INTRODUCTION
Since the announcement of the chromosome theory of heredity, cytologists and geneticists have been in quest of an organism in which the chromosomes are large enough to make it possible to see the qualitative differences along their length corresponding to the genes. The answer was found in the order Diptera. The insects belonging to this order are unique in having the giant (polytene) chromosomes in some of their organs viz. salivary glands, hepatic caecae, mid-gut, Malpighian tubules, nerve cells and foot pads etc. These polytene chromosomes, first reported by Balbiani (1881) in Chironomus, are extraordinarily large in their size. In their chemical as well as morphological characteristics, they correspond to the small mitotic chromosomes. Kostoff (1930) was the first to comment on the possible genetic significance of these banded elements. Painter (1933) presented the first evidence for a close correspondence between the genetic cross-over maps and the cytological configurations of the chromosomes. Later Bridges (1935) published a detailed salivary chromosome map of Drosophila melanogaster and described the relation of the bands to the genes.

Much of the classic work in cytogenetics had been
carried out on certain traditional materials like *Drosophila*. However, now it is known that several other members of this order can be profitably employed for such studies. Some of them have short life cycle, high reproductive potentials and less number of chromosomes. Moreover they can be easily reared and manipulated in the laboratory.

For the present investigations mosquitoes (family: *Culicidae*) were selected as material for karyological studies. This is the largest group of insects having several species of epidemiological significance in the tropical and temperate parts of the world. They have long been the subject of research but most of these researches remained restricted to their bionomics, disease transmission, control measures against malaria and resistance to the insecticides.

Stevens (1910, 1911) was perhaps the first man to initiate cytological work on mosquitoes. However, the greatest need for chromosomal studies of mosquitoes has been outlined by Kitzmiller, (1953, 1963, 1967) in his reviews of literature on the cytogenetics of mosquitoes.

The WHO Scientific Group (1964), in its report, has placed an increasing emphasis on such studies and a global programme is, therefore, now underway to construct the salivary chromosome maps for as many species as possible.
This type of research provides a basis for further important studies. It has been further emphasized that the mapping of polytene chromosomes in Anopheles, especially in those complexes in which systematics and disease transmission are problems, should be taken up.

The chromosome maps have greatly helped in understanding the process of evolution and speciation in the culicines. Based on the banding pattern of chromosomes, especially the X-chromosome, the salivary chromosomes have been used as reliable taxonomic tools in understanding the uncertain taxonomic status of some of the African, European and North-American species complexes of doubtful and mixed ancestries (Frizzi, 1947a, b., 1948, 1953a, b, 1958a,b,c; Frizzi and DeCarli, 1954; Baker and Kitzmiller, 1963b; and Voluzzi and Sabatini, 1967). Even the detection of certain populations, resistant to insecticides, is now conceivable by a study of the polytene chromosomes.

In India the work on the cytogenetics of mosquitoes was initiated by Rishikesh in 1955. Except for the works of Rishikesh (1955, 1959a,b), Sharma et al. (1966 to 1970) and Chowdaian et al. (1970), the karyological investigations on the Oriental species provide an ample scope for further study. Out of a large number of species available in the South-east Asian region of the Indian subcontinent, the
maps are available only for three species: Anopheles stephensi (Fishikesh, 1959b; Sharma et al., 1966, 1969), Anopheles barbirostris (Chowdaiah, 1970), whereas similar information for the various vector and non-vector species is still wanting.

The present research work was, therefore, undertaken for the mapping of the polytene chromosomes and to study the metaphase chromosomes in some of the mosquito species prevalent in the forests of Khasi and Jaintia hills in Assam (North-east India). The stay in that part of the country included an extensive field and laboratory work. As a result, the chromosome maps have been produced for four species of the genus Anopheles and one each of the genera Culex and Mansonella.

On comparison of the salivary chromosomes of various species of the subgenus Cellia, their interspecific relationship has been discussed in detail and certain evolutionary implications have been described.

Similarly a species each of Culex and Mansonella have been mapped in the present work. They have also been compared with related species of their respective subgenera/genera and their inter-specific relationship is discussed.

All the six species have been worked out for the
first time without any previous record of their polytene chromosomes. In fact cytological information with regard to the genus *Kansonia* has not been available at all.