considerable value in seed production where the reduced time taken to run to seed can mean the saving of a crop. The reduction of loss from Botrytis and the added facilities for selecting non-bolting types, that is, those plants that do not respond to vernalization, could also prove useful.

This marked response of the lettuce to cold treatment makes it a useful subject for experimental work.

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Nature of Peptones

THE result of the cleavage of several proteins or their derivatives by pure proteinases has been investigated by us. This was accomplished by the determination of the ratio of the total nitrogen contained in such linkages as might be split by proteinases to the amount of nitrogen contained in the terminal (NH_2 + NH)-groups set free by hydrolysis. (This ratio will amount to 6 in the case of a hexapeptide, in a tetrapeptid to 4, etc.) The substrates thus investigated were casein-peptone RWI[1] (prepared from casein-Hammarsten), a fraction of the anhydrolytic breakdown obtained from edestin (Fr.E[2]), and in addition ovalbumin.

The procedure was as follows. The proteins were subjected to a preliminary cleavage by a pure proteinase (casein and ovalbumin to pepsin-hydrochloride, the edestine product to pure pancreatic proteinase). The peptone formed was isolated and its hexone bases and tryptophane were determined quantitatively, and similarly the total nitrogen, the nitrogen of the amido groups (–$CONH_2$) and the nitrogen contained in (NH_2 + NH)-groups, the latter estimated by Linderstrøm-Lang's titration method.

In addition, the maximum amount of cleavage to which the peptone was still liable by successive splitting with pure proteinases was determined. From the total nitrogen must be deducted those amounts of nitrogen which *a priori* are not concerned in the action of pure proteinases, that is, the amount corresponding to 3 nitrogens of the guanidine radical of the arginine, to 2 nitrogens belonging to the imidazol radical of the histidine, to one nitrogen deriving from the ε-group of the lysine, to one nitrogen of the indol radical of the tryptophane, and finally, to the amount of nitrogen contained in the amido groups.

On the other hand, from the values obtained by the titration of the (NH_2 + NH)-group must be deducted that amount of nitrogen which reacts by this method without, however, being concerned in the enzyme action mentioned above, namely, that corresponding to one nitrogen belonging to the imidazol radical of histidine, to the guanidine radical of arginine, and to the ε-group of the lysine respectively. To this last 'corrected' value is added the amount of nitrogen contained in the –CO–NH-linkages which were opened by the additional splitting with proteinase, as determined by the enzyme tests. This value represents the total nitrogen contained in peptide-linkages opened hydrolytically by pure proteinases. If now the value for the total nitrogen (corrected as described above) is divided by this latter value, their quotient will represent the ratio $\frac{\text{N, total cleavable}}{\text{N, split hydrolytically}}$. This ratio in the peptones from casein and edestin amounted practically to 4. In the albumin-peptone, provided the latter is split exhaustively either by pepsin-hydrochloride or pancreatic proteinase, this ratio also amounted to 4. But if this peptone, having been previously split exhaustively by pepsin-hydrochloride in the enzyme tests, was subjected to the exhaustive action of pure pancreatic proteinase, an additional amount of cleavage was obtained, so that this value was reduced to nearly 3.

It appears, therefore, that the exhaustive digestion of casein, ovalbumin-pepsin-peptone (the latter by pepsin only), and the edestin product, so far as affected by pure proteinases, yields peptones which represent mixtures of tetrapeptide-chains, whereas the pepsin-peptone obtained from ovalbumin, which has been subjected to additional splitting by pancreatic proteinase, yields still lower peptide chains, for reasons which must still be investigated.

A full report on this investigation will be given elsewhere.

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Mode of Action of Ionizing Radiations on Aqueous Solutions

VARIOUS authors[1,2,3] have reported that the action of ionizing radiations in aqueous solutions is indirect. The primary action appears to be on the water, with the formation of an intermediate product which then acts upon the solute. If one accepts this hypothesis, one would expect: (1) that with an equal dose of radiation a dilute solution would be relatively more affected than a more concentrated one (dilution phenomenon); and (2) that any additional substance in the solution, capable of reacting with the intermediate product, would divert some of this from its partner to itself (protection phenomenon).

The indirect action theory has escaped general attention and even its supporters have only partially appreciated its logical consequences. As a result, experiments have frequently been interpreted in terms of the 'hit theory' without proper consideration of the possibility of an indirect action. One result of this situation is the common but erroneous belief that enzymes are too insensitive to radiation to account for radiation effects in living tissue.

One of us[4,5,6] has recently demonstrated that the effect of X-rays on aqueous solutions of enzymes and of other biologically active substances depends on the concentration and purity of such solutions, and that doses of as little as 50 roentgens can produce marked effects when concentrations of the order of those occurring in living cells are irradiated.

It is possible to show conclusively, from the effect of the initial concentration in these recent results, that the action of the radiation on the solutes used