EXPERIENTIA

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Reviews

'Waldsterben': Our Dying Forests

Part I

Editorial Preface

Perhaps the only incontrovertible result of the 'Waldsterben' research which has been carried out to date over several continents is the certainty that we are dealing with a disease syndrome far more complex than had been imagined even a year or two ago. Research that generates as many questions as it answers is not ready to be reined into the rigid confines of a comprehensive review. And yet, facts which *are* emerging – even if they are single pieces of the complex puzzle whose pattern is not yet clear – should, we feel, be disseminated as rapidly as possible. We have decided, therefore, to depart from our usual Multi-author Review format and with this issue of EXPERIENTIA introduce a new series of research reports on the Waldsterben crisis. Further papers on all aspects of this topic (including critical perspectives on areas which thus far have received insufficient attention, such as the connection between forest decay and radioactivity) will appear henceforth in free succession.

We wish to extend special thanks to Dr J. B. Bucher who has lent invaluable advice during the organization and preparation of this new series.

H. M.

Introductory Remarks

In the opinion of many scientists, the effects of air pollution are now posing the most serious threat to forests in the temperate zone. Forest damage has already spread to an alarming extent throughout Central Europe. In the Federal Republic of Germany, where the scientific and public community is highly aware of the ravages of forest decay, the phenomenon is better known as 'Waldsterben', a term which is now in current use internationally. Since much of the investigation into Waldsterben originates from and concentrates on this country, research reports have been written primarily in German. One of the goals of EXPERIENTIA's new interdisciplinary review series is therefore to bring this problem to the immediate attention of a concerned international public.

A few years ago, many researchers felt that acidic deposition was the main cause of forest decay. Later, it was discovered that other causes (for example, oxidant pollution and pathogens of various kinds) might be playing key roles as well. The increasingly rapid deterioration of the forests (in 1982, 7% of the forests in the Federal Republic were afflicted; by 1984 the figure had jumped to 50%) indicated that reassessment of old hypotheses and new problem approaches were urgently necessary. The present series will make no attempt to establish a consensus about the causes of forest decay; instead, EXPERIENTIA wishes to provide a forum for lively scientific debate.

The first contributions to this series are devoted to background information. *J. Fuhrer* discusses the formation of secondary air pollutants and their occurrence over Europe. He shows that the formation of atmospheric acidity is interrelated in a complex manner with the processes leading to the accumulation of ozone and other oxidants, which finally may have eco-toxicological consequences to forests. It is still difficult to prove these effects in the field, although under controlled conditions the uptake and the effects of gaseous air pollutants can easily be shown. The biochemical and physiological effects of fumigation experiments on trees are analyzed by *W. Landolt* and *Th. Keller*, For several years, now, a general depression of forest growth has been observed over wide regions in the northern hemisphere. This growth depression is most pronounced in regions afflicted by Waldsterben. The article by *S. B. McLaughlin* and *O. Bräker* deals with methods for evaluating and predicting forest growth responses to air pollution. The authors also highlight general methodologies in studying forest decline in Europe and the United States. Finally, *J.-Ph. Schütz* describes the few silvicultural measures available to control forest decay in a polluted environment.