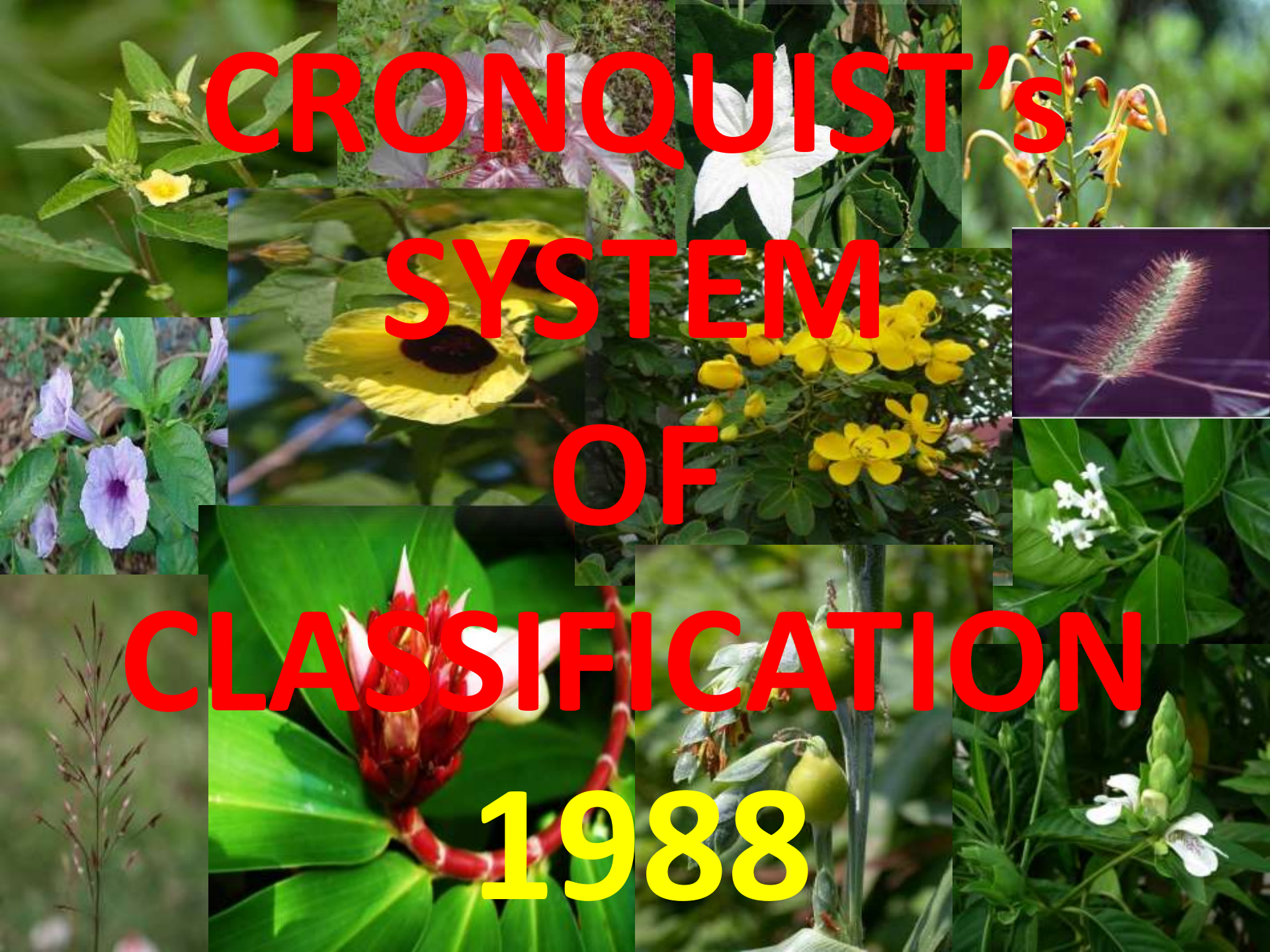

CRONQUIST's
SYSTEM
OF
CLASSIFICATION
1988

Arthur Lyman John Cronquist (1919 -1992) was a United States botanist and a specialist on Compositae. He is considered one of the most influential botanists of the 20th century, largely due to his formulation of the **Cronquist system OF Classification**

BASIS OF CLASSIFICATION

This system of classification is an elaboration of Bessey's system of classification and a refinement over Takhtajan's system (1964), which is based on morphological, anatomical, embryological, palynological, serological, cytological, chemical as well as ultra structural evidences.

According to Cronquist's system of classification, the angiosperms have been divided into two Classes

The **Cronquist system** is a **taxonomic classification system** **of** **flowering plants**. It was developed by Arthur Cronquist in his texts ***An Integrated System of Classification of Flowering Plants*** (1981) and ***The Evolution and Classification of Flowering Plants*** (1968; 2nd edition, 1988).

Cronquist's system places flowering plants into two broad classes, **Magnoliopsida** (dicotyledons) and **Liliopsida** (monocotyledons). Within these classes, related orders are grouped into subclasses.

The scheme is still widely used, in either the original form or in adapted versions, but some botanists are adopting the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG III.

The system as laid out in ***An Integrated System of Classification of Flowering Plants*** (1981) counts

321 families and **64** orders in class **Magnoliopsida**

And

19 orders and **65** families in class **Liliopsida**

A- Class Magnoliopsida

A.1- Subclass Magnoliidae (mostly basal dicots) (8 Orders, 39 families)

A.2-Subclass Hamamelidae [correctly *Hamamelididae*] [11 Orders, 25 families]

A.3- Subclass Caryophyllidae [3 Orders, 14 families]

A.4- Subclass Dilleniidae [13 Oders, 78 families]

A.5- Subclass Rosidae [18 Orders, 118 families]

A.6- Subclass Asteridae [11 Orders, 50 Families]

B- Class Liliopsida

B.1- Subclass Alismatidae [4 Oders, 16 Families]

B.2- Subclass Arecidae [4 Orders, 6 Families]

B.3- Subclass Commelinidae [7 Orders, 16 Families]

B.4- Subclass Zingiberidae [2 Orders, 9 Families]

B.5- Subclass Liliidae [2 Orders, 19 Families]

MERITS:

1. There is general agreement of Cronquist's system with that of other contemporary systems like Takhtajan, Dahlgren and Thorne.

2. Detailed information on anatomy, ultra- structure phytochemistry and chromosome — besides morphology — was presented in the revision of the classification in 1981 and 1988.

3. The system is highly phylogenetic.

4. Nomenclature is in accordance with the ICBN.

5. The family Asteraceae in Dicotyledons and Orchidaceae in Monocotyledons are generally regarded as advanced and are rightly placed towards the end of respective groups.

6. The relationships of different groups have been described with diagrams which provide valuable information on relative advancement and size of the various subclasses.

7. The family Winteraceae (vessel-less wood present similar to Pteridosperms) placed at the beginning of dicotyledons is favoured by many authors.

8. The subclass Magnoliidae is considered as the most primitive group of Dicotyledons. The placement of Dicotyledons before Monocotyledons finds general agreements with modern authors.

9. As the text is in English, the system has been readily adopted in different books.

DEMERITS:

1. Though highly phylogenetic and popular in U.S.A., this system is not very useful for identification and adoption in Herbaria since Indented keys for genera are not provided.

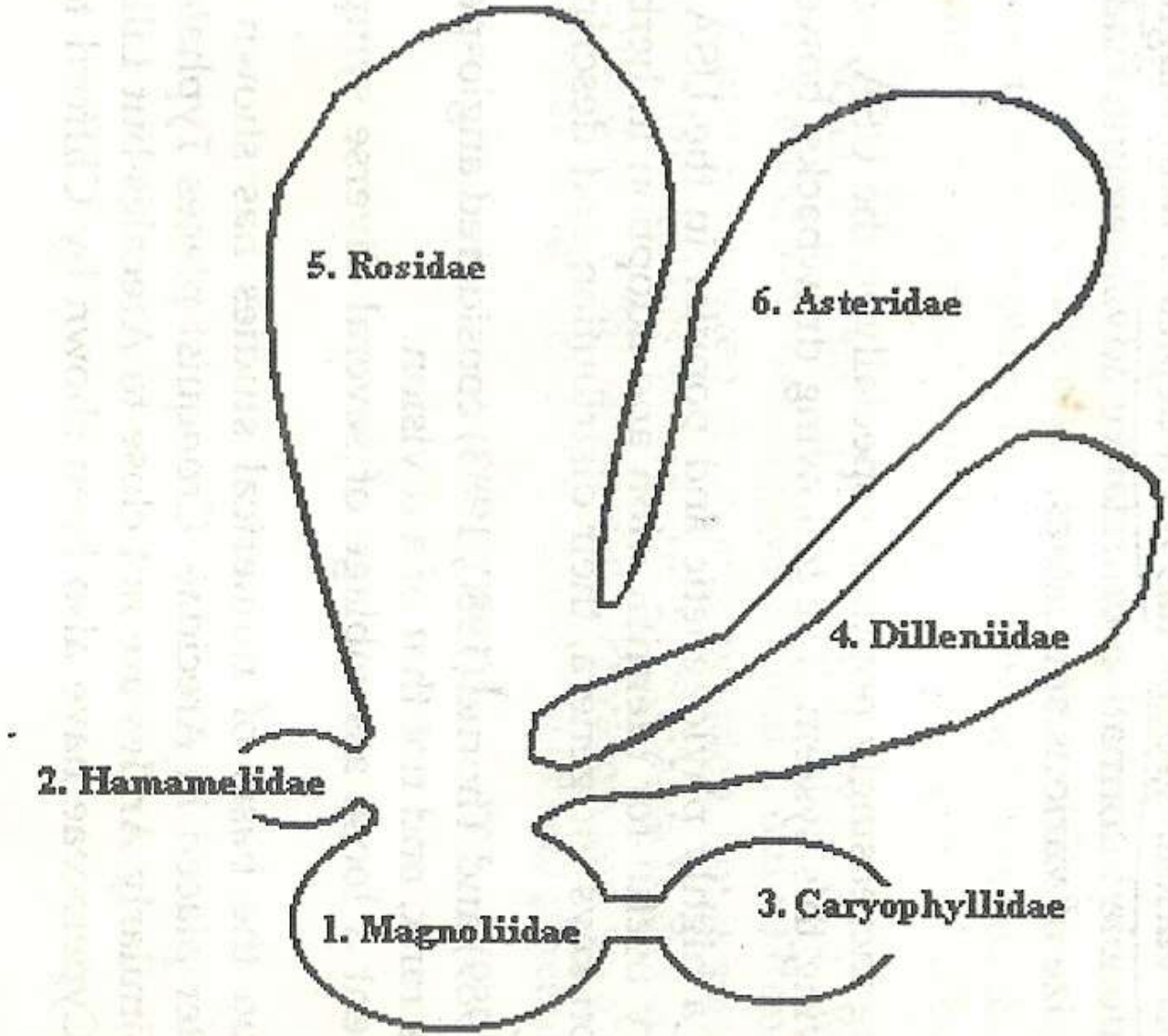
2. Dahlgren (1983, 89) and Thorne (1980, 83) treated angiosperms in the rank of a class and not that of a division.

3. Superorder as a rank above order has not been recognised here, though it is present in other contemporary classifications like Takhtajan, Thorne and Dahlgren.

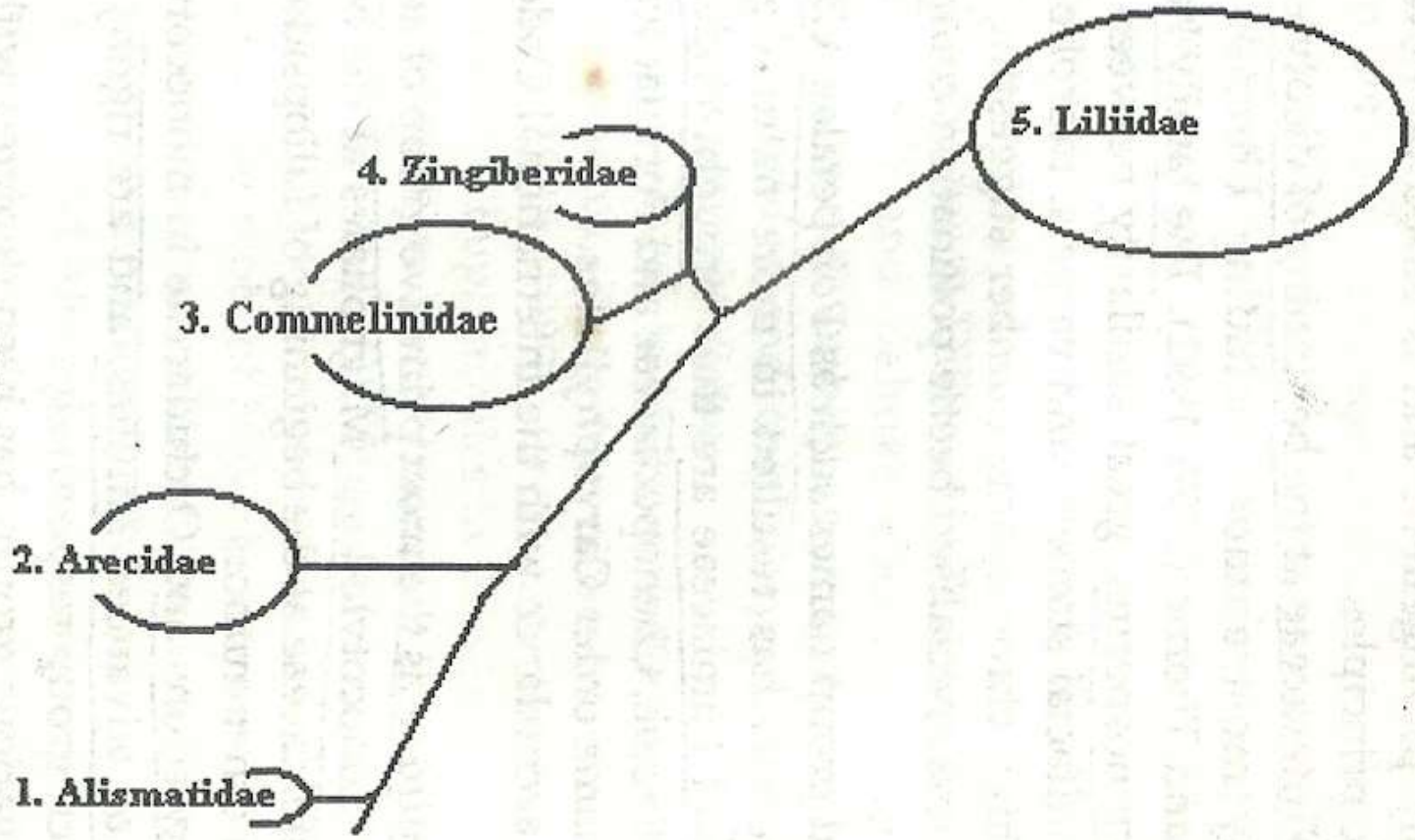
4. The subclass Asteridae represents a loose assemblage of several diverse sympetalous families.

5. Ehrendorfer (1983) pointed out that the subclass Hamamelidae does not represent an ancient side branch of the subclass Magnoliidae, but is remnant of a transition from Magnoliidae to Dilleniidae, Rosidae, and Asteridae.

6. There is a difference in opinion with other authors regarding the systematic position of some orders like Typhales, Arales, Urticales etc.



Magnoliopsida


5. Liliidae
4. Zingiberidae
3. Commelinidae
2. Arecidae
1. Alismatidae

Liliopsida

The following principles were adopted by Cronquist (1981) to classify the flowering plants:

1. The earliest angiosperms were shrubs rather than trees.
2. The simple leaf is primitive than compound leaf.
3. Reticulate venation is primitive than parallel venation.
4. Paracytic stomata is primitive than the other types.
5. Slender, elongated, long tracheids with numerous scalariform pits are primitive. Further specialisation leads to shorter broad vessels with somewhat thinner walls and transverse end walls with few larger perforations. Later on, the perforation becomes single and large.
6. Long and slender sieve elements with very oblique end walls where the sieve areas scattered along the longitudinal wall with groups of minute pores are primitive. Whereas, the phloem with short sieve tube elements where end walls having a single transverse sieve plate with large openings is a derived condition.

7. The area and activity of cambium and also the length of fusiform initial is more in primitive form which gradually becomes reduced in advanced one.
8. Plants with vascular bundles arranged in a ring are primitive rather than scattered vascular bundle as found in monocots.
9. Plants with large and terminal flowers are primitive, those may arrange in monochasia or dichasia and the other type of inflorescences have been derived from these types.
10. Flowers with many large, free and spirally arranged petals; many linear and spirally arranged stamens and free carpels as found in Magnoliaceae are primitive, and other types got evolved through gradual reduction, aggregation, elaboration and differentiation of floral members.
11. Plants with unisexual flowers are evolved from bisexual floral ancestors.
12. The large and indefinite number of floral members are primitive than the small and definite numbers.

13. Androecium with many stamens is primitive than the reduced numbers.
14. Linear stamens with embedded pollen sacs as found in some Magnolian genera are considered more primitive than the others.
15. Uniaperturate pollen grains are considered as primitive and the triaperturate type are derived from it.
16. Insect pollinated plants are considered as primitive from which wind pollinated plants got evolved.
17. The gynoecium comprising of many carpels arranged spirally on a more or less elongated receptacle is considered as primitive. Further evolution leads to the reduction of the number of carpels which are arranged in a single whorl and then undergo further fusion.
18. Axial placentation is primitive from which other types have been evolved.

19. Anatropous ovule is primitive from which other types have been evolved.
20. Ovule with two integuments (bitegmic) is primitive and, either by fusion or abortion, unitegmic condition has been evolved.
21. Embryo-sac with 8-nuclei (Polygonum-type) is primitive from which embryo-sac with 4- nuclei (Oenothera-type) has been derived through reduction.
22. Monocotyledons have been developed from dicotyledons through abortion of one cotyledon.
23. The follicle (fruit) is considered as primitive. Further, dry and dehiscent fruit is more primitive than fleshy and indehiscent fruit

COMPILED BY KOUSIK GHOSH
FROM DIFFERENT SOURCES

THANK YOU