1. INTRODUCTION

In advanced countries, Genetics has played a major role in the development of dairy cattle. Such fundamental genetic studies on the breed structure and genetic variability of different recognised breeds of Zebu cattle are scanty. The study group of Food and Agriculture Organization (Anonymous, 1966) also recognised these lacunae, particularly in the less developed areas of the world. They stressed the need for "suitable markers by which the genetic variability between different populations can be studied for any programme of evaluation and improvement of breeds".

Fundamentally, all the heritable differences between individuals can be attributed ultimately to biochemical differences which are under genic control. Hence a better understanding of inherited biochemical differences and their genetic basis may lead to selection procedures which can be used as supplements to conventional selection for the improvement of livestock. The presence of a certain amount of genetic variation in a population is the pre-requisite for progress through selection. Usually the genetic variation for quantitative traits have been estimated by the customary heritability estimates. However, there is a need for simple
genetic markers by which the approximate estimates of genetic variability can be measured.

The markers should show simple inheritance and be fairly neutral with regard to animal production, viability and reproduction. They should also be hidden to the breeder or otherwise these markers will often be subjected to selection (Rendel, 1867).

Perhaps, the most interesting new development in recent years has been the use of immunological and biochemical study of inherited blood protein variants in various breeds of cattle. They have been used to study the breed structure, changes in frequency of genes due to inbreeding and such other related problems. However, the studies on blood protein polymorphism could in no way replace the ordinary direct evaluation procedures in any breeding programme.

There remains the question on the effect of these genetic markers on characters of economic importance. If an animal carrying one particular marker gene can be shown to be superior over the other animals the marker gene could be most useful in selection especially when all other informations are lacking, e.g., when a decision has to be taken to use certain young bulls for progeny testing.
The practical importance of certain genetic markers in selection depends on the proportion of the genetic variance of the character that they can be shown to control (Robertson, 1961). Several genetic studies conducted earlier on different breeds of exotic cattle have shown that certain types of markers are definitely associated with and control the traits like milk yield and butter fat percent in dairy cattle. Apparently, the vast majority of them are neutral with respect to their influence on economic traits (Stormont, 1967).

There is a problem of identification of dairy animals in pedigree registration and in progeny testing or sire evaluation programmes. It is said that bias that occurs in sire evaluation is due to inclusion of misidentified records of the cows in sire group averages. The bias increases with the fraction of misidentified cows that have been inadvertently included in the programme (Van Vleck, 1970). All these problems can be solved easily if reliable records of blood types of animals are used for the determination of parentage. This is the only reliable method known so far to the geneticists for the exclusion of wrong parentage.

"In principle, the use of blood types as genetic markers has assured a bright future for the dairy industry and without these tests, the artificial breeding of cattle
in developed countries would not have flourished so much as it has today. It can rightfully claim some credit for the progress made in disseminating superior germ plasm" (Stormont, 1967).

To sum up, the study of blood groups and biochemical types has many applications in the field of cattle breeding of which the most important are:

1. Correct determination of parentage.
2. The study of breed differences.
3. Identification of individuals.
4. Association with production characters, and
5. Recognition of monozygotic twins and Freemartins.

The aim of this study:

a) Extensive genetic studies of exotic breeds of cattle have been done in Western countries using the blood types and biochemical serum protein variants. Similar fundamental studies on different breeds of Indian cattle are not available. It will be worthwhile to study the inheritance of these factors and to use them to study the structure of breeds and variations between various breeds of cattle before embarking upon more advanced breeding systems.

b) By means of serological and biochemical techniques, the genetic make up of every individual animal in a herd can be assessed and thereby the confidence in the pedigree records of animals may be increased.
c) An objective study of breed structures and breed differences can also be measured by means of the gene frequencies of several blood protein variants in different breeds of cattle distributed in various herds.

d) The information on the presence of certain blood types and serum protein variants in milking animals may be utilized to find out the correlation between various economic characters like age at first calving, lactation yield, lactation length, and inter calving period of the animals.