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Editorial

Major Biological Issues Resulting from Anthropogenic Disturbance of the Nitrogen Cycle

(The Third *New Phytologist* Symposium, Lancaster University, UK, 3–5 September 1997)

A two-day Discussion Meeting of the Royal Society, 'The Nitrogen Cycle', held in London in June 1991 (Stewart & Rosswall, 1992) reviewed the considerable progress made in understanding the N cycle in agricultural, forest and aquatic systems. The meeting included some discussion of the concerns which were already being expressed at that time over nitrate in water supplies, and the impacts of nitrogenous gases on tropospheric chemistry, the greenhouse effect and the ozone layer. Since then, disquiet over the impacts of nitrogenous compounds on the environment has increased, and numerous papers have been published on many aspects of the problem. We now have much better understanding of the size and scale of the perturbation of the N cycle, and several review papers have highlighted the complexity of the formidable issues that are challenging environmental scientists (Vitousek, 1994; Galloway *et al.*, 1995; Vitousek *et al.*, 1997).

The Trustees of *New Phytologist* decided to support a Symposium because many aspects of this topic fall within the remit of the journal, and there was a clear need for an international discussion meeting. The various problems associated with anthropogenic N enrichment – acidification, climate change, eutrophication, ozone destruction – are common to most countries, and the transboundary nature of the problems requires international dialogue and agreed action to provide solutions. We also saw the need to extend the discussion beyond nitrogenous compounds to include ozone as a secondary pollutant. We were fortunate to be able to bring together scientists who are at the leading edge of research on many important aspects of this subject. The papers in this volume represent their current thoughts on the problem, augmented by many perceptive comments from their peers who were the chairpersons of the various sessions. When we seek solutions to environmental problems of this magnitude, there is no substitute for good science and for open debate about the complex issues. Furthermore, shortcuts that may appeal to economists (for example, modelling based on insecure foundations) must never be seen as alternatives to well-designed experiments in the field and under controlled conditions. The best science is often regarded as too expensive, but misjudgements resulting from inadequate understanding could lead to costs for mankind that are beyond the grasp of the economics of the present day.

The chairpersons of sessions played an invaluable part in the meeting, especially during the periods of discussion, for which plenteous time was allowed in the programme. We are grateful to each of them for preparing a brief contribution to this volume, reflecting both personal views on important issues and some of the points that arose during discussion. In addition, Professor Howard Thomas kindly agreed to prepare a chapter of 'afterthoughts' in the light of the meeting as a whole. These additional contributions greatly enrich these proceedings by pointing to some of the major issues that will challenge scientists in the near future.

We acknowledge warmly the Trustees of *New Phytologist* who supported the full cost of the meeting, and we thank those who attended and enriched to the discussions but do not appear as authors

in this volume. We are grateful to the Managing Editor, Dr David Stribley, and to his staff for their help in achieving the very rapid publication of the proceedings, an essential part of making the meeting relevant.

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A note for etymologists!

The adjective 'anthropogenic' was originally used in connection with man's origin and development, and some well-known dictionaries still restrict it to that context. According to *Henderson's Dictionary of Biological Terms* (Longman, 1989) it means 'produced or caused by man'. A brief search of the scientific literature revealed that the definition in *Henderson's* is supported by usage in over 600 titles in the last decade, and thus we are comfortable with its appearance in our title and in many of the papers in this volume.