

Symposium on the Chemistry of Toxic Substances*

I. Introduction to the Symposium

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The past thirty years have seen research activity on the isolation and characterization of growth-promoting substances that at times has almost reached fever heat. As the chemical structures of these materials have been made secure, one by one they have become the subjects of more leisurely study by the nutritionist and the enzymologist, to provide for applied science fields a knowledge of appropriate niches for these vital substances. Continuing research in this field has now brought us to the point where a rough fabric of the cell can be described, into which each of these biocatalyst systems logically falls.

The focus of this symposium is, on the other hand, upon those substances that have the opposite effect—that of poisoning host organisms. Our knowledge in this field is considerably behind our knowledge of vitamins; we are at about the same point that workers on these latter substances were in 1935. Certain islands of information exist, but the information seems for the most part relatively unrelated. Sources of metabolic poisons are many; examples are known from the plant kingdom, micro-organisms, and higher animals, as well as a host of synthetic chemicals. Certainly they do not all act in the same manner; yet from our knowledge of enzyme systems it seems safe to assume that these toxic substances are for the most part 'negative catalysts'—enzyme inhibitors—inducing reversal or other breakdown of enzyme function, that under extreme circumstances may lead to death of the host.

It has been felt that scientific knowledge in general would be helped by staging a symposium on the subject of toxic substances.

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So little is known about some of these agents that we will be content for the present to note their existence and, where known, their chemical constitution. Where the information is available it may be possible to discuss mechanisms of action; it may be hoped that as knowledge about toxic agents expands, we may become able to describe them as they relate to their appropriate enzyme systems, and in this way gradually discard the term 'toxic substance' except where it may still be useful as an operational term.

In addition to the speakers, we are indebted for the success of this symposium to the Division of Medicinal Chemistry, American Chemical Society, and to the Army Chemical Corps for sponsorship. It is our hope that the programme may call attention to developments in research on toxic substances, and more especially to areas where further research may be most needed.