

Book Review by Kernaghan Webb of Jutta Bruneel, *Acid Rain and Ozone Layer Depletion: International Law*, (1990) 13 *Dalhousie Law Review*, pp. 474 – 487.

Dr. Webb articulates the concept of *technological adolescence*.

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Jutta Brunnée, *Acid Rain and Ozone Layer Depletion: International Law and Regulation*, New York: Transnational Publishers Inc., 1988. 302 pp.

Although international customary and conventional law have addressed aspects of transfrontier pollution problems for decades,¹ the regional and global environmental degradations which have come to the forefront in the 1980s and 1990s — acid rain, ozone depletion, and global warming, to name but three — represent new challenges to existing international law institutions and concepts. In a sense, the world has over the past two centuries gone through a period of what could be called “technological adolescence”, as individuals and corporations, largely from industrialized nations, exploited the earth’s resources with little if any concern for the immediate and long-term implications of their actions. In the face of ever-mounting and ominous evidence of the seriously ill health of the planet, there has been growing recognition that there are limits to what the earth can provide as well as responsibilities associated with the use of its resources. The as yet unanswered question is whether the structures and concepts of international law developed to this point are or will be adequate to contend with the serious threats to the world’s environment which lie ahead.

Jutta Brunnée’s book *Acid Rain and Ozone Layer Depletion: International Law and Regulation*² could be described as an attempt to answer this question by examining legal treatment of the two most significant forms of long range transboundary air pollutants (LRTAP) which have arisen to date. Originally a thesis prepared at Dalhousie Law School, Brunnée’s text follows in the footsteps of a similar, earlier Dalhousie Law School effort, van Lier’s *International Law and Acid Rain*, published in 1981.³

After making a detailed analysis of the international response to acid rain and ozone depletion up to 1987, Brunnée arrives at a cautiously optimistic conclusion concerning the ability of contemporary international legal regimes and concepts to deal with global atmospheric pollution problems. In essence, her position is that existing rules of international environmental law provide only broad directions, but cannot evolve quickly enough or respond with sufficient precision to

1. With respect to customary law, see, for example, the *Trail Smelter* Arbitration, (1938, 1941) III U.N.R.I.A.A., (1949); as to its limitations, see discussion *infra*. For an early example of treatment of pollution matters in a major multilateral convention, see the International Convention for the Prevention of Pollution of the Sea by Oil, London, May 12, 1954.

2. Brunnée, *Acid Rain and Ozone Layer Depletion: International Law and Regulation* New York: Transnational Publishers Inc., 1988.

3. Irene van Lier, *Acid Rain and International Law* (Toronto: Bunsel, 1981).

handle problems such as acid rain and ozone depletion.⁴ What is needed, according to Brunnée, is a preventive “management approach” to be added to international environmental law.⁵ For Brunnée, this approach is well illustrated by the work of the United Nations Environmental Program (UNEP), which resulted in the Vienna Convention for the Protection of the Ozone Layer⁶ and the subsequent Montreal Protocol on Substances that Deplete the Ozone Layer.⁷ The two approaches — the reactive, traditional international law system, and the preventive management *modus operandi* — are complementary and mutually reinforcing, since the traditional approach provides the foundation and framework for the specific management regimes created to respond to particular environmental problems.⁸

In the experience of this reviewer, it is all too often that legal-environmental commentators, in their haste to delve into detailed analysis of points of law, leave the reader in the dark by not providing sufficient background information concerning how the problem originated and why it developed in a way it did. In reality, legal analysis of complex issues, such as those surrounding environmental problems, usually only makes sense in light of this broader context. Brunnée does an excellent job of bringing the reader “up to speed” by canvassing the historical, scientific, and economic underpinnings to acid rain and ozone depletion.

Chapter II of the text is devoted to the description of the scientific aspects of atmospheric pollution. Here, the reader is made aware of, among other things, the impacts (and potential impacts) of acid rain and ozone depletion on human health, lakes, groundwater, fish, soil, forests, crops, wildlife and structures.⁹ The lack of conclusive evidence concerning who causes what damage to whom has represented a practical and legal barrier preventing easy resolution of the problem, while at the same time providing a convenient excuse for those nations less enthusiastic about swift clean-up action.¹⁰ Brunnée observes that up to half of the current sulphuric emissions are thought to be natural in origin, a factor which must hamper scientists in their efforts to find parties responsible for damages.¹¹ In light of such factors, the 1979 Economic

4. Brunnée, *supra*, note 2, at p. 141.

5. *Ibid.*

6. UNEP/IG 535, March 22, 1985, reprinted in (1987) 26 *ILL.M.* 1516. (hereinafter also referred to as “the Vienna Convention”).

7. UNEP, Final Act, September 16, 1987, reprinted in (1987) 26 *ILL.M.* 1541 (hereinafter also referred to as “the Montreal Protocol”).

8. Brunnée, *supra*, note 2, at p. 268.

9. *Ibid.*, at pp. 14-24; 43-47.

10. See further discussion of this in the context of U.S.-Canada acid rain negotiations *infra*.

11. Brunnée, *supra*, note 2, at p. 11.

Commission of Europe (ECE) Convention on Long-Range Transboundary Air Pollution¹² defines LRTAP as air pollution with origins in one state and adverse effects in another state "at such a distance that it is not possible to distinguish the contribution of individual emission sources. . ."¹³ Here we see an example of how the physical characteristics of acid precipitation necessitate a move away from the classic international tort situation where victim and wrongdoer are clearly discernible (eg., the *Trail Smelter*¹⁴ incident), in favour of a more cooperative approach. The difficulty is that as long as some states do not participate in the cooperative scheme¹⁵, the likelihood of success is greatly diminished.¹⁶

In the course of the chapter, a number of interesting and little known facts about LRTAP are presented. For example, many might not have been aware that acid rain has been a recognized *local* phenomenon since the 1800s, but that its international consequences only became apparent in the late 1950s.¹⁷ In Canada, the construction of the Inco "superstack" in 1972 in effect transformed a domestic pollution problem into one with transfrontier dimensions.¹⁸ Emerging from this discussion the reader gains an appreciation for another distinctive characteristic of much transfrontier air pollution which makes legal control difficult: there is no easily discernible line between acceptable and unacceptable LRTAP. Although, in international law, it is accepted that state responsibility lies for activities defined as wrongful and therefore subject to prohibition (eg., international crimes), the situation is considerably less clear where injury results from activity not so prohibited.¹⁹

Brunnée also looks at scientific aspects of the ozone problems. In contrast to the fairly long history and generally well accepted nature of acid rain, the theory that ozone depletion was caused by certain manmade chemicals was not even proposed until 1974.²⁰ while the

12. T.I.A.S. No. 10541, Geneva, November 13, 1979, reprinted at (1979) 18 *ILL.M.* 1442 (hereinafter also referred to as "the ECE LRTAP Convention").

13. Article 1 (b), discussed by Brunnée, *supra*, note 2, at pp. 136-137.

14. *Trail*, *supra*, note 1, discussed in greater detail *infra*.

15. For example, the United Kingdom and the United States have been hold outs, refusing to sign the sulphur protocol passed pursuant to the ECE LRTAP Convention; discussed in greater detail by Brunnée, *supra*, note 2, at p. 185.

16. On this problem, see discussion by Brunnée, *ibid.*, at pp. 53-54; see also p. 140.

17. *Ibid.*, at p. 9.

18. *Ibid.*, at p. 13.

19. See, for example, the evolving work of the International Law Commission concerning "International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law", discussed briefly by Brunnée, *ibid.*, at pp. 114-115.

20. *Ibid.*, at p. 34.

phenomenon of ozone depletion and its causes are now widely accepted, the extent of the long term effects of such ozone depletion are still a matter of considerable debate.²¹ This points to another distinctive characteristic of some of the new global pollution problems which makes their legal control difficult: essentially, the international community is required to respond *in advance* to future, anticipated damages of a speculative nature, *before* they materialize.²² Again, this supports Brunnée's basic thesis that a cooperative, management approach must be undertaken, that a piecemeal response will not be sufficient to address problems of this magnitude and nature. Moreover, the international response must be swift: it is estimated that, due to the extremely stable state of CFC 12 (a major identified ozone depleting chemical) and the fact that CFCs take years to accumulate in the atmosphere, an immediate 85% reduction in emissions is necessary just to keep current atmospheric ozone concentrations stable.²³

The third chapter introduces the reader to economic aspects of environmental protection of the atmosphere. Brunnée does an admirable job of synthesizing an enormous range of material here, from theoretical concepts, such as Pareto optimality, market failure, public goods, externalities, and the polluter pays principle²⁴, to a more practically-oriented examination of the costs of pollution control compared to the costs of environmental damage.²⁵ Emerging from this discussion is recognition that it is extremely difficult to attribute specific effects to a particular pollutant, this in turn making prescription of abatement measures problematic since the measures adopted might not solve the problem. Brunnée concludes her remarks on the economic aspects of acid rain by observing some of the limitations of cost-benefit analysis when applied to this area: "... even if the costs for reducing emissions are higher than those of the damage caused to another country it cannot be an excuse for causing that damage on another country's territory. Therefore, what is required is a diplomatic and political rather than an exclusively economic approach to the transboundary problem."²⁶ In effect, then, economic analysis reveals some of the causes for the current problems, but does not provide the immediate solutions.

Against this backdrop, the international law context as it applies to acid rain and ozone depletion is explored in Chapter IV. In attempting to

21. *Ibid.*, at pp. 43-47.

22. Observed by Brunnée *ibid.*, at p. 270.

23. *Ibid.*, at p. 38.

24. *Ibid.*, at pp. 52-60.

25. *Ibid.*, at pp. 70-79.

26. *Ibid.*, at p. 77.

describe the principles of international law relevant to LRTAP, Brunnée has taken on a daunting and complex task. Publicists have devoted their entire careers (and countless articles) to the articulation and development of principles of state responsibility and liability pertaining to international environmental degradations.²⁷ Some of the fundamental principles at play here, such as those relating to liability for injurious consequences arising out of acts not prohibited by international law (i.e., as is arguably the case with cumulative low impact insults to the environment those causing acid rain and ozone depletion) are still in the process of being worked out.²⁸ Brunnée's basic position is that, by itself, the traditional approach, with its cause-effect requirements and "rule-infringement-responsibility-remedy" system, lacks the ability to respond with adequate swiftness and precision to problems such as acid rain and ozone depletion.²⁹ It is apparent that Brunnée's objective in this chapter is to survey the major international law principles involved in a manner which lends support to her basic position, and not to portray the current body of international law from a particularly reform-minded perspective. For Brunnée (and for many others), the traditional approach has not in itself been sufficient to meet the challenge: the future lies in internationally cooperative activities and agreements which "flesh out" the general rules. Readers looking for a more aggressive and in-depth assessment of the prospects of traditional international law concepts to respond to the new global environment threats would be best advised to examine some of the many sources Brunnée cites in her footnotes to the chapter.

Main topics of discussion in the chapter are the substantive³⁰ and procedural³¹ rules of international law applicable to long range transboundary air pollution, state responsibility,³² and the use of national systems.³³ After noting the tension produced by the competing notions of territorial sovereignty (the right of nations to exploit resources within their jurisdiction) and integrity (the obligation of nations not to exploit

27. The most notable example is probably Professor Gunther Handl. Major articles by him include Handl, "Territorial Sovereignty and the Problem of Transnational Pollution," (1975) 69 *Am. J. Int'l L.* 50; Handl, "State Liability for Accidental Transnational Environmental Damage by Private Persons" (1980) 74 *Am. J. Int'l L.* 525; Handl, "International Liability of States for Marine Pollution" (1983) *Can. Y.B. Int'l L.* 85; Handl, "National Uses of Transboundary Air Resources: The International Entitlement Issue Reconsidered" (1986) 26 *Nat. Resources J.* 405.

28. See footnote 19, *supra*.

29. Brunnée, *supra*, at p. 141.

30. *Ibid.*, at pp. 83-103.

31. *Ibid.*, at pp. 103-112.

32. *Ibid.*, at pp. 112-121.

33. *Ibid.*, at pp. 124-132.

their resources in such a manner harmful to others), Brunnée then examines the substantive rules applicable. She reduces the major principles involved in “good neighborliness”³⁴ and “equitable utilization”.³⁵

Although aware of the fact that the concept of good neighborliness is a much broader notion and consequently has more general application than merely to environmental situations,³⁶ Brunnée employs it as shorthand to describe the duty of states to not cause serious damage beyond their territory. Her concepts of the principle as it pertains to environmental contexts is based on a combination of sources, from the Roman law maxim *sic utere ut alienum non laedas*,³⁷ to the *Trail Smelter* arbitrations,³⁸ Principle 21 of the Stockholm Declaration,³⁹ and the preamble of the U.N. Charter,⁴⁰ among others. Building on *sic utere* and *Trail*, she starts from the initial (and conservative) position that states cannot cause serious harm to other states. Principle 21 is used by Brunnée⁴¹ to broaden this limited state-to-state obligation to the more comprehensive duty to not cause harm to “areas beyond the limits of national jurisdiction”.⁴² Synthesizing the foregoing with the *Corfu Channel* case⁴³ (state obligation not to allow knowingly its territory to be used contrary to the rights of other states⁴⁴), the *Palmas* cases⁴⁵ (state obligation to protect within the territory the rights of other states⁴⁶) and the *Alabama* decision⁴⁷ (state obligation to use all due care in the

34. *Ibid.*, at pp. 87-98.

35. *Ibid.*, at pp. 98-103.

36. See, e.g., opening discussion at p. 87; at p. 88, Brunnée describes *Trail* as a decision which “confirmed and specified the rather broad notion” of good neighborliness; at p. 90 she refers to good neighborliness as a “general principle” occurring in the preamble to the U.N. Charter which underscores the determination of states to live together in peace with one another as good neighbors.

37. *Ibid.*, at p. 87.

38. *Trail*, *supra*, note 1. Brunnée is careful to note its well recognized limitations, such as the fact that Canada had admitted liability prior to submitting the case to arbitration (see, e.g., p. 89), but nevertheless relies on it substantially.

39. U.N. Doc. A/Conf. 48/14, reprinted in (1972) *ILLM.* 1416 (hereinafter referred to as “Principle 21”, and the “the Stockholm Declaration”). Discussed by Brunnée at pp. 89-90.

40. See note 36, *supra*.

41. Brunnée is careful to note its limitations — most obviously its non-binding nature, and the fact that principle 22 indicates a lack of consensus with respect to the question of liability: see Brunnée, note 2, *supra* at pp. 89-92.

42. *Ibid.*, at p. 89; see also at p. 136.

43. (1949) *I.C.J. Reports* 4.

44. Brunnée, *supra*, note 2, at pp. 94-95.

45. P.C. Arb. 1928 No. XIX in 2 *R.I.A.A.*

46. Brunnée, *supra*, note 2, at p. 95.

47. *Alabama Claims* case summary by P. Seidel, *Alabama Case* in R. Bernhardt, ed., *Encyclopedia of Public International Law*, instalment 2 (1983) at 11, 12.

performance of international obligations⁴⁸), Brunnée builds a preventive component into her obligation not to cause environmental harm.⁴⁹ She confirms her formulation by citing a number of examples of treaty provisions and state practices consistent with it.⁵⁰

The principle of good neighborliness is of such a broad nature that some commentators have gone so far as to suggest that it encompasses the concept of equitable utilization.⁵¹ Although Brunnée loads a great deal into her version of good neighborliness, she treats equitable utilization as separate and distinct. The extension of the principle of equitable utilization from the context in which it was originally articulated (shared water resources) to regional air sheds (eg., continental acid rain) is discussed, as are its limitations.⁵² Later, Brunnée notes the particular relevance of this principle to ozone depletion as an instance of the "global commons" phenomenon, given that, as with water basins, the ozone layer has a limited assimilative capacity and discernible boundaries.⁵³ The relationship between equitable utilization and the obligation to not cause significant harm is also examined, with Brunnée concluding that a utilization which causes significant transboundary harm would be considered inequitable in the absence of exceptional justifying circumstances.⁵⁴

Brunnée relies on the combined principles of "[t]he 'good neighborliness' of nations sharing natural resources"⁵⁵ as the well-spring for many procedural obligations of considerable importance of the problem of long range air pollution. The obligations of states to cooperate, notify and inform, consult and negotiate are all surveyed.⁵⁶ Brunnée rightly emphasizes that resolution of the acid rain and ozone depletion problems, given their magnitude and nature, depends heavily on states fulfilling these procedural obligations.⁵⁷

Determining the appropriate rules of state responsibility applicable to transboundary pollution has occupied the attention of the international legal community for many years. Problems arise when attempts are made

48. Brunnée, *supra*, note 2, at p. 95.

49. *Ibid.*, at pp. 94-96.

50. *Ibid.*, at pp. 96-98.

51. Eg., Goldie, "Development of an International Environmental Law — An Appraisal" in J. Hargrove, ed., *Law, Institutions, and the Global Environment*, Oceana Publications, Dobbs Ferry, N.Y., 1972, 104-165 at pp. 130-131.

52. Brunnée, *supra*, note 2, at pp. 98-103.

53. *Ibid.*, at p. 140.

54. *Ibid.*, at p. 103; pp 137-138.

55. *Ibid.*, at p. 103.

56. *Ibid.*, at pp. 103-111.

57. *Ibid.*, at p. 138, 140.

to translate the general obligations to prevent harm into specific and practicable rules resulting in liability. Thus, while Principle 21 of the Stockholm Declaration is evidence that state responsibility to avoid transboundary harm is generally accepted, the same Declaration also noted that international law regarding liability and compensation for victims needs to be developed (principle 22).⁵⁸ Issues yet to be conclusively resolved, which are discussed by Brunnée, include liability for acts, such as air pollution, which are not prohibited in international law, but which nevertheless cause harm,⁵⁹ the threshold level of harm necessary to attract liability,⁶⁰ and what standard of liability is appropriate⁶¹. Still, the author notes a number of potentially promising lines of attack: first, as a starting point, there is the long accepted rule established in the *Chorzow Factory* case⁶² that “the breach of an engagement, involves an obligation to make reparation in an adequate form”.⁶³ While the precise terms of the “serious harm” threshold are still debated and thus likely to continue to pose problems in the case of substantive obligations,⁶⁴ Brunnée correctly notes that with respect to procedural obligations to cooperate, inform and consult “the effects of LRTAP have crossed the threshold of ‘serious impact’ activating the duty as such.”⁶⁵

In spite of the fact that problems of acid rain and ozone depletion are quintessentially international in scope, an important role can and has been played by national legal systems on these types of issues. After noting the problems associated with use of national courts, Brunnée discusses the progressive “Nordic Convention”,⁶⁶ which gives any person located in the contracting state and affected by environmentally harmful activities of another contracting state the right to bring an action (including proceedings for compensation for damages) to the same extent and on the same terms as a legal entity of the state in which the activities are being carried out.⁶⁸ The U.S. *Clean Air Act*⁶⁸ — Canadian *Clean Air*

58. *Ibid.*, at p. 113.

59. Briefly discussed by Brunnée, *ibid.*, at pp. 114-115.

60. *Ibid.*, at pp. 115-116, and 136-140.

61. Brunnée concludes that, in spite of the move towards strict liability for ultrahazardous activities, a fault (due diligence) standard is appropriate for LRTAP situations: *ibid.*, at pp. 117-119.

62. (1928) *PCIJ* Ser. A. No. 17 21.

63. Brunnée, *Ibid.*, at p. 112.

64. *Ibid.*, at p. 116, 136,140, as confirmed by Handl, 1986, *supra*, note 27, at p. 412.

65. *Ibid.*, at p. 139.

66. 1974 Convention on the Protection of the Environment, reprinted in (1974) 13 *ILL.M.* 591.

67. Brunnée, *supra*, at pp. 126-127.

68. 42 U.S.C.

*Act*⁶⁹ reciprocal treatment provisions, and problems associated therewith are also summarized.⁷⁰

In light of the limitations of the traditional international law approach, with its broadly worded obligations, its emphasis on serious damage and causation, as well as its slowly evolving nature, Brunnée concludes that the existing international law system is inadequate by itself, but provides the foundation upon which a preventive management approach must be added.⁷¹ In this stance, Brunnée could be accused of exaggerating the limitations of the existing international law system, and expressing undue faith in the "management approach": in the final analysis, even the preventive regimes she discusses depend for their proper functioning on their being clearly established and accepted obligations and rules of liability. In this respect, some of the more progressive aspects of international law, such as the ongoing but as yet incomplete work of the ILC on liability for harm arising from acts not prohibited in international law and the move towards acceptance of strict liability as the acceptable standard for cases of environmental harm are perhaps not here given the attention they deserve.

In Chapter V, the early development of the cooperative, management LRTAP approach is set out, particularly as it applies to the acid rain problem. Discussion begins with a description of the United Nations Environmental Program in the early 1970s, and its use of Action Plans.⁷² Also examined are the efforts of regional or limited membership organizations, including the Council of Europe, OECD, and U.N.'s Economic Commission for Europe as well as the Economic and Social Commission for Asia and the Pacific, the Nordic Council, the European Economic Community, the various bilateral arrangements.⁷³ Brunnée's survey reveals some of the strengths and weaknesses, and varied institutional responses to LRTAP provided by the international community. The major subjects of discussion in the chapter are the ECE LRTAP Convention,⁷⁴ and the ongoing Canada-U.S. acid rain negotiations.⁷⁵

The impetus for the 1979 ECE LRTAP Convention are traced back to a statement made by President Leonid Brezhnev of the Soviet Union at

69. S.C. 1970-72, c. 47; now *Canadian Environmental Protection Act*, S.C. 1988, c. 22.

70. Brunnée, *supra*, note 2, at pp. 130-132.

71. *Ibid.*, at p. 141.

72. *Ibid.*, at pp. 143-149.

73. *Ibid.*, at pp. 150-223.

74. *Ibid.*, at pp. 175-186.

75. *Ibid.*, at pp. 190-210.

the 1975 conference, calling for international approaches to the pan-European problems associated with energy, transport, and the environment.⁷⁶ Norway and Sweden seized on the ECE's unique East-West membership, and the conference's recommendations for greater cooperations with respect to fuel desulphurization and control of NOX as an opportunity to forge an LRTAP agreement.⁷⁷ Negotiations began in 1977, culminating in the adoption of the treaty in 1979 and ratification in 1982.⁷⁸

The provisions of the convention are examined in some detail by Brunnée.⁷⁹ While critical of the lack of hard commitments for action and innumerable qualifiers contained in the Convention and protocols, she also provides valuable insights as to why the somewhat motherhood nature of the Convention was inevitable, given the diversity of interests and countries represented.⁸⁰ In spite of its many weaknesses, Brunnée views the Convention as a positive contribution toward resolution of the LRTAP problem, emphasizing in particular the flexibility of the framework approach for dealing with an issue the subject of scientific debate and significant economic implications.⁸¹

The multi-state activities of the ECE which culminated in the LRTAP conventions and protocols are constructively contrasted by Brunnée with the bilateral Canada-U.S. acid rain negotiations.⁸² That most European countries are both polluters and victims is described as a fact conducive of regional cooperation, whereas in the North American situation, the accepted victim-polluter (i.e., Canada U.S.) relation has made solutions less obvious.⁸³ On the other hand, the long tradition of cooperation between Canada and the United States is considered by Brunnée to be an important motivating factor for negotiated resolution of the problem.⁸⁴ The author analyzes the role of the IJC as a long respected institutional mechanism used to address Canada-U.S. border resource conflicts.⁸⁵ The development of the International Joint Commission's role in environmental matters is set out.⁸⁶ As to why the IJC has not played a central role in resolution of the acid rain problem, Brunnée realistically suggests

76. *Ibid.*, at p. 76.

77. *Ibid.*

78. *Ibid.*, at pp. 176-177.

79. *Ibid.*, at pp. 177-186.

80. *Ibid.*, at pp. 184-186.

81. *Ibid.*

82. *Ibid.*, at pp. 190-210.

83. *Ibid.*, at pp. 190-191.

84. *Ibid.*, at p. 191.

85. *Ibid.*, at pp. 192-198.

86. *Ibid.*

that the ecological, economic and political dimensions of the issue are of a national scale, and that it is perhaps too much to expect the governments to relinquish control over such decisions to an independent body.⁸⁷

Negotiations between the two countries outside the IJC framework are also examined, including the 1978 exchange of notes which established a research consultation group,⁸⁸ and the signing of a Memorandum of Intent in 1980.⁸⁹ Brunnée points to the coming into office of the Regan administration in January 1981 as a turning point in Canada-U.S. relations over acid rain.⁹⁰ U.S. manipulation of the scientists appointed to the working groups lead to questionable quality of work and criticisms of its objectivity, eventually resulting in the Americans adopting a frustrating (for the Canadians) "go slow, more research needed" position.⁹¹ When negotiations subsequently broke down, Canada began unilateral reductions.⁹² In a continuing effort to reduce some of the scientific uncertainty, in 1983 a tracer experiment agreement was signed between the two countries,⁹³ and in 1985 special envoys were appointed by the respective governments,⁹⁴ who recommended (among other things) a multi-million dollar commercial technology demonstration program in the U.S.⁹⁵ Brunnée's account of the development of the management approach to address the acid rain problem amply demonstrates that behind every bilateral agreement, memorandum of intent, or multi-lateral convention on acid rain lies a complex interplay of institutional, legal, political, scientific and socio-economic factors. Understanding such factors enhances our ability to respond through appropriate legal and institutional measures to future environmental threats.

Brunnée then looks in detail at the conception and development of the Vienna Convention on the Protection of the Ozone Layer and subsequent Montreal Protocol in Chapter VI. Given that the Convention and Protocol represent the first example of a truly global management approach to an environmental problem addressed by countries from a variety of ideological and economic backgrounds, and given that the

87. *Ibid.*, at p. 208.

88. *Ibid.*, at p. 199.

89. *Ibid.*, at p. 200.

90. *Ibid.*, at p. 202.

91. *Ibid.*, at pp. 202-203.

92. *Ibid.*, at p. 204.

93. *Ibid.*, at p. 205.

94. *Ibid.*

95. *Ibid.*, at p. 206.

agreements were reached in record time (as mentioned earlier, the problem of ozone layer depletion was not even scientifically recognized until 1974), it is not surprising that this approach is presented as the prototype upon which other agreements could be patterned.

In the course of her analysis, Brunnée reveals some of the substantive and procedural weaknesses as well as the strengths of the Convention and Protocol: for example, the probable insufficiency of the agreed upon CFC reductions,⁹⁶ and the fact that there is no mandatory procedure for dispute settlement⁹⁷ are two continuing problems (others have gone much farther in criticizing the terms of the Convention and Protocol.)⁹⁸ Brunnée sets out the integral role played by UNEP in initiating and promoting the drafting of the agreements and also describes the widely diverging interests of the parties which became evident during the negotiation phase preceding the drafting of the agreements.⁹⁹ Rifts between the EEC and the U.S. developed over whether or not limits should be placed on production or on consumption;¹⁰⁰ as well, the unique position of developing countries, who have not been significant contributors to the problem in the first place and did not want their ability to develop compromised by the agreement, also had to be recognized in the terms of the agreement.¹⁰¹ Interestingly, Brunnée attributes some of the aggressiveness in which the U.S. pursued the negotiation of the agreement to a domestic legal action against the federal Environmental Protection Agency.¹⁰² As with her evaluation of the acid rain agreements, Brunnée here indicates her support for the use of a framework agreement approach to address controversial issues marked by scientific uncertainty.¹⁰³

Throughout the book, Brunnée compares and contrasts the differences between acid rain and ozone depletion, and between the positions of the developed and developing nations to good effect. As a result, the reader gains an appreciation for how the legal form of international pollution agreements is in large part determined by such factors as whether the environmental problem is perceived as a regional threat (eg., acid rain) or

96. *Ibid.*, at p. 251.

97. *Ibid.*, at p. 235 and 267.

98. See, eg., P. Tourangeau, "The Montreal Protocol on Substances that Deplete the Ozone Layer: Can It Keep Us All from Needing Hats, Sunglasses, and Suntan Lotions?" (1988-1989)

11 *Hastings Int'l and Comp. L.Rev.* 509, esp. at pp. 519-540.

99. Brunnée, *supra*, note 2, at pp. 226-229.

100. *Ibid.*, at pp. 240-249.

101. *Ibid.*, at pp. 238-239.

102. *Ibid.*, at pp. 249-250.

103. *Ibid.*, at pp. 250-251.

as global in nature, and whether the problem is perceived by the actions of (and therefore primarily the responsibility of) the industrialized nations, as opposed to that of developing states.¹⁰⁴

Although Brunnée's account ends with discussion of events as of late 1987, the story is far from over. While the Vienna Convention entered into force September 22, 1988, and the protocol on January 1, 1989, some of the potentially most difficult components of the agreements have yet to be agreed upon: for example, procedures for determining incidents of non-compliance with Protocol terms have not yet been worked out, nor is there yet a procedure for deciding on the treatment of non-complying nations. On the acid rain front, U.S. President Bush's recent *Clean Air Act* legislative amendment initiatives could, if they survive Congress scrutiny intact, prove to be a major step toward Canada-U.S. agreement on this problem.

The atmospheric pollution issue which has now moved to centre stage in the international community is global warming. The March 11, 1989 Declaration of the Hague¹⁰⁵ calls for the development of new institutional authority, either by strengthening existing institutions or by creating an institution with "new and more effective decision-making and enforcement mechanisms" to address the global warming issue.¹⁰⁶ Decisions of the proposed authority are to be subject to review by the International Court of Justice at the Hague.¹⁰⁷ Twenty-four nations originally signed the declaration, and another nine signatories were announced following a meeting in Paris on May 9-10, 1989.¹⁰⁸ Signatories represent developed and developing countries, including Australia, Brazil, Canada, Czechoslovakia, Egypt, France, Hungary, Japan, India, Indonesia, Italy, the Ivory Coast, New Zealand, Senegal, Sweden, Venezuela, West Germany and Zimbabwe.¹⁰⁹ French Prime Minister Michel Rocard is reported to have invited nations that have not yet signed the declaration to become involved at the earliest possible time, so as to protect their interests before the regulations and enforcement mechanisms are finalized.¹¹⁰

104. On this subject, India has recently demanded that developed countries compensate it to the tune of \$2 billion to entice it to sign the ozone protocol: "India Wants \$2 Billion From Others to Sign Ozone Protocol", *BNA International Environment Reporter*, August, 1989, p. 389.

105. 12 INER 176, text reprinted in *International Digest of Health Legislation*, 1989, 40 (3) at pp. 122-724.

106. *Ibid.*, preamble.

107. *Ibid.*, principle (c).

108. Per "Meeting strengthens Hague Accord; Nine More Nations Sign Declaration", *BNA International Environment Reporter*, June, 1989, p. 287.

109. *Ibid.*

110. *Ibid.*

If, in their call for an international agency with new and effective "enforcement" mechanisms, the signatories to the Hague initiative envisage more than simply the trade sanctions and "dispute settlement mechanisms" in existing conventions, then it would seem self-evident that what is being considered is the establishment of an international environmental regime which is considerably more powerful than anything currently in place, several steps beyond the management approach described in the Vienna Convention and Montreal Protocol. Clearly, for such an institution to materialize, nations must first agree to relinquish significant aspects of sovereignty. In the opinion of this reviewer, one weakness of the Brunnée text is the apparent reluctance of the author to explore the possibility of such a global environmental authority (and its practical and legal implications) in the context of her discussion of the ozone depletion management approach. Perhaps even as late as 1987 the likelihood of a world environmental enforcement agency seemed beyond the realm of possibility, although calls for such an entity have been made since at least 1970.¹¹¹

A final note on the general readability of the text is in order. It has been said that a thesis or dissertation is only rarely publishable as a book, and even more rarely as a good one.¹¹² Brunnée's book is obviously one of the rare successes. It is eminently readable, well organized and thoroughly documented up to late 1987. It builds substantially on the earlier work of van Lier.¹¹³ There are limitations to the book: the lack of detailed discussion of the new developments in state responsibility and liability, lack of aggressive criticism of the ozone pact, and a failure to explore beyond the currently used approaches to international environmental problems. But these are inevitable deficiencies to be expected in a text which attempts to provide an overview of the issues. Anyone wishing to gain an understanding of this fast-developing area of international law would be well advised to start by obtaining a copy of this book.

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111. See, eg., G. Kennan, "To Prevent a World Wasteland: A Proposal" (1970), 48 *Foreign Affairs* 401-413.

112. E. Harman and I. Montague, eds., *The Thesis and the Book* Toronto: U. of T. Press, 1978.

113. van Lier, *supra*, note 3.