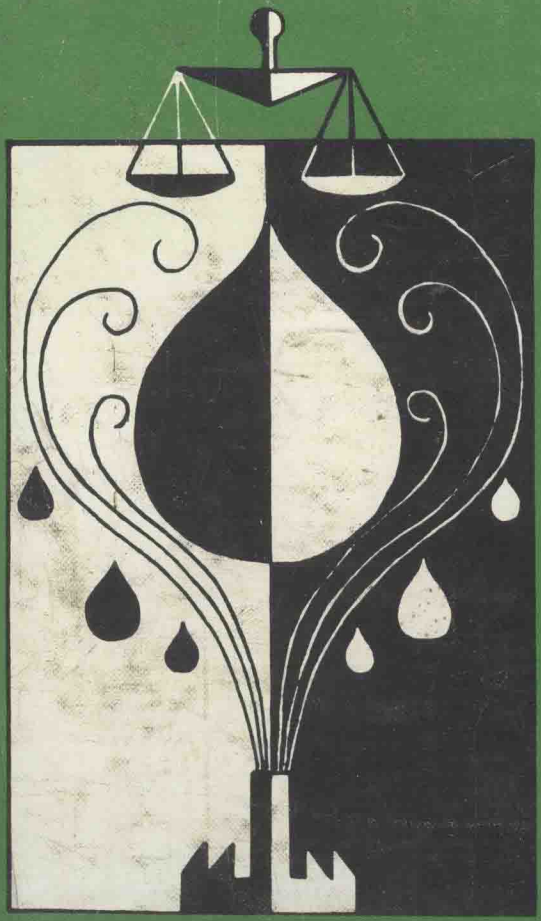
ACID RAIN
and
INTERNATIONAL LAW



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Foreword

The more impetuous reader will have ignored these pages and may already be imbedded in the technical and legal aspects of the acid rain problem described herein. Others, however, will reasonably expect some sort of comment indicating the source of this book.

This book is based on a Masters Degree thesis in the Faculty of Law, Dalhousie University, Nova Scotia, Canada. Its contents extends beyond the normal pursuit of academic requirements and covers a range of inquiry encompassing questions outside legal matters. Broadly speaking, this book draws together our current understanding of an environmental phenomena which is new in the technical, economic and legal sense and which, at the same time, poses an unprecedented challenge to the political communities involved. The text is a manifestation of both the perseverance and the perception of the author.

The issue of transboundary pollution or "Acid Rain" in the broader perspective of law, economics and environment, is of utmost importance to those nations which are involved in the transport through the atmosphere, of materials which may be injurious to the environments of neighbouring nations. The potential for damage to the natural environment is one aspect of human activity which is frequently ignored. The author proposes after extensive analysis, pathways which must be undertaken by responsible nations if the violation of our shared environments is to be prevented.

The author has focused on the situation in North America. Developments between Canada and the United States are moving rapidly so that, since the completion of the texts, certain future events referred to herein have now occurred. The apparent dating of the material, however, is only superficial. The development of legal structures to deal with transboundary air pollution and the assessment of environmental hazard will continue for some considerable time. Throughout, this text will remain a valuable source of basic information on the environment, economics and the law as they relate to this urgent matter.

H.C. Martin
Editor

Toronto
March, 1981

Preface

This work could not have been written without the help of a number of individuals to whom I am greatly indebted.

The gathering of current information was one of the most difficult tasks facing me. I owe thanks to all those who provided information including: the Environmental Law Centre of the IUCN in Bonn; Peter Finkle of Environment Canada in Ottawa; Mr. P. Lieben of the OECD Environment Directorate in Paris; Professor Louis B. Sohn of Harvard University in Cambridge MA; the UNEP Liaison Office in New York; Gregory Wetstone of the Environmental Law Institute in Washington, D.C.; and Samual Wex, Legal Adviser to the International Joint Commission in Ottawa. I have benefitted from the presentations given by various speakers at the Action Seminar on Acidic Precipitation, an international citizen's conference on acid rain in Toronto on November, 1, 2, and 3, 1979, and during the Environment Canada workshop on long-range transport of air pollution and its impact on the Atlantic region in Dartmouth, Nova Scotia in the fall of 1979. Finally, I received valuable assistance from the library staff of the Dalhousie Law School. Special thanks are owed to Patricia Forde, who provided me with a great number of sources through inter-library loans.

I am very grateful to Dr. Hans Martin, Ph.D., of the Atmospheric Environment Service of Environment Canada in Toronto. He not only gave me indispensable information, but also, through our vivid discussions during several conferences and other meetings, greatly contributed to my understanding of the issue at hand. Subsequently, he undertook the challenging task of editing and publishing this book. I am equally grateful to Michael Gardner, professor in Economics at Dalhousie University, with whom I had lengthy discussions on the economic aspects of acid rain. Also, I have benefitted by the advice of Dr. Doliver Nelson, visiting professor in the law of the sea at Dalhousie University, who temporarily supervised the original thesis.

The Isaac Walton Killam Foundation provided much appreciated financial assistance by awarding me a one-year grant. Many thanks are owed to the Dalhousie Law School who financed necessary visits to Ottawa and Toronto.

Most of all, I am indebted to my supervisor, Professor Ronald St. J. Macdonald, Q.C., senior professor in international law at Dalhousie University, who made me aware of the problem of acid rain. I am very impressed by his knowledge of general international law as well as by his insight in international environmental issues. I was very fortunate to work under his guidance and I benefitted very much from our pleasant and stimulating discussions. He has been a great source of inspiration for me.

Irene H. van Lier

List of Abbreviations

A.C.	Appeal Cases
All E.R.	All England Law Reports
C.A.	Court of Appeal
C.A.A.	Clean Air Act (U.S.)
Can. T.S.	Canada Treaty Series
CLP	Civil Liability Principle
CSCE	Conference on Security and Co-operation in Europe
DEQ	Demand for Environmental Quality
D.L.R.	Dominion Law Reports (Canada)
EC	European Communities
ECE	(United Nations) Economic Commission for Europe
ECJ	European Court of Justice
ECOSOC	(United Nations) Economic and Social Council
ECSC	European Coal and Steel Community
EDF	Environmental Damage Function
EEC	European Economic Community
EMEP	European Monitoring and Evaluation Programme
EPA	Environmental Protection Agency (U.S.)
ESRP	Equally Shared Responsibility Principle
EURATOM	European Atomic Energy Community
FAO	Food and Agricultural Organization
GA	(United Nations) General Assembly

GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GEMS	Global Environmental Monitoring System (UNEP)
GNP	Gross National Product
ICJ	International Court of Justice
ICNT	Informal Composite Negotiating Text
ICSU	International Council of Scientific Unions
ILA	International Law Association
ILM	International Legal Materials
IRS	International Referral System
IUCN	International Union for the Conservation of Nature and Natural Resources
LNTS	League of Nations Treaty Series
M.C.	Marginal Costs
M.P.R.	Maritime Provinces Reports (Canada)
NATO	North Atlantic Treaty Organization
NBCA	New Brunswick Court of Appeal
NVIR	Nederlandse Vereniging voor Internationaal Recht
OECD	Organization for Economic Co-operation and Development
OJEC	Official Journal of the European Communities
PCIJ	Permanent Court of International Justice
PPP	Polluter Pays Principle
Q.B.	Queen's Bench

SIP	State Implementation Plan (U.S.)
Stat.	Statute
UN	United Nations
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNREN	United Nations Rounds of Environmental Negotiations
UNRIAA	United Nations Reports of International Arbitral Awards
UNTS	United Nations Treaty Series
USC	United States Code
VPP	Victim Pays Principle
WHO	World Health Organization
WLR	The Weekly Law Reports
WMO	World Metereological Organization

List of Scientific Terms & Abbreviations

anion	negative ion
BTU	British Thermal Units
Ca^{2+}	calcium ion
$CaCO_3$	calcium carbonate (limestone)
cation	positive ion
CEC	cation exchange capacity
Cl^-	chloride ion
CO_2	carbon dioxide
CO_3^{2-}	carbonate ion
FGD	flue gas desulfurization
FBC	fluidized bed combustion
H^+	hydrogen ion
HCl	hydrochloric acid
HCO_3^-	bicarbonate ion
H_2CO_3	carbonic acid
HNO_3	nitric acid
H_2S	hydrogen sulfide
H_2SO_4	sulfuric acid
ion	electrically charged atom or group of atoms
K+	potassium ion
l.	litre
M tons	million metric tons
mb	millibar

Mg^{2+}	magnesium ion
Na_2CO_3	sodium carbonate
Na^+	sodium ion
NH_4^+	ammonium ion
NO_x, NO, NO_2 or NO_3^-	oxide of nitrogen
OH^-	hydroxyl ion
oligotrophic	with little species
pH	measure of acidity [= $- \log_{10} [H^+]$]
PCB	polychlorinated biphenyls
SO_2	sulfur dioxide

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Chapter One

Introduction

Human existence is based on man's natural environment. Man was brought forth and is sustained by what is known as the planetary ecosystem. The planetary ecosystem is a network of complex natural and cultural components, in which micro-organisms, plants, animals, including *homo sapiens*, and their non-living surroundings are interrelated. The planetary ecosystem unites the multitude of subsidiary ecosystems. Within this system man alone has a dual role: he is a natural symbiotic component of the ecosystem and he is able to change his environment in a beneficial or in a detrimental way. [1]

Man is dependent on the planetary ecosystem to provide him air to breathe, water to drink, food to eat, and other resources to make his life enjoyable. The interdependencies within the planetary ecosystem make our whole earth-