

## Bookreviews

ROBERT GUBERIAN

## AIR POLLUTION

## Phytotoxicity of Acidic Gases and Its Significance in Air Pollution Control

Ecological Studies 22. — Springer-Verlag, Berlin, Heidelberg et New York 1977, 127 pp., 40 Figs., 4 in colour.

The author of the book under review is one of the founders of the Landesanstalt für Immissions- und Bodennutzungsschutz des Landes Nordrhein-Westfalen the main purpose of which is the environmental restoration of the disturbed Ruhr industrial agglomeration. Equipped with a good staff and technical means, after World War II, the author achieved remarkable results as regards emission damage to the landscape. From a variety of atmospheric emissions the author has chosen the gaseous components, viz. sulfurdioxide, hydrogen chloride and hydrogen fluoride, whose influence upon the vegetation is described in detail in this comprehensive work.

Data collected by various institutions in a number of countries are clearly arranged in four chapters. The first contains (1) description of experimental methods used in field conditions situated close to the industrial emission sources, (2) field experiments with artificially produced and controlled fumigation, and (3) controlled fumigation in the laboratory.

Furthermore, apparatus techniques for (1) the analysis of the air, (2) measurement of fixation of carbon dioxide by assimilation organs, (3) chemical analysis of plants, and (4) electronic-microscopic analysis of the plants' ultrastructure. The methods described here do not represent an exhaustive survey of all procedures applied all over the world; the author, apparently, paid attention primarily to those experimental arrangements and apparatus techniques which he has personally tested or inspected. There is, e.g., no mention of the coulographic measurements of atmospheric  $\text{SO}_2$  (Czechoslovak patent), of the use of scanning electronic-microscopy, of multispectral pictures, etc. — In the second and most extensive chapter the impact of the investigated gaseous emissions upon the vegetation are evaluated from the economic, ecological and ideal viewpoints. In this part we find (1) analyses of the dependence of the degree of damage on the concentration of emissions and on the exposure time, and (2) the influence of both external and internal factors, such as climate, edaphic factors, developmental stage of the plant, age of its assimilation organs, and, also, species, variety and individual resistance.

In the next chapter, the phytotoxic characteristics of all three investigated gases are compared. Results of the investigation of the mechanisms affecting the plant metabolism, of accumulation of emissions in plant organs, and of the question of hidden injury are discussed. As regards the mechanism of the effect of  $\text{SO}_2$ , some recent discoveries of the inhibition of individual enzymes of photosynthesis by sulfur dioxide are lacking.

The last chapter discusses the question of limiting concentrations of toxicity, the significance of some plant species as specific indicators of individual air pollutants, the cultivation of resistant species and varieties, the significance of fertilization, and of some cultivation measures for plant protection. It is a pity that the results of the investigations on limiting toxicity concentrations conducted by MICHAJLOVSKIJ and MIROŠNIKOVA (U.S.S.R.), have not been quoted.

In general, the publication presents a good survey of investigations of the toxic influence of  $\text{SO}_2$ , HCl, and HF upon plants, using results achieved all over the world. Although the quotations, especially those from the non-German literature, are not exhaustive, with few small exceptions the book tackles all levels of investigation which have so far been undertaken. A valuable aspect of the work is the fact that practically all results of the activity of the Institute can be found here; originally scattered in various periodicals or less accessible monographs, they are now available for full scientific exploitation.

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