

After the Fall: An Analysis of Canadian Legal Claims for Damage Caused by Cosmos 954

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N.B. The authors dedicate this article to our friend Dr Gerald Fitzgerald. We had the privilege of working with him while articling at the Federal Department of Justice. No one beginning a life in public law and public service could have known a better exemplar of skill, integrity and generosity. The opinions expressed in this article are those of the authors and do not necessarily reflect those of any government agency.

Introduction

The Cosmos 954 incident was the first instance in the history of space exploration where a claim was made by one sovereign state against another on account of damage caused by a falling space object. The Soviet Union's partial satisfaction of the claim to the extent of three million dollars makes this case an important precedent in the development of international space law.

Cosmos 954, a Soviet nuclear-powered satellite, was launched on 18 September 1977.¹ Within weeks it showed signs of abnormal behaviour and on 23 January 1978, at 6:53 Eastern Standard Time, before the startled eyes of a few Northwest Territory residents, it re-entered the earth's atmosphere to the north of the Queen Charlotte Islands and disintegrated. Radioactive debris scattered over large portions of Canadian territory, particularly along a strip of land starting near Great Slave Lake and continuing north-eastward toward Baker Lake.

Concern about the possibility of contamination of the environment led to a large-scale airborne and ground search and recovery programme named Operation Morning Light, organized by the Canadian Armed Forces and the Atomic Energy Control Board of Canada. It ran from the re-entry date to mid-October 1978, interrupted only by spring thaw. Fourteen minutes after re-entry was confirmed by the tracking instruments of N.O.R.A.D., President Carter of the United States telephoned Prime Minister Trudeau to repeat an offer of immediate technical assistance for the clean-up and recovery operations. American expertise and equipment were utilized at an estimated cost of three million dollars, of which two million dollars were for incremental costs. Compensation for such a considerable amount was never a precondition for American assistance, nor did any legal obligation ever arise; in the end, Canada chose to exclude American costs in calculating the amount of compensation claimed from the Soviets.

While the Canadian government asked for statistical and technical data from Soviet scientists, it turned down an initial offer by the Soviets to otherwise assist in the clean-up operation. The Soviet Union may have been concerned that the search and recovery programme was partly motivated by the desire to gather intelligence about the construction of the Cosmos satellite and not for safety reasons. We have uncovered no information in the course of our research which would lead us to believe that a substantial amount of the costs claimed by Canada were incurred for intelligence reasons. Certainly, if there had been such claims they would have been inadmissible.

¹*Report to the Secretary General, U.N. DOC. A/AC.105/Inf. 368, 20 November 1977.*

In all the total costs of the operation amounted to nearly fourteen million dollars, of which only \$6,041,174.70 was claimed. Canada claimed only the incremental costs — those over and above what it would have had to pay for personnel and equipment used in the operation in any event. The Canadian claim was also modest in that while the government would have been justified in including interest on the principal amount of its damage claim, it did not do so.

On 23 March 1979 Canada made its formal legal claim against the Soviet Union. Negotiations towards a settlement did not begin for almost a year. Finally, after three sessions in February, June and November 1980, a three million dollar settlement which did not expressly acknowledge legal liability was concluded in Moscow on 2 April 1981. It took the form of a formal protocol signed by Canadian Ambassador Geoffrey Pearson and the Soviet Deputy Minister of Foreign Affairs, M.S. Rysov.

This paper analyzes the legal claims arising out of the Cosmos 954 incident. It must be borne in mind throughout that the case was negotiated and never reached the litigation stage. The paper is divided into four parts. Part I explores Canada's case under general international law for damages for trespass *per se*. Analogies to several of the more famous precedents — *Trail Smelter*, *Lake Lanoux*, the *Nuclear Tests* cases and *I'm Alone* — are reviewed and distinguished. Part II continues to investigate other possible claims that might have arisen were general internal law applicable, focusing in particular upon the various concepts of "damages". Part III suggests the possible Soviet argument that the *Liability Convention*² is exhaustive of the legal rights available to Canada, thus precluding reliance on general international law. Finally, Part IV reviews Canada's claims pursuant to the *Liability Convention*.

I. Claim for Trespass by Mere Fact of Entry

In this first part, Canada's case under general principles of international law for damages for trespass *per se* is analyzed and found to be extremely weak. It will be contended that even if a plausible case had existed under general international law, it would have been incompatible with the substantive terms of the *Liability Convention*, and therefore precluded to Canada.

Paragraph 21 of Canada's Statement of Claim³ alleged, *inter alia*, that the mere fact of the trespass of the satellite was a violation of

²*Convention on International Liability for Damage Caused by Space Objects*, 29 March 1972, 24 U.S.T. 2389, T.I.A.S. No. 7762, (1972) 66 Am. J. Int'l L. 702.

³Canada's Statement of Claim, *Claim against the Union of Soviet Socialist Republics for Damage Caused by Soviet Cosmos 954*, dated 23 January 1979, was annexed to a note from Mark MacGuigan, Secretary of State for External Affairs to Soviet Ambassador Alexander N. Yakovlev, 18 I.L.M. 899 (1979).

Canadian sovereignty, contrary to customary international law. Throughout the negotiations it was assumed that both the failure of the satellite to disintegrate in the upper atmosphere and Canada's becoming "the resting place" for the radioactive debris, were basically accidental, rather than the realization of Soviet intentions.

There are no decisional precedents on the question of falling satellites landing on territories other than those of the launching state. In an article in *The Globe and Mail* on 9 July 1979, it was mentioned that prior to Skylab there "have been at least 45 cases in which missile fragments, rocket casings and satellite chunks fired into orbit by one nation have been recovered on the territory of another".⁴ The article went on to say that while there have been some near misses, the only casualty thus far had been one Cuban cow. "Fidel Castro branded the accident as further evidence of Yankee aggression announcing that the fragments had splattered over a wide area and killed a cow. Five days later, 300 students of Havana University — accompanied by cows and bulls — demonstrated in front of the U.S. embassy, demanding compensation for the accident and chanting 'with cows or without cows the revolution will win'." The article did not say an official diplomatic protest or claim for reparations was made in that case.

The return to earth of the American space station Skylab attracted world attention. The media made much of the suspense created by the inability of N.A.S.A. officials to predict with much precision where it would eventually fall. Finally, on 11 July 1979, Skylab entered the earth's atmosphere and disintegrated over the Indian Ocean, showering tons of debris across the Great Australian Desert. Neil Hosenball, N.A.S.A.'s General Counsel and American representative to the United Nations Committee on Peaceful Use of Outer Space, announced that "[t]here is no question that the United States will pay damages. All a claimant will have to do is establish that the damage was in fact caused by Skylab."⁵ No harm to persons or property was ever reported and unlike Cosmos 954, Skylab carried no nuclear reactor. No claim was ever submitted by Australia, although Australian Prime Minister Malcolm Fraser did write to President Carter that "receiving Skylab is an honor we would have happily forgone".⁶

The Soviet study *International Space Law*⁷ also mentions the Cuban cows incident, but does not allude to any international legal claims as having arisen therefrom. A list of 44 space incidents appears in the

⁴*Globe and Mail* (9 July 1979), p. 11, col. 2.

⁵*New York Times* (8 July 1979), p. E 18, col. 3.

⁶*New York Times* (13 July 1979), p. A 7, col. 5.

⁷A. Piradov, *International Space Law* (1976), 62.

United States Senate Staff Report *Convention on International Liability for Damage Caused by Space Objects* [:] *Analysis and Background Data*⁸ and no mention is made anywhere of precedents which involve the pollution of the environment of one state as a result of the activities of another state.⁹

The *Trail Smelter*¹⁰ case is the only decisional precedent of an international tribunal on transnational pollution. The arbitral tribunal was empowered to determine the damages caused in Washington State by the Trail Smelter in British Columbia, and to establish a regime to control future emissions. Their decision was to be based on art. VI of the *Trail Smelter Convention*, which held that "[t]he Tribunal shall apply the law and practice followed in dealing with cognate questions in the United States of America, as well as International Law and Practice, and shall give consideration to the desire of the High Contracting Parties to reach a solution just to all parties concerned."¹¹ The tribunal was unable to find any decisions of international tribunals on all fours with the case before it. It did cite a decision by the Swiss Federal Court, which apparently relied partly on international law in resolving disputes between cantons.¹²

The Trail Smelter tribunal primarily relied on cases in the United States Supreme Court between states of the American union, which precedents the tribunal believed might "legitimately be taken as a guide in

⁸United States: Senate Committee on Aeronautical and Space Sciences, *Staff Report* [:] *Convention on International Liability for Damage caused by Space Objects* [:] *Analysis and Background Data*, 92d Cong., 2d Sess., (Comm. Print. May 1972), 74 [hereinafter *U.S. Senate Committee Report*].

⁹See, generally, Goldie, *Liability for Damage and the Progressive Development of International Law* (1965) 14 Int'l & Comp. L.Q. 1189. The environmental law precedents are surveyed at pp. 1226-88.

¹⁰*Trail Smelter Arbitration* (U.S. v. Canada), 3 R. Int'l Arb. Awards 1905 (1938, 1945).

¹¹*Convention for Settlement of Difficulties arising from Operation of Smelter at Trail, B.C.*, 15 April 1935, U.S. — Canada, U.S.T. No. 893, Can. T.S. No. 20.

¹²*Supra*, note 10, 1963. See Schindler, *The Administration of Justice in the Swiss Federal Court in Intercantonal Disputes* (1921) 15 Am. J. Int'l L. 149, 172-4. The Swiss Federal Court enjoined the canton of Aargau from allowing shooting practice to take place on a range in its territory until adequate steps had been taken to eliminate the danger of stray bullets causing damage to the persons and property in Solothurn. After precautionary measures had been taken, the Court lifted its injunction, holding that the demand of the Government of Solothurn that all endangerment be absolutely abolished apparently goes too far. One reason for holding that absolute safety was not required was that cantons had a federal constitutional duty to provide places for shooting practice. Moreover, the decision apparently did not determine whether Aargau might be liable for any damage caused, even if its conduct was not enjoined. Accordingly, this precedent was too parochial and limited to have been of much relevance for the purposes of the Cosmos negotiations. See *Judgments of the Swiss Federal Tribunal* (1900), vol. XXVI, part I, 449-51.

this field of international law".¹³ The cases involved requests for injunctions in respect of acts or omissions of the defendant state which resulted in air or water pollution damage to the plaintiff state. The tribunal cited, for example, *Georgia v. Tennessee Copper Co. and Ducktown Sulphur, Copper and Iron Co.*¹⁴ In that case the Court held:

Without excluding the considerations that equity always takes into account,... [i]t is a fair and reasonable demand on the part of a sovereign that the air over its territory should not be polluted on a great scale by sulphurous acid gas, that the forests on its mountains, be they better or worse, and whatever domestic destruction they may have suffered, should not be further destroyed or threatened by the acts of persons beyond its control, that the crops and orchards on its hills should not be endangered from the same source... .

Whether Georgia by insisting upon this claim is doing more harm than good to her own citizens is for her to determine. The possible disaster to those outside the State must be accepted as a consequence of her standing upon her extreme rights.¹⁵

This case is important because it indicates that where one sovereign state allows activities on its territories to cause damage to another, the plea that the activity is "reasonable" will carry less weight than it might in a domestic court. The theory that A is legally permitted to cause harm to B when A's activities are, all things (including B's harm) considered, in the "public interest", may be workable if A and B are members of the same community, one in which there is an agreed upon standard of public good. But in the international arena, where the content of "public interest" will be endlessly disputable, and A and B are sovereign states which cannot be expected to sacrifice without compensation their persons or territories for the "general good", a "reasonableness" test which would involve the balancing of interests would be objectionable.

While the *Ducktown* case is germane to the discussion following in Part II, it does not establish the proposition under discussion, which is that there is an international law cause of action for the unintentional and not materially harmful intrusion of debris, in particular, satellite fragments, on the territory of the plaintiff state. In *Ducktown*, the Supreme Court granted an injunction at the State of Georgia's request against a Tennessee company which was only sufficient to save the territory of Georgia from serious danger of immediate injury.¹⁶

An important qualification of all of the American judgments cited by the *Trail Smelter* tribunal is that they deal with claims for injunctions, and do not determine whether damages might later be awarded, even if a

¹³*Ibid.*, 1964.

¹⁴206 U.S. 230 (1907).

¹⁵*Ibid.*, 238-9 *per* Holmes J.

¹⁶237 U.S. 474, 476 (1915) *per* McReynolds J.

judgment for an injunction is denied. The *Trail Smelter* tribunal nonetheless concluded its review of the American cases with the general conclusion that

under the principles of international law, as well as of the law of the United States, no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence.¹⁷

The tribunal then observed:

The decisions of the Supreme Court of the United States which are the basis of these conclusions are decisions in equity and a solution inspired by them, together with the regime hereinafter prescribed, will, in the opinion of the Tribunal, be "just to all parties concerned", as long, at least, as the present conditions in the Columbia River Valley continue to prevail.¹⁸

Accordingly, the tribunal found Canada liable for damage, such as injury to cropland, caused by the Trail Smelter. It established a regime for future use of the Smelter, whereby the risk of further harm was not absolutely eliminated but pollution would be kept below a level sufficient to cause harm. This does not conclusively establish that, absent material harm, a state can freely allow pollutants from activities within its borders to cross into the territory of another state, because the *Trail Smelter* tribunal was drawing analogies from the equity cases of the Supreme Court under its own equity jurisdiction "to reach a solution 'just to all parties concerned'."¹⁹ Thus it could still be contended that, under general international law, it is a tort, for which at least nominal damages are available, to allow pollutants to cross international boundaries, even when no material harm is caused.

About the only other precedent worth remarking upon before the well-known *Nuclear Tests* cases is the *Lake Lanoux* arbitration.²⁰ There the tribunal agreed that "an upstream state" is acting unlawfully if it changes the waters of a river in their natural condition to the serious injury of a downstream state. On the other hand, the tribunal stated that "the rule according to which States may utilize the hydraulic force of international water courses only on condition of a prior agreement between the interested States cannot be established as a custom, or even less as a general principle of law."²¹ Thus, at least in the context of rivers, some interference with the natural state of another country is permitted by international law, as long as no serious injury results.

¹⁷*Supra*, note 10, 1965.

¹⁸*Ibid.*

¹⁹*Ibid.*

²⁰*Lake Lanoux* (Spain v. France), 12 R. Int'l Arb. Awards 281 (1957); discussed in I. Brownlie, *Principles of Public International Law*, 2d ed. (1973), 265.

²¹Brownlie, *ibid.*

The *Nuclear Tests* cases decided by the International Court of Justice in 1973 and 1974 involved applications by Australia and New Zealand to have the I.C.J. declare French nuclear testing in the South Pacific inconsistent with applicable rules of international law. The application of New Zealand which stated, *inter alia*, that nuclear testing was a violation of the rights of all members of the international community including New Zealand, continued:

(c) it violates the right of New Zealand that no radioactive material enter the territory of New Zealand... including [its] air space and territorial waters, as a result of nuclear testing;

(d) it violates the right of New Zealand that no radioactive material, having entered the territory of New Zealand... including... its air space and territorial waters, as a result of nuclear testing, cause harm, including apprehension, anxiety and concern, to the people and Government of New Zealand.²²

No judgment on the merits was ever rendered in the *Nuclear Tests* case, the action being short-circuited by a determination of the I.C.J. that a French assurance to New Zealand that it would conduct no further atmospheric testing rendered the case moot.

A similar result was reached in the case involving Australia, but there several judges did comment on what the legal issues would have been had the case proceeded to a decision on the merits. In a dissenting judgment, Judge de Castro reviewed the possible bases for an international legal claim arising out of the intrusion of radioactive fall-out. The following passage implies that harmfulness of fall-out might be an essential part of a valid claim:²³

The right relied on by the Applicant with regard to the deposit of radioactive fall-out on its territory was considered in the Order of 22 June 1973. We must now consider whether reliance on this right makes the request for examination of the merits of the case admissible. The Applicant's complaint against France of violation of its sovereignty by introducing harmful matter into its territory without its permission is based on a legal interest which has been well known since the time of Roman law. The prohibition of *immissio* (of water, smoke, fragments of stone) into a neighbouring property was a feature of Roman law. The principle *sic utere tuo ut aliaenum non laedas* is a feature of law both ancient and modern. It is well known that the owner of a property is liable for intolerable smoke or smells, "because he oversteps [the physical limits of his property], because there is *immissio* over the neighbouring properties, because he causes injury."²⁴

²²*Application of New Zealand* (New Zealand v. France), 1973 I.C.J. Pleadings, vol. II, (Nuclear Tests) 3, 8 (Application dated 9 May 1973). Note that para. (c) does not refer to harm caused to the people and government of New Zealand.

²³*Nuclear Tests* (Australia v. France), 1974 I.C.J. 372, 388 (Judgment of 20 December 1974).

²⁴Reference to H. & L. Mazeaud & A. Tunc, *Traité théorique et pratique de la responsabilité civile*, 5th ed. (1957), vol. 1, paras 597, 679 *et seq.*

Judge de Castro cited *Trail Smelter* as a possible authority for the proposition that "there is a general rule that there is a right to demand prohibition of the emission by neighbouring properties of noxious fumes", whence "the consequence must be drawn, by an obvious analogy, that the Applicant is entitled to ask the court to uphold its claim that France should put an end to the deposit of radioactive fall-out on its territory." At one point Judge de Castro did imply that the intrusion of radioactive fall-out into the territory of another state might be sufficient to make out an international tort:

The question whether the deposit of radioactive substances on the Applicant's territory as a result of the French nuclear tests is harmful to the Applicant should only be settled in the course of proceedings on the merits in which the Court would consider whether intrusion or trespass into the territory of another is unlawful in itself, or only if it gives rise to damage; in the latter hypothesis, it would still have to consider the nature of the alleged damage, its existence and its relative importance in order to pronounce on the claim for prohibition of the French nuclear tests.²⁵

In his dissenting opinion, Judge Barwick, the Australian judge *ad hoc* on the I.C.J., suggested that not only may it depend on the nature of the material deposited whether its mere presence is an infringement of sovereignty, but that the nature of the activity leading to its being deposited might also be relevant:

In resolving the question whether damage is of the essence of the right to territorial integrity in relation to the intrusion of physical matter into territory, there may arise what is a large question as to the classification of substances which may be introduced with impunity by one State on to and into the territory and environment of another. Is there a possible limitation or qualification of the right to territorial and environmental integrity which springs from the nature of the activity which generates the substance which is deposited or intruded into the State's territory and environment? *There are doubtless uses of territory by a State which are of such a nature that the consequences for another State and its territory and environment of such a use must be accepted by that other State.* It may very well be that a line is to be drawn between depositions and intrusions which are lawful and must be borne and those which are unlawful; on the other hand it may be that because of the unique nature of nuclides and the internationally unnecessary and unprofitable activity which gives rise to their dissemination, no more need to be decided than the question whether the intrusion of such nuclides so derived is unlawful.²⁶

In summary, it is evident that the decisional precedents in international law do not expressly hold that the unintended intrusion of debris is not actionable if no material injury occurs to the plaintiff state. Rather, those cases granting damages and injunctions have tended to stress material injury by way of justification for the award.

Gunther Handl has explored in detail the specific issue of whether there can be a cause of action in international law for the intrusion of

²⁵The only authority cited by Judge de Castro, *supra*, note 23, 389-90 was the Swiss case referred to, *supra*, note 12.

²⁶*Ibid.*, 433.

environmental contaminants where there is no material injury.²⁷ He concludes emphatically that there cannot be. In support of this conclusion, he presents examples of state practice in addition to the ubiquitous decisional precedent of *Trail Smelter* and its less consequential relative, the *Lake Lanoux* arbitration. He points out that in the *Peyton Packing Co. and Casuco Co.* case,²⁸ where Mexico complained about emissions from an American factory, the diplomatic note alleged that serious harm was being caused to Ciudad Juarez.²⁹ Furthermore, in an exchange of notes over flooding in the Tijuana Basin, the United States did not complain of the discharge of waters from Mexican construction activities onto American territory as an international wrong *per se*, but urged that steps be taken to ensure that no damage be caused thereby.³⁰ In the *Rose Street Canal* case, the United States Assistant Secretary of State referred to material injury as part of its claim:

[T]he principle of international law which obligates every state to respect the full sovereignty of other states and to refrain from creating or authorizing or countenancing the creation in its territory of any agency... which causes injury to another state or its inhabitants is one of long standing and universal recognition.³¹

In these precedents, references to actual injury may have been suppressed for reasons of diplomacy or tact. The authors of the statements cited may not have wished to interject a possibly inflammatory allegation of violation of sovereignty when their only concern was the prevention or reparation of material injuries. On the other hand, it may not have occurred to them to allege a violation of sovereignty. The failure to make a claim cannot be confidently interpreted as a concession that it does not exist. Still, these examples of state practice provide no confirmation of the view that an unintentional intrusion of debris which causes no material harm is actionable.

Handl also cites a number of conventions, treaties and declarations which make material injury essential to a claim of international law tort.³² For example, Principle 21 of the *Declaration of the United Nations Conference on the Human Environment* provides:

States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to

²⁷Handl, *Territorial Sovereignty and the Problem of Transnational Pollution* (1975) 69 Am. J. Int'l L. 50.

²⁸*Ibid.*, 70.

²⁹M. Whiteman, *Digest of International Law* (1968), vol. 6, 256, Note of 6 April 1961 (Mexico — U.S.).

³⁰*Ibid.*, 261.

³¹Handl, *supra*, note 27, 71. See Whiteman, *supra*, note 29, 265 (Letter to the Mayor of the City of Douglas, 12 May 1955).

³²*Ibid.*, 68.

their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or areas beyond the limits of national jurisdictions.³³

Another source of international law which should be considered along with conventions, judicial decisions and state practice is, in the words of the *Statute of the International Court of Justice*, "the general principles of law recognized by civilized nations".³⁴ There is uncertainty and disagreement in the academic literature as to whether this refers to rules which are so simple and apparently rational that no system which claims to be judicial could be without them — e.g., estoppel, *res judicata*, perhaps *pacta sunt servanda* — or whether it also applies to less obvious and more substantial principles of law such as unjust enrichment, or the theory of the public contract, which happen to be common elements among most, or all "civilized" legal systems.³⁵

The principle that the harmless depositing of debris on a plaintiff state by otherwise legitimate activities of the defendant state is not actionable is not so manifestly rational and indisputable that it can be said to be a "principle" in the first mentioned sense. But this principle seems to qualify in the second sense, which is to say that it is found in many important legal systems.

Jerome Elkind, in a comparative study of nuisance law,³⁶ finds that under Roman law a certain amount of smoke and water from activities on a neighbouring property must be tolerated by a landowner, but that a cause of action would lie for substantial wrongs. He claims that there was also a cause of action of a different nature if the intrusion was willful or negligent. Under German law, "the owner of a piece of land may not forbid the discharge of gases, vapours, odours, smoke, soot, heat, noise, vibrations and similar interferences proceeding from another piece of

³³*Declaration of the United Nations Conference on the Human Environment*, Stockholm, 16 June 1972, 11 I.L.M. 1416, 1420 (1972). He then refers to a variety of treaties and declarations which implicitly affirm the principle of material damage in connection with diversion and pollution of waters, e.g., Article X of the *Helsinki Rules on the Uses of Waters of International Rivers* in *Report of the Fifty-Second Conference of the I.L.A.* (1966), 447; *Boundary Waters and Questions Arising along the Boundary between the U.S.A. and Canada*, 11 January 1909, Great Britain — United States, 12 U.S.T. 319, T.I.A.S. No. 548. See also *International Boundary Waters Treaty Act*, R.S.C. 1970, c. I-20, Schedule I, of which art. IV, second paragraph, provides that "waters herein defined as boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property on the other".

³⁴Article 38 (1) (c).

³⁵See D. O'Connell, *International Law*, 2d ed. (1970), 9-14; Friedmann, *The Uses of "General Principles" in the Development of International Law* (1964) 57 Am. J. Int'l L. 279.

³⁶Elkind, *Footnote to the Nuclear Test Cases: Abuse of Rights — A Blind Alley for Environmentalists* (1974) 9 Vand. J. Trans. L. 75.

land, insofar as the interference does not materially injure the use of the land."³⁷ Finally, under French law, Elkind finds that there is no liability unless the disturbance "goes beyond the bounds of ordinary relations among neighbours".³⁸

As a matter of fact, even under English common law as interpreted by Fleming in *The Law of Torts*, a nuisance must be "substantial and unreasonable" before it is actionable.³⁹ Moreover, even if the intrusion is "direct" or in the form of large, easily sensible objects, so that one can call it a "trespass", Fleming reports that although there are no decisions expressly on point, the modern position can "safely be accepted" to be that there is no liability unless the intrusion is intended, or results in actual harm.⁴⁰

That domestic legal systems do not allow even nominal damages for unintended and harmless intrusions does not necessarily mean that international law does not either. There might be special features of the international community which make the domestic law of nuisance inapplicable. It has already been suggested, in connection with the *Ducktown* case,⁴¹ that there is less room for the "balancing of interests" and tolerance and nuisance in the name of general social utility in international law than there might be in a municipal legal system. Still, some estimable reasons can be offered in support of a rule which holds that unintentional, harmless intrusions do not warrant even nominal damages.

The lack of intention by the defendant state that there be an intrusion makes it less reasonable that it be understood by the plaintiff state or the international community generally as an affront to the dignity or sovereignty of the plaintiff state. It can be understood instead as the accidental by-product of a legitimate activity which, absent material damage, should have no international repercussions.

Another consideration is that the materially harmless intrusion of debris cannot be construed as an attempt by the defendant state to exercise control or change the internal state of affairs in the territory of the plaintiff state, in the way that the arrest or destruction of persons or property in the plaintiff state by agents of the defendant state can be. In the latter case, nominal, or even punitive damages, or at least a declaration of illegality, might be appropriate as satisfaction for the challenge to the plaintiff state's sovereignty, even if no material harm is incurred.

³⁷*Ibid.*, 81.

³⁸*Ibid.*, 83.

³⁹J. Fleming, *The Law of Torts*, 4th ed. (1971), 342.

⁴⁰*Ibid.*, 347-8.

⁴¹*Supra*, note 14.

These factors are sufficient to distinguish the *Cosmos 954* case from the *I'm Alone*⁴² arbitration in which Canada won substantial damages from the United States even though it suffered no pecuniary losses. In that case, a ship of Canadian registry was sunk on the high seas by an American revenue ship, because of its involvement in smuggling liquor into the United States. The tribunal awarded Canada \$25,000 in damages, even though the ship was *de facto* owned and controlled and managed by a group of persons who were "entirely, or nearly so, citizens of the United States".⁴³ According to the commissioners:

The act of sinking the ship... was an unlawful act... and the United States ought formally to acknowledge its illegality, and to apologize to His Majesty's Canadian Government therefor... and as... a material amend in respect of the wrong the United States should pay the sum of \$25,000 to His Majesty's Canadian Government.⁴⁴

The Commissioners also recommended that compensation be paid for the benefit of the captain and members of the crew, "none of whom was a party to the illegal conspiracy".⁴⁵ The desire to ensure that the innocent victims were compensated may have been a decisive factor in the tribunal's award of monetary damages in addition to requiring the acknowledgement of illegality and the apology.

It should be noted that the tribunal in *Trail Smelter* was not asked by the United States to award it the costs of investigating the damage in Washington State under the heading of "damages in respect of the wrong done the United States in violation of sovereignty".⁴⁶ In fact, it was unnecessary to decide the question of alleged violation of sovereignty, because the claim could be denied on the narrow grounds that such damages were not intended to be compensatory under the terms of the *compromis*. The Americans claimed repayment of expenses of investigation "on a further and separate ground",⁴⁷ namely, that they should be regarded as costs of litigation. But the tribunal replied that "arbitration and final settlement of a long pending controversy between two independent Governments... where each Government has incurred expenses, and where it is to the mutual advantage of the two Governments that a just conclusion and permanent disposition of an international controversy should be reached".⁴⁸ The tribunal further noted that the controversy facing it "did not involve any such facts as the persons appointed under the Convention of 23 January 1934, between the United States of

⁴²*S.S. I'm Alone* (Canada v. U.S.), 3 R. Int'l Arb. Awards 1609 (1935).

⁴³*Ibid.*, 1618.

⁴⁴*Ibid.*

⁴⁵*Ibid.*

⁴⁶*Supra*, note 10, 1932.

⁴⁷*Ibid.*, 1933.

⁴⁸*Ibid.*

America and the Dominion of Canada felt to justify them in awarding to Canada damages for violation of sovereignty in the *I'm Alone* award of January 5, 1935.⁴⁹

It is submitted that there is yet another consideration in favour of a liability rule for unintended and harmless intrusion of debris, which might be called the "reciprocity argument".⁵⁰ The idea is that since international, like domestic litigation is expensive, two countries engaged in activities which create equal risks or injury to each other might as well say that they should each bear the losses caused. In the long run, they will benefit from the lack of liability about as much as from the lack of a right to reparation.

The reciprocity argument is even applicable should substantial damages occur, as long as the plaintiff and defendant have been subjecting each other to equal risks. But the less the injuries tend to be, the stronger the argument for no liability is: the greater the cost of litigation relative to the amount of the recovery, the greater can be our confidence that no party is bearing a seriously disproportionate share of the losses.

It might be suggested that the debris of fallen satellites is distinguishable from other pollutants causing harm. For one thing, the cases and treaties discussed are concerned with injuries caused by activities carried on entirely within the defendant state. While the defendant state may recognize effects on the environment of the plaintiff state as the inevitable result of its activities, it is not the intention of the defendant state, or persons within it carrying on the activity, that there be any extra-territorial effect. But the intention of a satellite launch is to put an object outside of the territorial limits of the state. This fact may allow one to distinguish such an instance from cases of unintentional pollution, but it is impossible to produce any satisfactory moral or political reasons why this distinction should be the basis for imposing international liability which would not otherwise exist. After all, it is still not the intention of a launching state that debris should scatter on the territory of other countries. This may be recognized by the launching states as probable or practically inevitable, but so might the intrusion of ordinary environmental pollution. In both cases of transnational environmental pollution and satellite debris, a *prima facie* legitimate activity results in an unintended intrusion onto the territory of another country. If the absence of an affront to sovereignty and the undesirability of international litigation are reasons for saying the intrusion of environmental pollutants

⁴⁹*Ibid.*

⁵⁰See Fletcher, *Fairness and Utility in Tort Theory* (1972) 85 Harv. L. Rev. 537.

causing no material harm is not actionable, the same reasons should apply to the case of satellite debris.

A preliminary conclusion can be drawn that there is practically no support in policy or precedent for the theory that the unintended intrusion of satellite debris warrants, in the absence of material damage, recovery of even nominal damages.

Even if nominal damages would otherwise be available at general international law for the materially harmless "trespass" of a satellite, the *Liability Convention*⁵¹ might completely preclude the possibility of such damages being awarded. In Part II, the interaction of the *Convention* and general international law will be discussed in some detail; here it is sufficient to note that a strong case can be made that the existence of the *Liability Convention* precludes resort to a broader basis of liability than is contemplated by the *Convention* itself. This argument is further strengthened if the plaintiff state relies on the provisions of the treaty as a basis for its claim, as Canada did in this case.

Article I (a) of the *Liability Convention* provides that for the purposes of the *Convention*, "the term 'damage' means loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organizations". Article II provides that "a launching State shall be absolutely liable to pay compensation for the damage caused by its space object on the surface of the earth or to aircraft in flight."⁵² Article XII provides that "the compensation which the launching State shall be liable to pay for damage under this Convention shall be determined in accordance with international law and the principles of justice and equity, in order to provide such reparation in respect of the damage as will restore the person, natural or juridical, State or international organization on whose behalf the claim is presented to the condition which would have existed if the damage had not occurred." All of this would seem to support William Foster's conclusion that "[a]s the sole object of compensation is to effect a *restitutio in integrum*, there can be no award of punitive or nominal damages, to use common law terminology, for neither category of damages is designed to compensate a person for the injury he has sustained."⁵³ Apparently,⁵⁴ the Soviet delegate emphasized this point during discussion of the Legal

⁵¹*Supra*, note 2.

⁵²[Emphasis added.]

⁵³Foster, *The Convention on International Liability for Damage Caused by Space Objects* (1972) Can. Y.B. Int'l L. 137, 172.

⁵⁴*Ibid.*, fn. 111.

Subcommittee to the United Nations Committee on the Peaceful Uses of Outer Space, which subcommittee prepared the *Liability Convention*.⁵⁵

II. Claims for Violation of Sovereignty by Satellite Crashes at General International Law

In Part II, possible Canadian claims under the head of "violations of sovereignty" are considered. It is argued that if general principles of international law had been applicable, then Canada would have had a strong case for recovering the costs of its clean-up operation on that basis. To support this argument, an examination is made of the ways in which various Canadian claims could have been presented and substantiated under general international law.

In addition to the "mere trespass" claim, para. 21 of Canada's Statement of Claim alleged that "[t]his violation [of Canadian sovereignty] is established by... the harmful consequences of this intrusion, being the damage caused to Canada by the presence of hazardous radioactive debris and the interference with the sovereign right of Canada to determine the acts that will be performed on its territory."⁵⁶

Part I of this paper indicated that there are decisional precedents in respect of liability for ground damage by space satellites. The closest analogies would be in more mundane pollution cases but even here *Trail Smelter* stands alone. There is very little academic literature on what the extent of liability at general international law, apart from the space treaties, is supposed to be. Thus in *Law and Public Order in Outer Space*,⁵⁷ MacDougal, Lasswell and Vlasic could do no better than cite air and water pollution as the closest analogies, observe how "primitive" international law was in those areas, and conclude by citing some of the constellation of factors they considered might be relevant in fixing liability.

It is submitted, nonetheless, that a strong case can be made for strict international liability for damage caused by space satellites at general international law. For example, if Skylab fragments had caused material damage to countries which were not parties to the space treaties, it is submitted that the American obligation to compensate would have stemmed from international law, and not just moral magnanimity. A special case of a claim for damages for violation of sovereignty (the trespass *per se* claim) was discussed in Part I. Assuming material damage or a substantial interference with Canada's internal state of affairs, the

⁵⁵See U.N. Doc. A/AC.105/C.2/SR. 100, 137-8 *per* A. Piradov.

⁵⁶*Supra*, note 3, 907.

⁵⁷M. McDougal, H. Lasswell & I. Vlasic, *Law and Public Order in Outer Space* (1963), 613-20.

following types of claims would have been possible under the general head of "violation of sovereignty".

A. Existing Damage to Persons and Property and Mitigation Thereof

Radioactive contamination caused by Cosmos 954 amounted to a direct and immediate devaluation of Canadian territory. Canada was entitled to be restored to the position it was in before the damage occurred. It took steps towards restoration in respect of some of the damage: the whereabouts of much of the radioactive core of Cosmos is still unknown.

Peter Haanappel, in discussing Canada's claim under the *Liability Convention*, said that "[i]t... appeared that no *measurable* damage had been caused to the Canadian environment by the nuclear debris of the Cosmos".⁵⁸ He seems to have concluded that, consequently, no claim could be lodged under the *Liability Convention*, since the only damage Canada suffered was in preventing future damage. It is submitted that Haanappel's comment could not imply a valid objection to Canada's claim at general international law or under the *Liability Convention*. If Haanappel meant that there was no material damage to the environment, he is simply mistaken on the facts. The nuclear contamination of vast stretches of Canadian territory, some debris emitting potentially lethal dosages of radiation, is surely material damage.⁵⁹ It seems that Haanappel was emphasizing the difficulty of estimating the precise quantum of damages; later in his article he writes that the definition of "damage" in the *Liability Convention* cannot by any "stretch of the imagination" cover the costs incurred by Canada in preventing potential damage, where *actual* damage never occurred or remains unmeasurable, such as a general damage to the environment. But on this interpretation of his remark, Haanappel also seems to have been mistaken. In international law, as in Anglo-American domestic law, the difficulty of estimating the quantum of damages is not an argument against awarding them. In the *Sapphire Claim*, for example, the arbitrator held that "[i]t is not necessary to prove the exact damage suffered in order to award damages. On the contrary, when such a proof is impossible, particularly as a result of the behaviour of the author of the damage, it is enough for the judge to be able to admit with sufficient probability the existence and extent of the damage".⁶⁰

⁵⁸Haanappel, *Some Observations on the Crash of Cosmos 954* (1978) 6 J. Space L. 147, 148.

⁵⁹W. Gummer, F. Campbell, G. Knight & J. Ricard, *Cosmos 954* [:] *The Occurrence and Nature of Recovered Debris* (1980), 5-7, 10-22.

⁶⁰*Sapphire International Petroleum Ltd v. National Iranian Oil Co.* 35 I.L.R. 136, 187-8 (Arbitration Award, 1935).

In any event, even if Haanappel's non-measurability objection ordinarily would have been a valid objection to the awarding of damages for the damage to the Canadian environment, this objection dissolved when the damages were converted into another readily calculable form by the reasonable attempts to mitigate them. Canada was entitled under the *Chorzów Factory* principle⁶¹ to be restored to the position it was in before the damage occurred. It did so by means of the clean-up operation. Unless the Soviets could have shown that Canada's effort in cleaning up the damage was unreasonably more costly than leaving the debris where it fell, Canada would have been entitled to recover fully the costs of the clean-up operation as mitigation of the damage caused to its environment.

B. Psychological Harm as Material Damage

In the French *Nuclear Tests* cases, where Australia and New Zealand had difficulties in proving that physical illness would result from the deposit of radioactive debris from French nuclear tests, both nations emphasized that, at the very least, the presence of the debris would be a source of anxiety to the people and governments of their nations. Thus, para. 47 of the Australian application for an interim injunction states:

There is, moreover, a significant psychological consequence of nuclear testing. People feel a real concern that the testing of nuclear weapons in the atmosphere places their lives, health and well-being and that of their children and future generations in jeopardy. Even in the absence of effects which can be positively identified with radiation doses due to radio-active fall-out generated by French nuclear testing of nuclear weapons, populations are subjected to mental stress and anxiety generated by fear and this is a cause of injury to them.⁶²

Similarly, para. 2 of the New Zealand request says that among the rights New Zealand was seeking to protect was:

(iv) the right of New Zealand that no radioactive material having entered the territory of New Zealand, the Cook Islands, Niue or the Tokela Islands, including their airspace and territorial waters, as a result of nuclear testing cause harm, including apprehension, anxiety and concern to the people and government of New Zealand, and of the Cook Islands, Niue and the Tokelau Islands.⁶³

In analyzing Canada's trespass *per se* claim in Part I, we referred to Handl's argument that material injury is a necessary element of a valid international claim arising out of transnational pollution.⁶⁴ Handl, alluding to the Australian claim in the *Nuclear Tests* case, concludes:

⁶¹*Chorzów Factory* (Germany v. Poland) (Merits), 1928 P.C.I.J., ser. A, No. 17, 4, 29 (Judgment of 13 September 1928).

⁶²*Application of Australia* (Australia v. France), 1974 I.C.J. Pleadings, vol. 1 (Nuclear Tests) 3, 14 (Application dated 9 May 1928).

⁶³*Request of New Zealand* (New Zealand v. France), 1974 I.C.J. Pleadings, vol. 2 (Nuclear Tests) 49 (Request dated 14 May 1973).

⁶⁴*Supra*, note 27, 75.

Material damage, denoting simply injuries to a state other than those bearing on its status as a sovereign member of the international community, *including the psychological impact of transnational pollution on the state's population or part thereof*, would seem to suffice in itself as a basis for a successful direct international claim against the polluting state.⁶⁵

In support of his inclusion of psychological impact as a type of material injury, Handl appends this footnote:

↘ For if a state has a legitimate "interest independent of and behind its citizens in all the earth and air within its domain" and it has "the last word as to whether its mountains shall be stripped of their forests and its inhabitants shall breath pure air" [see *Georgia v. Tennessee Copper Co.* 206 U.S. 230, 237 (1907)] — this passage cited also by the Trail Smelter Tribunal, [3 R. Int'l Arb. Awards 1905, 1965 (1938, 1945)] — it is a reasonable conclusion that it has such an interest also in the psychological well-being of its citizens. [For the *parens patriae* concept, see Garton, *The State versus Extraterritorial Pollution — States' "Environmental Rights" under Federal Common Law* (1972) 2 Ecology L.Q. 313.]⁶⁶

Had the Soviets contended that no harm had been sustained by Canadian persons or property by the crash of Cosmos, Canada could not only have pointed to the devaluation of Canadian territory, but to the continued and well-founded anxiety the population and government of Canada would have experienced had clean-up operations not been undertaken. Cosmos contained 110 pounds of enriched uranium and uranium fission by-products such as strontium 90, caesium and cerium.⁶⁷ Some of the uranium fragments detected were found to emit potentially lethal or seriously harmful doses of radiation. The potential risk to the population who lived in the vicinity where Cosmos debris was scattered, included external radiation to part or all of the body, and internal radiation by inhalation or ingestion.⁶⁸

The presence of radioactive materials was manifestly a source of great concern to Canadians, and indeed, it is not altogether out of the question that international law would have allowed damages under the head of mental suffering. There are several precedents for such an award, amongst which is the award in the *Lusitania* case for shock suffered by relatives of the victims.⁶⁹ But in the Cosmos 954 incident, the events were not as traumatic or as grave. Furthermore, the effects were felt by more than a small number of individuals. It is arguable that because of the difficulty of determining appropriate compensation for anxiety which is

⁶⁵*Ibid.*, 75 [emphasis added].

⁶⁶*Ibid.*, fn. 161.

⁶⁷Aikman, *Operation Morning Light* (1978) 2 Sentinel 5, 13; see Gummer, *et al.*, *supra*, note 59, 6-7, 46 *et seq.* where it is reported that 65 kilograms of debris were actually recovered.

⁶⁸Gummer, *et al.*, *ibid.*, 34.

⁶⁹*Lusitania Case* (U.S. v. Germany), 7 R. Int'l Arb. Awards 32 (1923).

both mild and widely shared, international law should allow only nominal damages. In the Cosmos case the most plausible purpose of pointing to the anxiety of Canadians would have been to demonstrate that Canada suffered a material injury, which it should have mitigated, and did mitigate, by its clean-up operations. Again, by converting its damages from a difficult-to-estimate form (general anxiety) to a readily calculable one (incremental costs of recovery operations) Canada removed a difficulty in making out its claim for compensation from the Soviet Union.⁷⁰

C. *Prevention of Future Damage*

Haanappel argued that the costs of Operation Morning Light were to prevent *potential* damage where no "actual" or "measurable" damage occurred. He further asserted that the *Liability Convention* could "by no stretch of the imagination" be considered to allow recovery for *prevention* of damages, although he departs from his disparagement of Canada's claim sufficiently to allow the possibility that art. VII of the 1967 *Outer Space Treaty* "might be wide enough to cover the costs incurred by Canada in *preventing* possible damage from the Cosmos satellite".⁷¹

With respect, Haanappel's argument should be rejected on two grounds. First, Operation Morning Light was justified under both general international law and the *Liability Convention*, as it attempted to mitigate damages by reducing *existing* damage to Canadian property. Therefore, there is no need to focus on the prevention of future damage. Second, even if Operation Morning Light could only have been justified as an attempt to prevent future damage to Canadian persons and property, its costs would have still been entirely recoverable under both general international law and under the *Liability Convention*. The reason for jumping ahead for a moment to consider the *Liability Convention* is that this will permit a more concise and coherent presentation of the legal implications of the potential damage.

It has already been argued that the difficulty of measuring damage did not preclude Canada from recovering the costs of mitigation. Canada had no need to rely on a claim that it prevented *potential* damage from occurring. The nuclear contamination of vast stretches of Canadian territory, rendering it dangerous for humans and animals, and therefore less usable, was an *existing, realized* damage to Canadian property. We will argue this point more fully later on, in Part IV (B).

⁷⁰Note that in the *Nuclear Tests* cases, the purpose of Australia and New Zealand in stressing the concern of their governments and populations was to provide a basis for granting interim measures to protect their rights, not to obtain monetary compensation.

⁷¹Haanappel, *supra*, note 58, 148-9.

To consider a case which depended purely on prevention of future damage, suppose that Cosmos debris had fallen into the international waters off Canada, and Canada had spent considerable resources in preventing the debris from being washed into Canadian territorial waters and up onto its shores; or that Canada had destroyed the satellite in outer space to prevent it from falling and injuring Canadian persons and property inside Canada's borders. In cases such as these, Canada would have incurred considerable expense in preventing damage to it from occurring even though it had not as yet suffered any actual damage. It is submitted that even in these cases, Canada would have been entitled to recover under general principles of international law. To see why, we must examine the principle of mitigation of damages carefully.

Consider three cases of a person's house catching fire. In case A, the house burns to the ground but the plaintiff rebuilds it. He mitigates his damages by restoring himself to where he was before the damage occurred. In case B, the plaintiff has the opportunity to put out the fire after it has started, but before it burns down the house. He expends resources in so doing. He has mitigated his damages by preventing further damage from occurring, although he has already sustained some actual damage. In either case, there is no doubt that the plaintiff is entitled to his expenses in mitigating his damages.⁷² Now consider case C. The fire has not yet reached the plaintiff's property. He prevents any damage from occurring by digging a trench around his property. Can there be any doubt that the plaintiff is still entitled to his expenses in preventing damage from occurring? Or are we to say that the plaintiff can recover the cost of preventing more damage in case B because he has already suffered *some* damage, but that the plaintiff cannot recover the costs of preventing damage in case C because he has not yet sustained any damage? Given the legal policies of putting the losses caused by an activity on the tortfeasor while encouraging the plaintiff to reduce those losses as far as possible, it is perverse to distinguish between the two cases.

It is true that both municipal and international legal systems have to draw the line somewhere on granting recovery for precautionary measures. For example, if a state maintained a special task force to deal with falling satellites (as the Americans maintain a special group to deal with nuclear emergencies, a group which participated in Operation Morning Light⁷³) one would not expect general international law to provide for that nation to recover its annual costs from launching states.

⁷²In Anglo-American common law, in any case: see *Gardner v. The King* 1933 N.Z.L.R. 730 (S.C.); *Banco de Portugal v. Waterlow & Sons Ltd* [1932] A.C. 452 (H.L.); H. Street, *Principles of the Law of Damages* (1962), 32.

⁷³*Supra*, note 59, 2.

The point is not that it would be unjust for launching states to bear the costs of reasonable precautionary measures. But presumably the difficulty of estimating what are reasonable precautionary measures, the difficulty of pro-rating the expenses among the various launching states and the absence of any substantial realized or threatened damage all weigh against granting recovery. It would be a more difficult case if a state took precautionary measures against a particular danger; for example, if a state on Skylab's flight path had taken extensive measures to prepare for possible damage, it would not have been unthinkable, it is submitted, that the state might have had a valid claim for damages against the United States under both general international law and the *Liability Convention*. The reason no such claims were made is probably partly because no state except the United States undertook elaborate measures in anticipation of Skylab's return to earth. Some nations may have alerted their public services, army and medical personnel, but this would have involved practically no incremental costs; and the incremental costs incurred were probably so small that international litigation or just transnational grumbling would have seemed petty.

It is an entirely different situation where there is a clear and imminent threat of harm to persons or property. Then it is completely consistent with the legal policies of placing liability on the launching state for damage to persons and property, and requiring plaintiff states to mitigate their damage, not to allow plaintiff states to recover the costs of preventive measures. In this type of case there are no countervailing policy considerations.

Haanappel's assertion that "by no stretch of the imagination" could the *Liability Convention* be considered to permit recovery for costs incurred in preventing damages from occurring is based on an excessively literalistic approach. The only nontextual support he offers from his interpretation of the treaty is a footnote⁷⁴ that "[t]he narrow definition of 'damage' as contained in Article I (a) of the Liability Convention was already recognized as 'one of the major problem' areas of the Convention in a Staff Report of 1972 prepared for the Committee on Aeronautical and Space Sciences of the United States Senate."⁷⁵

A perusal of the *United States Senate Committee Report* reveals that the Committee did not believe the treaty allowed recovery for "remote or indirect damage... for which there is only a hypothetical causal connection with a particular space activity" and "non-physical damage — "such forms as electrical interference (jamming), trespass without

⁷⁴Haanappel, *supra*, note 58, 149, fn. 11.

⁷⁵Reference to *U.S. Senate Committee Report, supra*, note 8.

injury, and psychic injury (where caused without physical contact)".⁷⁶ There is no recognition in the *Report* that expenses incurred in preventing a direct threat of physical damage to persons or property is problematic, let alone non-recoverable, under the *Liability Convention*.

Consequently, it is submitted that under the *Liability Convention* a claim can rest for expenses incurred in preventing physical damage to persons or property where none has yet occurred.

But let us, for a moment, pursue Haanappel's reasoning to its logical conclusion. To be consistent, he would have to maintain that in cases like case B above (house catching fire), a state can only recover the costs of reducing existing damage, but not of preventing further damage. Thus, in the Cosmos case, he would have had to ask how much of Operation Morning Light could have been justified as an effort to reduce existing property damage and how much could have been justified only as an attempt to prevent future damage to persons or property from occurring? Only the former would have been recoverable. It should be noted that if Operation Morning Light was entirely justified as a reasonable measure to reduce *existing* damage to Canadian property, there would have been no need to perform the bizarre division of damages that follows from Haanappel's argument even if that argument were correct.

By contrast, it follows logically from the propositions that recovery would be authorized by the *Liability Convention* for cases like case A (reduction of existing damage) and cases like case C (prevention of future damage) that recovery would be permitted in cases like case B, where expenses have been incurred both in reducing existing damage and preventing further damage.

By analogy, if it had been necessary to consider the Cosmos case as being like case B, where costs were incurred partly to reduce existing damage to property, the costs of Operation Morning Light would have still been entirely recoverable from the Soviet Union both under general international law and under the *Liability Convention*. But, to repeat, there was no need whatever for Canada to have been sidetracked into such a discussion, since Operation Morning Light was entirely justified as a reasonable measure to mitigate damages by reducing existing damage to Canadian property.⁷⁷

⁷⁶*Ibid.*, 22-3.

⁷⁷Paragraph 17 of the Canadian Statement of Claim, *supra*, note 3, 905, was somewhat problematic. It said that "[u]nder general principles of international law, Canada had a duty to take the necessary measures to prevent and reduce the harmful consequences of the damage and thereby to mitigate damages." The implication might be that the "damage" was the intrusion of the debris, and that the contamination of Canadian property was a harmful consequence of the damage, and the potential damage averted by

D. Interference with the Sovereign Right of Canada to Determine the Acts that will be Performed on its Territory

A final way in which the Canadian claim could have been phrased under general international law would have been to say that the presence of radioactive Cosmos debris within Canadian boundaries interfered with Canada's right, by virtue of its sovereignty, to determine the environmental state of affairs within its own boundaries.⁷⁸ Canada would have been entitled to mitigate this damage by removing the debris; hence the costs of Operation Morning Light would have been recoverable under this claim.

As Part I of this paper has shown, state A is not liable to state B merely because, as a result of otherwise legitimate activities on state A, the environment of state B is changed. There must be something more. In the *Lake Lanoux*⁷⁹ case, the tribunal observed that France could not be liable to Spain merely because France's use of upstream waters in its own territory had changed the flow of downstream waters in Spanish territory. The tribunal did agree, however, that if the use of waters by France had *seriously injured* Spanish interests, there would be international liability.

Clearly, the causing of material injury to persons or property is a "something more" proposition which must be sufficient to qualify an intrusion of debris as an interference with the plaintiff state's right to determine its own internal state of affairs. In other words, insofar as Canada had a valid claim against the Soviet Union for the causing of damage, it also had a valid claim for "interference with the sovereign right of Canada to determine the acts that will be performed on its territory".

Consider a hypothetical case where the claim for violation of Canada's right to determine the state of affairs in its territory might be of pivotal importance. Suppose that a satellite landed within Canadian territory, but in such a remote and desolate part of the country that Canada could not seriously contend that its territory had been damaged. The territory is useless anyway. Suppose also, contrary to what this paper

Operation Morning Light was a further "harmful consequence". As we shall see, the *Liability Convention* does not allow recovery for violation of sovereignty, but only for actual damages to persons or property. Under the *Liability Convention*, the mere fact of the intrusion of debris was not "damage" to Canada. It would probably have been more appropriate to say in para. 17 that "Canada had a duty to take the necessary measures to mitigate its damages by reducing the damage and preventing further damage from occurring". We have assumed that Professor Haanappel would agree with our view that a state can recover the cost of mitigating its injury from existing damage.

⁷⁸*Ibid.*, para. 3.

⁷⁹*Supra*, note 20.

argues in Part II (C), that general international law does not permit a claim for the costs of mitigating potential damage. Finally, suppose that there is a serious threat that the debris will be carried by wind and water to more useful and populated areas of Canada. Then Canada could still cogently contend that the creation of a threat to Canada within Canadian boundaries is an interference with its sovereign right to determine the state of affairs on its own territory. The fact that the debris represents a hazard to Canadians would be the "something more" in addition to the mere presence of the debris which triggers international liability. The *Nuclear Tests* cases provide an example of a situation where the "interference-with-right-to-determine-own-state-of-affairs" claim was critical. One of the problems faced by Australia and New Zealand was the difficulty of demonstrating how much, if any, harm would be caused to their inhabitants by the added ionizing radiation caused by radioactive debris. Their case was made more difficult by the fact that the Australian National Radiation Advisory Committee had advised in respect of particular previous French tests that they represented no significant risk to the Australian population, a fact not overlooked by the French government.⁸⁰ Consequently, the Australian claim emphasized the violation of its sovereignty. Paragraph 48 of the application states:

The Australian Government contends that the conduct of the tests described above has violated, and if the tests are continued, will further violate international law and the Charter of the United Nations, and, *inter alia*, Australia's rights in the following respects:

- (i) The right of Australia and its people in common with other states and their peoples to be free from atmospheric nuclear weapons tests by any country is and will be violated;
- (ii) The deposit of radioactive fall-out on the territory of Australia and its dispersion in Australia's airspace without Australia's consent:
 - a) violates Australian sovereignty over its territory;
 - b) impairs Australia's right to determine what acts shall take place within its territory and in particular whether Australia and its people shall be exposed to radiation from artificial sources.⁸¹

Australia's counsel, Mr Ellicott, argued further that Australia had the right to determine for itself whether "Australia and its people shall be exposed to the effects of ionizing radiation from artificial sources."⁸²

⁸⁰*Request of Australia* (Australia v. France), 1973 I.C.J. Pleadings, vol. 1 (Nuclear Tests) 41, 54, para. 61 (Request dated 9 May 1973); see also *Nuclear Tests* (Australia v. France), 1974 I.C.J. 482 (Judgment of 20 December 1974) *per* Petren J.

⁸¹*Supra*, note 62, 14, para. 49.

⁸²*Argument of Mr Ellicott* (Australia v. France), 1973 I.C.J. Pleadings (Nuclear Tests) 163, 188 (Argument given 21 May 1973).

Australia seems to have contended that even if it could not prove that the increased radiation levels in Australia from French nuclear tests would cause physical injury to Australians, there was nonetheless sufficient scientific uncertainty about the effects of increased radiation that a major policy choice was involved in deciding whether to risk increased levels in return for some benefit. Australia, in its sovereignty, had the exclusive right to make this choice. In other words, the "something more" in addition to the mere intrusion of the debris was that there was good reason to believe that the debris was seriously harmful. Thus understood, the argument that Australia had been denied by France's activities the rights to determine for itself its own internal state of affairs seems highly convincing.

Similarly, in the Cosmos case, it would have been valid for Canada to emphasize the "right-to-determine-its-own-state-of-affairs" claim if the Soviets had maintained that the debris was not harmful, or not harmful enough to warrant recovery operations. Canada could then have replied that there was at least serious reason to believe that the debris was gravely harmful, and the intrusion of Cosmos interfered with its right to decide for itself whether radiation levels in the North had increased above natural levels. Canada mitigated its damages by removing the debris, and so would then have been entitled to the costs of recovery operations. This might have been a more persuasive way of putting Canada's case than contending that even if no physical harm had occurred, the presence of the debris was a source of anxiety and concern, which was mitigated by the recovery operations.⁸³

The problem with relying too heavily on this version of a possible Canadian claim is that its main focus would have been on Canada's right to determine its own policy with respect to radiation levels within its boundaries, rather than on actual damage caused or potential damage to persons or property. If the *Liability Convention* is seen as determinative of the legal rights of Canada in the Cosmos case, as is contended in this article, then the "interference-with-right-to-determine-own-state-of-affairs" claim would have been inadmissible.

E. A Note on the Application of the Emergency Right of Entry Principle

It may be that implicit in the Soviet reference to "unintentional emergency landing" in their reply to the Canadian statement of claim is an argument that the fall of the satellite calls into play the international law associated with the emergency landing of ships in distress in foreign

⁸³See *supra*, Part II(B).

territory. In the *Aerial Incident of 27 July 1955* case the British pleadings before the I.C.J. maintained that:

It is a rule of the law of the sea that ships which are driven to take refuge in a foreign port by stress of weather or are compelled to dock by *force majeure* or any other overruling necessity, are not subject to the local regulations of the port with regard to any incapacity, penalty, prohibition, duties or taxes in force in that port" [C. Colombos, *International Law of the Sea*, 3d ed. (1954), 249.]

This was affirmed by Lord Stowell in *The Eleanor* (Edw. 359) where it was held that "real and irresistible distress" proved by clear and satisfactory evidence "must be at all times a sufficient passport for human beings" entitling them to the rights of hospitality in a British Port.⁸⁴

The British admitted⁸⁵ that a right of entry for aircraft in distress is not specifically guaranteed by the *Convention Relating to the Regulation of Aerial Navigation* signed in Paris on 13 October 1919⁸⁶ or by the *Chicago Convention* of 7 December 1944.⁸⁷ They pointed out, however, that the former provides in art. 22 that "[a]ircraft of the contracting states shall be entitled to the same measures of assistance for landing, particularly in case of distress, as national aircraft." Further, art. 25 of the *Chicago Convention* provides that:

Each contracting State undertakes to provide such measures of assistance to aircraft in distress in its territory as it may find practicable, and to permit, subject to control by its own authorities, the owners of the aircraft or authorities of the State in which the aircraft is registered to provide such measures of assistance as may be necessitated by the circumstances. Each contracting State, when undertaking a search for missing aircraft, will collaborate in co-ordinated measures which may be recommended from time to time pursuant to this Convention.

None of this, it is submitted, would have been of much help to the Soviets. Even if the case of a crashing satellite is covered by the principle of the emergency rights of entry for ships in distress, it would not follow that the launching state is exempt from liability for actual damage caused. The "right of entry" principle arguably only means that a state cannot forcibly prevent a ship in distress from landing, or take advantage of its position by taxing or confiscating it. It is possible that the state of landing might still have an action for the actual damage caused it.⁸⁸ In this case

⁸⁴*Memorial of U.K.* (Israel v. Bulgaria; U.S. v. Bulgaria; U.K. v. Bulgaria), 1959 I.C.J. Pleadings (Aerial Incident of 27 July 1955) 331, 358-9 (Memorial dated 28 August 1958).

⁸⁵*Ibid.*

⁸⁶11 L.N.T.S. 1974.

⁸⁷*Interim Agreement on International Civil Aviation*, 171 U.N.T.S. 501.

⁸⁸There are no cases directly on the point. In the *Aerial Incident of 27 July 1955* case, however, the Israeli memorial said in respect of an El Al airliner which they believed to have unintentionally strayed from its flight path onto Bulgarian territory. *Memorial of Israel* (Israel v. Bulgaria; U.S. v. Bulgaria; U.K. v. Bulgaria), 1959 I.C.J. Pleadings (Aerial Incident of 27 July 1955) 45, 87 (Memorial dated 2 June 1958): "if Bulgarian

Canada could have conceded that it did not have a claim for nominal damages for trespass *per se* under the “ships in distress” principle,⁸⁹ but still could have contended that the Soviet Union had to compensate Canada for its expenditures in correcting those interferences with its sovereignty — *i.e.*, immediate damage to property, creation of a hazard to person or property — caused by Cosmos’ descent.

Note should be made here of the distinction in international law between catastrophes involving persons and those involving property. In the case of salvage, for example, rescuers generally are entitled to a share of the value of the property saved, but have no right to remuneration for saving lives.⁹⁰ There is a tendency, however, to give special status to rescue operations involving human life and this is reflected in the space treaties. Commenting on the *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects launched into Outer Space* (1968),⁹¹ I.C.J. Judge Lachs writes in *The Law of Outer Space*:

There can be little doubt that in view of the high costs which may be involved in these operations [*i.e.*, expenses incurred in the rescue, recovery and return of astronauts and space objects] the reimbursement of the expenses incurred by other States is fully justified, the more that such provisions are well known in other fields, such as sea and air navigation. In general, remuneration is provided for salvage of property. On the other hand, there is a clear trend towards excluding any financial remuneration wherever assistance in saving human life is involved. As to outer-space activities, no provision has been adopted as to remuneration or the refund of expenses incurred in rendering assistance to and the return of astronauts. The silence of the law warrants the conclusion that no compensation can be demanded. Different is the situation, with regard to the recovery and return of space objects or their component parts. The

sovereignty was violated... and if damage and loss were caused to it by that infraction of its sovereignty, then the Bulgarian Government is entitled to prefer an appropriate claim for satisfaction or reparation”. It was not inconsistent for the Israelis to admit this possibility of liability and still contend that the Bulgarians were internationally liable for shooting down the aircraft.

⁸⁹This is not much of a concession in view of the feebleness of that claim; see *supra*, Part I.

⁹⁰See the *International Convention for the Unification of Certain Rules of Law Respecting Assistance and Salvage at Sea*, Brussels, 23 September 1910, reproduced in Canada: External Affairs, *Treaties and Agreements Affecting Canada in Force Between His Majesty and the United States of America, 1814-1925* (1927), 361, and compare art. 3 thereof with art. 9. By contrast, the *Brussels Convention for the Unification of Certain Rules relating to Assistance and Salvage of Aircraft or by Aircraft at Sea* (1938) gave a rescuer of human lives at sea a right to indemnity for expenses, up to a specified monetary limit. However, this treaty never came into force. See P. Martin, D. McClean & E. Martin, *Shawcross and Beaumont* [:] *Air Law*, 4th ed. (1977), vol. 2, A 79.

⁹¹22 April 1968, 19 U.S.T. 7570, T.I.A.S. No. 6599, 672 U.N.T.S. 119 [hereinafter the *Rescue and Return Agreement*].

expenses are to be borne by the launching authority. Thus any state incurring such expenses, wherever the action which led to them took place, on its territory or beyond its frontiers, may present a claim for their refund. It may even request an advance payment.⁹²

It is perhaps possible that general international law, extending the conventional and decisional precedents just canvassed in connection with non-compensation for recovery and rescue operations, would hold that actual damage inflicted by a manned spacecraft is not compensable. Article 5 of the *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies* (1967)⁹³ does not distinguish between manned and unmanned spacecraft, nor does the *Liability Convention*. But even if general international law does make this distinction, there would have been no grounds for applying it to the Cosmos case.

The argument presented thus far takes the possible Soviet case at its strongest by assuming that the conventional and decisional precedents of ships in distress are relevant analogies. Actually, they are not in several crucial respects. One of the policies behind the "emergency right of entry" principle is that states jealous of their sovereignty should not needlessly destroy persons or property when emergencies force them to intrude onto their territory. In the Cosmos case, the intrusion was not a deliberate emergency landing to save valuable Soviet equipment, but the consequence of the survival of universally unwanted debris which the Soviets had hoped would burn up in the upper atmosphere.⁹⁴ Thus one essential rationale for the "emergency right of entry" principle was entirely inapplicable. The Soviet Union could not have condemned a Canadian effort to destroy the satellite in the upper atmosphere so as to prevent ground damage, since the Soviet Union had abandoned the satellite to possible destruction by burn-up on re-entry.

Another justification for the "emergency right of entry" principle is that when an intrusion is for the purpose of saving life or property, the state of landing cannot reasonably claim that it has suffered an assault to its dignity. The same reasoning does not hold when the intrusion is of worse than useless debris. Consequently, the "emergency right of entry principle" could not have stood between Canada and the nominal compensation it sought for trespass *per se*. As was shown in Part I,

⁹²M. Lachs, *The Law of Outer Space* [:] *An Experience in Contemporary Law-Making* (1972), 85.

⁹³27 January 1967, 18 U.S.T. 2410, T.I.A.S. No. 6347, 610 U.N.T.S. 205 [hereinafter the *Outer Space Treaty*].

⁹⁴See Statement of Claim, *supra*, note 3, 903, para. 5, referring to the statement by Alexander N. Yakovlev on 24 January 1978.

however, nominal damages would probably not have been available to begin with for the harmless, unintentional invasion of debris from an otherwise legitimate activity.

III. Whether the Liability Convention is Exhaustive of the Legal Rights Between Canada and the Soviet Union

Part II of this paper examined claims which Canada might have advanced in accordance with general international law. In Part III, the authors project the probable Soviet argument that would have been put forth had the matter reached the litigation stage. There has been little discussion in the academic literature on Cosmos on this point, and it is useful to canvass this topic in attempting to understand the avenues of redress available to states in circumstances similar to the Cosmos incident.

The Soviets would undoubtedly have argued that parties to the *Liability Convention* could not resort to other sources of international law to find a broader basis of liability than provided for in the *Convention* itself. Such speculation is highly credible inasmuch as Soviet jurists have long preferred conventional law over custom as a source of international law and would have been expected to argue that the *Liability Convention* is exhaustive, and the Soviets would probably have been correct.

International Space Law,⁹⁵ a collaborative effort of several Soviet jurists which describes the development of the law of outer space, contains the discussion reproduced below. Note the usual Soviet objections to custom as a source of international law: it is difficult to ascertain what the law is, and many of the rules are rooted in the practice of European colonial powers. By contrast, emphasis is placed on the definiteness of treaty law and its dependence on the explicit consent of sovereign states. The passage also expresses the Soviet view that the novel and unique problems of space law cannot be resolved by reference to general international law alone, but must be worked out in detail by means of international conventions guided by the spirit of general international law. The passage is as follows:

Under Clause B of Article 38 of the Statute of the International Court of Justice of the United Nations, the court invokes international custom in settling international disputes. The International Court of Justice was established and functions on the basis of rules contained in Chapter XIV of the United Nations Charter. In accordance with Article III of the Space Treaty, the Charter of the United Nations is one of the regulators of space activities. The logical conclusion from this is that

⁹⁵*Supra*, note 7. See also G. Tunkin, *Theory of International Law*, (trans. W. Butler) (1974), 133-7.

international custom is the second source of international space law. But this view, correct as it may appear at first glance, arouses certain doubts, which have to be cleared up.

A question arises at once as to which international custom may become a legal regulator of the space activities of states. Will this be the custom of public international law, which arose out of the practical activities of states, but outside the sphere of outer space, and which may be applied to regulating the space activities of states? Or will this be custom arising precisely out of the space activities of states?

The first question may confidently be answered in the negative. International custom that arose out of the practical activities of states in spheres other than outer space must not be applied to regulating the space activities of states. Activities "down on Earth" and in outer space are too different, and so are the conditions in which they are conducted, for these activities to be subjected to identical regulation. This being so, the custom of international space law may arise only out of the space activities of states. This refers to the possibility of the emergence of international custom in the sphere of space law, but not to the actual emergence of this or that specific custom. There are serious reasons for this.

For one thing, the Space Age began so recently that states have not had enough time yet to build up international custom. Up to now the formation of international custom, as a rule, required routine practical activities by states over a period of many years, sometimes even centuries, and it was only then that international custom crystallised from them. How will this be in the future? Can the future space activities of states give rise to international custom, and what are the conditions in which it may be formed? Or is it, perhaps, impossible in general for international custom to arise in the sphere of the space activities of states?

International custom as a source of public international law meets with substantial political and juridical opposition, especially in the young developing countries. Even many bourgeois juridical experts take the view that customary international law is increasingly losing its significance. Peoples who suffered, or are still suffering from capitalist exploitation cannot forget that the policy of plunder and of relations of inequality between strong and weak partners rested upon certain international customs, which were established, above all, by the strong capitalist countries to further their selfish ends. The bad reputation gained by international custom cannot but have a decisive influence on the future in the field of space law too.

Is there a need in our age, the age of the scientific and technological revolution, to attach importance to the spontaneous, unconscious processes whereby customary rules are formed, considering that a broad road of conscious and systematic law-making through the conclusion of international treaties and agreements is now open to all states? It is this rational road of international law-making that is advocated by the Soviet Union and the other socialist countries, the road of contractually establishing a system or rules of international law to regulate the space activities of states. And the Soviet Union's policy of peace and its vigorous support for the contractual law-making of states are helping to establish a system of international space law for the good of all countries.⁹⁶

The authors go on to explain the differences between international customary law and treaty law. The former is identified as problematic in

⁹⁶*Ibid.*, 74-7.

that it is often difficult to discern what the rules entail. The Soviet preference for treaty law is based on the fact that logically interrelated rules of contractual law are set down in writing in the treaty's text, which can then be interpreted. The Soviet authors do not deny that customary international law might arise in the future, especially when emergency situations might, for example, compel astronauts to act "expediently" in a manner not previously considered by their state. It is in this way that, conceivably, customary law may become a secondary, reserve source of international space law, but the authors go no further.

Both the history of its development and its text support the contention that the *Liability Convention* is intended to be exhaustive. As early as 1959, according to Foster, "the question of liability for damage or injury caused by spacecraft was regarded as being of immediate concern to the world community".⁹⁷ The international law of state responsibility for unintentional intrusions was uncertain to begin with, and its application to space objects even more contentious.⁹⁸ It was decided to delay the drafting of a liability convention until a convention on general principles of the law of outer space could be developed.⁹⁹ A first step was the *United Nations General Assembly Resolution 1962 (XVII) Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space*.¹⁰⁰ Sections of this declaration were adopted almost verbatim in the subsequent three outer space conventions. Thus art. 4 of the *Declaration* was later adopted as art. III of the *Outer Space Treaty* (1967):

The activities of States in the exploration and use of outer space shall be carried on in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation and understanding.

Article 7 of the *Declaration* —

The state on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and any personnel thereon, while in outer space. Ownership of objects launched into outer space, and of their component parts is not affected by their passage through outer space or by their return to earth. Such objects or component parts shall furnish identifying data upon request prior to return —

later reappears as art. VIII of the *Outer Space Treaty*, which is elaborated upon in the *Rescue and Return Agreement* (1968).¹⁰¹

⁹⁷Foster, *supra*, note 53, 138.

⁹⁸See for example the variety of the opinions summarized by L. Lipson & N. Katzenbach, *Report to the National Aeronautics and Space Administration on the Law of Outer Space* (1974).

⁹⁹Foster, *supra*, note 53, 140.

¹⁰⁰*United Nations General Assembly Official Records*, 18th Sess. Supp. No. 15, 15.

¹⁰¹*Supra*, note 91.

Article 8 of the *Declaration* is the ancestor of the *Liability Convention*. It reads as follows:

Each State which launches or procures the launching of an object into outer space and each State from whose territory or facility an object is launched, is internationally liable for damage to a foreign State or to its natural or juridical persons by such object or its component parts on the earth, in air space, or in outer space.

This was later incorporated into the *Outer Space Treaty*.

A statement of general principles had been necessary because general international law was uncertain to begin with, and in any event required modification in its application to outer space. The *Outer Space Treaty* was therefore evidence of some progress towards elaborating rules of international space law including state responsibility for ground damage. But the *Outer Space Treaty* states very general propositions, and these required further elaboration. In particular, the elaboration of art. VII, dealing with state responsibility, was urgently required. Foster writes:

The frustration of the international community with respect to the failure of the Committee on the Peaceful Uses of Outer Space to prepare a liability convention is well illustrated by the U.N.G.A. Res. 2601 (XXIV) on January 16, 1970. After recalling the General Assembly's earlier resolution requesting the Committee "to complete urgently the draft agreement", the resolution states that the General Assembly:

"*Regrets* that the Commission has not yet been able to complete the drafting of a liability convention, a task assigned to it by the General Assembly during the last six years... .

"*Expresses its deepest dissatisfaction* that efforts to complete the convention have not been successful and at the same time urges the Committee... to complete the draft convention on liability in time for final consideration by the General Assembly during its twenty-fifth session;

"*Emphasizes* that the convention is intended to establish international rules and procedures concerning liability for damage caused by the launching of objects into outer space and to ensure in particular, the prompt and equitable compensation for damage."¹⁰²

There would thus be strong support in the public record for a Soviet contention that the *Liability Convention* was the culmination of a long law-making process to establish detailed rules concerning state responsibility for damage by space objects. The whole purpose of this process would be negated if states could resort to more ambiguous sources of international law, such as custom or the *Outer Space Treaty*, in an attempt to establish legal claims which find no support in the *Liability Convention*.

¹⁰²Foster, *supra*, note 53, 139, fn. 10.

There is also strong textual support for the view that the *Liability Convention* is supposed to state completely the rules covering damage by space objects. The preamble states:

Recognizing the need to elaborate effective international rules and procedures concerning liability for damage caused by space objects to ensure, in particular, the prompt payment under the terms of this Convention of a full equitable measure of compensation to victims of such damage.

Believing that the establishment of such rules and procedures will contribute to the strengthening of international cooperation in the field of the exploration and use of outer space for peaceful purposes.

The *Convention* then proceeds to set out detailed provisions concerning liability and the procedure for making claims for damage by space objects. It gives certain advantages to plaintiff states, such as the absolute liability provision, in art. II, and certain advantages to launching states, such as the right to present a claim for indemnification to other participants in a joint launching, in art. V. What would be the point of establishing detailed rules and working out compromises between the rights of launching states and the rights of plaintiff states if parties to the treaty could still resort to the inscrutable rules of customary international law?

If there is some argument that resort to general international law is not precluded to parties to the *Liability Convention*, it does seem out of the question for a state party to the *Liability Convention* to resort to the state responsibility provisions of the *Outer Space Treaty*. After all, the preamble of the *Liability Convention* says the state parties to it are “[r]ecalling the Treaty on Principles Governing the Activity of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies.” Clearly, the *Liability Convention* was intended to make more precise the provisions concerning state responsibility of the *Outer Space Treaty*. What sense would it have made if Canada then referred to the *Outer Space Treaty* as a source of broader liability than the *Liability Convention* when the *Liability Convention* unambiguously implies that it is intended to elaborate the *Outer Space Treaty*?

The *Vienna Convention on the Law of Treaties* is also relevant in determining the extent to which the *Liability Convention* is exhaustive.¹⁰³ T. Elias has pointed out that “[a]lthough it has not yet come formally into force, the practice since its adoption in May 1969 has been for teachers of international law, government legal officers and practitioners of international law and international tribunals to refer to the Convention on matters relating to treaties as if it were already in force.”¹⁰⁴

¹⁰³See I. Brownlie, *Basic Documents in International Law*, 2d ed. (1972), 233.

¹⁰⁴T. Elias, *The Modern Law of Treaties* (1974), 13.

Article 30 (3) of the *Vienna Convention* provides:

When all the parties to the earlier treaty are parties also to the later treaty but the earlier treaty is not terminated or suspended in an operation under article 59, the earlier treaty applies only to the extent that its provisions are compatible with those of the later treaty.

Article 59 provides that:

1. A treaty shall be considered as terminated if all the parties to it conclude a later treaty relating to the same subject-matter and:

(a) it appears from the later treaty or is otherwise established that the parties intended that the matter should be governed by that treaty; or

(b) the provisions of the later treaty are so far incompatible with those of the earlier one that the two treaties are not capable of being applied at the same time.

2. The earlier treaty shall be considered as only suspended in operation if it appears from the later treaty or is otherwise established that such was the intention of the parties.

In other words, a prior treaty on the same subject matter as a later treaty operates only insofar as it is not "incompatible" with the latter. There need not be an express suspension of the prior treaty; it is sufficient that the later treaty manifests an intention by the parties that it is to supplant the provisions of the prior treaty. It is submitted that even if the *Liability Convention* does not imply the intention of the state parties that it will supplant the *Outer Space Treaty* between parties to it, it is at least necessary to read the earlier treaty in the light of the more detailed later treaty.

While the *Vienna Convention* only explicitly deals with successive treaties on the same subject matter, its basic principle should apply to general international law and a subsequent treaty on the same subject matter. The Soviet Union could therefore have argued convincingly that the manifest intention of the *Liability Convention* to define completely the rights and remedies of space object accidents precluded resort to the "incompatible" rules of pre-existing general international law.

A possible Soviet contention that the *Liability Convention* is exhaustive would have been especially powerful inasmuch as Canada is not only a state party to the *Liability Convention*, but had claimed under its substantive provisions in accordance with its procedures. In so doing, Canada had claimed the substantive and procedural advantages of the *Convention*; how could it then have side-stepped the disadvantage of the *Liability Convention* by attempting to rely on other sources of law?

That it is impermissible to do so should be obvious in the case of the procedural provisions of the *Liability Convention*. By having cited the *Liability Convention*, Canada obliged the Soviet Union to settle the claim within a year or establish a claims commission under art. XII. Canada would then have been unable to embarrass the Soviet Union by

presenting a claim under general international law before the I.C.J. while the negotiating and claims commission process was still operating. Nor would it have been allowed to maintain a claim against the Soviet Union under other sources of international law if the claims commission had met and decided against its claim under the *Liability Convention*. In either case, the purposes of the *Convention* in establishing certain procedures would have been thwarted if other channels could have been used to press a claim. Having set it in motion, the process contemplated by the *Liability Convention* was the only one Canada could have resorted to.

It should be obvious that Canada could not have used the process established by the *Liability Convention* to press claims that were inconsistent with the substantive provisions of the *Liability Convention*. Furthermore, Canada could not have expected the Soviets to overlook art. XI (2) of the *Liability Convention*. It reads:

Nothing in this Convention shall prevent a state, or natural or juridical persons it might represent, from pursuing a claim in the courts or administrative tribunals or agencies of a launching state. A state shall not, however, be entitled to present a claim under this Convention in respect of the same damage for which a claim is being pursued in the courts or administrative tribunals or agencies of a launching state or under another international agreement which is binding on the states concerned.

Article XI does not *expressly* refer to the case of a claimant under the *Liability Convention* also pursuing through international channels a claim under general international law. But the general policy of art. XI is clearly that claimants under the *Liability Convention* should not be able to resort to other channels, relying on other theories of liability, to press claims arising from the same damage. Thus art. XI certainly bolsters the argument made earlier that the process provided by the *Liability Convention* must be used exclusively or not at all. There seems to be no reason to exempt a state from this principle when its resort to other channels happens to be based on a theory of liability sounding in general international law.

It should not be assumed that a plaintiff state can never use the procedures of the *Liability Convention* to make claims under other treaties for other types of damage arising from the same incident. It is true that many of the procedural articles of the *Liability Convention* refer to damage or compensation for damage "under this convention".¹⁰⁵ But it might not be stretching the language too far to hold that since the *Liability Convention* is part of a trio of related space treaties, a state can press claims for damages for violations of the other two space treaties along with its claim under the *Liability Convention*, where all the claims arise from the same incident. For example, suppose Canada had wanted

¹⁰⁵See arts XI, XII, XIII.

to claim damages for the alleged Soviet violation in the Cosmos case of art. 5 of the *Rescue and Return Agreement*. It would have been highly convenient if Canada could have processed this claim along with its claim for damages under the *Liability Convention*. The wastefulness of separately litigating two distinct aspects of the same incident argue in favour of generally allowing claims under the other two space treaties to be included with *Liability Convention* claims.

Whereas claims under art. 5 of the *Rescue and Return Agreement* and art. VIII of the *Liability Convention* may peacefully coexist, claims under art. VII of the *Outer Space Treaty* and art. VIII of the *Liability Convention* cannot. Article VIII of the *Liability Convention* is an elaboration of art. VII of the *Outer Space Treaty* and therefore the earlier treaty must be read in the light of the later one.

In summary, it is submitted that the Soviet Union would have been correct in arguing that the Cosmos case had to be decided under the terms of the *Liability Convention*. No broader basis of liability than the *Liability Convention* allows could have been invoked by Canada. This does not mean that general international law and the *Outer Space Treaty* are entirely irrelevant. In fact, there are two considerations that indicate the contrary.

First, both general international law and the *Outer Space Treaty* are part of the legal and political context in which the *Liability Convention* was negotiated and ratified. Thus it would not have been inappropriate for Canada to have argued that under general international law and the *Outer Space Treaty*, Canada should be able to recover the costs of Operation Morning Light; that the *Liability Convention* was intended primarily to ensure "the prompt payment of a full and equitable measure of compensation to victims of damage" caused by space objects; and that it would therefore be wrong to construe the *Convention* as putting Canada in a drastically worse position than it was in before the *Convention* was adopted.

Second, the *Liability Convention* incorporates part of general international law. Article XII provides that:

The compensation which the launching state shall be liable to pay for damage under this Convention shall be determined in accordance with international law and the principles of justice and equity, in order to provide such reparation in respect of the damage as will restore the person, natural or juridical, state or international organization on whose behalf the claim presented to the condition which would have existed if the damage had not occurred.

IV. Possible Claims by Canada under the *Liability Convention*

In this final part, the types of claims considered in Part II under general international law are re-examined to determine the extent to which they are sustainable within the provisions of the *Liability Convention*.

The first section briefly ties in the extended discussion of trespass *per se* previously outlined in Part I. The discussion then moves to a review of the possible claims listed in Part II and examines the issues of damages and the sovereign rights of a state as they relate to the *Convention*.

A. *Trespass per se*

To reiterate the hypothesis set out in Part I, Canada could not have sustained a claim for trespass *per se* under the *Liability Convention*. The definition of "damages" in art. I of that instrument was obviously intended to be exhaustive and the failure of this definition to include dignitary damages to states implies that no damages for trespass *per se* could be allowed. This was not a mere oversight by the drafters, for the *travaux préparatoires*¹⁰⁶ on the *Convention* indicate that the Soviet delegate expressly stated that the *Convention* should not allow for the recovery of nominal damages.¹⁰⁷ The Americans concurred with this view, according to the conclusion reached in the *United States Senate Committee Report*.¹⁰⁸

Furthermore, the history of the development of the *Liability Convention* and its precursors suggests that the purpose of the international community was to ensure that victims of damage from space objects were properly compensated, not to save plaintiff states from the affront to their dignity caused by intrusions into their territory. In their reply of 2 May 1979 to a note by the Canadian Department of External Affairs, the Soviets drew attention to the provisions of the *Outer Space Treaty* and the *Rescue and Return Agreement* which require states to rescue and return astronauts, and, upon request, to recover and return space objects which intrude onto their territory. These articles are evidence of tolerance for unintentional intrusions of objects, rather than a policy of condemning these intrusions as a violation of state sovereignty. Moreover, the third and fourth paragraphs of the preamble of the *Liability Convention*, which respectively recognize that damage by space objects may take place notwithstanding precautionary measures by states and international organizations, and the necessity of providing compensation for victims of such damage, emphasize the aim of compensation, not condemnation.

In summary, even if general international law allows nominal damages for the unintended intrusion of a space object — and it probably does not¹⁰⁹ — the *Liability Convention* does not. As a party to the

¹⁰⁶8 I.L.M. 679, 692 art. 32 (1969).

¹⁰⁷*Supra*, note 53, 52.

¹⁰⁸*Supra*, note 8.

¹⁰⁹*Supra*, Part I.

Liability Convention, and one who has taken advantage of its provisions¹¹⁰ Canada cannot resort to a theory of liability incompatible with the terms of the *Liability Convention*.

B. Existing Damage to Persons and Property and Mitigation Thereof

One intuitive understanding of "damage" to property is a drastic change in its physical structure. It is submitted that a more sophisticated understanding of the meaning of damage better serves the purposes of the *Liability Convention*. This understanding supposes that property has no intrinsic, universal value which transcends human evaluation. Property is only worth what people think it is worth. "Damage" to property means it has been rendered less suitable for those human purposes for which it was originally valued.

If rain caused by weather modification activity of the defendant state falls upon the territory of the plaintiff state, has there been damage to the plaintiff state's land? The answer depends upon the circumstances. If the land has been set aside for growing rice, the rain is irrigation. If the land is being used to build residential housing, the rain may be considered a flood. It cannot be said that there has been damage just because there has been a change in the chemical and physical structure of the topsoil. A determination of whether "damage" to the land has occurred is contingent on whether inhabitants of the plaintiff state value the land more in its original condition or in its condition after the incident occurs.

Consequently, while the spreading of radioactive material may not produce any obvious changes in physical or chemical structure, such as a dent in the ground, it may nonetheless amount to grave damage to property — because it cannot be used for human purposes such as habitation and agriculture, and so is less valued by its owners. Conversely, the physical disintegration of a building caused by the impact of a satellite may not be damage — if the building was scheduled for demolition.

So far, it has been shown how human evaluation, not just a change in physical or chemical structure, is a component of a determination that "damage to property" has occurred. The next task is to show the importance of information in human evaluation. In the examples considered thus far, the physical or chemical state of the possibly "damaged" land was known by its inhabitants. But they may not have known how useful the land was in its final state. If nuclear debris scatters, the inhabitants may know exactly where each concentration of particle is and how much radiation it is emitting — but not how damaging this radiation is to human beings. Thus they don't know if the land is safe for

¹¹⁰*Supra*, Part III.

habitation. This makes it less valuable to them. As long as there is sound reason to believe that the levels of ionizing radiation might be harmful, the land may be considered entirely uninhabitable.

This is one point Canada might have made in the Cosmos case. Canada need not have proved exactly how dangerous ionizing radiation was to persons; as long as there was a sound reason to believe it might have been sufficiently harmful to cause physical illness, areas where it was present were less useful to Canada for almost any human purpose to which it might have ordinarily been put.

But what if the physical or chemical state of the land is not known until after an incident? This type of uncertainty can also be a component of the evaluation its owners have of the property. Consider this hypothetical story.

Two neighbouring states, Chelm and Largovia, agree to a convention whereby each is absolutely liable to the other for damage (the definition is the same as in art. I (a) of the *Liability Convention*) caused by its army to the other state. Full compensation (the definition is the same as art. XII of the *Liability Convention*) is to be made for such damage.

One day, while on manoeuvres involving the practising of laying land mines, a Chelm army brigade inadvertently wanders onto Largovian territory. The next day both Chelm and Largovia realize that a vast stretch of Largovian territory was traversed during the manoeuvres. The confused Chelm army is unable to say how mines were laid in Largovia, or where.

Largovia conducts a massive minesweeping operation, the costs of which it claims from Chelm. Is it entitled to recover under the *Convention*?

Suppose that only a few live mines are actually discovered. If the location and nature of these mines had been known, their locations could have been marked and cordoned off, and only a small part of Largovian land would have been devalued. The costs of removing the damage by defusing the mines would have been appreciable, but much smaller than those of the operation that actually took place.

But because it was not known how many live mines there were, or where they were, the vast stretch of Largovian territory traversed by the Chelm brigade was less usable. Therefore, the whole area of land was damaged. Largovia mitigated its damages by searching the whole area. The damage was removed not just by defusing the live mines but by proving that there were none in the rest of the area. It is submitted that Largovia should recover all of its costs and not just what its costs would have been had it known exactly where the mines were.

Indeed, if *no* live mines had been discovered, it is submitted that the entire costs of the operation would still have been recoverable. The concern that there were live mines made the territory less usable and thus the land was damaged; this damage was caused by Chelm's army.

Consider, for example, the recent Mississauga, Ontario train accident.¹¹¹ A city had to be evacuated because of concern that chlorine gas had escaped or would escape from a wrecked tank car. It turned out that most of the chlorine escaped into the upper atmosphere during an explosion when the crash occurred. Thus the danger was in fact much less than had been believed. Furthermore, the chlorine which did remain did not drift into Mississauga in dangerous concentrations. But it would be misleading to say that Mississauga was not "damaged" by the train accident. The city was *uninhabitable* until it was verified that the danger had passed.

To refer back to the hypothetical example, the Cosmos case seems to be like the case where a few mines are found. Had Canada known exactly where the concentrations of dangerous material were located, it could have been said that a fairly small part of its territory had been damaged. No massive clean-up operations would have been necessary.

But until the operations were undertaken, a vast stretch of the Arctic was less valuable to Canadians. They were concerned about the dangers of travelling, visiting or inhabiting this land, or eating the animals and plants that came from it. Thus they had to avoid using the land altogether since various areas were cordoned off during Operation Morning Light, use it only after taking expensive precautions, or continue using it as they had been, but with more concern and anxiety than they would have otherwise. In any of these events, their estimation of the value of the land would have been less — and would only have risen again had the Canadian government, as it did, taken elaborate search and clean-up operations.

It is difficult to quantify exactly the devaluation of Canadian territory, but there is in fact no need to do so because, as has been argued,¹¹² under general international law, Canada would have been entitled to recover the incremental costs of its recovery operations on the grounds that Cosmos damaged Canadian territory and Canada had mitigated its damages by removing the debris. This same type of claim, it is submitted, would have been clearly sustainable under the *Liability Convention*. The nuclear contamination of vast stretches of Canadian territory was damage to "persons and property" within the meaning of art. I (a) of

¹¹¹Globe and Mail (12 November 1979), p. 1, col. 6.

¹¹²*Supra*, Part II (A).

the *Liability Convention*. Under general international law it is not an objection to the awarding of damages that no more than a rough estimate of the correct quantum is possible.¹¹³ Moreover, even if the difficulty of estimating damages were an objection to awarding any, this objection disappears where the plaintiff state converts its damage into a readily calculable form — the costs of reasonable measures to remove the damage.

Article XII of the *Liability Convention* expressly states that the damages are to be determined in accordance with “*international law and the principles of justice and equity*, in order to provide such reparation in respect of the damage as will restore the person, natural or juridical,... to the condition which would have existed if the damage had not occurred.”¹¹⁴ Therefore, the fact that general international law would not allow the difficulty of calculating an exact quantum of damages to prevent the awarding of damages implies that the difficulty does not preclude recovery under the *Liability Convention*. In any event, Canada’s incremental cost in restoring itself to the condition it was in before the damage occurred were readily calculable. If among the principles of general international law is the principle that a state is entitled to its expenses in taking reasonable steps to mitigate its damages, these expenses — in the Cosmos case, the incremental costs of recovery operations — would also be recoverable under the *Liability Convention*.

Furthermore, it would be entirely inconsistent with the expressly stated policy of the *Liability Convention* not to allow compensation for costs in mitigating damages. Article II fixes absolute liability on the launching state. The preamble emphasizes that victims should receive “a full and equitable measure of compensation”. Article XII explains that the goal in fixing the quantum of compensation is to restore the victim to the condition which would have existed had the damage not occurred. Canada incurred expenses in restoring itself to the condition which would have existed “if the damage had not occurred”. To hold that these expenses were not compensable would be to completely negate the obvious purpose of the *Liability Convention* — to remove the financial burden of restoring victims of space object damage to the equivalent of their original condition and place that financial burden on the launching state.

It should be mentioned that the negotiating record of the *Liability Convention* does not undermine Canada’s position. It is true that Canada abstained from the approval given to the final draft of the *Liability*

¹¹³See *Sapphire International Petroleum*, *supra*, note 60.

¹¹⁴[Emphasis added.]

Convention in the United Nations General Assembly resolution, but it did so on the grounds that it was unacceptable for a victim to receive less compensation because he was injured by a space object launched by another state than he would have received if he had been injured in a less exotic manner.¹¹⁵ Canada would have preferred to have the quantum of compensation determined by reference to the domestic law of the victim's state, so long as that law was not incompatible with international law. Article XII of the *Liability Convention*, of course, settled on the standard of "international law and the principles of justice and equity". Such issues as whether moral damages for pain and suffering are obtainable, and when damage becomes too remote to be compensable, were left to be decided in accordance with this general standard, as well as the more specific direction of the *Liability Convention* that the victim be restored to an equivalent of his original condition.¹¹⁶ While Canada would clearly have preferred the domestic law of the victim's state as the standard of compensation, the negotiating record of the *Liability Convention* does not embarrass Canada in its contention that the contamination of its territory by Cosmos debris is damage within the meaning of the *Convention*, and that it is entitled to recover its expenses in mitigating its damages by removing the damage.

C. "Psychological Harm" as Material Damage

Canada could have made a plausible claim under the *Liability Convention* that the intrusion of Cosmos debris caused "psychological harm" to some Canadians and that Canada mitigated its damage by removing dangerous concentrations of debris, verifying that the land was safe thus alleviating the psychological damage. In Part II(B) this concept was analyzed in relation to a claim under general international law and most of it is germane to a claim under the *Liability Convention*.

Most western commentators interpret "damage" to health under the *Liability Convention* as including at least some kinds of psychological damage. Stephen Gorove writes:

The broad phrase, "loss of life, personal injury or other impairment of health" may mean not only physical injury but also injury affecting mental as well as other social well being. In support of this position attention may be called to the definition used by the World Health Organization, which describes health as "a state of complete physical, mental and social well being". Viewed against this definition, the phrase "other impairment of health" seems broad enough to cover personal injury resulting in the impairment of mental faculties. If health in such a sense is directly affected, recovery may be had.¹¹⁷

¹¹⁵Foster, *supra*, note 53, 137, fn. 3: "The Resolution carried by a vote of 93 to 0 with 4 abstentions (Canada, Iran, Japan and Sweden)."

¹¹⁶See *U.S. Senate Committee Report, supra*, note 8, 23.

¹¹⁷Gorove, *Cosmos 954: Issues of Law and Policy* (1978) 6 J. Space L. 137, 140.

Foster cites art. I (a) and continues:

From the broad terminology used in this definition it is clear that all injuries to persons are covered whether or not they are accompanied by objective or substantially harmful physical or psychopathological consequences provided they at least result in an "impairment of health". Moreover, it is immaterial whether the injuries are suffered through physical impact with a space object or result from biological, chemical or radiological contamination emanating from a space object.¹¹⁸

Ronald Alexander writes:

While the Liability Convention does not explicitly permit the recovery for the decedent's pain and suffering... it does permit a recovery for "impairment of health" where a claimant suffers *personal injury*. Since impairment of *physical* health constitutes "personal injury", the Convention's reference to impairment of health must relate instead to impairment of emotional or mental health. The provision thus seems to permit recovery for the injured person's pain and suffering if he lives, and probably would allow a like recovery even when he subsequently dies of the injuries.¹¹⁹

Unfortunately, little research has been done by Canadians on the psychological impact which the Cosmos incident had on Northern residents. Assuming that it is hyperbolic to talk about "terror" or "nervous shock", it might still have been appropriate for Canada to point to the concern and anxiety of Northern residents over the possibility of nuclear contamination. Major Aikman reports that when Lt Col. Davidson spoke to the native people at Baker Lake they "wanted to know what radiation would do to the caribou, to the fish, and to them";¹²⁰ they were clearly very worried about the effects of radiation, and their concern was lessened by the clean-up operations.

It would have been difficult to estimate the extent and magnitude of such mild psychic disphoria, and difficult to determine what would count as "just and equitable" compensation for it. Note, however, that the difficulty of calculating exactly the quantum of damages is not, as previously stated, in international law a bar to their being awarded.¹²¹ In any case, Canada would not have asked for such a difficult calculation to be made. In any event, Canada did not ask for such a difficult calculation to be made. It presented a precisely calculated claim for the costs of mitigating its damages, one aspect of which arguably was psychological. That is, it could have been argued:

1. "Health" is defined in the Constitution of the World Health Organization as meaning "a state of complete physical, mental and

¹¹⁸Foster, *supra*, note 53, 155.

¹¹⁹Alexander, *Measuring Damages Under the Convention on International Liability for Damage Caused by Space Objects* (1978) 6 J. Space L. 151, 155.

¹²⁰*Supra*, note 67, 20.

¹²¹*Supra*, Part II (A).

social well being.”¹²² The anxiety and concern the residents of a state experience as a result of the intrusion of radioactive debris is therefore an “impairment of their health”. Thus, it is “damage” within the meaning of the *Liability Convention*.

2. Canada mitigated its damages by conducting extensive search and clean-up operations.
3. Under the *Liability Convention*, a state is entitled to its expenses incurred in taking reasonable measures to mitigate its damages.

D. Prevention of Future Damage

It is submitted that even if Canada had had to rest its claim under the *Liability Convention* entirely on the basis that it incurred expenses in taking reasonable measures to prevent *future* damage to persons and property, Canada would still have had a valid claim under the *Liability Convention*. Thus, Canada could have argued that Operation Morning Light prevented future damage, such as irritation of Northern travellers who would chance upon Cosmos debris, from occurring.¹²³

E. Interference with the Sovereign Right of Canada to Determine the Acts that will be Performed on its Territory

The definition of “damage” in the *Liability Convention* does not include interference with a state’s right to determine the environmental state of affairs within its own boundaries. Since art. I (a) says “damage means” rather than “damage includes”, the definition, as pointed out earlier, is clearly intended to be exhaustive. The definition was the result of protracted and contentious negotiations, and it must be assumed that it is incompatible with the purposes of the *Liability Convention* for a party to the *Convention*, let alone a party which had already invoked the substantive and procedural provisions of the *Liability Convention*, to allow recovery on a broader theory of what constitutes “damage”. Thus, while the “right-to-determine-its-own-state-of-affairs” claim is probably sustainable at general international law,¹²⁴ and perhaps under art. VII of the *Outer Space Treaty* which refers simply to “damage” to a state, the operation of the *Liability Convention* would preclude Canada from validly making this type of claim in the Cosmos case.

¹²²*Constitution of the World Health Organization*, opened for signature 22 July 1946, T.I.A.S. No. 1808, 14 U.N.T.S. 185, preamble.

¹²³A detailed argument for this proposition is presented, *supra*, Part II (C).

¹²⁴See *supra*, Part II (D).