

REMARKS ON THE SYSTEM OF THE SPERMATOPHYTES

by

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(Translation from part of the Introduction to Chapter III of the Author's "Compendium van de Terminologie, Nomenclatuur en Systematiek der Zaadplanten", Utrecht, 1937, p. 134—139)

For the group of plants treated in the "Compendium" I have used the name Spermatophyta. WETTSTEIN in his "Handbuch" remarks that this name is incorrect because in botany the word "sperma" is used for spermatozoids, and from the name Spermatophyta it might be concluded that by it "plants with spermatozoids" were meant. WETTSTEIN's objection is not to be taken seriously however. Nobody will ever think of translating the name Gymnospermae by "plants with naked spermatozoids"! I did not like to use the name Phanerogamae for the group since the corresponding name "Cryptogamae" has lost all meaning. "Anthophyta" cannot be used, because the Pteridospermae have no flowers and it would even be advisable to use the term "Flower" only with regard to Angiospermae.

The classic division into Gymnospermae and Angiospermae has been given up. The Pteridospermae are fundamentally different from the Gymnospermae e.g. by the form of their leaves and by the absence of a strobilus. I consider them equal in rank to the subdivision Gymnospermae. The same may be said of the group which formerly under the name Gnetales or Gnetinae used to be considered as a subdivision of the Gymnospermae, but which, in my opinion, are even farther removed from the Gymnospermae than the Pteridospermae. They have obtained here the rank of a new subdivision under the name *Chlamydospermae*. I have distinguished therefore four subdivisions of the Spermatophyta namely Pteridospermae, Gymnospermae, *Chlamydospermae* and Angiospermae.

The division of the Gymnospermae in Classes is similar to that found in most modern handbooks. Some alterations however have been made in the system of the Coniferae. The division into the three families Taxaceae, Pinaceae (or Abietaceae) and Cupressaceae gives a perfectly wrong idea of the

great differences in form which are found within this Class. In conformity with NÉGER and PILGER I have distinguished seven groups, three of which (the Araucariales, the Podocarpaceae and the Pinales) are considered as Orders whilst of the remaining four groups two have been classed in the Order Cupressales and two in the Order Taxales. Not without some hesitation however; the distinction of seven orders could, surely, also be defended.

My division into seven groups is not connected with the preconceived opinion that the cone of the Pinaceae is not to be regarded as an inflorescence but as a flower. It seems to me that in this way the problem is not rightly formulated. It is more correct to ask ourselves whether the cone of the Pinaceae (and of the other Coniferae) is a uniaxial or a biaxial strobilus.

In the descriptions of the various groups I have not expressed an opinion in this controversy. When dealing with the Gymnospermae I have avoided the terms "Flower" and "Inflorescence" entirely and instead I have always used the term "strobilus". In my opinion the most primitive form of this strobilus is to be found in the Araucariales and this order, also on account of other characters, ought to be the starting point in a discussion of the Coniferae. The Taxales, particularly the Taxaceae, have the most reduced strobilus and on that account they have been placed at the end of the Class. In passing I might mention that the macrostrobilus of the Araucariales is in my opinion uniaxial.

The subdivision Chlamydospermae has been divided into two Orders, of which the order of the Gnetales includes the families of the Ephedraceae and Gnetaceae, whilst *Welwitschia* forms an order of its own.

The division of the Angiospermae into Orders does not deviate considerably from the usual one and on the whole agrees most with the one given by WETTSTEIN, especially as regards the Dicotyledons. The grouping of the orders however differs considerably. The coloured plate shows the principles which have led to the new arrangement.

That plate needs an explanation.

The usual conception, which for the system of WETTSTEIN for instance has been expressed by JANCHEN in the form of a phylogenetical tree, is considered by me to be incorrect. The idea of such a tree has been derived from human genealogy. If, starting from a given human couple, the successive generations are connected by lines, we obtain a figure resembling a tree. If we extend that figure for, let us say ten generations, the older

generations will all have died. The branches of the tree are then formed by individuals (families) who are not longer present; the ultimate branchlets of the tree only are still alive.

The resemblance between the phylogenetical tree and the genealogical tree however is very superficial. In biology part of the living (recent) forms are put on the bifurcations of the branches and in this way the biologists make clear (more or less deliberately) that these forms are older than the forms or groups which are found at the end of the branches. In order to give this tree a phylogenetical appearance in agreement with the human genealogical tree, Time has been included in the representation without taking into account, however, that we know nothing of the relative age of the groups. This mistake is perhaps most apparent in the phylogenetical tree of the Angiospermae, because fossil forms (ancestors?) are here practically unknown. If we imagine to ourselves the system of the Angiospermae as a tree, we can only see the branchlets in leaf — the living forms — but with regard to the true nature of the trunk and the other branches we have no data and cannot reproduce anything. The latter can only be obtained from the study of fossil forms, and of these far too little is known. Therefore, the phylogenetical tree of the Angiospermae is — contrary to a human genealogical one — purely hypothetical, based upon morphological evidence of the living forms only, with neglect of the very important — but alas unknown — extinct groups. So the phylogenetical tree of the Angiospermae is a tree of which we know the foliage only; a tree, on the crown of which we look from above, but whose dense foliage does not allow us to see the structure of its branches. It might as well be a wood or a heap of leaves!

This consideration however puts an end to the idea that a tree could be used as a fit representation of the system of the Angiospermae.

Another representation, to which these objections cannot be made, is the following. One could imagine the Orders of the Angiospermae to be larger or smaller globes, the size depending on the number of families, and these globes we might arrange in space in such a fashion, that those, which resemble each other most, are brought closest together. One might carry this out by attaching a great number of differently sized balloons, filled with gas, to the floor of a room by means of strings. One might be able to reconstruct a representation in space with the lengths and the mutual distances of the strings. This construction of course would express our views concerning

the resemblance and consequently concerning the relationship.

If we have to draw this representation on a plate, on a plane surface, therefore the system of the globes must be projected on this surface. The globes now become discs and we are free to manoeuvre our projection-plane in such a fashion, that the discs cover each other as little as possible or, if it can be managed, not at all. It cannot be helped however, that the clearness of the representation is lost for the greater part on account of the loss of one of the three dimensions. As a compensation for that loss we may join the discs by means of lines.

Now imagine that the coloured plate has been carried out in this way.

The two broken lines running on the left side of the plate towards the broken circle segment, are a deliberate inconsistency in the representation. The broken circle segment, of course, is meant to represent a group of old, unknown Angiosperms, from which the Monocotyledons as well as the Dicotyledons have developed. In doing this we have allowed Time to enter surreptitiously. But the representation itself has not been changed by it. With the broken lines I only wish to express that I consider the Monocotyledons and the Dicotyledons to be parallel series, which already very early have each gone their own way and that I do not attach considerable phylogenetic importance to the resemblance between Helobiae and Ranales. When one should wish to do this, one can leave out the broken lines and the circle segment and draw a line from the disc Helobiae to the disc Ranales.

It goes without saying that the lines, connecting the discs, are not all of equal value. This value might be expressed by the thickness of the lines. Whilst I suppose that most taxonomists will agree with me as regards the connection Ranales-Rosales-Myrtales, some of them may object to the position and the connections of the Tricoccae and many even will think the connections Ranales-Ebenales, Rhoadales-Batidales, Tubiflorae-Callitrichales and Tubiflorae-Hippuridales rather doubtful. As regards the latter two orders we have to keep in mind, that their place with the Tricoccae, respectively with the Myrtales, has satisfied nobody and that a number of their characters rather point to a relationship with the Tubiflorae. So we can better accept them as strongly reduced forms at the end of a series than give them a place on which they certainly have no right.

When treating the families in a book another dimension disappears from the representation; the bidimensional picture

has to become linear and with that again part of the clearness is lost.

WETTSTEIN in his "Handbuch" rightly requires from a system "es soll einerseits der wissenschaftlichen Forschung gerecht werden, eine Darstellung der entwicklungsgeschichtlichen Beziehungen der Pflanzen zu einander zu geben, anderseits den praktischen Bedürfnisse nach Uebersicht entsprechen".

It seems to me however that in keeping upright the division of the Dicotyledons in Choripetalae (Archichlamydeae) and Sympetalae (Metachlamydeae), respectively in Monochlamydeae, Dialypetalae and Sympetalae, the mutual phylogenetic relations have been sacrificed to the practical need for clearness. It has now been generally accepted that the Monochlamydeae are no phylogenetic unity and all taxonomists agree on the polyphyletic origin of the Sympetalae. I think the time has come to express that view in the order in which the families are dealt with, and, naturally, I have taken the symbolic representation on the coloured plate as a basis for my sequence. Therefore I have divided the Dicotyledons into eight series, which may be read directly from the plate. I believe not to have taken away anything from the clearness in doing this, whilst the present views of phylogenetic relations are better expressed by it.

Of course the system of the Angiospermae will in future undergo a great many changes. Many families, when they will have been better and more fully studied, will have to be removed from one Order into another. But it does not seem to me that the time for a revolution of the present system has arrived yet. We can only progress by small steps and that is the reason why the arrangement given here is mainly conservative.

Utrecht-Baarn, December 1937.

SPERMATOPHYTA

ONDERAFD. I. PTERIDOSPERMAE

1. Fam. Lyginodendraceae
2. Fam. Medullosaceae

ONDERAFD. II. GYMNOSPERMAE

KLASSE CYCADINAE

Fam. Cycadaceae

KLASSE BENNETTITINAE

Fam. Bennettitaceae

KLASSE CORDAITINAE

Fam. Cordaitaceae

KLASSE GINKGOINAE

Fam. Ginkgoaceae

KLASSE CONIFERAE

ORDE ARAUCARIALES

1. Fam. Araucariaceae

ORDE PODOCARPALES

2. Fam. Podocarpaceae

ORDE PINALES

3. Fam. Pinaceae

ORDE CUPRESSALES

4. Fam. Cupressaceae
5. Fam. Taxodiaceae

ORDE TAXALES

6. Fam. Cephalotaxaceae
7. Fam. Taxaceae

ONDERAFD. III. CHLAMYDOSPERMAE

ORDE GNETALES

1. Fam. Ephedraceae
2. Fam. Gnetaceae

ORDE WELWITSCHIALES

3. Fam. Welwitschiaceae

ONDERAFD. IV. ANGIOSPERMAE**KLASSE MONOCOTYLEDONEAE****1. ORDE SPADICIFLORAE**

1. Fam. Araceae
2. Fam. Palmae
3. Fam. Cyclanthaceae
4. Fam. Lemnaceae

2. ORDE PANDANALES

1. Fam. Typhaceae
2. Fam. Pandanaceae
3. Fam. Sparganiaceae

3. ORDE HELOBIAE

1. Fam. Aponogetonaceae
2. Fam. Potamogetonaceae
3. Fam. Najadaceae
4. Fam. Scheuchzeriaceae
5. Fam. Alismataceae
6. Fam. Butomaceae
7. Fam. Hydrocharitaceae

4. ORDE TRIURIDALES

1. Fam. Triuridaceae

5. ORDE FARINOSAE

1. Fam. Flagellariaceae
2. Fam. Restionaceae
3. Fam. Centrolepidaceae
4. Fam. Mayacaceae
5. Fam. Xyridaceae
6. Fam. Eriocaulaceae
7. Fam. Thurniaceae
8. Fam. Rapateaceae
9. Fam. Bromeliaceae
10. Fam. Commelinaceae
11. Fam. Pontederiaceae
12. Fam. Cyanastraceae
13. Fam. Philydraceae

6. ORDE LILIIFLORAE

1. Fam. Juncaceae
2. Fam. Stemonaceae
3. Fam. Liliaceae
4. Fam. Haemodoraceae
5. Fam. Amaryllidaceae
6. Fam. Velloziaceae
7. Fam. Taccaceae

- 8. Fam. Dioscoreaceae
- 9. Fam. Iridaceae
- 10. Fam. Burmanniaceae
- 11. Fam. Corsiaceae
- 7. ORDE GLUMIFLORAE
 - 1. Fam. Gramineae
 - 2. Fam. Cyperaceae
- 8. ORDE SCITAMINEAE
 - 1. Fam. Musaceae
 - 2. Fam. Zingiberaceae
 - 3. Fam. Cannaceae
 - 4. Fam. Marantaceae
- 9. ORDE GYNANDRAE
 - 1. Fam. Apostasiaceae
 - 2. Fam. Orchidaceae

KLASSE DICOTYLEDONEAE

Reeks Casuarinales → „*Amentiflorae*” → *Urticales* → *Centrospermae* → *Plumbaginales* → *Primulales*. Orden 10—26.

- 10. ORDE CASUARINALES
 - 1. Fam. Casuarinaceae
- 11. ORDE PIPERALES
 - 1. Fam. Saururaceae
 - 2. Fam. Piperaceae
 - 3. Fam. Chloranthaceae
- 12. ORDE SALICALES
 - 1. Fam. Salicaceae
- 13. ORDE GARRYALES
 - 1. Fam. Garryaceae
- 14. ORDE LEITNERIALES
 - 1. Fam. Leitneriaceae
- 15. ORDE JUGLANDALES
 - 1. Fam. Juglandaceae
- 16. ORDE JULIANIALES
 - 1. Fam. Julianiaceae
- 17. ORDE MYRICALES
 - 1. Fam. Myricaceae
- 18. ORDE BALANOPSISDALES
 - 1. Fam. Balanopsidaceae

19. ORDE HYDROSTACHYALES
1. Fam. Hydrostachyaceae
20. ORDE FAGALES
1. Fam. Betulaceae
2. Fam. Fagaceae
21. ORDE URTICALES
1. Fam. Moraceae
2. Fam. Cannabaceae
3. Fam. Urticaceae
4. Fam. Ulmaceae
5. Fam. Eucommiaceae
6. Fam. Rhoipteleaceae
22. ORDE CENTROSPERMAE
1. Fam. Chenopodiaceae
2. Fam. Amaranthaceae
3. Fam. Nyctaginaceae
4. Fam. Phytolaccaceae
5. Fam. Gyrostemaceae
6. Fam. Achatocarpaceae
7. Fam. Aizoaceae
8. Fam. Portulacaceae
9. Fam. Basellaceae
10. Fam. Dysphaniaceae
11. Fam. Caryophyllaceae
23. ORDE POLYGONALES
1. Fam. Polygonaceae
24. ORDE CACTALES
1. Fam. Cactaceae
25. ORDE PLUMBAGINALES
1. Fam. Plumbaginaceae
26. ORDE PRIMULALES
1. Fam. Theophrastaceae
2. Fam. Myrsinaceae
3. Fam. Primulaceae

Reeks „Amentiflorae” → Proteales → Santalales → Balanophorales. Orden 27—29.

27. ORDE PROTEALES
1. Fam. Proteaceae
28. ORDE SANTALALES
1. Fam. Olacaceae
2. Fam. Opiliaceae

3. Fam. Oktoknemaceae
4. Fam. Grubbiaceae
5. Fam. Santalaceae
6. Fam. Myzodendraceae
7. Fam. Loranthaceae
8. Fam. Cynomoriaceae

29. ORDE BALANOPHORALES

1. Fam. Balanophoraceae

Reeks Hamamelidales → Ranales → Ebenales. Orden 30—32.

30. ORDE HAMAMELIDALES

1. Fam. Hamamelidaceae
2. Fam. Platanaceae

31. ORDE RANALES

1. Fam. Cercidiphyllaceae
2. Fam. Trochodendraceae
3. Fam. Ranunculaceae
4. Fam. Lardizabalaceae
5. Fam. Berberidaceae
6. Fam. Menispermaceae
7. Fam. Magnoliaceae
8. Fam. Himantandraceae
9. Fam. Calycanthaceae
10. Fam. Lactoridaceae
11. Fam. Annonaceae
12. Fam. Eupomatiaceae
13. Fam. Myristicaceae
14. Fam. Gomortegaceae
15. Fam. Monimiaceae
16. Fam. Lauraceae
17. Fam. Hernandiaceae
18. Fam. Nymphaeaceae
19. Fam. Ceratophyllaceae

32. ORDE EBENALES

1. Fam. Sapotaceae
2. Fam. Sarcospermataceae
3. Fam. Hoplestigmataceae
4. Fam. Ebenaceae
5. Fam. Diclidantheraceae
6. Fam. Symplocaceae
7. Fam. Styracaceae
8. Fam. Lissocarpaceae

Reeks Ranales → *Aristolochiales* → *Rosales* → *Myrtales*.
Orden 33—36.

33. ORDE ARISTOLOCHIALES

1. Fam. Aristolochiaceae
2. Fam. Rafflesiaceae
3. Fam. Hydnoraceae

34. ORDE ROSALES

1. Fam. Crassulaceae
2. Fam. Cephalotaceae
3. Fam. Saxifragaceae
4. Fam. Pittosporaceae
5. Fam. Byblidaceae
6. Fam. Brunelliaceae
7. Fam. Cunoniaceae
8. Fam. Myrothamnaceae
9. Fam. Bruniaceae
10. Fam. Roridulaceae
11. Fam. Crossosomataceae
12. Fam. Rosaceae
13. Fam. Connaraceae
14. Fam. Mimosaceae
15. Fam. Papilionaceae

35. ORDE PODOSTEMALES

1. Fam. Podostemaceae

36. ORDE MYRTALES

1. Fam. Penaeaceae
2. Fam. Geissolomataceae
3. Fam. Oliniaceae
4. Fam. Thymelaeaceae
5. Fam. Elaeagnaceae
6. Fam. Lythraceae
7. Fam. Heteropyxidaceae
8. Fam. Sonneratiaceae
9. Fam. Crypteroniaceae
10. Fam. Rhizophoraceae
11. Fam. Alangiaceae
12. Fam. Nyssaceae
13. Fam. Lecythidaceae
14. Fam. Combretaceae
15. Fam. Myrtaceae
16. Fam. Punicaceae
17. Fam. Melastomataceae
18. Fam. Oenotheraceae
19. Fam. Trapaceae

20. Fam. Haloragaceae
21. Fam. Gunneraceae
22. Fam. Thelygonaceae

Reeks Rhoadales → *Parietales* → *Guttiferales* → *Ericales* →
Campanulatae. Orden 37—45.

37. ORDE RHOEADALES

1. Fam. Papaveraceae
2. Fam. Capparidaceae
3. Fam. Cruciferae
4. Fam. Tovariaceae
5. Fam. Resedaceae
6. Fam. Moringaceae
7. Fam. Bretschneideraceae

38. ORDE BATIDALES

1. Fam. Batidaceae

39. ORDE SARRACENIALES

1. Fam. Sarraceniaceae
2. Fam. Nepenthaceae
3. Fam. Droseraceae

40. ORDE PARIETALES

1. Fam. Cistaceae
2. Fam. Bixaceae
3. Fam. Cochlospermaceae
4. Fam. Tamaricaceae
5. Fam. Fouquieriaceae
6. Fam. Frankeniaceae
7. Fam. Elatinaceae
8. Fam. Violaceae
9. Fam. Canellaceae
10. Fam. Flacourtiaceae
11. Fam. Lacistemaceae
12. Fam. Stachyuraceae
13. Fam. Turneraceae
14. Fam. Malesherbiaceae
15. Fam. Passifloraceae
16. Fam. Achariaceae
17. Fam. Caricaceae
18. Fam. Loasaceae
19. Fam. Begoniaceae
20. Fam. Datisceae
21. Fam. Ancistrocladaceae

41. ORDE CUCURBITALES

1. Fam. Cucurbitaceae

42. ORDE GUTTIFERALES
1. Fam. Dilleniaceae
 2. Fam. Actinidiaceae
 3. Fam. Ochnaceae
 4. Fam. Strasburgeriaceae
 5. Fam. Medusagynaceae
 6. Fam. Eucryphiaceae
 7. Fam. Caryocaraceae
 8. Fam. Marcgraviaceae
 9. Fam. Quinaceae
 10. Fam. Theaceae
 11. Fam. Guttiferae
 12. Fam. Dipterocarpaceae
43. ORDE DIAPENSIALES
1. Fam. Diapensiaceae
44. ORDE ERICALES
1. Fam. Clethraceae
 2. Fam. Pirolaceae
 3. Fam. Ericaceae
 4. Fam. Epacridaceae
 5. Fam. Empetraceae
45. ORDE CAMPANULATAE
1. Fam. Campanulaceae
 2. Fam. Goodeniaceae
 3. Fam. Brunoniaceae
 4. Fam. Stylidiaceae
 5. Fam. Calyceraceae
 6. Fam. Compositae

Reeks Rosales → *Pandales* → *Malvales* → *Tricoccae* → *Gerniales* → *Terebinthales* → *Rhamnales*. Orden 46—51.

46. ORDE PANDALES
1. Fam. Pandaceae
47. ORDE MALVALES
1. Fam. Elaeocarpaceae
 2. Fam. Chlaenaceae
 3. Fam. Tillaceae
 4. Fam. Malvaceae
 5. Fam. Bombacaceae
 6. Fam. Sterculiaceae
 7. Fam. Scytopetalaceae
 8. Fam. Gonystylaceae
48. ORDE TRICOCCAE
1. Fam. Dichapetalaceae

2. Fam. Euphorbiaceae
3. Fam. Buxaceae
4. Fam. Daphniphyllaceae

49. ORDE GERANIALES

1. Fam. Linaceae
2. Fam. Humiriaceae
3. Fam. Oxalidaceae
4. Fam. Geraniaceae
5. Fam. Limnanthaceae
6. Fam. Tropaeolaceae
7. Fam. Erythroxylaceae
8. Fam. Malpighiaceae
9. Fam. Zygophyllaceae
10. Fam. Cneoraceae

50. ORDE TEREBINTHALES

1. Fam. Rutaceae
2. Fam. Simaroubaceae
3. Fam. Burseraceae
4. Fam. Meliaceae
5. Fam. Tremandraceae
6. Fam. Polygalaceae
7. Fam. Trigoniaceae
8. Fam. Vochysiaceae
9. Fam. Anacardiaceae
10. Fam. Sapindaceae
11. Fam. Akaniaceae
12. Fam. Aextoxicaceae
13. Fam. Aceraceae
14. Fam. Hippocastanaceae
15. Fam. Coriariaceae
16. Fam. Sabiaceae
17. Fam. Melianthaceae
18. Fam. Balsaminaceae
19. Fam. Didieraceae

51. ORDE RHAMNALES

1. Fam. Rhamnaceae
2. Fam. Vitaceae

Reeks Terebinthales → *Celastrales* → *Umbelliflorae* →
Rubiales. Orden 52—54.

52. ORDE CELASTRALES

1. Fam. Cyrillaceae
2. Fam. Pentaphylacaceae
3. Fam. Corynocarpaceae
4. Fam. Aquifoliaceae

5. Fam. Celastraceae
6. Fam. Salvadoraceae
7. Fam. Staphyleaceae
8. Fam. Hippocrateaceae
9. Fam. Stackhousiaceae
10. Fam. Icacinaceae

53. ORDE UMBELLIFLORAE

1. Fam. Araliaceae
2. Fam. Cornaceae
3. Fam. Umbelliferae

54. ORDE RUBIALES

1. Fam. Caprifoliaceae
2. Fam. Rubiaceae
3. Fam. Adoxaceae
4. Fam. Valerianaceae
5. Fam. Dipsacaceae

Reeks Terebinthales → *Ligustrales* → *Contortae* → *Tubiflorae*
→ *Plantaginales*. Orden 55—60.

55. ORDE LIGUSTRALES

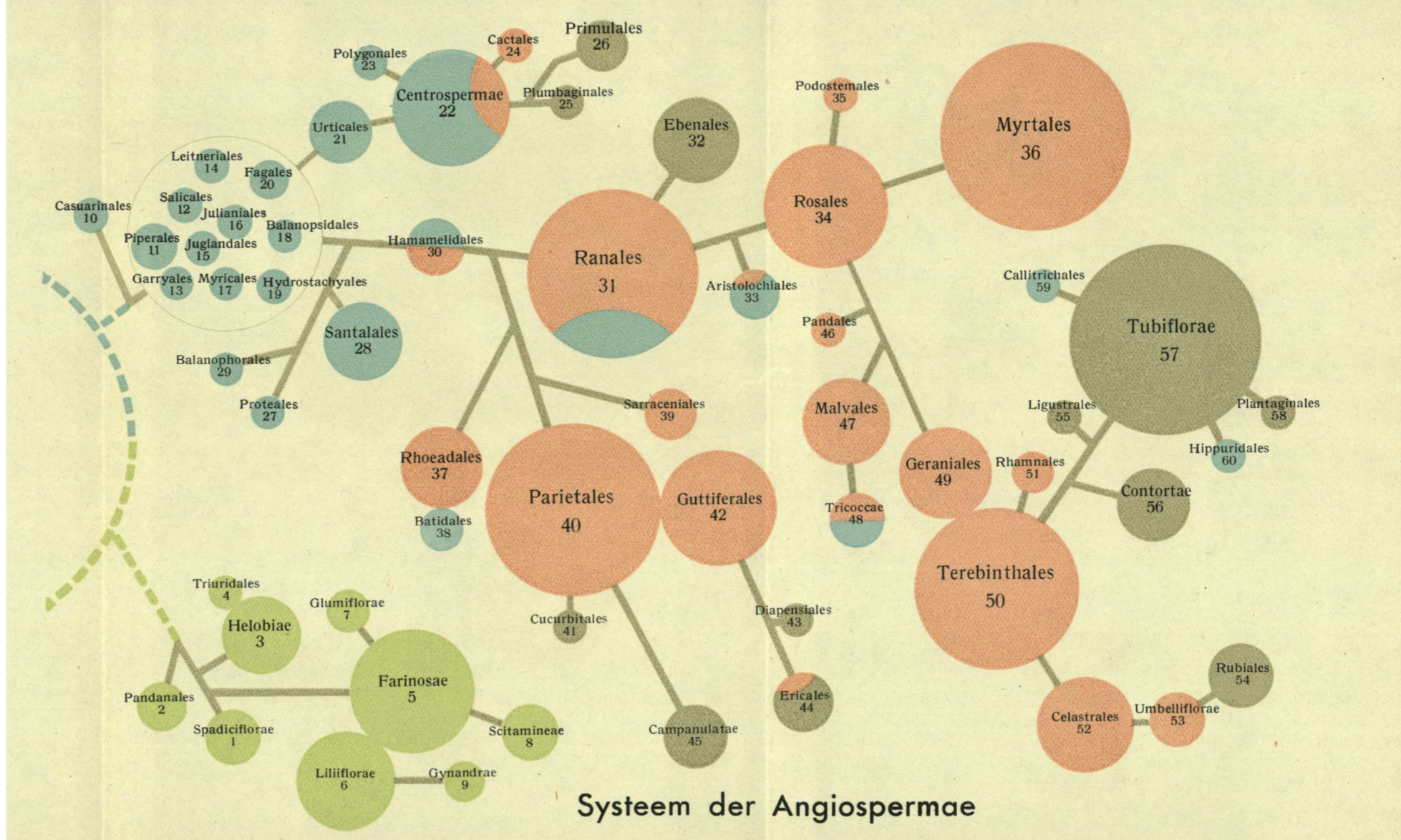
1. Fam. Oleaceae

56. ORDE CONTORTAE

1. Fam. Desfontaineaceae
2. Fam. Loganiaceae
3. Fam. Buddleiaceae
4. Fam. Gentianaceae
5. Fam. Menyanthaceae
6. Fam. Apocynaceae
7. Fam. Asclepiadaceae

57. ORDE TUBIFLORAE

1. Fam. Convolvulaceae
2. Fam. Cuscutaceae
3. Fam. Polemoniaceae
4. Fam. Hydrophyllaceae
5. Fam. Lennoaceae
6. Fam. Boraginaceae
7. Fam. Nolanaceae
8. Fam. Solanaceae
9. Fam. Scrophulariaceae
10. Fam. Lentibulariaceae
11. Fam. Orobanchaceae
12. Fam. Gesneriaceae
13. Fam. Bignoniaceae
14. Fam. Pedaliaceae



- 15. Fam. Martyniaceae
 - 16. Fam. Acanthaceae
 - 17. Fam. Verbenaceae
 - 18. Fam. Avicenniaceae
 - 19. Fam. Labiatae
 - 20. Fam. Globulariaceae
 - 21. Fam. Phrymaceae
 - 22. Fam. Myoporaceae
 - 23. Fam. Columelliaceae
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- 58. ORDE PLANTAGINALES
 - 1. Fam. Plantaginaceae
 - 59. ORDE CALLITRICHALES
 - 1. Fam. Callitrichaceae
 - 60. ORDE HIPPURIDALES
 - 1. Fam. Hippuridaceae