Rejection of name: A legitimate name is one in accordance with the rules of Botanical nomenclature, while those which do not satisfy the rules are known as illegitimate names. A **synonym** is a rejected due to misapplication or difference in taxonomic judgment. Some rules are framed for the rejection of names:

1. Superfluous name: The name which is given to a taxon when already some name is present in existence is called superfluous name. The superfluous names must be rejected.

2. Basionym: it is a specific or interspecific epithet which has priority and is retained when transferred to a new or different taxon.

3. Homonym: It is the same name given to other taxon and should be rejected.

4. Tautonym: It is the specific epithet repeats exactly the generic name and must be rejected (not applicable for zoological nomenclature).

5. Nomen nudum: The names which are published without any description, called nomina nuda and are rejected until published with proper description.

Typification: A nomenclatural type is that element of a taxon to which the name of a taxon is permanently attached. The nomenclatural type of a species is an individual herbarium specimen mounted on a sheet. Careful presentation is essential as they are the records of the present and past. If a specimen cannot be preserved in dried form it should be recorded by diagnostic drawing, photographs and proper description.

Following terms are commonly used in the nomenclature of types:

1. Holotype: It is one specimen or other element used by the author or designated by him as nomenclatural type.

2. Isotype: It is duplicate copy of the holotype. During collection several plants or plant branches are collected. Later one is selected as holotype and rest are considered as isotypes.

3. Lectotype: A lectotype is a specimen or other element selected from the original material to serve as nomenclatural type when no holotype was designated at the time of publication.

4. Syntype: If the author does not designate a single holotype from the multiple collections and has used all or more than one specimens then the specimens are called syntypes.

5. Neotype: A neotype is a specimen or other element selected to serve as nomenclatural type as long as all the material on which the name of the taxon was based is missing.

6. Paratype: Where the author has cited two or more specimens as types, one will be holotype and the remaining specimens will be paratypes.

Herbarium: A herbarium is place for collection of plant specimens, that usually being dried and pressed, and arranged in the sequence of an accepted classification and are available for reference or other scientific study.

In some cases such as succulents and specimens unsuitable for pressing are preserved in some preservatives like formaldehyde soln. (4-5%) or in formyl acetic acid.

Herbarium sheet: It is defined as a sheet of thick and tough paper having a measurement of 42x29 cm upon which perfectly dried and well displayed plant specimen is mounted and properly labelled for permanent retention at any herbarium.

Important Herbaria of the world:

1. Royal Botanic Garden, Kew, England
2. Museum of Natural History, Paris, France
3. New York Botanic Garden, NY.
4. Central National Herbaria, Sibpur, India

Botanic Gardens: It can be defined as a place to grow and maintain plants of different countries, according to their habitat and importance, for the academic and economic benefit of mankind.

Some Botanic Gardens of the world:

1. Royal Botanic Garden, Kew, England
2. Museum of Natural History, Paris, France
3. Botanic Garden of Heidelberg, Scotland
4. Indian Botanic Garden, Sibpur, Kolkata
5. Lloyd Botanic Garden, Darjeeling

Classification: There are three systems of classifications

1. **Artificial system:** The system where the organisms are classified into different taxa based on one or few superficial characteristics only. e.g. sexual classification by Carolas Linnaeus.
2. **Natural system:** The system where the plants are grouped on the basis of common natural characteristics and placed into different taxa. This type of classification system do not consider the evolutionary relationship between the taxa. e.g. classification of G. Bentham and J.D. Hooker.

Phylogenetic system: The system where the construction of classification is based on the course of evolution and tries to arrange the plants based on genetic and phylogenetic relationships. e.g. Classification of Engler and Prantl, John Hutchinson and A. Cronquist.

Artificial system: Linnaeus system of classification

Described in *Systema Naturae* (1735) and *Species Plantarum* (1753). The significance of flower structure is recognized by him. He emphasized the basic numerical characteristics of sexual parts, stamens and carpels. Thus the Linnaeus system is known as sexual system.

Based on the number, size, length and union of stamens he classified the flowering plants into 24 classes such as Monandria (flower with one stamen), Diandria (flower with two stamens) etc. The classes were further divided into orders, based on the number of styles in each flower such as Monogynia (flower with one style), Digynia (flowers with two styles) etc.

Merit: The only merit of this system is the quick and easy identification of plants based on one or a few characters.

Demerits:

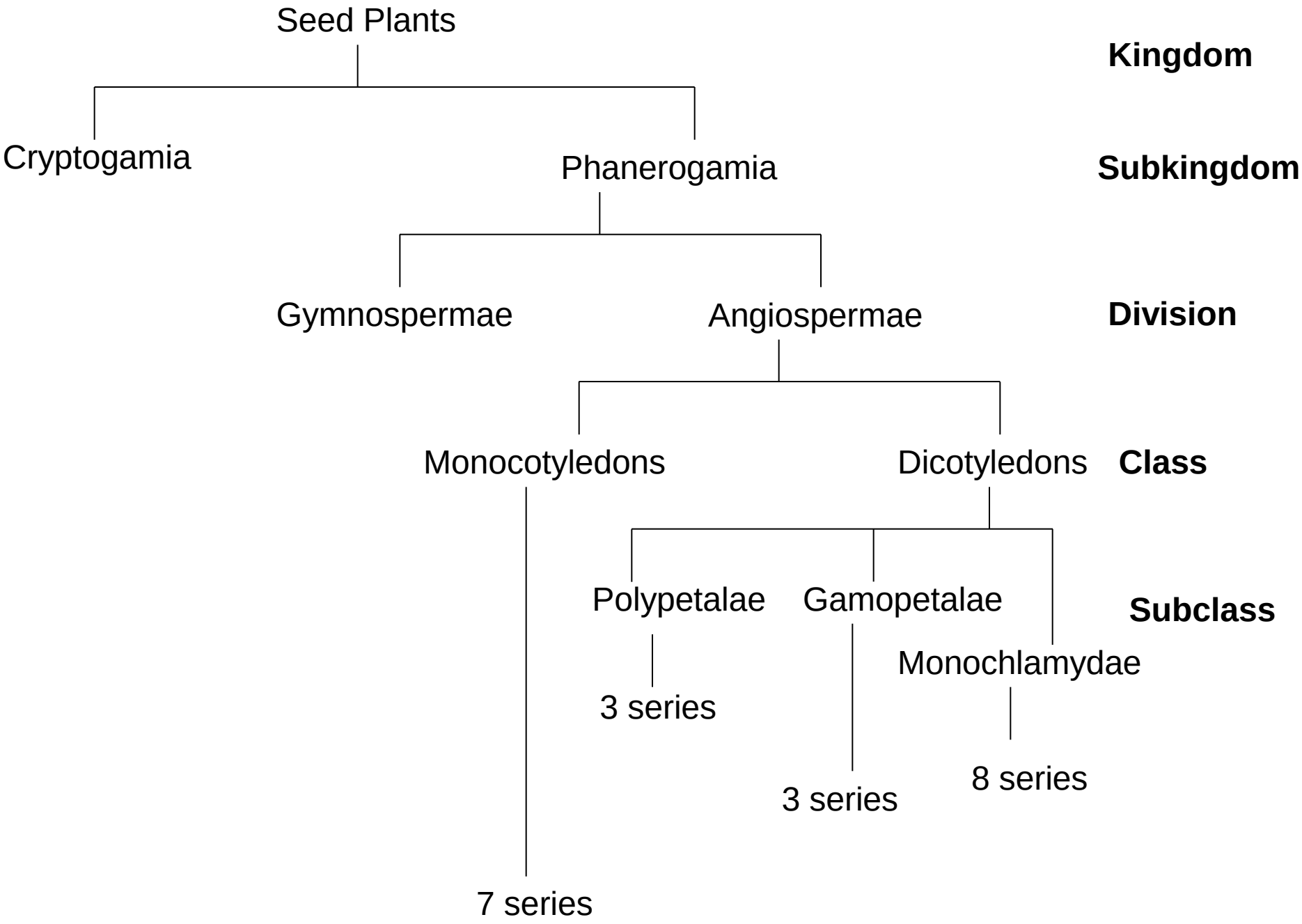
1. The system is not at all sexual in proper sense, but based on only numerical relationships of sex organs.

2. The closely related members go apart and distantly related members become very close to each others due the numerical relations between them.

3. The Monocotyledons, Dicotyledons and Gymnosperms are not considered separately. Thus the members of Monocotyledons and Dicotyledons become very close.

Natural system: Bentham and Hooker system of classification

Described in *Genara Plantrum* (1862). They divided seed plants into two subkingdoms: Cryptogamia and Phanerogamia.


Seed Plants
Kingdom
Cryptogamia
Phanerogamia
Subkingdom
Gymnospermae
Angiospermae
Division
Monocotyledons
Dicotyledons
Class
Polypetalae
Gamopetalae
Monochlamydae
Subclass
3 series
3 series
8 series
7 series

Merits:

1. This is great natural system of its own kind.
2. This system is suitable for all practical purposes especially identification and description of plants.
3. The Dicotyledons are primitive than Monocotyledons.

Demerits:

1. The classification is based on the assumption of constancy of species. Hence closely related taxon are often widely separated.
2. Authors are silent about the phylogeny of Dicotyledons and Monocotyledons and anomalous position of Gymnosperm between Dicotyledons and Monocotyledons.
3. The authors did not consider the phylogenetic relationship, thus close related families were placed apart and unrelated families placed very near.

Phylogenetic system: Cronquist system of classification

Published in 'The evolution of Flowering plants' (1988).

He divided the Division **Magnoliophyta** (Angiosperms) into two classes **Magnoliatae** (Dicotyledons) and **Liliatae** (Monocotyledons).

He divided class Magnoliatae into 6 subclass and 55 orders of which Magnoliales is the primitive and Asterales is the advanced taxa.

On the other hand the class Liliatae was divided into 4 subclass and 18 orders of which Alismatales is the primitive and Orchidales is the advanced taxa.

Merits:

1. There is a general agreement of this system with the other contemporary systems.
2. Detailed information on anatomy, ultra structure phytochemistry and chromosome- besides morphology was presented.
3. Nomenclature in accordance with the ICBN.
4. The family Asteraceae in Dicotyledons and Orchidaceae in Monocotyledons are generally regarded as advanced and generally placed towards the end of the respective groups.

Demerits:

1. Though highly phylogenetic and popular in USA this system is not very useful for identification and adoption.
2. Dahlgren and Throne treated angiosperms in the rank of a class not that of a division.
3. Superorder as a rank above order has not been recognized here, though it is present in other contemporary classification like Takhtajan, Thorne and Dahlgren.

Family identification characters of following families. Dicotyledons – Ranunculacea, Rutaceae, Leguminosae, Cucurbitaceae, Asclepiadaceae, Apocynaceae, Euphorbiaceae and Compositae. Monocotyledons - Orchidaceae & Poaceae.