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An 16

Notes on Law of Loss  
and

Part III

Atavism

(now of course out of date)

Frac more recent paper on  
biochemical & physiological evidence  
for Dollo's Law see  
Needham, J. Contributions,

Chemical Physiology & Problems

of reversibility in evolution.  
Bot. Rev. Vol 13. 1938 pp

225 - 252

---

Look up quest. of calyx et in *Naydosporaceae* mutants  
etc.

anything subsequent to Alarism + L<sub>1</sub> L<sub>2</sub> papers  
marked +

A. Aber  
52 Huntington P  
Cambridge

# Law of Loss & Atavism

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On Pseudoaxis found in Mimocots fun leaf bases  
 see M 53, 43, 44, 84 (not used)

Leont. 1908

Church, A. H. Types of Floral Mechanism.  
Part I Types I-XII Oxford 1908

6

p 29

The general reduction sequence - the influence  
which can be traced from *Leucogon alatum* with  
the vegetative habit of *Polygonum maritimum* to *Leucogon*  
remains a hyemal one to habit of a "mud-drip"  
habit - from the form of *Scleranthus* upon the  
present day end-result of a "daisy" habit - thus though  
still more pronounced series of "most-reduction"  
p 30

"It appears permissible then to trace the phylogeny  
of the Snowdrop from a *Leucogon* - like ancestor, with  
of full vegetative habit & abundantly flowered inflorescence..."

Cherry more definitely recognises reduction - <sup>to flower</sup> - <sup>based on</sup> <sup>that the result is a</sup> <sup>consideration</sup> -  
as a main fact - in evolution of <sup>consideration</sup> -  
Evolution independent work <sup>of</sup> <sup>flower</sup>  
vegetative organs - well as of flower

7

Wentham, HF Floral Evolution; with  
 particular reference to the Synzygiales Dudykew  
 New Phyt. Vol X <sup>1911</sup> pp 73-83, 109-120  
 145-159, 217-226 Vol XI pp 145-166,  
 217-235, 290-305, 373-397

Celakovsky. Das Reduktionsgesetz der  
 Blüten Satz. d. Königl. Bohmischer  
 Ges der Wiss. Prag 1895. pp 1-140

II The Archichlamydeae, their Phylogenetic  
 Relations to the Synzygiales. VA X pp 109-120  
 Bary 20% of the whole number of species of Archichlamydeae  
 have stamens equal in number to or less than the  
 corolla segments, but are isomerous or digomerous  
 and possess characters near 95% of species  
 of Synzygiales.

Wentham holds that where indefinite stamens  
 occur (such as the more primitive families) (possibly due to  
 some branching due to choice) the Quantitative law  
 tends to choice

as illustrated by the  
 p 113  
 "We gather from the foregoing summary of the Archichlamydeae  
 that there is an unmistakable tendency to economy in product-  
 parts" (particular) of sporophylls (but less marked), perhaps,  
 of procarps.

The tendency is to economy in stamens: Wentham  
 I - II

Dollo, L. Les lois de l'évolution. Bull. de la Soc. Belge de Géologie de paléont. et de hydrol. T. VII Procès-verbaux. Séance du 25 juillet 1893 pp 164-166.

" p. 165.

" L'évolution est discontinue, - irréversible, - limitée."  
He explains that he means by irreversibility by saying  
"Un Organisme peut-il retourner (totalement ou partiellement) à un état antérieur, déjà réalisé dans la série de ses ancêtres?"

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The handbook paper is a résumé of Dollo says  
he proposes & publishes a little book on the subject.  
He says that his researches of species about  
fossil bones in the museum of Brussels  
led him to the generalization. He says in  
opposes also to plain languages no illustrations.



Dollo's law  
 animal case ~~loss~~ replacement, a loss by a different  
 structure B.S.N. p. 119.  
 Osborn's expansion, Dollo's law S.W. p. 25

~~In the case of animals~~  
 Cephalopods, vertebrates with arthropods.  
 Zoologus has the advantage of more palaeontology  
 evidence than the rarer evolutionary lines  
 any vertebrates, hence in ~~from their fossil~~  
 history gives no help regarding the discern-  
 ible the gaps. We have to rely upon the evidence  
 comparative morphology alone.

2 to case of plants

Celakovsky

p 8 sind vorher, segum - flower  
 Redukt. series ) flower fr. azyclia un. nomen, fan  
 to cyclia un. - few pars - Symonios andrewen -  
 Symonios

Zies sind von ... to andrewen  
 in punctum  
 p 9

"Denn es ist doch gar nicht wahrscheinlich  
 dass in der durch Reduktion isandrusch oder  
 durch eine theilweise Rückbildung Pleiandrie  
 durch neu eingetretene Verzweigung  
 zu dieser beidemmal zu sein kann  
 Hais y Papaverosa etc an die d. de d. d. d.

p 134  
 Gpant des madmit exdenu 7 Phylogenetik de d. d. d.

Celakovsky L J 194 Das Reduktionsgesetz  
 der Blüten, des De d. d. d. und die  
 Oddyplomenie Sitzungsber. d. Königl.  
 Böhmischer Gesellsch. der Wissenschaften  
 Math. Naturwiss. Klasse Jhrg 1894 (publ. 1895)  
 14 pp

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New structures :-

Trichomes es. beard of "falls" = Iris  
 Pappus of Compositae  
 Outgrowths from Stamens Pterostemon  
 Corona es. Narisus (? staminal)  
 Angular outgrowths from receptacle es. Nais  
 Populus  
 Keels + wings of fleated stem leaves of Irids

metamorphosis of axillary organ Honey plant.

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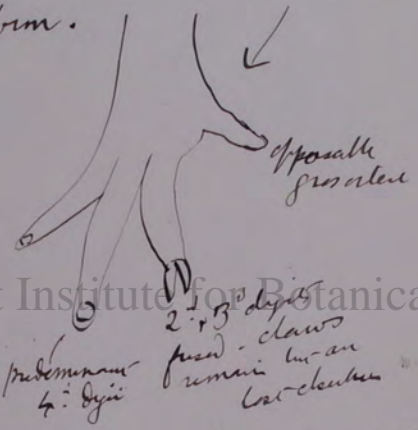
Intercalary growth <sup>for veins</sup>  
 es. tube of Crocus flr - Crocus  
 bez. reduced repeated type of  
 chord



p 194-5.

The following are interpretations stages in the adaptation, the foot to arboreal life

The first article opposable, — the reduction of the 2<sup>d</sup> & 3<sup>d</sup> article & the predominance of the 4<sup>th</sup>; — the syndactylous of the articles in course of atrophy, the regression of the fingers, — these are the successive steps adaptation of the foot to arboreal life. Tarsipes is the most highly adapted form.



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p 198

The foot of the Macroscelididae possess the specialities acquired by those of the Phalangeridae in the arboreal life — predominance of the 4<sup>th</sup> article, reduction syndactylous, a semi thumb, & even an opposable great toe in process, reduction of the least modified genes (Hypsiprymnodon) The Macroscelididae are hence descendants of arboreal ancestors.

p 199

A kangaroo exists which is arboreal in the present day (Dendrolagus) This is secondary

arboresc - ~~Arboresc~~ "C'est un Kangourou qui est  
 retenu vuire dans les arbres". The most primitive  
 Macropodidae had an opposable thumb - Dendrolagus  
 would not have lost this "gros atail" if between the  
 primitive arboreal life & the second arboreal life it  
 had an fossil terrestrial phase.

"Chose intéressante, le gros atail opposable  
 d'holoman atrophie chez les ancêtres immédiats  
 de Dendrolagus ne s'est pas retrouvé dans le  
 retour à la vie arboricole." (Footnote "C'est ce  
 que j'ai appelé l'irréversibilité de l'évolution")  
 Mais les griffes des atails restant au pis  
 un développement considérable a été recourbées,  
 marquant, ainsi, le rapport entre la perfection  
 du préhensibilité et la réduction des griffes, au  
 vice versa.

p 202 (Conclusions)

1. Il est vraisemblable que tous les Macropodaux  
 furent, un jour, arboricoles.
2. A ce titre, comme à tout d'autres (ex: régression  
 de la dentition de lait), le sont trop spécialement  
 pour qu'on puisse voir en eux la cause des  
 placentaires.
3. Ce sont, au contraire, des placentaires,  
 profondément modifiés, car s'ils n'ont pas de  
 placentaire, c'est qu'ils l'ont perdu.
4. Ils proviennent, sans doute, de placentaire  
 très primitifs, à placentaire encore peu imparfait,  
 cause de fréquents accidents (naissances prématurées)

4  
dans la gymnastique violente de la vie arboricole. Et 4  
c'est, probablement, pour éviter ces accidents que cet  
organe embryonnaire a disparu.

5

6. Bien que tous les Marsupiaux aient été, originellement,  
arboricoles, beaucoup ont, actuellement, renoncé à ce  
genre de vie.

Les uns sont devenus arboricoles; d'autres, Terrestres,  
caveurs ou sauteurs; d'autres, enfin, fouisseurs.  
Certains, même, sont remontés dans les arbres  
après être descendus à terre.

7. Ces migrations et adaptations ont dû avoir lieu pour  
s'adapter à la vie.

Les Ichtyosaures ne descendent-ils pas de  
Reptiles Terrestres, qui, un jour, naquirent aussi  
des Poissons, — et, pourtant, ne sont-ils pas  
retournés à la mer, dans les Cétacés?

Les Cétacés ne proviennent-ils pas de Mammifères  
Terrestres, qui, un jour, ~~ont~~ naquirent aussi des  
Poissons, — et, pourtant, ne sont-ils pas rentrés  
dans l'Océan leur première patrie?

Pourquoi les Marsupiaux, d'abord tous arboricoles,  
mais de branche terrestre, n'auraient-ils pu  
revenir dans le milieu dans ils sont partis?

Cependant, si ils dépassent en platitude  
les Ichtyosaures et les Cétacés, c'est quand  
étant déjà redescendus à terre, ils remontent  
dans les arbres, prenant, de cette façon, une  
vie arboricole secondaire, après une vie terrestre  
secondaire.

Depéret Les transformations du monde animal. p 220; Eyles Edit. The  
Chelonidae - chelonae; Otliccaae. Spongidae  
French of passage being "The Chelonidae &  
Zoologie botanique. p 117 ms

16

Desm. Les ancêtres des Marsupiaux  
Travaux Station Zoologique Wimmerer.  
T. 7. 1895 pp 188-600.

Natural History of the  
Mammalia Vol I. Marsupalia. 1846.  
V L M B. 35. 33. p 135 n  
Dendroglus



8 The Cheloniidae of pelagic habitat have lessened, by  
 regression, the weight of bony cases which enclose them,  
 by the aid of cyst-spaces or fontanelles x x x; but  
 the Athecae or Spargidae under the influence of a life  
 mode has again become littoral, have retained the  
 reduced shield of the Chelones, replacing it by a second  
 shield composed of polygonal dermic plates, <sup>irregularly</sup> <sup>shiplined</sup> <sup>irregularly</sup>  
 upon the rudimentary plate forming shield, with or by  
 welded to it.

Gadus in Cambridge Natural History M.B. 7. 3. 40

- ① The osteoderm of *Sphargis* corresponds to the second ossification in the Scutes / Crocodile
  - ② The carapace + plastron of *Therapsid* corresponds to abdominal ribs
- Sphargis* has ① in its pectoral shell + ② in deeper lying plastron + neural plate.

Case. Journ. Morphology XIV 1897 p 21 (Belfer B. 39. 4.)

*Dermochelys* (apparently = *Sphargis*). There is evidence of fossil ancestors than have lost the dorsal carapace of the Chelonidae. *Protostege* + *Protosphargis* represent intermediate fossil forms where the carapace is gone, but the dorsal ossifications are not formed.

Proc Am Phil Soc Philadelphia 12 June 1872

Bauer holds that the carapace of *Dermochelys* is secondary  
Phylogeny of Testudines 6 Ann Ent US FS. p 649. 1873  
Cope & D Lyell's Lectures. Philadelphia 1891  
Smith Woodward Proc. Zool. Ass. 10 Nov 1887

M.F. 87.

Dalla. Bull Mus Roy Hist Nat - Belge 4 p 79. 1886 - 5 p 55. 1888  
+ Ann. d. soc. sci. de Bruxelles Ann 11. p 139. 1887

Case E C On the Osteology of *Protostege*. Journ. Morph. Vol XIV 19 26-55, 3 pl.

Woodward AS 1898 Outlines of Vertebrate  
Palaeontology.

19

p x x.

"Herewith also, sufficient is known to indicate that  
changes in the vertebrate skeleton have taken place  
in a certain definite, irreversible order."

"The vertebrate fins with endoskeletal supports in the  
earliest fishes always appear to tend towards atrophy,  
while the dermal rays surrounding them become  
stouter; when the endoskeletal base of the  
fin has been reduced to one small ray, elements,  
these may eventually gain — even the lobe of the

great-petoral fin of the modern anguilliform  
(Lophius) is formed solely by the elongation of  
two of these little elements. The same phenomenon

is observed among mammals; the number of  
digits may be reduced even to one, but when  
any reduction has taken place the original pentadactylous  
is never restored. Finally, in the case of all  
vertebrates, the teeth tend to degenerate; from the  
supply of successive teeth is stopped, then the one  
"permanent" set disappears — when either of these  
phases of degeneration is accomplished, the original  
state is never recovered."

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The Law of Loss  
Notes for the Linnean discussion Nov 7. 1918

D. H. Scott - notably special

W. Betson. suggests some embryological evidence which he thinks may be destructive, but I could not altogether follow him. The way he spoke suggests to me that he lacks the historical morphological sense of direction which I could trace in any type of this.

FW Oliver. spoke of vestigial structures becoming organs of secretion such as "coriis" etc. way; naturally some spoke of type as "coriis" etc. way; naturally some give "motor stimulation".

McC. Stokes. spoke of difficulty in fossil evidence & accept view that paleo-annelids are secondary phenomena arise so early (in Cretaceous) none of them at individual - C. Smith's idea of stages of phylogenetic way cells. He says

HC Wardell. suggests nature of pupae of Compositae. Echinomys nature / pupae of Compositae. Echinomys nature / pupae of Compositae. Echinomys nature / pupae of Compositae.

A. J. Wilmott. thought that Echinomys might support my view, pointed out some possible even followed me within one group.

Followed Wilmott with an account of some hairless form of feranium which he felt in several genera did not regard its hair, to give him a general conclusion - then two might have been expected.

Schuberg. spoke last. I could not follow his argument. Smetley about Law of Inevitability. Law of Loss, Law of Inevitability, evolution. all being part of the momentum / evolution.

T. O.

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D. Smith Woodward. Completely acceded to the  
 Lab, university for the palaeontology  
 from view + gave some new instances.  
 He mentions of instance that Sphaeris has entirely lost  
 its teeth, but that they recently had one Coxamine in  
 the Museum & found them in the first instance in an  
 more a less of the nature, & balance.

J. Fordich. Apparently answered Mr. Botcher a (a  
 embryonal form, - large (as I have heard before)  
 the embryology repeats the embryology) & the  
 ancestor and the adult stages  
 saw several instances of the loss of the respiratory  
 very good one of the insects by descent  
 for water Antergard they less than the water treaty  
 organs, but they accept a long the definite  
 treaty gas in the case than they have taken  
 to the water.

Spends L. Ed. Full Walsh told me of some anatomical  
 instance he is going to look into  
 Mrs Saunders made the important suggestion that  
 one must distinguish between ~~loss of~~ feminine  
 loss & oppru loss due to inhibition.

Dr. Bauringer suggests body of E. virens also he says  
 applied Dollo's ideas to Botry 25 years ago  
 (letter from C. Daves Sherborn)

## The Law of Lops

57

The Chub has no teeth in its mouth as have the trout, pike, &c but has a mouth hard, tough and leathery. It does not seem, however, to have found the lops of teeth satisfactory, and has developed teeth in its throat.

H. P. Robertson

Nov. 8 - 1918

Eschscholzia, L.

Une leçon élémentaire sur le Darwinisme  
Recueil d'oeuvres de Léo Eschscholzia. Botanique  
générale II 1909 pp 163-268.

ATAVISM 60

p.p 193 - 197

a section entitled Dollo's dictum than evolution is  
irreversible

- The examples again the types found:— Rosaceae
- ① The apteoty of certain Caryophyllaceae, etc "renouvelle la situation récluse par l'apetotie primitive des trochopernes inférieures" (this example of course goes to the ground if the primitive Angiosperm was the Ranalean type)
  - ② By selection of "anomalies accidentelles" Hemerocallis  
his stem a form of *H. peltata* in the 6 perianth segments an abnormally bearded (i.e. all like the external 3 of normal flr) & the 3 interior stamens normally absent are perfectly developed.  
(?) Do not feel quite convinced about this case: "may be a mere doubling of the existing stamens" loss of the many per. members of the outer perianth
  - ③ The staminate is Pentastemon my develop. normal anther
  - ④ The normally absent 5: stamens my appear in various circumstances

"Je ne vois vraiment pas comment on peut parler de l'évolution et refuser d'appeler ces phénomènes des réversions. Ils suffisent à leur sens, à refuser la théorie de l'irréversibilité."

It must be noted that all these cases + the abnormal Collet's toes referred to in letter from Hemerocallis, are cases of increase of number of <sup>stamens</sup> pages, such my some # are lost. This may be a special case.

Chabr Skelly

Cyprinae  
Cyp. family

Leuciscus cephalus  
Cyprina cephalus

Race C. leuciscus

Leuciscus vulgaris

Race Cyprina rubrus

Leuciscus rubrus

Race Cyprina brans

Abrams vulgaris, or A brans

(Chabr, brans  
Race etc)

Cyprinae - entire dev of jaw teeth  
pharyngeal & gill-teeth

"the pharyngeal dentition is among the most  
important in the jaw"  
Anat. Sci. 1896. 8 p 391

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The ultimate cuspidate teeth  
any possible water analysis occurs - the  
fishes + ? see no reason to suppose that  
the Cyprinae as described for fishes  
are jaw teeth.



Demost J, Marsall J + Vandervelde  
 2. Evolution by Atrophy. Trans by Mr. Chalmers  
 Mitchell. Int. Sci. Ser. vol 87 1891

MISC. 7. 89. 900  
 p 221  
 p 225. Teratology contains no undoubted case of  
 the reverse / evolution"

p 321  
 Evolution is irreversible, & secondary, with few more  
 or less obvious exceptions, in fact the following  
 conditions:—

1. That an institution or an organ which has once  
 disappeared never reappears.
2. That an institution or organ once reduced to the  
 condition of vestige cannot be re-established —  
 part of former functions
3. Neither can the former (new functions)

p 247

"From all the facts that we have before us, the  
~~sexual condition becomes plain that regression, not only~~  
~~the etymology of the word, does not imply, either other~~  
~~ancestral condition.~~

ATAVISM  
 Rudimentary organs & institutions resemble the  
 primitive states of these, as far as they no longer  
 possess certain functions. The less the primitive stages did  
 between the primitive & the advanced forms. In the primitive  
 condition the institution or organ is capable of varying  
 in the direction of new uses; in the advanced form, after  
 a certain degree of atrophy, there is no longer the possibility  
 of reversion & assume did not acquire new functions.  
 These observations concern only epiphyse buds or  
 secondary

p 249  
"The degenerate condition is  
"degenerate" is not an actual retrace, 7 steps  
with the form of defoliation is marked. The segment  
condition is "new form", really the form retrace  
evolution is misleading."

ATAVISM

Remember, E. Fris pallida Lam, abava das  
Ergebnis einer auf Grund atavischer Merkmal  
vorgenommenen Züchtung und ihre Geschichte  
Bred. Centralbl Bot 16, 1896 pp 13-24, 27pp

Castle 1506 found a 4-toed hand 76  
of  
foot jurnea pig + had a 4-toed  
one for it. The hypothetical ancestor  
1 the rodents probably had 5 toes on  
each foot - in the normal  
number - modern jurnea pig  
is 3 - to the foot. This is  
depressive mutation tendency towards  
the ancestral type.

pp 57-60

Genetics by H. E. Walter  
New York 1913

ATAVISM

Darwin Origin of Species Ed: 6 1894  
p 377

ATAVISM 17  
1894

"There remains, however, the difficulty. After an organ has ceased being used, & has become in consequence much reduced, how can it be still further reduced in size until the merest vestige is left; & how can it be finally quite obliterated? It is scarcely possible that these changes or processes any further effect after the organ has once been rendered functionless. Some additional explanation is here requisite which I cannot give."

= This explanation is due to a point in the case of Professor Farmer in *Plant life* - in a case of *misdirected buds* of *o* in the *same direction*.

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### Punnett's Mendelian

p 80

Punnett on the evolution of domestic varieties  
any case shows a process of addition of factors in some cases & "so far, as pleiotropy seems to show that they are either the nature of metabolic factors or inhibitors of factors, or of reduplicative factors as in the case of the fowls' combs."

(This is suggestive in connection with the exceptions to the law, less such as appears in the 5th volume in Scrophs)

83

Kellia D. La Loi de l'Irréversibilité  
de l'Évolution (Dollo), vérifiée par l'étude  
des larves d'insectes. Bull. de la Soc.  
Zool. de France. Vd 40. 1915 pp 38-43

p 43

Conclusion :  
" On voit donc que dans les agaves locomoteurs  
des larves des Diptères libres n'arrivent  
à voir avec les pattes terminales disparues  
et sont par rapport à ces dernières de  
véritables néoformations.

Les larves de Diptères avaient donc perdu  
leurs pattes en passant, au cours de leur  
évolution, par les conditions de vie spéciales  
(parasitaires ou xylophages). Ces pattes n'ont  
jamais réapparu, même chez les larves,  
qui sont retournées à la vie libre, et qui  
se sont réadaptées aux anciennes conditions  
de vie par des moyens nouveaux et  
variés."

V.L. ME 15  
(number missing)  
+ Linnæus



DC,  
104  
15

Dollo L Les Céphalopodes adaptés à la 87  
vie benthique Secondaire et à la Vie Benthique  
Terrestre. Zool. Jahrbücher Suppl. 15. Bd 1.  
1912. pp 105—140

p 107  
Dewees Heliumbum = folios :-  
Algae → Terrestrial Anthrophytes → Gymnosperms  
with floaty leaves → Heliumbum, a Gymnosperm  
plant - un-aerial leaves in process; return to  
Terrestrial life.

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? A variation on the Law of Lohp

If the eye-stalk be removed from a young shrimp, it will in time regenerate a new eye, but if the optic ganglion which lies beneath the eye be removed, then, when the wound heals up, there will be produced not a new eye, but an extra antenna.

Presidential Address, Section D. Zoology, Biol. Conf. 1916  
Professor S. W. Macbride - Report p. 413

Crépeau F. Bull de la Soc. Roy de  
Bot. de Belg. T. 4 1865. pp 276-  
278, 1 pl.

Recueil de faits tératologiques  
Linnaea vulgaris L. Pelvic form with  
5 Chambers in ovary. Errera - pp  
velut citis <sup>th</sup> is <sup>is</sup> alavata (p 223)

~~Bank~~

Bentham has seen a 5<sup>th</sup> specimen: Stemodia  
+ Miss in Leucophyllum Errera  
p 222 definitely regards this as atarvian

Errera, L. Pentstemon gentianoides  
et Pentstemon Hartwegi. Bull de  
la Soc Bot de Belgique  
T. 14 1878 pp 182-248.



Dear Sturton, Of course I refer<sup>63</sup>  
to your Errera's view as being opposed  
to Dollo's. I will look up the references  
but can do so only at home, as I have  
no books here.

SAS.

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Leçon élémentaire sur le Darwinisme<sup>64</sup>  
(with an interesting bibliography relating  
Dollo's, loi de l'Evolution). 3<sup>re</sup> Edition.

L. Errera, Recueil d'Œuvres. -

Botanique générale, II. 1909, p. 193.

By a curious coincidence will  
I recall the these notes, <sup>P. 2 of</sup>  
Petrovic's has just brought  
me proofs of an article he  
has written on the dolls matter  
for Jan. no. of Sci. Mop. & I tell  
you of that coming paper &  
hope of your paper - but I  
do not know whether we  
will be able to refer to your

paper as it is not in print.

Myos.

you can perhaps wait-  
for his paper which  
does not deal with  
hot day

Copy of reply 30.5.20

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Have been trying to analyze any the Tubacora

I had been trying to analyze ~~what~~ <sup>which</sup>, among anatomical characters, can be treated as phyletic & which are really too easily produced in response to external conditions & have any value from the <sup>or can under the same</sup> standpoint? What I had written was:-

"From my study of leaves I have come to the conclusion that the following points are of the utmost significance from the phyletic standpoint:-

1. The general plan of the primary vascular system
2. The distribution of the vascular bundles.

But I find <sup>in at least one feature</sup> the distribution of the assimilating parenchyma, the amount of vascular tissue, fibres, & the number of bundles, or even of bundle series, have, as a rule, little importance; they appear to be features which fluctuate readily in response to the conditions of life."

Do you agree with this? Palmside parenchyma seems to be produced in connexion with the leaf surface at right angles to the sun, regardless of its morphological nature, eg. the inverted leaves of certain monocots have certain palmside tissue on the morphologically lower side. It should be

inclined to think that it is a form of tissue that is directly due to exposure to sunlight & no more significant ~~than~~ than the greening of all sorts of organs under the influence of the sun's rays.

If accessory transfusion tissue is really a modified form of mesophyll tissue, don't you think it may also be a direct response to conditions? (But about this I feel much less conviction than I do about the palisade parenchyma.) I have the idea

a vague one, I fear — that the entire group may have an hereditary tendency to develop the layer of mesophyll between the spongy & palisade parenchyma into accessory transfusion tissue, in both the cases you cite, it is mesophyll which is transformed — through in different planes.

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