INTRODUCTION

The forest vegetation in India which according to Hooker (1872) is the richest and most varied on the surface of the earth is governed by a complex of environmental features, including climatic and edaphic factors and varied topography. The recent estimate of the forest area is 783,692 sq.km. (Anonymous, 1961) forming 24% of the total area. Gamble (1902) states that the nearly 5,000 woody species, which constitute 1/3 of the total Indian flora, surpass all the other countries of the world. The hard woods cover as much as 96.7% of the total forest area and include 3,000 species of trees (Anonymous, l.c.). Out of these 270 species are included under the commercial timbers of India (Pearson & Brown, 1932). *Tectona grandis* L. and *Shorea robusta* Gaertn. are the prized timbers of the
country. Some other important hard woods are Dipterocarpus pilosus Roxb., Dalbergia latifolia Roxb., Palaquium ellipticum Benth., Pterocarpus dalbergioides Roxb. and Santalum album L.

The paramount importance of forests in the economy of a country needs no emphasis. From times immemorial, industrial regions are relatively heavy users of processed wood, both as lumber and pulp. The study of Indian forests dates back before the beginning of the Christian era. A scientific manuscript "Virkshayurveda" compiled by Parasara of those days, includes 14 forest types in India (cf. Core, 1955). Hooker & Thompson (1855) had divided the flora of India into 17 botanical provinces. However, the recent 8 botanical sub-divisions of Chatterjee (1939) are more logical and realistic. As many as 16 forest types with several sub-types are described by Champion & Seth (in press).

The first systematic study in India with regard to forest management, regeneration, soil conservation and other silvicultural practices goes back to almost a century. Illuminating instances of regeneration and afforestation from the area surveyed such as teak plantations (1868) at Beamonpokhri, regeneration of Cryptomeria japonica D.Don about the same time around Darjeeling and natural regeneration of Pinus insularis Endgl. (1908) around Shillong deserve special mention. The tempo of "Vana-Mahotsva" reflects the approach of the Indian government to make afforestation * A national festival for promotion of tree plantation.
a national issue to enhance the forest area which is below average.

Considering the extensive efforts made for regeneration and afforestation in many parts of the country, it is surprising that closer study has not been made of the variation in the inherent characters of the stock used and of the possibilities of improving it on modern cytogenetic lines. Perhaps, this may be assigned to the experimental difficulty arising from the long life span of the trees and hence experiments on improvement induced through hybridization, selection and polyploidy were confined only to the crop plants. Gustafsson (1960) has stressed the use of genetic tools like polyploidy and mutagenesis in improvement and breeding of trees. Wright (1962) has also impressed upon the necessity to exploit hybridization and polyploidy in tree improvement. Recently, the role of haploids in forest genetics has been discussed by Stettler (1966). Mehra (1960) while reviewing the cytology of conifers has emphasised how such a knowledge can be employed in their breeding behaviour leading to their improvement. Nilsson-Ehle's (1936) studies on auto-triploid *Populus tremula* L. has shown the probable role of polyploids in the improvement of trees. Evidently, a study of chromosome number and their behaviour at meiosis and a knowledge of the chromosomal and geographical or ecological races becomes indispensable for any rational programme of
Some fragmentary efforts on the cytology of hard
woods which occupy 67% of the world forests, are of Atchison
(1947b, 1948, 1949, 1951) on Leguminosae; Janaki-Ammal et al.
(1950) on Rhododendrons; Ramsay (1963) on Proteaceae; Perry
(1943) on Euphorbiaceae; Wright (1944, 1957) on *Praxinus*;
Atchison (1947a), Ruggeri (1960, 1961) and Smith-White
(1942, 1943, 1950, 1954a) on Myrtaeae; Smith-White (1954b)
on Rutaceae; Foster (1933), Duffield (1943), Takizawa
(1940, 1952), Wright (1957) and Santamour (1962, 1965) on
*Acer*; Egolf (1962) on *Viburnum*; Condit (1928, 1933, 1964) on
*Ficus*; Woodworth (1929a,b, 1930a,b, 1931) on Betulaceae;
Sax (1920), Jaretzy (1930), Friesner (1930), Duffield (1940)
and Graves (1962) on Fagaceae; Blackburn & Harrison (1924),
Johnsson (1940), Løve & Løve (1942), Smith (1943), Wilkinson
(1944), Håkansson (1955) and Suda (1958, 1960, 1961, 1963)
on Salicaceae.

So far no comprehensive effort has been made to study
the cytology of Indian hardwoods. Some scattered reports
available, are those of Arora (1960, 1961), Bhaduri & Bose
(1949), Bhaduri & Kar (1949), Bhaduri & Islam (1949), Das
Janaki-Ammal & Sobti (1962), Khoshoo & Singh (1963), Mehra
& Singh (1962), Mukherjee (1950), Nanda (1962), Rao
(1954, 1967), Roy & Jha (1956, 1961, 1962, 1965a,b) and
Considering the importance of the subject and the paucity of information available, a project on the cytology of Himalayan trees was initiated by Professor P.N. Mehra with the financial assistance of the PL 480 USAID. The object was to collect comprehensive data on cytological, morphological, ecological and other forestry aspects of the Himalayan trees so as to form a sound basis for future cytogenetical and hybridization work to improve the forest wealth of the country. The present work on the woody elements of the families of Disciflorae and some families of Calyciflorae namely, Saxifragaceae, Hamamelidaceae, Combretaceae, Myrtaceae, Lecythidaceae and Melastomaceae is a part of this project. The bias of the study has been on the forestry aspect and special importance has been given to the timbers as given by Pearson & Brown (l.c.), local working plans and the information gathered from the local inhabitants. The woody elements have been cytologically investigated from the natural populations of Darjeeling and Khasia & Jaintia hills. Along with this extensive field notes on the ecological distribution of the various species and their flowering and fruiting seasons have been recorded. A detailed floristic account of the major forest types in the area surveyed is given in the first few pages.