**Lecture no. 11**

**Wing venation (Comstock & Needham)**

**Wing Venation**

The pattern of veins and cross veins is termed “Venation”. The archedictyon is the name given to a hypothetical scheme of wing venation proposed for the very first winged insect such as fossil insects. Since all winged insects are believed to have evolved from a common ancestor, the archediction represents the "template" that has been modified (and streamlined) by natural selection for 200 million years. According to current dogma, the archedictyon contained 6-8 longitudinal veins. These veins (and their branches) are named according to a system devised by John Comstock and George Needham-the Comstock-Needham System.

The Comstock-Needham system is a naming system for Insect Wing Veins, devised by John Comstock and George Needham in 1898. It was an important step in showing the homology of all insect wings.



The Comstock and Needham system attributes different names to the veins on an insect's wing. From the anterior (leading) edge of the wing towards the posterior (rear), the major longitudinal veins are named (Standard abbreviations are used to indicate different veins are):

* **Costa-“C”** (meaning Rib) usually forms the thickened anterior margin of the wing-it is always unbranched.
* **Sub Costa-“Sc”** (meaning below the Rib) runs immediately below costa, always in the bottom of a trough between Costa and Radius. Sc is divided into two branches-SC1 and SC2.
* **Radius-“R”** (analogy with abone in the forearm) is the next main vein. It is a stout one and connects at the base with the second axillary sclerite. The radius typically branches once near the base, producing anteriorly the **R1** and posteriorly the radial sector **Rs**. The radial sector may fork twice into four main branches-R2, R3, R4, R5.
* **Media-“M”** (meaning Middle) is one of the two veins, articulating with some of the small medium sclerites. Media is divided typically into four branches viz., M1.M2,M3,M4. (The Media (M) can be divided into MA (anterior media) and MP (posterior media) which again, divides, but infact these two can not be distinguished all the time, and hence M1, M2, M3 and M4 names are given).
* **Cubitus-“Cu”** (meaning Elbow) also articulates with the median axillary sclerite. According to the Comstock-Needham system, the cubitus forks once, producing the Cu1 and Cu2. According to some other authorities, Cu1 may fork again, producing the Cu1a and Cu1b. (the Cu 1a and Cu1b of Comstock-Neetham system can named as CuA (anterior cubitus) and CuP (posterior cubitus).
* **Anal Vein-“A”** (reference to its posterior location) form a set, which are united or close together at the base and closely associated with the 3rd axillary sclerites. As there are several anal veins, they are called **A1**, **A2**, and so on.

**Cross Veins:** Crossveins link the longitudinal veins, and are named accordingly (for example, the medio-cubital crossvein is termed **m-cu**). Some crossveins have their own

name, like the humeral crossvein **h** and the sectoral crossvein **s.**