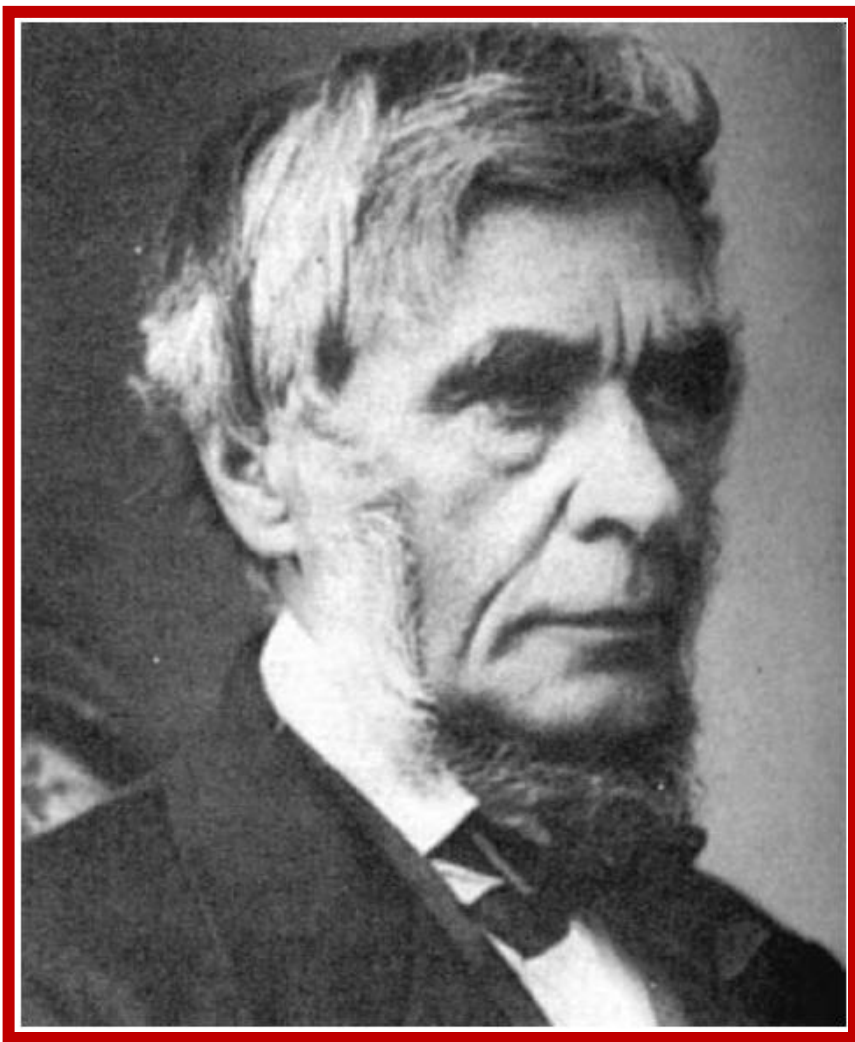




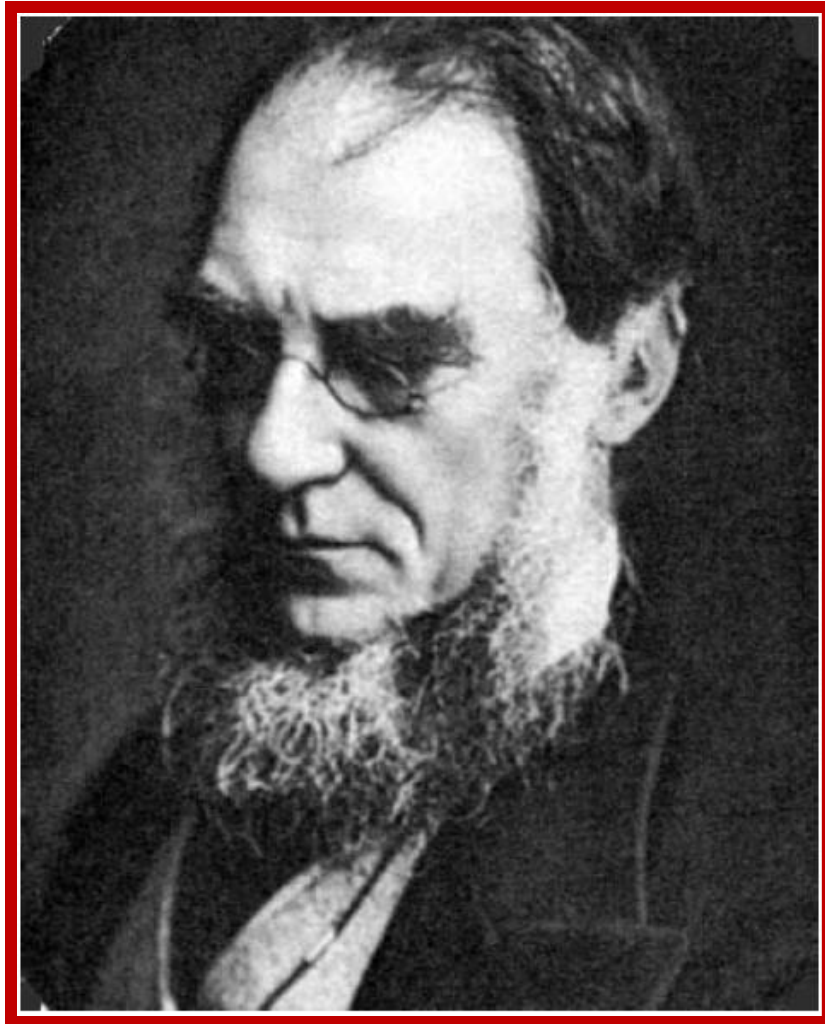
Bentham & Hooker's system of classification

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George Bentham (1800-1884)



Sir Joseph Dalton Hooker (1817-1911)

Bentham & Hooker's system of classification

- The system of classification of seed plants was proposed by Bentham and Hooker.
- It's the most well developed natural classification system , it was published in 3 volume work *Genera plantarum* (1862-83).
- They described 97,205 species of seed plants belonging to 7,569 genera of 202 families starting from Ranunculaceae up to Gramineae.

Bentham & Hooker's system of classification

- The delimitation of genera was based on natural affinities and was pre-Darwinian in concept.
- The system divided all the seed plants into three classes

– Dicotyledons (165 families)

– Gymnosperms (3 families) and

– Monocotyledons (34 families).

-Polypetalae

-Gamopetalae

-Monochlamydeae

Class 1: Dicotyledons

- Seed with 2 cotyledons
- Flowers with pentamerous or tetramerous
- Reticulate venation

Subclass 1: Polypetalae

- **Polypetalae:** sepals and petals distinct, petals free (14 series, 25 orders and 165 families)
 - **Thalamiflorae:** flowers hypogynous, stamens many, disc absent
 - **6 Orders:** *Ranales, Parietales, Polygalineae, Caryophyllineae, Guttiferales and Malvales*
 - **Disciflorae:** flowers hypogynous, disc present below the ovary
 - **4 Orders:** *Geraniales, Olacales, Celastrales and Sapindales*
 - **Calyciflorae:** flowers perigynous or epigynous
 - **5 Orders:** *Rosales, Myrtales, Passiflorales, Ficoidales and Umbellales*

Subclass 2: Gamopetalae

- **Gamopetalae:** Sepals and petals distinct, petals fused
 - **Inferae:** ovary inferior
 - **3 orders:** Rubiales, Asterales and Campanales
 - **Heteromerae:** Ovary superior, stamens in one or two whorls, carpels more than 2
 - **3 orders:** Ericales, Primulales and Ebenales
 - **Bicarpellatae:** Ovary superior, stamens in one whorls, carpels 2
 - **4 orders:** Gentianales, Polemoniales, Personales and Lamiales

Subclass 3: Monochlamydeae

- **Monochlamydeae:** flowers apetalous, perianth lacking or if present not differentiated into sepals and petals
 - **Curvembryeae:** embryo coiled, ovule usually 1
 - **Multiovulate aquaticae:** aquatic plants, ovules many
 - **Multiovulate terrestres:** terrestrial plants, ovules many
 - **Microembryeae:** embryo minute
 - **Daphnales :** carpel 1, ovule 1
 - **Achlamydosporae:** ovary inferior, unilocular, ovules 1-3
 - **Unisexuales:** flowers unisexual
 - **Ordines anomali:** relationship uncertain

Class 2: Gymnospermae

- Ovules naked
 - 3 families

Class 3: Monocotyledons

- Flowers trimerous, venation parallel
 - **Microspermae** : ovary inferior, seeds minute
 - **Epigynae**: ovary inferior, seeds large
 - **Coronarieae** : ovary superior, carpels united, perianth colored
 - **Calycinae**: ovary superior, carpels united, perianth green
 - **Nudiflorae**: ovary superior, perianth absent
 - **Apocarpae**: ovary superior, carpels more than 1, free
 - **Glumaceae** : ovary superior, perianth reduced, flowers enclosed in glumes

Merits of Bentham and Hooker's System

- Each plant has been described either from the actual specimen or preserved herbarium sheets so that the descriptions are detailed as well as quite accurate.
- The system is highly practical and is useful to students of systematic botany for easy identification of species.
- The flora describes geographical distribution of species and genera.
- The generic descriptions are complete, accurate and based on direct observations.

Merits of Bentham and Hooker's System

- Larger genera have been divided into sub genera, each with specific number of species.
- Dicots begin with the order Ranales which are now universally considered as to be the most primitive angiosperms.
- Placing of monocots after the dicot is again a natural one and according to evolutionary trends.
- The placing of series disciflorae in between thalami florae and calyciflorae is quite natural.
- The placing of gamopetalae after polypetalae is justified since union of petals is considered to be an advanced feature over the free condition

Demerits of Bentham and Hooker's System

- Keeping gymnosperms in between dicots and monocots is anomalous.
- Subclass monochlamydeae is quite artificial.
- Placing of monochlamydeae after gamopetalae does not seem to be natural.
- Some of the closely related species are placed distantly while distant species are placed close to each other.
- Certain families of monochlamydeae are closely related to families in polypetalae, e.g. Chenopodiaceae and Caryophyllaceae

Demerits of Bentham and Hooker's System

- Advanced families, such as Orchidaceae have been considered primitive in this system by placing them in the beginning. Placing of Orchidaceae in the beginning of monocotyledons is unnatural as it is one of the most advanced families of monocots.
- Similarly, Compositae (Asteraceae) has been placed near the beginning of gamopetalae which is quite unnatural.
- Liliaceae and Amaryllidaceae were kept apart merely on the basis of characters of ovary though they are very closely related.
- There were no phylogenetic considerations

PLANT KINGDOM

CRYPTOGAMIA
(Non-flowering plants)

PHANEROGAMIA
(Flowering plants)

CLASSES

DICOTYLEDONAE

GYMNOSPERMAE

MONOCOTYLEDONAE

(Two cotyledons in the seed)

(Seed not enclosed in fruit)

(One Cotyledon in the Seed)

SUB-CLASSES

POLYPETALAE

GAMOPETALAE

MONOCHLAMYDAE

SERIES

- * THALAMIFLORAE
6 Orders
34 Families
- * DISCIFLORAE
4 Orders
22 Families
- * CALYCIFLORAE
5 Orders
27 Families

SERIES

- * INFERAE
3 Orders
9 Families
- * HETEROMERAE
3 Orders
12 Families
- * BICARPELLATAE
4 Orders
23 Families

SERIES

- * CURVEMBRYAE
6 Families
- * MULTIOVULATE
AQUATICAE
1 Family
- * MULTIOVULATE
TERRESTRIS
3 Families
- * MICROEMBRYAE
4 Families

- * DAPHNIALES
5 Families
- * ACHLAMYDO-
SPORAE
3 Families
- * UNISEXUALES
9 Families
- * ORDINA
ANAMOLI
9 Families

SERIES

- * MICROSPERMAE
3 Families
- * EDIGYNAE
7 Families
- * CORONARIAE
8 Families
- * CALYCINAE
5 Families
- * NUDIFLORAE
5 Families
- * APOCARRAE
3 Families
- * GLUMACEAE
5 Families