Federal Government contributed more than $1,400,000 for protection and reforestation in cooperating states. Cooperative fire protection was extended to several million acres which had not previously been covered. The work of growing and distributing trees for forest planting also was enlarged.

DISCUSSION

CRYSTALLINE AMYLASE

NORTHRUP and Kunitz's recent announcement, in these columns, of the crystallization of trypsin, the pancreatic protease, prompts us to record here the crystallization of pancreatic amylase also.

From buffered alcohol-water solutions of pancreatic amylase, freshly purified by methods previously described from this laboratory, crystals have been obtained which show enzymic activity almost as high as the maximum observed in the highly purified preparations of this enzyme as previously prepared and studied.

The crystalline amylase is obtained as very minute isotropic elongated crystals which exhibit slight double refraction. Professor P. F. Kerr, of our department of mineralogy, to whom we are indebted for the crystallographic examination, reports further that the index of refraction as determined by immersion is approximately 1.54.

In view of the protein or protein-like nature of the crystals and their very slow deposition from the alcoholic systems, it is exceedingly important to work with a very small temperature gradient and in the region of hydrogen-ion activity corresponding to the isoelectric point.

The hydrogen-ion activity of the solution is adjusted by means of phosphate buffers in such concentration that they are not separated out at the temperatures employed. Both formation and yield of crystals are very dependent upon the hydrogen-ion activity of the system.

Careful study and rigorous observance of the best experimental conditions thus far found make it possible to obtain crystals with regularity; but as yet only in very small amounts. Furthermore, the crystals are so minute, so light and so unstable that even after they have been formed they must be handled by means of highly specialized and very time-consuming technique.

Hence it appears inevitable that further progress must be exceedingly slow and it therefore seems best to record, at this preliminary stage of the work, the fact that this much-studied and presumably typical amylolytic enzyme has been obtained in crystalline form, even if as yet only upon a small scale.[1]

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[1] Contribution No. 661 from the Department of Chemistry, Columbia University, New York.

PSYCHIC ANALOGUES OF ALLERGY

WHEN a foreign protein comes in contact with the tissue cells of a normal organism these become irritated and enter upon a cycle of unwonted metabolic change, the results of which appear in a week or two.

The first of these results is a specific hypersensitiveness toward the foreign protein in question so that thereafter infinitesimal quantities of the latter may be able to irritate the cells.

Experiment has made it obvious that the acquirement of specific sensitization goes hand in hand with the development of extraordinary powers within the tissue cells for rapid destruction, digestion or neutralization of the offensive foreign protein. The effective cellular agents in these reactions we know as *antibodies*. Their varieties and qualifications transcend our knowledge.

While the details of these cellular evolutions are exceedingly complex it is manifest that they are all coordinated to effect a purpose; to protect the body against a foreign poison; to endow it with what we call immunity toward the harmful substance which first irritated the cells.

Study of the pathogenesis of various infections leads irresistibly to the conclusion that, by and large, the essence of all infectious diseases inheres in the foreign proteins liberated in the body through the presence of invading microbes. Obviously no range of human endeavor is more fraught with problems affecting human welfare than that which is concerned with the understanding and control of the poisons leading to immunity.

There are doubtless several ways by which the biological status of immunity may be attained, but only one concerns us here—that, namely, in which the foreign protein or "antigen," as it is called, on entering the normal body has been able in the course of a few days to excite the latter to develop essentially new vital powers objectively witnessed by specific hypersensitiveness and defensive antibody reactions. The normal body which has undergone such a course of cellular training is now said to be "immune" toward that particular antigen, or microbe, which started the disturbance. It is characteristic of the immune state that the body which has acquired it responds at once with defensive reactions calculated to inhibit or destroy the irritating antigen whenever thereafter the latter makes a new invasion.

It might safely be predicted that all future contests