~~ a subtle would be noticed that they should show some resemblance to the foliage leaves of the species when they become leafy. KH)

p 527. Sympetalous corollas with stipular structures.

Petal stipules ~~form~~ eine paarige Ligula (Apocynaceae); or appear as Zwischenzipfel like interpetalar stipules (Gentianaceae, Apocynaceae, Asclepiadaceae; or appear as undivided scales (Apocynaceae, Boraginaceae); or form much divided ligular scales (Gentianaceae, Apocynaceae Rubiaceae), or a continuous ring (Rhamnaceae,) or a prominent Kante (Apocynaceae)

p559 Glück 1919 cont.

Petals may have pinnate or palmate venation, or curved, or parallel veins

p641 et seq.

Lists a number of cases of stipulate & ligulate stamens

p652

Fig 280, 6 p 652

Zygophyllum macropterum

stamen with ligule

p663

He refers to the hollow scales of the Boraginaceae
as "Fragwürdiger Natur".

Hayata B (1931)

p 328
Assumes that the ancestors were as numerous as the present species, & the ancestors & their derivatives are united in a reticulate relation.

p 332
Pointing that the typical "tree" picture of evolution is a rootless tree.!

p 346
Wirkliches Wesen und äussere Erscheinung können nie voneinander getrennt vorkommen. Wo eine Realität ist, ist auch notwendig eine Erscheinung davon.

Hayata, B (1921

p 98

"I regard the natural system as a dynamic one, changing with the view of the systematizer & subject to alteration, according to the way in which it is considered, & I believe that none of the species, genera or families has a fixed natural position, but has changeable positions, subject to alteration according to the criterion for comparison."

Footnote p. 99

"In the course of my study, I became more & more aware of the analogy between the classification of words & that of plants. An artificial system of plants is comparable to the ordinary dictionary in which words are arranged in alphabetical order. In consulting such a word list, we merely consult our own convenience; while another kind of dictionary like Roget's Thesaurus somewhat resembles my dynamic system, denoting real relations between plants themselves

---

Roget's Thesaurus 13th edit. 1863

[my edition]

Introduction vii

"The words & phrases of the language are here classed, not according to their sound or their orthography [he might add, or their derivation" AA] but strictly according to their signification."

[Derivation in word may be regarded as phylogeny in species. AA]

p XVII – XVIII

"I enter into no enquiry into the changes of meaning [the words when I classify] are now used ... I enter into no

Roget's Thesaurus contd (interpolation in Haycraft) 1921 27

inquiry into the changes of meaning they may have undergone in the course of time. I ... have no concern with their etymologies, or with the history of their transformations; far less do I venture to thread the mazes of the vast labyrinth into which I should be led by any attempt at a general discrimination of synonyms.

p xxiii

"classification of ideas is the true basis on which words, which are their symbols, should be classified".

Footnote

"The principle by which I have been guided in framing my verbal classification is the same as that which is employed in the various departments of Natural History. Thus the sectional divisions I have formed, correspond to the Natural Families in Botany & Zoology, & the filiation of words presents a network analogous to the natural filiation of plants or animals.

[Is this in 1st edn which is 1852 (thus pre-Darwin?) the net-analogy.

Haycraft (p 100) notes Roget's use)

p 101 (Haycraft contd)

"the resemblance of individuals in species is not confined to cases of blood-relationship, but is manifested by the emotional-and relationships."

p 103

The genus now present are those that have existed for the eternal past & will continue to exist through the infinite future.

[So far as I can see, he completely disregards geological history. Of his partisipation there — it is unlikely. Have not altogether understood his partisipation — but it is unlikely. Maybe he has been influenced by Roget's views — his

naive surprise at the coincidence between ~~his~~ the scheme of his paper & the scheme of Roget's book is amusing & more significant in ~~[illegible]~~ its way hyper-an of his psychology than in classification. When he is rejecting sees only the rejection of the true analysis of psychology.

p115

Engler "speaks of "natural affinity" (Natürliche Verwandtschaft), the true meaning of which is certainly blood-relationship. 'But non-systematologists can trace directly ... is constitutional resemblance instead of blood-relationship .... We are ... obliged only to infer blood-relationship through the resemblances of constitutional resemblances, [illegible] the latter (his, in reality, [illegible] than the former is in agreement with [illegible] need not agree).

[See use of criticism)

Hayata. criticism (Nov 14 & 15. 1938)

Hayata (1921, p 98) says that the natural system which he wishes to see established "is a dynamic one, changing with the view of the systematizer & subject to alteration, according to the way in which it is considered." He adds that he believes "that none of the species genera or families have a fixed natural position, but has changeable positions, subject to alteration according to the criterion of comparison." He contrasts his views with that of previous systematisers such as Engler, which he calls "static". By using the terms "static" of the orthodox, & "dynamic" of his own, Hayata has, I think, prejudiced the issue from the start. When these two contrasted terms are presented to the reader, it is a foregone conclusion that a "dynamic" theory ~~[illegible]~~ must be preferable to a static one; but they are no justification for the use of these terms, [illegible] what in fact [illegible] Hayata has in mind. ~~[illegible] used justifiably, since they~~ fail to convey ~~Hayata's~~ what Hayata's "dynamic" ~~[illegible]~~ system has no right to the designation; because it changes with the point of view of the systematist; it would be fairer to call it "partial" or "changeable", or to describe it merely as "subjective", & as making no claim to objective reality. ~~It has, however, scarcely possible to [illegible] analyse Hayata's work, since they are [illegible] as [illegible]~~ I [illegible] account, Hayata's theory is known too [illegible] confused for detailed analysis; if he also states that "If the natural system should be fixed to explain all the mutual relations of all the members of the system, it would be a dynamic one": We are thus led to the conclusion that, ~~[illegible]~~ in the last resort, the "dynamic" system [illegible] mystic [illegible] the unfixed to

Hagen (criticism) cont.

character quality that was described in the first place as of distinctive character. It is also remarkable that, when it comes to the practical application of his theory of taxonomy, his claim to the establishment of a new viewpoint fades away. The actual classification which he proposes differs in no important respect from ~~[illegible]~~ those of other systematists, though in his notes he lays special stress on the points in which each group shows approaches to other groups, even to those which would be placed far away on ~~any~~ any natural system. Such resemblances, however, are recognized by all serious ~~systematists~~ taxonomists. Then ~~as~~ so much ~~many~~ parallelism between all the families of flowering plants taken two by two that between ~~of can find~~ some [illegible] can be found a commonality ~~[illegible]~~ of any pair chosen at random, ~~[illegible]~~

// Roget's class:

~~Roget's~~ Hagen considers his system parallel to Roget's classification of words. But ~~any~~ natural system must be compared to a more dictionary. Roget's system, ~~to~~ any artificial system to a more dictionary. Roget's system, as any artificial system ... though he does not use — there is no classification of words, derivatives would correspond to polytypy, while unrelated words of the same meaning might be compared to ~~[illegible]~~ species which had reached the same evolutionary level by different routes — as may be by more remote routes as when, for instance, a Romance word or Teutonic word in English have acquired an identical or at least closely similar meaning. Similarity in sound

Hayden's criterion. cons.
& conversely may be regarded as ~~habitat~~ "habit" similarities, sometimes masking fundamental differences

Hayden discounts palaeontological evidence altogether & assumes that the genes have found their exact [illegible] ever (all the way down) See Hayden B (1931). The ancestors of numerous present species.
He is bearing the words on p. 115 ~~[illegible]~~ copied just before the criticism. In so far, his work is valid it is in urging the possibility of parallel (identical) contributions in non-related plants, & in his rebuttal of the retraction rather than the tree as simile for the history of ~~the~~ any groups.

If there has been evolution in tending seeing Hayden perhaps helps as letting one feel this ~~[illegible]~~ state possible, & [illegible] subjective one.

SA.

~~Bohl~~ (vol fulled 1899, 1900" on title page)

32

Bohlen, K. Morphologische Beobachtungen über Nebenblatt – und Verzweigungsverhältnisse einiger andinen Alchemilla-Arten. Öfversigt af Kongl. ~~Vet~~ Vetenskaps – Akad. Förhandlingar 1895. Stockholm No. 6 pp 565–581

In some Alchemillas one stipule is dwarfed, & the other often bears an axillary bud.

a) both stipules present. A aphanoides (stem leaves & bracts) A. alpina bracts

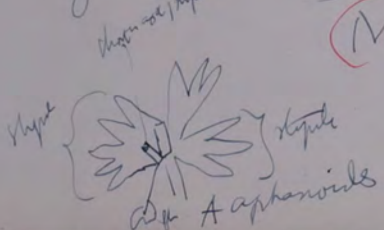
b) generally one stipule only present, frequently both vanished. A pinnata, A orbiculata, A sibbaldiaefolia (Hochblätter)

Clos. Bull Soc Bot de Fr. T. 16. 1875 p 150. Adesmia aphylla. Astragalus have buds in axil of stipules

pp 577–8

Lathyrus aphaca there may be buds in axils of stipules or in the normal place between them. He does not know whether the buds in A. sibbaldiaefolia & orbiculata are capable of giving rise to true leafy shoots

(Must look at this again of young Alchemilla



Buds in axils of stipules = whole leaf attempts to stipules.

33

Fritsch, K. Ueber die Eigenthümlichkeiten ausserordentlich üppig entwickelter Schösslinge des schwarzen Hollunders. pp 214-217
Österr. Bot. Zeitschr. Jahrg 39. Wien 1889

P. 370: b. 89. 39

Details) leaf variation, stipules etc. not read properly.

If deny Sambucus in detail this must be read again..

Caspary
Ueber die Nektarien der Stipulä von
Sambucus racemosa und nigra
Bot. Zeit. Jahg 6 1848 pp 681–687)
He calls them Stipular-secs
instead of stipular nectaries
Q 370-6.7.6.

Dammer, U. Die Extrafloralen Nectarien an <u>Sambucus nigra</u>. Österreichische Bot. Zeitschrift. Jahrg. 40. Wien 1890
<u>pp 261 – 264</u>

Thus the ~~glands~~ objects at base of the Sambucus leaves which excrete nectar are stipular

But you may get a third <u>between</u> the two in a stipular position [in] the leaves the nature of this doubtful

& also describes these nectaries as occurring elsewhere, which he calls metamorphosed leaf teeth

He divides the extrafloral nectaries into 3 :—

1. Metamorphosed stipules
   " pinnules of second order
2 " ~~for~~ leaf teeth
3 "
(or possibly 4 — stem excrescences.)

? think he was wrong since there sometimes comes one between the two which correspond [to] stipules.

Huxley, T.H The Gentians: Notes & Queries 36
Journ Linn Soc Bot. Vol 24, 1888 pp 101 – 124
P. 370. b. 104. 13

p 121

If ... no conclusion appears to me to be very clear; that
is, that they (the Gentianae) are not to be accounted for
by migration from any "centre" of diffusion, or such a locality
can be assigned in the present condition of the world.

p 122-3

it would be rash to deny that species belonging to the same
type may have arisen in different localities; but it seems
probable that the process of modification & the retention
would upon would be so similar in widely different localities
as to give rise to close simulacra. Such
groups undoubtedly the same species; but the polygeny
of genera, & still more of larger groups, appears to me
to be highly probable.

ref to Tyler p 318 2 third

Engler A Versuch einer Entwicklungsgeschichte der Pflanzenwelt. Theil II 1882 37

Leipzig RD. 50.81

p 318

~~exp~~ differ[some] Ofsted lin the Leens sedimen-

ages of species at differ points

Roget, P. M. (1852)

p xxiii footnote: 1st ed., Roget's Thesaurus

"The process [of] verbal classification is similar in principle to [that] which is employed in the various departments of Natural History. Thus the sentient divisions [have] formed, correspond to Natural Families in Botany & Zoology, & the [gradation] [towards] presents a near analogy to the natural [gradation] of plants & animals."

(Roget Origin, Species A.A.)

Norman, J. M. (p. 382 - 45.32) Quelques Observations de Morphologie végétale. Ann. d. sci. nat. 1858 Ser. IV. Bot. T. IX pp 105 - 141 39

p106
He finds glands associated with leaf base & axil in about 9/10 of Conifers (He examined ± 140-150 species representing more than 1/2 the genera of the family. He then discusses these & mucilage glands & then (p 113) decides that they are stipules.

p114
When the foliage organ is reduced to organs of an inferior rank (hairs, glands etc.) several of these may represent a single leaf. In Sphenogyne the aigrette represents the pentaphyllous, or at least oligophyllous calyx.

p115
When several glands in phalanges or in groups occur on the base of the leaf or auprès d'elle, these glands may together represent two stipules.

p116
The great majority of Conifers having two glands.

118-119. In very young leaves the glands are more layer relatively to the leaf than they are later.

p120
The leaf comes into existence before the [glands] [stipules] appear

p121
Other earlier observers had also seen the stipules

p162
Notes under ~~stipules~~ bracts & stipules
(He has a section which I have not read on the stipules
of Lotus, Dorycnium & Bonjeania & Epilobiaceae
& Lythraceae.)

His figures are not given. See of Glück (who got
the Ann d Sci nat ref wrong; the original is in
Programme de l'Université de Christiania
1857 but Norman himself does not mention
this or give a ref.)

(Might be worth reading more thoroughly)
I believe he talks about pseudostipules, but
seem to have overlooked it — it's probably in the
non-Cruciferae part

Norman J M (1857) The original which I have found is a
reprint (quarto in a big volume) in Lausanne

I have not compared this with the version of paper cited in 1857
above, but it appears to be the same thing. The figures in the 1857
version show the stipules viewed as solid objects. In
Crambe hispanica he figures a very young leaf, showing
that in the young leaf the stipules are relatively large.

Trécul, A (1876)

Cf. ff peduncle of Clivia in 8 leaves // various Agave spp.

Observes to invert bundles: Narcissus leaf

Condensed

"Dès lors n'est-il pas plus naturel de dire que c'est la ramification qui se modifie pour produire les divers organes des plantes, et de diviser les rameaux en terminés ou définis et en non terminés ou indéfinis? Les rameaux définis sont les feuilles, des stipules, les spathes, les bractées, les sépales, les pétales, les étamines, les styles ou les divisions stigmatiques. Les rameaux indéfinis sont les racines ou branches souterraines et les adventives, les branches aériennes proprement dit, les pédoncules, les corps réceptaculaires, les ovaires et enfin les ovules.

Toutes les divisions de la plante étant considérées comme des modes de la ramification.

(in very good line with his glimmering of a holistic standpoint)

Uittien, H (1928)

p313

[All I have said in work & short paper is :–

"The idea of the essential equivalence of stem & leaf has recently received striking confirmation from the work of Uittien, who has shown that among the Flowering Plants there is a correlation between the relative lengths of the main & lateral ~~nerves of the~~ axes of the branch system, & of the main & lateral nerves of the leaf."]

Uittien
pp 390–1 (Introduction)

He hopes to be able to prove that the relative lengths of the main & lateral axes of the stem stands in close correlation with the relative lengths of the main & lateral nerves of the leaf. If the leaves of a plant are pinnately nerved or pinnately divided, then the main axis of the stem exceeds the lateral axis in length; the infl. axis is racemose; while the leaves are palmately ~~overreach~~ nerved or divided, when the lateral axes exceed the main axis; in the last case he calls the branching cymose (tho' he points out that this is not exactly the textbook use). He calls the inflorescence of plants with opposite leaves not-cymose but dichasial.

Sachs in his textbook (4th edn 1874, p 187) uses the expression cymose for palmately ~~leaves~~ veined leaves, so that it may be assumed that he had in mind the correlation of leaf & shoot.

p401

He reckons parallel veined leaves in the hand-nerved type e.g. non-Monocots.

Willkomm contd. (2)

43

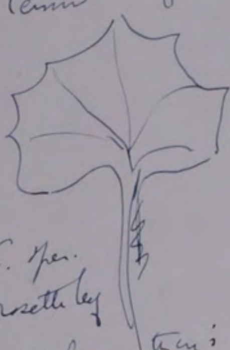
p401

Velenovsky (p ~~783~~ 809) forms mt. that all capitate are not racemose, gives some examples, cymose. Willkomm adds that the umbels of Umbelliferae are cymose, & of Primulaceae, racemose. infl

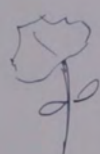
p402

The outer form of the leaf does not always correspond to the Gerbalt type. pp402-3

Cardamine. The Cruciferae are typically racemose & pinnate-veined, but there are several species whose names alone suggest palmate venation e.g. C. pedata Regel et Til, C. cordata Barn. C. rotundifolia Michx & C. asarifolia L. ~~But~~ ~~The~~ All these have ~~occasionally~~ small leaflets beneath simple leaves, in the terminal leaflet.



C. spec. rosette leaf



same species stem leaf

In rosette leaves there is often a shortening of the leaf-spindle shaped at the base near the stem which makes the leaf heart-shaped; stem leaves are pinnate

p404

Whether ternate leaves count as pinnate or palmate nervation depends on comparison with related species or genera. Palmate - Ran. Umbell. & pinnate - Leguminosae

p405
Cytisus Lobuneum + Leguminous species of describes as palmate, a number with the acknowledgment of their origin from pinnate forms.

p407
He regards *Bauhinia* leaf as due to fusion of 2 leaflets, then may produce a perfectly simple looking leaf
of REFres. Arkiv f. Bot. Bd 8 1909 &
Velenovsky II p 457-8

p410
The Umbelliferae do not make the distinction between the ~~inflorescence~~ vegetative branching *infl + veg branch*. The lowest inflorescence may easily be replaced by vegetative rays / an umbel may [illegible]
axes.

of Daucus
The umbel has in common with a true cyme inflorescence that the main axis verkümmert (dwindles, disappears) a and in flower, while the lateral axes overtop the main axis, & may carry on the branching. # The umbel has only got the reputation of being racemose because lateral before the dying out of the main axis, so many axes are formed.

p411
2 or Umbelliferae the umbel is a cyme, but in Primula it is a raceme; in the Umbelliferae only the lateral branches can go on growing, while in Primula (e.g. the Etage-primulas) the main axis elongates.

p412
He regards all Umbelliferae leaves as palmate, or as derived from palmate forms.

p413
In repeatedly pinnate Umbelliferae leaves the laminar features are homologous with the axis of the leaf — in other words pinnate leaves are ternate. One can see this developing leaves.

p430
Stipellae = repetition of the stipulae of the leaflets in whole leaf as the bases of 5 - 6 the families. many Leguminosae

p431
Enumerates 8 racemose families & notes that seven of them Simaroubaceae, Burseraceae, Meliaceae, Sapindaceae, Sabiaceae & Anacardiaceae, & Melianthaceae, have flowers in Rispen than in the remaining families, & corresponding on this they generally have more compound pinnate compound leaves. He points out that this is a further proof of the agreement in branching characteristics of leaf & stem

Gagnepain 1941 paper

p434
When leaves are opposite, one would not expect opposite lateral branches of the main axis to be the inflorescence, but the (relative) main axis would be abbreviated. It is completely form this abbreviation results in the main axis abortion, or terminating in a flower, & e.g. Caryophyllaceae, a dichasium is produced. The two

Uittien contd. (5) 46

2nd axes overtop the main axis, & in turn overtopped by the axes of the next order

"Der causale Zusammenhang zwischen der Blattstellung und der Achsenverkürzung entgeht uns zur Zeit völlig."

[But is not the point that the shoot is subject to rhythmic elongation & abbreviation. This occurs with internodal shoots, giving an ~~elongated~~ attendant internode & a suppressed node, bringing the two leaves to one level; while in the ~~[illegible]~~ complex the tendency to abbreviation produces the ~~[illegible]~~ terminal flower & the tendency to elongation produces the elongation of the increasing lateral internodes between the nodal shoots in

A rhythm opposing to main cauline

AA Dec 6 38]

(This is due to strong tendency of the lateral axes of an underlying aspire to be the main axis [of underlying] undisposition & which is dying onwards to ~~[illegible]~~ of an open star.] (I see I missed the point that Uittien also misses — that 2 opposite leaves exhaust ~~the main~~ axis AA Oct 13.42

pa 35 Contrasts the capitulum of Compositae & Campanulaceae also Cymose with that of Dipsaceae, Valerianaceae & Rubiaceae, which is dichasial. [Thymus he treats the inflorescences of plants with opposite leaves as a special case. It may be really special, I think — a contrast between a continuous spiral & an interrupted spiral. The plant with opposite leaves is coming near the flower type. AA Dec 6. 38]

p439
In opposite leaves we get abbreviation of the leaf-spindle, giving a leaf with cordate base, a palmate, or palmate compound leaf. The horse Chestnut is an example.

p440
In the genus Gilia (Polemoniaceae) see Brand, Das Pflanzenreich 150) there are 66 species with scattered pinnately nerved leaves, more than 30 with opposite ~~alt~~ palmate leaves, & possibly 3 with scattered but palmate leaves.

[Here again the connexion really seems clear. Alternation of elongation of internodes & abbreviation in the individual shoot, & alternation of shortening of main axis & elongation of the veins in the ~~pal~~ leaf. A.A. Dec 6.38]
shortening of midrib = stopping of apical growth

p443
Guttiferae, Myrtaceae & Dipsacaceae are three families an exception in giving opposite leaves but no palmate venation.

p444
He regards the Platanus leaf as essentially pinnate.

Uittien (7)

[Is there a correlation between long petiole & heart-shaped leaf (i.e. long petiole & leaf, [illegible]) ~~[illegible]~~ marked in comparison with main laterals?
Also between internode elongation of climbers & a heart-shaped leaf — Internode elongation may inhibit the spindle 1° leaf in cases of scattered leaves, or still more than two leaves are at same level as in decussate leaves. AA Dec 8.38 (U. quotes Beketoff as finding the length of the whole stem to leaf stalk one in inverse ratio to one another)]

[p471 C. de Candolle (1855) concludes that peltate leaves are not whorled & are seldom in opposite pairs

p 468
Uittien notes however that with few exceptions peltate leaves belong to cymose or opposite-leaved families

[Peltation is some ways an extreme case of [illegible] leaf. AA Dec 8.38
[illegible] importance) about [illegible]]

Root, stem leaf

pp 474-5

"die Einheiten der Morphologie sind Stengel, Blatt und Wurzel, .." Zwar sind diese drei Einheiten durch einen grossen Komplex von Eigenschaften von einander verschieden, doch sind sie an denselben Individuum aus vollkommen gleichen Zellen entstanden; sie haben unendlich viele gemeinsame Eigenschaften, chemische und anatomische, weshalb dürfen sie dann in der Verzweigung nicht übereinstimmen? Die scharfe Grenze zwischen den drei morphologischen Einheiten wird dadurch nicht beeinträchtigt."
(prejudiced)

Wittrew (8)

He quotes Velenovsky ~~page~~ 626
who relates tree branching & leaf nervation.
quite specifically.

p477

Conclus

The relative lengths of the main & lateral axes of the plant stands in ~~relation connexion~~ is correlated with the relative lengths of the main & side nerves. One may hence say in general that palmate nerved & palmate formed leaves belong in cymose inflorescences, & ~~form~~ pinnately nerved ~~formed~~ or pinnate formed leaves to racemose inflorescences. Exceptions to this rule are numerous, since leaf form & inflorescence may in different cases vary independently.

... When the leaves are opposite, the main axis is almost always shortened in favor of the side axes; ... i.e. decussate inflorescences may change into the so-called cymose. Also the nervation of opposite leaves may be palmate; a heart-shaped leaf often occurs in such cases. ... The leaf form of Lianes is not to be explained thro' adaptation, but stands in relation with the branching of the axis — so also peltate leaves

Snow R (1929)

It is clear from this paper & the references in it that ~~axillary buds~~ - both the shoot apex & also older leaves may have an inhibiting effect on the development of the axillary buds

The leaves inhibit not only the axillary buds but also the terminal buds, causing them after a time to stop elongating & to turn into winter buds."

(f this see Dostál Ueber die Sommerperiodicität bei Quercus und Fagus. Ber. d. D. bot Ges. 45. 436 1927)

[Inhibiting effect of leaves on apical & lateral shoot ~~shoot~~ buds is a confirmation of my idea of the leaf striving to be a shoot, & the competition between the two.
AA Dec 8.38.
also competition between main & lateral shoots

Goebel (1889)

[illegible] U. vulgaris [illegible] aufgefunden "Ausserhalb der gewöhnlichen Ausläufer andere, bei welchen die Blätter zu blasenlosen, dicht mit Drüsen besetzten krallenförmig eingebogenen Gebilden geworden sind ...

Uebrigens können die mit Krallen besetzten Sprosse an ihrer Spitze wieder in gewöhnliche übergehen.

51A

Glück H (1906) AB. 80.70 51B

p 15 -18

Describes figures an example for U. neglecta in which an inflorescence has been highly transformed — has transformed into water shoot

Taf I fig 7 a-b

p 18 He states that it is not an adventitious shoot, but develops from meristematic tissue on the leaf margin. This continues on the leaf instead of springing from it at an angle which an adventitious shoot should do [this seems highly artificial distinction AA]

p 19 [This is the only example he knows of in Lentibulariaceae]

U. vulgaris Pl II fig 13 An example in which an air shoot is transformed at its apex into a water leaf

Pl II fig 14 U Bremii

A bud scale isolated from the parent plant produced a water leaf bearing bladders from which appeared on the rudiment of a bladder

[Can it be that these transformations are understood possibly by reduced water anatomy which would not much differ a water shoot v. zygote from a vein of a leaf? AA Dec ~~16~~ 15. 38

When it comes to this there is no real confusion of categories, but in the ~~Lentibulariaceae~~ we have adventitious budding carried to an extreme point — if it happens to occur at the leaf apex which has prolonged apical growth it may form a continuation of that apex instead of a ~~lat~~ shoot at an angle with the leaf surface as is usual in adventitious budding from leaves. AA Dec 16. 38]

Goebel K (1909.)

p125

The leaves of many Lentibulariaceae have the capacity of producing adventitious shoots.

eg. Pinguicula caudata & alpina & in the water Utricularia. In U peltata, diffuse; in the Utricularias on the forkings of the leaf & the stalk of the bladder. The adventitious shoots occur especially if leaves are detached.

p123 He figures Cardamine pratensis with slightly dev. adv. shoots on the bases of the pinnules, & rudiments on the points of ~~separate~~ the vein branchings

Bower 1916

p 695

(General conclusions about Vascular plants)

"the leaf is a bifacial member with margins defined structurally, tho' these may be obscured"

(He admits exceptions of course)

p 703

in almost all Angiosperms the apical growth of the leaf-primordium is arrested early,

p 704

In the Higher Vascular Plants that is lost by arrest of apical growth is largely made up by intercalary growth ||

It is on developmental & comparative grounds that the line will have to be drawn in each special case

between the two possible sources of the parts ranked as "stipules", viz. basal developments of wings, & primordial leaf-[illegible] a basal position of intercalary growth above them.

Stipules & pseudo-stipules

Candolle, C de 1868
Leaf = un rameau à face postérieure atrophiée
Applies anatomical conditions to morphology

p50 – 51

~~the leaf~~
[?] la feuille ... ~~est~~ "un rameau dont le cône terminal serait frappé de stérilité, tantôt sur une zone plus ou moins étendue de son sommet-même (feuilles peltées, feuilles cylindriques, feuilles plates, mais complètes, telles que Acer pseudo-Platanus et Populus nigra), tantôt sur le sommet à la fois et sur la face postérieure (~~feuilles~~ feuilles ordinaires)."

(He seems to refer to retention of radial symmetry in Acer Pseudo-platanus & Populus nigra

p 37
bundles, leaves of peltate leaf petiole
"répartis également dans le pourtour du pétiole" (Troll attributes this observation to Martens, 1869, not de Candolle as far [illegible])

Dostál, R (1909)

p553

The assimilating leaf forms Hemmungsstoff which hinders the growth of the axillary bud. If the leaf is removed or rendered inactive, so that it produces no Hemmungssekretionen, the axillary bud becomes free, and grows strongly if it has enough food material.

Dostál R (1927) I cannot follow. Better quote Snow & the references there given

Beketoff (1868 / 67–)

p 421

His theses are:—

1) The length of the limb & of the leaf stalk stand in inverse ratio to one another (~~& then he means the~~ ~~length of the leaf limb in proportion~~ to its width)

2. Je länger der Blattstiel, desto verhältnissmässig kürzer, oder, was dasselbe ist, desto verhältnissmässig breiter ist die Blattscheibe

3) ~~The length of stalk & the number of members in~~ whorl stand in inverse relation to one another

Je mehr Seiten in einer Blattanordnung, desto verhältnissmässig länger, oder, was dasselbe ist, desto verhältnissmässig schmaler sind die Blätter

(In each case he is telling us the proportional length of leaf)

Fothergill, WE (1888) (notes the cordate, sagittate hastate sometimes peltate leaves seen in
p 307 In climbers
"basal development varies inversely with the amount of strengthening tissue in the stem".
The longer the stalk the more cordate or sagittate the leaf
(p 310 excludes climbing petioles)

(climbing plants often enough to show that "there may be some causal connection between the climbing habit & large development of the basal portions of the leaves."

Begun Dec 15, 1938. Finished Dec 17, 38

von Schultz-Schultzenstein (1861) (1)

Disputes Goethe's metamorphosis theory!

p275
"man weiss nicht zu sagen, was das Blatt ist *; es bleibt ein abstrakter, mechanischer Flächenbegriff."

Leaf – axis
abstract-Concepts

p276
Ist der Achsenbegriff ebensowenig bestimmt, und vielmehr nur eine mechanische Abstraction, wie der Anhangsbegriff."

axis – appendages in leaves as well as shoots

p277
Auch wiederholt sich das Verhältniss von Achse und Anhang in den verzweigten Blättern aller Pflanzen, so dass also der selbst mechanische ~~Achsenbegriff~~ ganz und gar nicht ~~Achse~~ auf die Stengel zu beschränken, ~~und Stengel~~

Branching is the fundamental property of plant life

p278
Wir betrachten die Verzweigung als die wahre morphologische Allgemeinheit der Pflanze, welche daher auch in allen äusseren Pflanzentheilen zu erkennen ist, so dass die Pflanzengestalt nur als Ausdruck der Verzweigung erscheint.

misfortune of Deutsch-word "Branch" not "Shoot"

p279
der Name Spross als eine mit Anhängen besetzte Achse, mit Zweig identificirt, und Spross für Zweig gesagt worden ist, ~~(it disappears apparently ... this)~~

(He disapproves, this because he wants to include the branching, to leaf veins etc as "branching" XX)

von Schultz-Schultzenstein (cont.)
(2)

59

p 281

Die Blattstiele sind die Stämme, aus deren Verzweigung die Blattrippen hervorgehen. Das Verhältniss der Blattstiele zu den Blattrippen ist das gleiche wie das Verhältniss von Stamm und Zweig an den Stengeln; beider ist eingang ähnlich, &c. Die Blattstiele besitzen daher auch im Allgemeinen den Bau des Stengels, und sind entweder vollkommene oder halbirte Stengel, deren Hälften sich auf den gegenüberstehenden scheitelwüchsigen Seiten entsprechen. Bei den Blättern der Lupinen, der Malven, Rosskastanien, Araliaceen besitzen die Blattstiele vollkommene Holzringe wie die Stengel der Pflanzen; da wo die Blattstiele halbrund sind, stellen sie die eine Seitenhälfte dieses Baues vor. xxx Wenn daher die Blattstiele den Stengeln, die Blattrippen aber den Blattstielen gleichgebildet sind, so sind alle Blattrippen wahre Stengelgebilde, und zwar wie alle anderen Zweige.

In gewissen Fällen wiederholt sich sogar die quirlförmige Stellung der Blätter um die Stengel der Pflanze in den Blättern selbst, wie besonders bei vielen gescheitelten (gefingerten) Blättern der Araliaceen (Sciadophyllum), der Hülsenpflanzen (Lupinus-Arten), so dass ein solches Blatt einer ganzen Actinophyllum beblätterten Pflanze ähnlich wird.

correspondence of petiole & [illegible] to stem & [illegible] whole

Selbst die Regel der Stengelverzweigung, dass von den Knoten ihrer beblätterten Pflanzen Glieder Blätter entspringen, wiederholt sich im Kleinen an der Blattverzweigung, indem sowohl an dem Knoten, wodurch sich der Blattstiel von dem Blatt abgliedert, Blattfortsätze, welche die

von Schultz-Schultzenstein cont.

Stipulae, Ochreae darstellen, als auch an den Blattstiel ramificationen der zusammengesetzten, namentlich der unterbrochen gefiederten Blätter Blattansätze sich bilden, welche als Stipulae foliorum [Stipellae] zu betrachten sind.

p282

in den verzweigten (gefiederten) Blättern die Blattstiele die Achsen, die Blättchen dagegen Anhänge darstellen, und beide als solche ganz mit den Stengelachsen und Anhängen übereinstimmen. [punctuation of leaf as leafy axis] anaphyta.

p 285–6
Hexzens [illegible] the plant is made up of anaphyta

p. 288
Die Verzweigung ... ist eine wiederholte Erzeugung von Individuen, welche mit der Mutter verwachsen bleiben, sich nicht ablösen, so dass das Ganze vom Stamm und Zweig eine Gesellschaft unter sich verwachsener älteren und jüngeren Individuen bilden, ... ~~Das~~

Die Verzweigung drückt daher den allgemeinen Charakter der Pflanze aus, und man kann die Pflanze definieren als ein Wesen, das sich verzweigt.

[Paper full of insight but also much in it that is useless and not worth controversy. Ben[?] attack of others is positive[?], good and worth [illegible]. He finds in it substantial truth; should I stem[?]
He fails in not [illegible] the leaf lamina veins & their consequent ways [illegible] branches of a shoot, whereas the leaf corresponds to stem branches than branch.
lamina : petiole = leaf : stem
HA
Dec 17 38]

Skutch, A. F. (1930)

Origin of pseudolamina = Banana

pp 254–5

The fully developed leaf consists (descriptively) of sheath, petiole, lamina & precursory appendage. The precursory appendage in the smaller leaf rudiments forms a large proportion of the length. (p 256) The lamina halves are younger than the remaining portions of the leaf & are intercalated between the midrib on the one hand & the marginal bundle & hyaline marginal wing on the other hand.

p 259

The intercalation of the lamina between the midrib & the wing begins at the apex & proceeds basally

p 260

In the very young leaf water flows backwards from the apex in the marginal bundles.

p 262

In all the species & varieties of *Musa* which Skutch has examined, the leaves are rolled in the same way, the upper half covered by the left, while the spiral of the phyllotaxy rises from the upper to the left of an observer facing the stem. rolling & spiral of phyllotaxis

p 263

pseudolamina — The lamina halves of the banana are a secondary devt. & not homologues with the expanded portion of dicotyledonous leaves.

p 263

Trécul. Memoire sur la formation des feuilles. Ann Sci nat. bot III. 20. 235–314. 1853. It is evident from his descriptions & figures that the future midribs first appear & the lamina grows as paired outgrowths from its sides in *Liriodendron* (Pl 21 fig 47) & *Citrus* (Pl 22 fig 24) & *Rumex* (Pl 25 fig 168)

Origin of leaf lamina

Skutch (1930) and

Origin of leaf lamina

~~petals Skutch found~~

p 263

Noack found that the wings of the leaf of *Pelargonium* are produced by a marginal meristem in which the histogenetic layers behave very much as in the terminal growing point of the leaf, or even in the growing point of the stem.

Pseudolamina by hyaline wing

p 264

The point of origin of the meristem from which the wings is developed is different in *Musa* & other Scitamineae from all other plants, with the single exception of the Palms. In dicotyledons the wings originate at an early stage before the marginal tissues of the midrib (or rhachis) have lost their meristematic character. In *Musa* the lamina halves do not commence to develop until the marginal cells of the [illegible] completely [illegible], then the marginal [illegible] midrib have lost their meristematic status; hence the [illegible] differentiated into a scarious border; hence the margin of [illegible] is relegated to deeper, less specialised tissues, & the margin of the developing lamina-half is occupied by a 'hyaline wing' instead of by the primitive meristem itself, as in *Pelargonium*. It is for this reason, among others, that I consider the lamina-halves of the banana a secondary development, & in no sense homologous with those of the dicotyledonous leaf.

p 265

As the result of the activity of two entirely independent meristems, one lamina-half of the banana frequently extends further down the petiole than the other. An inequality of 17 cms has been measured.

petiole

Skutch (1930) cont?

In Dicot. leaves the petiole is a relatively late development, intercalated between the lamina & the leaf base after the former is well advanced. (Tréul & Decnega)
In the banana the condition is just the reverse
The petiole is easily distinguishable in rudiments when the lamina-halves are in their earliest stages.

p 268
He goes on more than the preceding apex is petiolar, not whereas I consider it as the apical part of petiole, while the lamina is formed of a more proximal region, the petiole, & the region to the lamina as formed of the distal part of leaf sheath [ ], so that the petiole base is about the preceding tip.. [I don't see much reason for this AA]

pseudo lamina

p270
In the early devt of the midrib or shoulder, in the intercalation of the lamina between this & the margin, very little does not form a part of the interior lamina, the banana shows points of greement with the dicotyledons of the origin of foliar leaves.

Summary p270

In the rudiment of the banana leaf the lamina-halves arise at a relatively very late period. The lamina-halves arise from the edges of the midrib, not at all in the hyaline margin & the outermost vascular bundle of each side of the midrib. This margin, then early loses its meristematic condition, becomes the coarser-membraneous wing which bordering the newly unfurled lamina, & the vascular bundle

Skutch 1930 contd.

becomes the marginal bundle, to lamina. The apex of each half lamina precedes the base in differentiation, & the marginal region [illegible] near the middle of the lamina. The banana leaf is a secondary devt., & its morphology & devel. is entirely different from that of the typical dicotyledonous leaves. Its midrib is morphologically a portion of the leaf-base or 'sheath', while the preceding appendage is probably a vestigial petiole.

* see (11) 88

Foster: AS (1929) p445

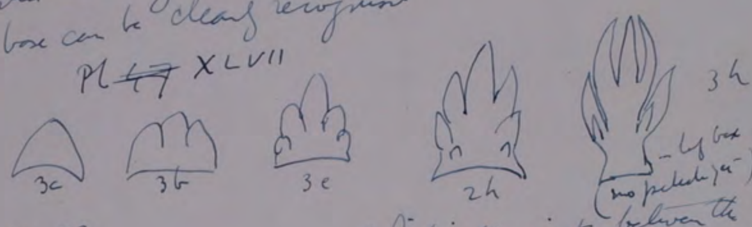
Confirms Moore's* ~~statement~~ observations that in winter bud of Aesculus Hippocastanum 2 pairs of small scale primordia may be ~~and~~ present as the [illegible], & these they earlier form the first cataphylls of next winter bud.

advance dev. in horsechestnut bud

Compares / primordia & foliage (opposite) leaf dev.

p452 At a very early stage the whole foliage leaf primordium appears as a trilobate structure. When this ternate condition has been attained, a small papillate swelling originates from the lower outer margin of each of the main lateral lobes of the foliage leaf primordium. These papillae later develop into the primordia of the second pair of leaflets. The median leaflet primordium by rapid concentrated [illegible] growth assumes the form of an acuminate finger-like process. It is noteworthy that the second pair of leaflet primordia have begun development that the so called leaf-base can be clearly recognised

Pl ~~47~~ XLVII



p453

as Eichler maintained, a real distinction exists between the mode of lamina formation in Aesculus Hippocastanum & the true basipetal type of leaf development. In Melianthus major, for example, Eichler found (table II fig 39 & 40) that on the six leaf members of the first order arise basipetally as more or less distinct & successively developed papillae

Foster A.S. (1929) cont'd

upon the margins of the "upper leaf". In Aesculus, however, ... a definite ternate condition of the whole leaf primordium is first reached from which the members (i.e. leaflets) of the second & third orders ~~later~~ develop both basipetally & centripetally. Thus it seems quite correct morphologically to interpret the 2 or 3 pairs of leaflet primordia as successive branches of the primary lateral lobes of the laminar primordium.

[This is then the same type of thing as the pedate leaves of Aroids e.g. the Dracunculus: it is just what one would expect when the rachis is absent. ~~AA~~ AA]

Lamina devt.

The upper leaflet primordia develop as acuminate, finger-like bodies. Then 2 parallel ridges of active growing tissue appear on their ventral faces. These new centres of growth (Schüepp's "Vegetationslinien") give rise by rapid & prolonged cell division to the blade of the leaflet. We thus see that the blade of the leaflet, like the midrib, is a primary structure. The leaflet blade itself is a secondary formation. The appearance of the blade in the leaflet primordia takes place basipetally, so that one may find relatively well developed leaves in which the third pair of leaflet primordia are still in the "peg" condition.

p455

Every bud scale terminates (during some period of its history in bean-) in groups of minute finger-shaped bodies that are morphologically equivalent to the early & immature-modified developmental stages of leaflets. [Being the ~~leaflet~~ scale, if at a later stage these reduced leaflets disappear, may yet be fairly interpreted as lamina-less ~~leaf bases of AA~~ AA]

67

Foster (1929) cont'd attempt to complete leaves

Foster shows that the bud scale primordia which (in the lower bud scales) appear on superficial inspection to be of leaf base nature alone, do in fact ~~actually~~ produce apical leaf-lets primordia (p. 458), though these are frequently deciduous (p 459)

p462

Meristematic growth all. along the margins of the sheath gives rise to sheath wings — Laminar development basal region of leaf

p470 — Each leaf type is own developmental history

The lower transitional bud scales, in spite of the advanced development of the lamina & the decreased extent of the sheath wings, do not exhibit an intermediate development status as compared with the foliage leaf — rather, as in the bud scales their ontogeny proceeds along a divergent path almost from the beginning.

p476

Lamina primordia are formed in connection with all the cataphyllary structures in the horsechestnut.

p477 — True leaf-sheath cataphylls

In a number of plants with definitely vaginate foliage leaves there is considerable evidence to show that the cataphylls (or parts) morphologically represent leaf-sheaths with partially "arrested" or completely suppressed laminar primordia. But although this (He quotes Tp 75, 85 & 86 of Monocots further). appears correct in some cases, it is apparent ~~an~~ sheathed in a real homology exists between the relatively inconspicuous petiolus-like base of the foliage leaf & Aesculus the highly developed sheath of the cataphyllary structure. (p478) While both foliage leaf petiolus and cataphyll sheath

p 478. Foster (1929) 68

originate from the basal region of the leaf primordium &
to this extent may be considered homologous, their course of region &
mode of growth in the developing scale & leaf are radically
different. Foster ∴ feels that the interpretation of bud scales in
this species as "transformed" or "modified" leaf-bases suggests
an ontogenetic parallelism with the pulvinus of the foliage leaf which
does not exist. On the contrary Foster regards the bud scales
of Aesculus Hippocastanum as 2 membered homologous
transitional forms of typical common primordium is essentially
foliar organs in which the sheath is completely divergent product
with the blade of the foliage leaf, while the
winged structure & represents a
of the hypopodium.

Goebel's theory of the bud scale

p 482, 483 : bud scales as "arrested formations" of
Goebel characterises bud scales as [illegible] Foster concludes that it is quite
foliage leaf primordia. the series of bud scale in Aesculus
impossible to separate the ontogeny of a developmental parallelism
Hippocastanum into an early period of divergent growth of the scale,
with the foliage leaf, followed by a stage of developmental history of the scale,
"leaf base. On the contrary, the developmental process which is
regarded as continuous & "determinate" is completely reversed
characterized almost from the start by a complete & the hypopodium
of the primordia rates exactly between the lamina
of the foliage-leaf primordium

(inlexe)
Nehemiah Grew (1682)

pp 171.
~~The~~ Describing Chicory & Hawkweed he notes that "the Leaf it-self answers to the Flower in other Flowers". ~~He means~~ ~~than the corolla~~ i.e. he recognises the homology of the corolla in florets of the ray & disk type (by "leaf" he means corolla of the ray type, i.e. of "flower" the corolla of the disk type)

p 170
He compares the disk floret to "a lovely Flower with five Leaves & a Tubular Base, wh. resembles the Cowslip. So that every Flower with the Florid Attire, Embosomes, as it is, a Posy of perfect Flowers" describing a

A "flower with the Florid Attire" is his way of describing a compound flower.

Weatherwax P (1917) p 454

The spikelets of all varieties of maize begin as two perfect flrs, & monoecism is caused by the suppression of some part or parts of all the flowers. The entire lower flr of the ear spikelet is suppressed, except in a few varieties.

p 455

In the [illegible] when it occurs, suppression begins at about the time of the differentiation of the spore mother cells in the functional organs.

Suppression

Abortion of upper flowers

Percival p 114

In the early stages of the development of a spikelet of Triticum vulgare 8 or 9 flower rudiments can be distinguished, but none of the spikelets yield grains to this number. When the 3 or 4 lower flowers have reached a certain stage of devt, the upper 4 or 5 cease to grow, ~~& their tissues become def~~ probably falling victims to the rapacity (for food materials) of the flowers below ~~[illegible]~~.

Inhibitors in evolution

Suppressors & inhibitors

Veatcurux P (1933) (1918) ~~dms II~~ Evolution (6) 71

Cz VI 146 (I cannot trace this on orig. page)

Suppressing influences stress loss — evol.

Describe a mutant of Maize called "Deformed"

The difference between it & the normal plant is one of degree of development of parts present, in functional or rudimentary form, in any corn plant. As the Maize plant develops from the seedling stage, there are laid down, in different parts, almost innumerable primordia that are doomed never to develop into functional organs; and the adult form of the whole plant depends upon an ordering & timing of differential suppression of these primordia. Stamens are suppressed in ♀ flowers, pistils in male flowers; all but one of two possible pistillate branches are suppressed, etc. We mean pistillate, to account for the mutation, some influence interrupting or deranging many of these suppressing influences

Importance of inhibitors.

But no need to suppose an hereditary stage in which these inhibitors were nonexistent, —thus, when one does of like Bears one pistillate. Many floral inhibitors

Giantism due to failure of pituitary gland, but it does not follow that there was ever a stage when the inhibitor was absent.

An inhibitor may thus suppress something that has never been anything latent

Anderson, E. The Origin of Angiosperms. Nature 72

March 24. 1934

Suggests that the group of Magnoliaceae including Tetracentron, Drimys, Cercidiphyllum, Trochodendron, Magnolia, Liriodendron, which have 19 chromosomes, arose from a cross between one of the group consisting of Ginkgoales, Cycadales & Coniferales which have 12 or 11 chroms. & Gnetales, which have 7. ~~[illegible]~~ This followed by chromosome doubling.

Hybrid

73

STRUCTURAL BASIS OF PLANT LIFE

SIR W. BRAGG ON X-RAYS AND CELLULOSE

A lecture on "Cellulose in the Light of the X-Rays" was given at the Royal Institution by Sir William Bragg, F.R.S., yesterday.

He began by referring to the discovery that in Nature certain atoms, certain molecules, certain combinations of molecules were highly preferred to all others. Oxygen atoms made up half the known world, silicon and aluminium the greater part of the other half. Most of the 90 kinds of atoms might be said to be present in traces only. The seas gave to the water molecule easy precedence over others; in the rocks combinations consisting mainly of oxygen and silicon were predominant.

Carbon atoms were very small in number in comparison with all that the earth contained; but they had a special distinction because they were used so largely for the building of living things. Their combinations with other atoms, especially oxygen, nitrogen, and hydrogen, were dealt with in organic chemistry. An infinite number of such combinations could be conceived; yet a very few were singled out for almost universal employment. There was the long-chain type, of which the links were made of carbon; these were the fats, greases, paraffin, and the like. A second type was built on the "benzene" ring, of which the core consisted of six carbon arranged in a hexagon. This was the basis of many dyes, explosives, and drugs of various kinds.

Cellulose was the fundamental molecular combination occurring in vegetable growth. One had but to remember that trees and shrubs, grasses, and plants of all kinds were mainly composed of cellulose to be struck with the strangeness of such a sharp selection. The chemists had shown that cellulose was essentially some multiple of a certain group of atoms, six carbons, 10 hydrogens, and five oxygens. They had also been able to show fairly completely how the atoms in this group were attached to one another, which to which. They had shown that the six carbons were arranged in a sequence. They did not, however, make a long chain; five of them with the oxygen made a ring, and the remaining carbon with certain attachments hung therefrom. This construction was the basis of the structure of plant life.

From X-ray analysis it appeared that cellulose was composed, in large part at least, of a mass of small crystals. That the same diagram was obtained from all fibres, even from animal cellulose, showed that we were dealing always with the same substance. It could be deduced by measuring up the spaces on the diagram that there was in each crystal a periodicity parallel to the direction of the fibre; and such a periodicity fell naturally into a scheme hinted at by the chemical results. The essential feature thus supported by both X-ray and chemical evidence was the long chain of many links. The bonds that tied the links together were far stronger than those that tied the chain together. There seemed ground to suppose that bundles of these long chains formed "crystallites," small crystalline masses, of which the cellulose was largely composed. When a thread was stretched the X-rays showed that these bundles went more and more into line. When the stress was too great the bundles began to slide past one another, and if the force was too great they let go and the thread broke.

Thus the basis of fibre in Nature was really this elemental fibre of rings in a series. The thread or the rope was a reproduction on a large scale of a process which Nature had already begun on a scale infinitely smaller. The diamond was extremely rigid because these strong bonds were exerted in every direction; but here were strong bonds in one direction only, and this was the basis of fibre. Fibre had a direction; and there must be direction where there was growth. The interest lay in the strange yet simple way in which Nature laid down the fibre structure. The method involved regularity in the arrangement of the atoms; and that was how the X-rays were able to detect it.

Selection in atoms.

Cellulose as the basis of plant life

~~Hydro~~

Hilditch + Lovern
The Evolution of Natural Fats.
Nature pp 478–481
Vol 137 1936

Chemistry considered in the morphological groups of systematics. Deals w plants.

Classic, perhaps 75

Sachs Bot. Zeit. 1863

~~P 370 c 95~~

Q. 370. 6. 8. 1 etc

Important paper on vessels etc.: basis of later work.

And early in same volume Sachs's paper on albumen seeds — good for combination of anatomy & physiology. — plant as living thing

nature) flower & fruit 76

Spieghel Isagoges 1606 V.L. Anderson
p. 7 N*.11.15

Common dissimilar parts
~~root~~ radix
caulis
ramus
folia
flos
semen

Radix non à forma, sed ab usu describitur, definiturq; : quod usus illi singularis sit, forma verò summoperè ~~variet~~ variet.

Semen verò est foetus, et quasi (~~as of it~~ as it were) totius Plantae compendium. Sed quid, Flos, atq; Fructum? Hoc diu (a long while) multumq (often) quaesivi nec quidquam inveni, quo mihi vobisq; satisfaciam. (I myself satisfy) (totus dictus)

Theophrastus

Sense obs. follows)

Holson

Prat, A (1935)

The shoot as an integrated unit

77

p 142

2 an annual grass in flower (as is consummated in A.A)

the shoot shows a biometric & anatomical gradation.

That is why the internodes vary in length & structure according to their distance from the inflorescence.

[In this words the flowering shoot consists of units (its relations) each of them & type & structure are determined by its position within the shoot. The shoot is thus an organism made with units of as an A.A

metamorphosis

Lotsy on Goethe as representing modern phylogenetic ideas
Beih. Bot. Centralblatt. 38
158–181. 1921

P. 370. G. 56. 38

D. Hayata. On Goethe's "Leaf"
Icones Plantarum Formosanarum
X. 1921 pp 75–95

Caspar Friedrich Wolff. Theoria Generationis
1759

Lotsy says that all – he looked upon the flower as a reduction from a leafy ~~shoot~~ growing point due to reduction in quantity of food, whereas Goethe though it was quality not quantity that was the deciding factor.

Goebel K (1924) Form & Funktion 79

I have only looked at this. The concluding words are:–

p 557

Man kann freilich den in dieser Darstellung
gemachten Versuch, die Entfaltungsbewegungen
als durch den Bau, vor allem die
Symmetrieverhältnisse der einzelnen
Pflanzenorgane bedingt nachzuweisen, als
berechtigt anerkennen aber hervorheben,
diese Bauverhältnisse seien so wie sie sind
um diese Bewegungen zu ermöglichen.
Damit aber wäre ein Gebiet ?berührt betreten, das
über das der naturwissenschaftlichen
oder physischen Untersuchung herausgeht,
also ein „meta"-physischen.

I gather that he treats function definitely as the
outcome of structure.

Charge – the Farm. T. Hennell. 1934. Concluded
p 192 [Fre Library 631.(59359)

80

The Teagle used for dressing cloth may be as much as seven feet high & bear 40 to 100 heads. "The teasel heads which grow upon upright stems, one in the middle of each plant & larger than any of the other stems, are called "kings". They are the largest & finest; the stems may be of second & third quality, called middlings & scrubs.

Teasel fr

Seed dormancy 81

ind that when they plough meadows that have been growing for twenty, thirty or forty years, black mustard comes up in profusion, although this weed was not present in the meadows.

Numerous other observations of an entirely new type of vegetation, appearing upon soil freshly turned up by the digging of wells, ditches, the removal of buildings, and the plowing of old meadows and pastures have been cited as proving that seeds may lie in the soil quiescent and viable for 25, or even 50 years, and germinate when the soil is loosened up and the seeds given proper air, water, and perhaps light conditions for germination.

LYDIA S. M. ROBINSON.

RECTORS OF HAWARDEN (clii. 297).—Christopher Pasley. Earwaker, 'St. Mary-on-the-Hill, Chester' pp. 67 and 129, gives the inscription, once in the church, to the memory of this distinguished divine, D.D., first, chaplain to the Lord Keeper of the Great Seal, then to the house of Derby; tutor to the Earl of Derby; late rector of Hawarden, etc. He died on Sept. 17, 1658, aged 53, and was buried at St. Mary's, in St. Katherine's aisle, as "Dockter Parsley." The monument gives his arms and crest. Presumably the earl of Derby was Charles the 17th earl, born 1628, died 1672. Dr. "Pashlow," who carried the heraldic banner with the deceased's arms at the funeral of John Williams, archbishop of York, in 1650 ('Cheshire and Lancs. Funerall Certifs.' Record Soc. p. xi.) may be the same person. Christopher Pasley A.M. was appointed rector of St. Mary (Staining), Aldersgate, London on Oct. 2, 1625 and resigned in 1628, his successor being appointed on Jan. 14, 1627/8 (Hennessey, *Novum Repertorium*).

Venn's 'Alumn. Cantab.' shows Christopher Pasley a sizar at Trinity 1612, B.A., M.A. 1619, D.D. 1638, and that he was a prebendary of Lincoln 1625–6, rector of St. Mary, Staining, vicar of Buckden (Hunts) in 1627, probably rector of Scotton (Lincs.) 1627, vicar of Cottingham 1628, probably rector of Hawarden 1638–41. He was father of Christopher (bapt. 24 Nov. 1640, at Hawarden), of St. John's, Cambridge, 1655, B.A. 1658, educated at Ruthin School (Venn). Other children were Charles, bapt. Jan. 9, 1644/5 at St. Michael's, Chester, and Mary, bapt. Dec 4, 1642 at Hawarden. The latter, or another daughter, married Wm. Coventry of Newhouse and their son John (bapt. Aug. 25, 1658) was buried at St. Mary's, Chester, on Nov. 1, 1658. (Earwaker *loc. cit*).

The Venns mention a Christopher "Pashley" of Corpus College, 1575, curate of St.

Leaf bulbils, Kalanchoe

82

Johnson, M. A. (1934)

Kalanchoë daigremontiana R. Hamet et Perrier de la Bâthie "is far more prodigal in the production of foliar plantlets or pseudobulbils than is Bryophyllum .... it is not uncommon for a large leaf to bear as many as sixty pseudobulbils

Native of Madagascar.

~~p356~~.

p 357. Apical growth of the leaf persists for a short time, lasting until the primordia are about 0.9 mm in length.

p 358

The production of the pseudobulbils ~~develops~~ progressively basipetally, so that the older plantlets are found at the tip

The origin of the pseudobulbils can be traced in leaves so young as to be only 2.5 mm to 3 mm in length.

The [pseudobulbils / plantlets] arise as ~~an area~~ of ~~a patch~~ of meristematic ~~tissue~~ regions in ~~the~~ leaf notches

p360

plantlet with 2 pairs of leaves have well organized roots

p 361

In Bryophyllum calycinum and in Kalanchoë daigremontiana the devt. of the plantlets is the normal ontogeny of the directly connected with the leaves are few leaf & can be detected when the leaves are two to four millimetres in length. This activity is initiated in the row of mesophyll ~~cells~~ cells in K. daigremontiana located in the bottom of the young leaf notches

p363 Johnson M A (1939) cont

The plantlets appear so early in the ontogeny of the leaf that they may be seen with the unaided eye long before the leaf has reached maturity. Furthermore they are not organized from mature cells which have been regenerated or rejuvenated, but from cells which have never lost their meristematic qualities.

p356 Fig 2

Plantlets still attached to the parent plant may bear leaves which are already producing plantlets of the second order

p363

Plantlets are produced in abundance during the summer under good growing conditions, but their growth is retarded throughout the winter, and the dormant meristems are to be found in the leaf notches.

Noack K L (1922)

p475

Devt of Pelargonium leaf

"in allen Fällen bilden die subepidermale Schicht am Rande der Spreite durch tangentiale Teilungen das Material zum Aufbau der inneren Mesophyll-schichten."

p478

die ganze Masse des Mesophylls des fertigen Blattes aus der subepidermalen Schicht ~~des~~ Primordialzapfens entsteht, der ~~seinerseits~~ seinerseits die Anlage der Mittelrippe des ausgewachsenen Blattes darstellt.

Very good pictures (p466-7) of the young developing leaf

p488

Whole mass of leaf from subepidermal layer 789

p482 Whole mass of lamina from subepidermal layer of primordial rib.

~~Stefanoff, B (1957)~~

Mathuse, O (1906)

p 474 the possibility of ~~rooting~~ getting detached leaves to develop roots & shoots first described by Mandirola 1652 Manuale de Guardineri. Vicenza 1652 [Mathuse does not seem to have seen it]

Process of leaf cutting seems much used in horticulture

Sinnott, E W & Bailey I W (1914) Stipules 86

p 442

in the majority of plants with trilacunar nodes, stipules are present; in almost all with unilacunar nodes, stipules are absent, & in all with multilacunar nodes, the leaf base more or less sheathing base.

p 446

i.e. stipules & lateral leaf traces generally occur together.

The Polygonaceae are prevalently multilacunar, & in almost every case possess a stipular structure, the ochrea which completely encircles the stem. The species of Rumex, however, are exceptional to the family in having trilacunar nodes & also possessing ~~trilacunar &~~ 2 typical distinct stipules instead of an ochrea.

The Aquifoliaceae are generally unilacunar & stipules either absent or very small. In Ilex opaca however there are 2 lateral gaps & the traces, to stipules reach their best development in the family.

Rosaceae typically trilacunar & stipulate being Spiraea & [illegible], however, are exceptional in being unilacunar & also exstipulate.

Almost all Umbelliferae are multilacunar & with sheathing leaf bases. Hydrocotyle, however, is exceptional in being trilacunar & having 2 typical & distinct stipules.

Relation of stipules & teeth

p 445

Where exstipulate trilacunar families occur, the leaves are toothed or entire. "This suggests the possibility that teeth, or leaflets and the like, & the traces to lobes of leaves, or to the stipules, or to teeth, may be independent of their occurrence or absence of other factors or factors"

p450
Saxifragaceae. (entire leaves) { Philadelphus
Deutzia
Hydrangea } no stipules

(Toothed leaves) Ribes stipules

Caprifoliaceae. entire leaved Lonicera, Diervilla } exstipulate
+ entire leaved species of Viburnum
tho' many of the serrate, dentate or lobed
Viburnums are stipulate

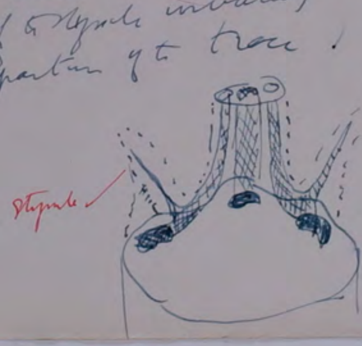
(other cases of this found)

p451
Analogy suggests that stipules are integral parts of the base of the leaf & is in agreement with the theory that stipules, sheathing leaf base, ochrea, tendril stipules (of higher Monocots) are morphologically identical

Stipules may perhaps be considered as 2 earliest leaf teeth, their position being determined by that of the 2 lateral traces .... they may also be regarded as two basal leaf lobes, which to differentiate between a tooth or lobe seems also more one of degree than kind.

p452
The greater the lateral leaf trace apparently exerts in the stimulus which results in the development of the stipule, for the stipule invariably occurs opposite the point of departure of the trace.

p447 Each stipule draws its vascular supply 1 of 2 or 3 ... from branches derived from the corresponding lateral traces



Moore, E (1909)

88

plm

"Bud dissected ? Aesculus Hippocastanum shows to-day the full number of leaves exists - to bud at the beginning of winter. In addition two plus two tiny scales appear as papillae at the membranate point [These are very distinct in the figure AA]

Fig 36 Plate 10

These are fun-scales of the next winter bud

Rhodes, A. & Scott, L. I. (1938)
Regarding ~~[illegible]~~ leaf cuttings of plants which do not bud
leaves can be made to root. The leaves were severed
from the stem by an oblique cut through the base of the petiole as near
as possible to the stem. Kept in warmth & well watered.
Aucuba japonica Thunb. gave the greatest success.
Hedera Helix L., Solanum tuberosum L. & Pelargonium sp.
~~[illegible]~~ also rooted ~ the base of one or more leaves.

Hagemys O/(1930) Tendrils of Cucurbitaceae Passifloraceae

p25
Tendrils of Cucurbitaceae have been explained in the past as roots, leaves, shoots & stems or grass[?] series [Amans of detail drum I have not read]

p73
He concludes that the tendril is equivalent to a whole vegetative shoot (der zugleich das α-Vorblatt, welches an seinem eigenen Achselprodukte emporgewachsen ist, einschliesst) ~~[struck through]~~)

p.48
The axis standing in the axil of α is A3. It is the ~~2 or 3 leaves~~ (~~tendril~~) tendril bearer & may bear a number of leaves (tendril arms)
The branched tendril is really many leaves,
The unbranched tendril is really one leaf,
bearing only the first prophyll.

p49 In the axil of α there is the stiff, unversatile tendril bearer, which bears the pseudo-terminal leaf (tendril)
In Cucumis tendril consists of one leaf of α
The tendril bearer (A3) remains undeveloped

50-51
Mp *Sicyos bryoniaefolius* more than one tendril is associated with each leaf. Hagemys shows that these tendrils arise from a common rudiment & are together equivalent to the single tendril of other Cucurbitaceae

p79
Passifloraceae
p75. Passiflora tendril generally spoken of as a stem

Hagemp O (1930) cont

structure & literature, but H. has much in
in few lines string Momordica (a one-armed tendril
of Cucurbitaceae p 76)

p 82

The tendrils of Passifloraceae are probably to be
explained like the one armed tendrils of Cucurbitaceae, as
a thread-like hand with a pseudo-terminal leaf.

[Hagemp's more convincing about tendrils than
Goebel on Antigonum since he uses anatomy
in deciding whether he is dealing with leaf or stem
structures. A.A]

p 88

Rudimentary lamina or apex) tendril in Passiflora

Goebel, K (1921) Leaf tendrils (partially axis) 92

Antigonum leptopus (I find this Polygonaceae)

p311. Tendrils formed from two parts; ~~the~~ a lower, the tendril bearer, & an upper. In the upper part the bracts are transformed into tendril arms, & the axis above the tendril bearer region is also a tendril.

p307. The tendril-bearer bears small scales and reduced buds in their axils.

p311 The whole thing is an ~~reduced~~ inflorescence in which flower production is inhibited.

p312 Goebel's final conclusion is then all shoot-tendrils (excluding Cucurbitaceae) are transformed inflorescences*.

[The evidence of the leaf nature of the tendril arms is not altogether convincing as he gives no anatomy in support [illegible].]

* I doubt if he is necessarily right. — it would be better to ~~say a short~~ leave it as a short one & go further.

Porsch, O (1907)

p 37

~~Regards~~ Derives the embryo-sac, the ~~[illegible]~~ of
Angiosperms from the prothallus in archegonium, the
Gymnosperm. Supposes the prothallus to be lost — & the
archegonia reduced to two.
(not worth while to go into details of this, I think)

Bremekamp, C. E. B. (1935)

not very enlightening. He omits a narrow definition of a tree, as during, for instance, Palms & Cycads, whose crown is of leaves only, & Draceana, which has not yet normal woody tracheïs.

His definition (p 647) is:-

A tree is a Seed plant with continuous growth in thickness caused only by a bifacial cambium, whose stem consists, at least in the basal part, of an unbranched central axis, the "Stamm", bearing a crown consisting of numerous branches.

Vickery, J. W. (1933)

95

p 256

Epiphyllous shoots in Drosera have been frequently recorded in the literature. p 257 They may occur on detached leaves, or on leaves still attached to the parent.

In D. peltata & D. auriculata the budding begins as a swelling associated with the base of one of the glands (p 261) the epidermis & mesophyll of the leaf divide to produce the bud tissue.

p 266

It is unlikely that the metabolism associated with digestion is necessary for bud production, since young leaves kept covered under cover in the laboratory frequently produced buds.

Schüepp O (1938)

[English summary

Three main types of meristem can be distinguished by the directions of cell-division & growth. The massive meristems inside the growing point & the sporangia divide & grow uniformly in the ~~three~~ directions of space. The rib-like meristems of roots, stems petioles & veins divide & grow mainly or exclusively in the direction of the longitudinal axis of the organ. The lamellar meristems of the leaf-blade divide & grow almost exclusively parallel to the superficial layers surface of the leaf. In the growing point the superficial layers of the tunica grow as a <u>lamellar meristem</u>; the centre of the growing point grows as a massive meristem; the young pith of the stem grows as a rib like meristem. In the development of the leaf the superficial layers folding, the growth in area of the surface & the growth in thickness of the inside are thus adapted to one another.

"Leaves with simple tree-like manner of branching" follow similar rules of branching to lateral branches.
p90 leaves with "bäumchenförmigem" Verzweigungsschema" (mit einfachem)

p86. This tree-leaf form in primitive fern leaves any

p86. [illegible] type the lateral growing points

p87. In the primitive type [illegible] than the main one, have less developmental power & the gps of 3rd order still less!

comparison of leaf & shoot branching

[Leaf may be compared with a branched ~~reduced~~ shoot ~~syst~~ system which is reduced progressively in the successive orders of branching AA. This contains arises from which he says 'Can dev. in basipetal order be a result of ~~the~~ inhibition of apical growth?' cf flowers & their appendages AA (not Schüepp)
types I cannot understand much of it]

Schüepp, O 1938 (cont.)

[Since the superficial layers of the tunica grow as a lamellar meristem, this lamellar growth reappears in the formation of lamina — leaf — but in wings of leaf sheath from the tunica (is this correct? A.A.). If the leaf being formed from the leaf ~~base~~ rudiment originates as a ring-like upgrowth entirely surrounding the apex as in many monocots, this mass then it is drawn from the whole surface of the tunica, & is naturally causes the tunica's lamina-like growth. If it arises only from a portion of the circumference, it still partakes of the laminar characteristic of the tunica but in a more limited way. A.A.]

98

Turrill, W. B. (1938)

p 363

We have no certain evidence as to the groups or groups from which the angiosperms evolved. We do not know when or where they originated. We cannot say with certainty which are primitive families and (with a few possible exceptions) what are primitive characters.

p 364

Chandler (1923) has been able to trace an evolutionary series (a main line with subsidiary branched lines) in seeds of Stratiotes from the Upper Eocene to the present-time.

[Turrill's paper is lengthy but not regarded as contributive AA]

Flahault, Ch. Les progrès de la Géographie botanique depuis 1884. Progressus rei botanicae. 1907. (Engl. Abstract) [pp 243 – 317]

III Ontogenetic Phytogeography. p 290

Origin of Conifers

N. hemisphere has majority of Conifers. They were much nearer the Pole in earlier periods. From the Jurassic to the end of the Tertiary the N. polar region supported a large number.

Miocene of Greenland: — Taxodium, Glyptostrobus, Sequoia, Cephalotaxus (a Taxus), Chamaecyparis, Pinus. Later, these genera also lived in Alaska, Siberia etc. At the same period Glyptostrobus lived in Sequoia, Taxodium, Western Europe (France etc) & Abies, Picea, Larix N. America (Nebraska)

In Middle Europe.

In earlier times: — Araucaria

Jurassic

Cedrus } L. Cretaceous
Abies }
Podocarpus Eocene

The Conifers now live in the N. hemisphere, hence seem to have originated in the continents round the S. Pole.

Origin of Angiosperms

Angiosperms in L. Cretaceous.

Sun-expansion } Dicots in upper Cretaceous.

At the end of the Cretaceous period climates which were previously uniform began to differentiate, & the types of vegetation requiring tropical climate where gradually chased southward. To the previously existing genera of sub tropical facies were added genera which are now characteristic of our temperate climates, — Betula, Fagus, Quercus, Juglans, Acer, Hedera, Viburnum.

= It seems as tho' since the Lower Cretaceous there has been a mountain climate less warm than that of the plains, — the Abietineae growing in the mountains, the ferns & cycads in the plains.

The Upper Jurassic & L. Cretaceous ferns include Aspidium, Asplenium, Gleichenia, Osmunda, Sequoia, Glyptostrobus, [illegible] forms, & Zamia, Podocarpus, Torreya. Cycas

Upper Cretaceous Palms appear, Betula, Juglans, Populus, Salix, Quercus, Fagus, Myrica & Acer, Hedera, Cornus, Viburnum, Liquidambar, genera now extra-European, — Cinnamomum, Liriodendron, Artocarpus, Persea, [illegible] Eucalyptus.

In W. Europe the Eocene vegetation was still tropical on the whole.

Oligocene. Palms; Taxodium, Libocedrus, Glyptostrobus & Sequoia appear for first time — Both in Gymnos & Angiosperms species identical with the living ones begin to appear.

Miocene in W. Europe little less its tropical character, the proportion of subtropical species losing their leaves in winter increases. The seasons appear to have been not very sharply limited for even winter, — the winters mild & the summers rainy. Juniperus, Sequoia, Taxodium, Libocedrus, Callitris, Glyptostrobus, definitely abandon Europe at the end of the Miocene & beginning of the Pliocene.

There is a remarkable resemblance between the present-flora of N. America, the present-flora of E. Asia & the Miocene flora of W. Europe.

The Miocene flora is very rich in woody species belongs to a ~~closed~~ class. Families & genera represents in Europe in the Miocene ~~have~~ have now extinct have.

As the plants were driven southward by the cold they were stopped by the Mediterranean, which dates from the beginning of the Pliocene. This accounts for the relative poverty of the western European flora compared with that of America.

There are numerous Tertiary species in the Balkan massif e.g. Pinus Peuce, Picea omorica etc

The Cold ~~period~~ marks the beginning of the Pleistocene period. The Paleogene vegetation had by then been pretty well annihilated in Europe. In the cold early Pleistocene period Betula nana, Dryas octopetala various Salix, Saxifraga oppositifolia etc lived in Central Europe. No tree except Betula odorata was found N. of the Alps.

Men on ~~on~~ interglacial forest flora

102

Hooker J D Distribution Géographique
des plantes dans la flore de l'Amerique du nord
Ann d. sci nat bot Ser VI T. V (Transl.
from 1878 R. Institution Lecture) 1878 p 518
(very de abstract)

Flora of E N. American ex Laurentide with in Dendrons
trees + shrubs. (Four Island in the Niagara falls,
whose surface is less than New Jaroes, - 30 species, trees +
20 shrubs + bushes.) Most of the genera common
to Europe + Asia, but a few are found only in E Asia about
America - Many species are identical in Japan
+ in E. America, + there are a considerable number
of genera I think we know 2 species only, one
belongs Japan the other E. America
trees also

38 genera of American
in Europe Asia

In the west, the Mexican flora is very prominent
Greenland is inhabited almost entirely by Scandinavian
plants; — is poorer in species than any other division
of the arctic flora, many Scandinavian polar species being
lacking — it extends 4000 miles south of the
polar circle but the prolongation adds relatively few
species to its flora. Hooker supposes that in a
period anterior to the glacial period a flora common
to Scandinavia Greenland extended over all the
polar regions of America, but that, enter the

glaciation this flora was chased to the S. But the
Greenland species went S. until they came to the sea
+ thus may perished on account of the cold, only the
most resistant surviving. So after the when the climate
became warm again the peninsula repeopled itself
with the most vigorous species of the ante glacial flora,
with no admixture of american forms.

Asa Gay's Essay on the Flora of Japan.

In Miocene times the 3 N. Continents were continuous
or so little separated that their floras could easily
intermingle. The absence of E-asiatic plants
in N. America; the associates with the very prolonged
glaciation of this part as compared with the east, or
because of the high lying ground. In the glacial
period there was little or no migration of the boka plants
in the W. of America as there was in the east, but
very much later when the Rocky mountains
became free from glaciation the plains for Mexico
+ the South invaded this unoccupied territory,
+ at the same time northern plants came south to it,
so we get a mixture

Stiles, W (1938)

p 230

It is a remarkable fact that with the continued application of the principles of physical chemistry to the investigation of vital plant-activities, it has gradually become more & more evident that simple explanations of these activities in terms of physical chemistry are not forthcoming.

p 231

x x x x

Thirty years ago, when the importance of the principles of chemical dynamics in life processes was coming to be fully realised, it looked as if the solution of many of the problems of plant-physiology in terms of physical chemistry was fairly imminent. But with the application of these principles to our investigations of the living processes we find that in every one of them the protoplasm introduces a factor which renders these processes not readily explicable in this way. [Then having gone so far he proceeds to an act of faith & adds: A.A.]

There is at present no reason to suppose that with further advance in knowledge of the protoplasmic system we shall not ultimately be able to explain physiological processes in physico-chemical terms, & I would re-affirm what F. F. Blackman emphasised in his Presidential Address to this Section thirty years ago, namely, 'the inevitableness of physical-chemical principles in the cell.'

Deinega, V (1898) (Studienty bie / wate)

His chiefly concerned w/ bundle devt. & palms.
At the beginning he states that p440 Eichler's "Blattgrund"
either forms stipules or develops as a leaf sheath, or a
basal thickened part of the leaf base. From the "Oberblatt"
of developed leaf ~~stalks~~ lamina & leaf stalk, the
latter due to intercalary growth) the tissue between Blattgrund &
Blattspreite. "Diese Entwickelung findet ziemlich
spät statt, wenn die Blattspreite schon mehr oder
weniger differenziert ist."

Late devt. / petiole

Colomb, (1887) 107

p75–6

Les stipules et la ligule sont donc des organes de même nature, entre lesquels il est possible de retrouver tous les passages, la stipule étant une portion de ligule axillaire.

Lorsque enfin on étudie la façon dont naissent les faisceaux de la stipule, on arrive à définir cet organe: Definition
un appendice, inséré sur la tige, à la base de la feuille, et dont tous les faisceaux proviennent exclusivement des faisceaux foliaires correspondants

p74

regions nectaires; Sambucus as anatomically true stipules

[? AA on prophylls even attached to the parent axis [pythane] like stipules to parent-axis] the leaf. Feb 2. 35

[The bundles for the prophylls & even of succeeding leaves in a shoot may come direct from the parent axis, see Arber Gr. IX p. 608]
this is unlike the bdls of stipules

Trécul, A (1853) 108

Pl 21 fig 46–52 shows (as Sketch points out) distinctly the origin of the lamina by wings of the midrib in Liriodendron tulipifera L.

p 249–50. Develop leaf devt. of Galega officinalis

p 251. The limb of the leaflet is product of marginal growth of rachis-like primordium.

p 255 Speaks of the ~~leaf~~ time leaf rudiment as a rachis

p 293 He uses the expression "l'axe de la feuille" of rachis-like rudiment

p 300 All leaves, when the whole petiole is exposed to the air, ~~are~~ very early the elongation of the stem, grow more in the upper part of the petiole. But there is a short space near the insertion of petiole on limb, where the elongation is less than lower down.

Henry (1847)

p171 (?paper on immensely detailed fully illustrated description of buds (including bud scales & stipules))

~~they~~ Begins with Gemmae foliaceae + bracts then Gemmae petalaceae as transitional to the Gemmae stipulaceae. (the buds distinct in stipules) He includes ochreas with the [illegible], since protection ~~was~~ is by means of a fusion of leaf stalk & stipules.

Gemmae nudae ~~have~~ distinguished from the Gemmae tectae which have a cover — but he does not sharply distinguish them

p174
Die knospenartigen Enden der Achse können wir daher betrachten als eine nach erfolgtem

Stillestehen im Längenwachsthum statt findende Umbildung der Theile, die bestimmt ist, dieselbe Achse später fortzuführen.

Die eigentliche Knospe, Gemma, beginnt und bildet in fortschreitender Entwickelung eine neue Achse, die bestimmt ist, später auszuwachsen und sich daher aus blattartigen Theilen, die zur neuen Achse gehören, eine Hülle bildet, unter welcher die sich später entwickelnden Blattorgane als Rudiment verborgen und geschützt ruhen, bis zu ihrer weiteren Ausbreitung und Ausbildung.

Barnes, C.M, Graham, R.J.D & Stewart, G.B (1949) 110

Kalanchoe verticillata has a c
constant feature but produces a other side
of the leaf apex

Standt, H. N. (1938)

Delete leaves ? 150 of Kalanchoe rotundifolia produce
plantlets from vessel meristems on the adaxial surface
of the basal parts of the petiole.

By the time the leaf is fully matured, the meristematic
cushion has become differentiated into primordia of two leaves
this and then remains dormant, & root
primordia are initiated after the leaf is removed
from the plant.

Wilson, C. L. (1937)

Gas – not much good

p 656

The writer believes with Thomas... that branched stamens, including those arranged in stamen fascicles, may well be looked upon as the ultimate ramifications of an ancient fern-like plant, each stamen representing an ultimate branchlet – (telome) bearing two synangia.

p 670

the modern stamen is not homologous with the entire leaf.

th

Moodley, F (1912) 112

Figures & descriptions of Salix & Populus petiole anatomy

p 11 middle of solicineae to leaf = 3 trace member.

Glück H (1925)

p156
Axillary stipules occur in Nymphaeaceae, Urticaceae & Droseraceae

p155
Lateral stipules general in Dicots, & very rare in Monocots
In general, lateral stipules form a leaf sheath

p156
The leaf sheath is owing to modification of stipules,

The axillary stipule in Nymphaeaceae & Potamogeton is derived from lateral stipules.

Gates RR (1935)

p2

While rare in animals, polyploidy is so widespread in flowering plants that a genus which does not show at least one case of it may almost be regarded as an exception. The evolution of many plant genera has clearly been accompanied by the development of higher chromosome multiples from an original basic number.

p 3

In 1922 Blakeslee discovered haploidy in Datura i.e. the egg cell develops parthenogenetically & produces a plant having a single set of chromosomes. Such plants are usually much dwarfed, but it is significant that it has the morphology of the sporophyte

(Lan Jaye) chromosome maps) Drosophila

The analogy of the individual & the whole veg. world leading to an evolutionary idea

Wigand p12 1846 See Chron. stud. of ref.

Starting from the idea of metamorphosis in the members of the individual plant, he suggests that we may consider the whole plant world as one organism, then within this organism something analogous to metamorphosis in the individual has gone on.

"Es ist einleuchtend, dass eine Metamorphose des Pflanzenreichs ... nichts anderes wäre, als die Lösung der höchsten Aufgabe unserer Wissenschaft: das natürliche System."

He compares the relation of various types of plants to metamorphosis of organs of the individual to the relation of ~~[illegible]~~

"... dass wir, wollten wir hierbei so verfahren, dass wir durch Annahme einer der Zeit nach vor sich gegangenen Verwandlung des einen in's andere (z. B. die Glieder der Pflanzenkette durch Zusammensetzung des Moosstengels aus Algen) in Verbindung brächten, so wären wir damit auf dem nämlichen Standpuncte, der bereits für die Metamorphose des Pflanzenindividuums widerlegt worden ist."

Dittmer, H. J. (1937)

Root-system versus aerial system

(115)

One plant - Secale cereale L had 13,815,672 roots with a surface area of 2,554.09 square feet. Living root hairs 14,335,568,288 total surface area 4,321.31 sq ft. The total extent surface of 80 shoots with 480 leaves was 51.38 sq ft. The surface area of the subterranean parts was ∴ 130 times that exposed by the tops.

[This means that such a plant is in much closer relation with the environment in the soil than the shoot; the shoot is far more independent & carrying on its life within itself. (AA March 28.40)]

Bartholomaeus anglicus. Bk XVII

A tree and an herbe cometh forth in one maner: and of one waye: for one cometh of a nother. For yf thou sowest the seed of a tree / fyrste it sheweth and spryngeth forth as an herbe: and is therine confecte / And ryseth and torneth in to the kynde of a tree. And in space of short tyme the herbe torneth in to a tendre and yonge tree.

[This shows the invalidity of some of the arguments in favour of recapitulation. For clearly a seedling tree in a measure cannot start life in the form of a tree — must pass through a herb stage; ∴ no phylogenetic conclusion can be drawn from the former. AA Feb 11. 39]

Herb & Tree habit

11

Graham, R. J. D. & Stewart L. B. (1929)

Rooted leaf cuttings of Ginkgo biloba & Podocarpus macrophylla; Ginkgo rooted from petiole & Podocarpus from leaf base. The authors expect the shoots in time.
They have ~~to~~ raised plants from leaf cuttings of species of Acanthus, Acalypha, Alsomitra, Brownea, Chirita, Coleus, Dioscorea, Eranthemum, Ficus, Gardenia, Gesneria, Jacobinia, Kopsia, Medinella, Panax, Peperomia, Vitis, Rosa, Ruellia, Sanchezia, Sanseveria, Zamioculcas.