variation. "Within recent years", continued the speaker, "a new light has been thrown on this question by the appearance of the theories of Mendel, DeVries and Johannsen. The basic principle of these theories is that an individual plant or animal is composed of distinct units which correspond in a sense to atoms in chemistry. By crossing two individuals a combination of units takes place which finds expression in a new form combining the characters of the two.

If the above theory of "Unit characters" is correct hereditary variation must take place in either of two ways, viz.—

(a) Through new combinations of characters by crossing, or
(b) By the sudden alteration in the unit constitution of the individual itself, a phenomenon to which the name "Mutation" has been applied.

This idea is clearly inimical to the old Darwinian belief in the omnipresence of hereditary variation at least in so far as it concerns those plants which naturally self-fertilize.

If we accept the idea that the various forms within an old race arise either as the result of natural crossing or by mutation, our next problem is to determine, if possible, how often these combinations and mutations take place, and which is of the more frequent occurrence.

DeVries, the real founder of the mutation theory, has classified mutations under two catagories, viz., Retrogressive Mutation and Progressive Mutation. The first owes its existence to the dropping out of a unit while the latter has arisen, according to DeVries, through the acquisition of a new unit. Despite all that has been said and written about the mutations theory and its great practical importance, the speaker had not found it very seriously considered in Europe. While there were evidences to show that so-called retrogressive mutations probably occur occasionally, yet he had not been able to find an unquestionable example of a progressive mutation. On the other hand the whole manner of thinking in the most progressive centres, such as Cambridge, England, (Bateson, Punnet, Wood, etc.), Copenhagen (Johannsen, Ravn, etc.), Berlin (Bauer), Austria (Tschermak), Sweden (Ehle and Tedin), and many other places was after the combinations idea. This idea has developed enormously during the past ten years following the extensive work which has been done in artificial cross fertilization, a work which provides a means of studying the unit constitution of the individual plant or animal and thus of throwing new light upon the great problems of heredity.

It has long been held by certain authorities that natural cross-fertilization among such supposedly self-fertilizing plants as wheat, oats, barley and peas was practically impossible. Re-