occasion some concern at first, until the meaning of "probable error" is recalled. The weight of C is  $4.299 \pm 0.028$  grammes—*i.e.*, it is equally likely to be between 4.271 grammes and 4.327 grammes or outside these limits. At the same time the weight of D is  $4.269 \pm 0.032$  grammes—*i.e.*, it is equally likely to be between 4.238 grammes and 4.301 grammes or outside these limits. Thus the lower limit of C (4.271 grammes) is much lower than the upper limit of D (4.301)that is, the two overlap-so that there is no real difference between C and D, but only a difference caused by the special set of samples here used to compute the means. Such a difference is said to be "non-significant"—*i.e.*, it does not signify any real difference.

Mathematicians have computed from their study of probability that any difference less than three times the probable error of that difference has only a 20-to-I chance of being a real difference-that is, one not caused by mere fluctuations of sampling. Thus, on comparing averages, the probable errors of the differences are of great importance. They have been calculated for the present set of figures as follows :-

> Difference between A and B =  $0.023 \pm 0.035$  grammes. B and C =  $0.239 \pm 0.038$ .... .. C and D =  $0.030 \pm 0.042$ ,, D and E =  $0.030 \pm 0.055$

Thus, the differences between A and B, C and D, and D and E are less than the probable errors of these differences, and so are nonsignificant. Therefore we cannot say that there is any difference in weight between grain cut at stages A and B and between those cut at stages C, D, and E. On the other hand, the difference between B and C (0.230 grammes) is 6.3 times the probable error of the difference, 0.038. This is the outstanding fact of the investigation, and consultation of tables of probabilities shows that the chances are 25,000 to I that such a difference is significant-odds that most of us would be willing to accept as certainty. Thus we conclude that if we cut at stage C there are 25,000 chances to I that we will get a higher yield than cutting at stage B, but that if we wait longer no increased weight need be anticipated.

Two more points must be mentioned. Firstly, a further calculation will enable us to estimate the gain obtained by waiting from stage B to stage C as 2.5 bushels per cent., or exactly I bushel per acre on a 40-bushel crop-the probability of at least this gain occurring being 40 to I, which may be taken as practical certainty. Secondly, we may now define the degree of maturity to which the crops had attained at the critical stage C, cutting before which results in a loss of weight, and cutting after which results in no gain. The stage will be more closely defined by describing those before and after it as follows :-

Stage B, second cutting: General aspect of crop-nearly ripecoloured, in some patches nearly all green has disappeared. Strawpractically all straws now yellow, but a few still green just below the head and just above top knot. Heads-one-third still green and twothirds white or turning white. Grain-that in white heads when squeezed between the fingers produced a dry dough. (This stage proved too early to cut profitably).