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COMMISSION DES DROITS DE L'HOMME
Sous-Commission de la promotion et de
la protection des droits de l'homme
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AUTRES QUESTIONS RELATIVES AUX DROITS DE L'HOMME

Droits de l'homme et armes de destruction massive ou de nature à causer des blessures ou des maux superflus et frappant sans discrimination

Document de travail présenté par M. Y. K. J. Yeung Sik Yuen en application de la décision 2001/119[*] de la Sous-Commission

Résumé

Le présent rapport est présenté en application de la décision 2001/119 et des résolutions 1997/36 et 37 de la Sous-Commission. Dans sa résolution 1997/36, la Sous-Commission s'est déclarée préoccupée par l'emploi de certaines armes de destruction massive ou aveugle, ou de nature à causer des dommages ou des souffrances inutiles, désignant nommément les armes nucléaires, les armes chimiques, les bombes à dépression, les bombes à dispersion, les armes biologiques et les armes contenant de l'uranium appauvri. Dans cette résolution, la Sous-Commission s'est également déclarée convaincue que l'utilisation ou la menace d'utilisation de ces armes était «incompatible avec les droits de l'homme reconnus sur le plan international et/ou le droit humanitaire» et a prié M^me^ Clemencia Forero Ucros, membre de la Sous-Commission, d'élaborer un document de travail traitant de ce sujet. La résolution 1997/37 a ajouté à ce mandat la question du transfert illicite de ces armes. Par la décision 2001/119, la Sous-Commission a autorisé M. Y. K. J. Sik Yuen à établir le présent document de travail.

[*] Le nombre de pages du présent rapport dépasse les limites fixées par l'Assemblée générale. En conséquence, seul le résumé est traduit dans toutes les langues officielles de l'ONU. L'annexe est distribuée uniquement dans la langue originale. Pour permettre à son auteur de procéder à des recherches approfondies, le rapport a été présenté après la date fixée par l'Assemblée générale.

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La première partie du document traite des droits de l'homme et du droit humanitaire qui entrent en jeu, tandis que la deuxième partie traite des armes elles-mêmes.

Analysant les droits de l'homme auxquels risque de porter atteinte l'utilisation des armes et catégories d'armes énumérées, l'auteur place l'accent sur le droit à la vie, le droit de ne pas être soumis à la torture, le droit à la santé et au bien-être, l'interdiction de tout génocide et les droits connexes énoncés dans les instruments relatifs aux droits fondamentaux de l'individu. Il place également l'accent sur l'article 2 de la Charte des Nations Unies, en raison du «pouvoir de menace» évident dont disposent les États détenteurs de telles armes.

Analysant le droit humanitaire, l'auteur explique dans un premier temps l'importance tant des traités que du droit humanitaire coutumier comme sources du droit relatif aux armements. Sont ainsi présentés les principales dispositions de la Convention IV de La Haye de 1907 et son Règlement concernant les lois et coutumes de la guerre sur terre, à commencer par la clause Martens, l'article 22 relatif à la proportionnalité et l'article 23 interdisant les armes empoisonnées et celles propres à causer des maux superflus. La Charte et le Statut de la Cour internationale de Justice (CIJ) sont cités comme soutenant le puissant rôle joué par le droit humanitaire coutumier. Sont également examinées les principales dispositions relatives aux armements des Conventions de Genève de 1949 et de leurs deux protocoles additionnels. Il est porté une attention particulière à l'article 3 commun de ces Conventions, compte tenu de l'opinion émise par la CIJ selon laquelle cette disposition est un «étalon commun» applicable à tout conflit armé, qu'un État soit ou non partie à un conflit armé. Il est fait référence aux nombreuses dispositions du Protocole additionnel I qui limitent les types et emplois des armes. L'accent est placé sur la disposition prescrivant aux États d'étudier, avant d'élaborer et d'utiliser des armes, la mesure dans laquelle une arme proposée violerait le droit humanitaire existant. Cette règle est considérée par la CIJ comme étant une règle de droit humanitaire coutumier. Sont également examinés les articles relatifs à la protection de l'environnement. Le recensement des instruments se conclut par l'examen des dispositions pertinentes de la Convention sur l'interdiction ou la limitation de l'emploi de certaines armes classiques qui peuvent être considérées comme produisant des effets traumatiques excessifs ou comme frappant sans discrimination, de son Protocole ainsi que de la Convention sur l'interdiction de l'emploi, du stockage, de la production et du transfert des mines antipersonnel et sur leur destruction.

S'appuyant sur les diverses sources du droit humanitaire, l'auteur conclut que des armes doivent être considérées comme étant interdites si:

a) Elles frappent sans discrimination (n'opérant aucune distinction entre civils et belligérants);

b) Leur emploi est disproportionné par rapport à la poursuite d'objectifs militaires légitimes;

c) Elles nuisent à l'environnement de façon étendue, durable et grave;

d) Elles causent des dommages et des souffrances inutiles.

Dans la deuxième partie, l'auteur évalue les armes elles-mêmes, en commençant par les armes nucléaires. Il passe en revue les mesures prises par l'Assemblée générale, l'avis consultatif

émis en 1996 par la CIJ sur la licéité de la menace ou de l'emploi d'armes nucléaires, ainsi que de nombreux traités internationaux et études scientifiques. En ce qui concerne l'emploi, le transfert et le stockage d'armes nucléaires, l'auteur constate de graves disparités, lacunes et autres carences inexplicables autrement que par des motifs politiques, étant donné que des armes nucléaires ne pourraient aucunement être utilisées de façon compatible avec le quadruple critère énoncé dans la première partie.

Sont ensuite présentées les minibombes nucléaires et les armes de destruction d'abris fortifiés, en particulier la bombe B61-11. L'auteur s'alarme de la publication d'un rapport du Pentagone intitulé *Nuclear Posture Review*, qui préconise l'emploi de ces armes en premier recours contre sept États, dont cinq ne possèdent pas l'arme nucléaire. L'auteur estime que cette doctrine, même si elle fait appel à des minibombes nucléaires ou à des armes de destruction d'abris fortifiés renforcées à l'uranium appauvri, porte atteinte aux droits de l'homme et est contraire au droit humanitaire.

Examinant les armes biologiques et chimiques, l'auteur en recense les principaux composés et évalue les deux principaux traités interdisant la production, le stockage et l'utilisation de ces armes. Tout en appelant l'attention sur certaines carences de ces traités, il déplore l'absence d'un traité d'interdiction similaire concernant les armes nucléaires, soulignant que les armes chimiques et biologiques sont «l'arme nucléaire du pauvre» et que les États détenteurs d'armes nucléaires sont peu nombreux.

Dans la section intitulée «Armes frappant sans discrimination», l'auteur évalue les mines antipersonnel, les bombes à dispersion et les bombes à dépression, commençant par d'autres dispositions du Protocole additionnel I relatives à ces armes. En ce qui concerne les mines antipersonnel, l'auteur se concentre sur celles qui ne sont pas déclenchées manuellement. Après une brève description de certaines dispositions de la Convention sur l'interdiction des mines antipersonnel, l'auteur note que les grandes puissances ne l'ont pas ratifiée.

Abordant les bombes à dispersion, l'auteur indique que les sous-munitions de ces bombes peuvent saturer une superficie correspondant à celle de plusieurs terrains de football. Il souligne à la fois l'impossibilité de les confiner et le fait que lorsqu'elles n'explosent pas lors du largage (elles ont un taux d'échec élevé compris entre 5 et 30 %), elles peuvent exploser longtemps après la fin du conflit. Ces bombes non explosées équivalent alors à des mines terrestres. L'auteur recense les endroits où des bombes à dispersion ont été utilisées lors d'opérations militaires. Il décrit certains des modèles les plus récents, dont des «munitions à effets combinés» dotées d'un blindage léger et ayant un effet antipersonnel et incendiaire. L'auteur souligne que le Comité international de la Croix-Rouge a appelé de ses vœux un moratoire sur les bombes à dispersion.

En ce qui concerne les bombes à dépression (également appelées «hypobarométriques» car elles sont activées par la pression atmosphérique et «faucheuses de marguerites» en raison de la forme du cratère qu'elles produisent), l'auteur se concentre sur le modèle BLU-82 (surnommé «Big Blue»). Les bombes à dépression de la troisième génération utilisent de la poudre d'uranium. En raison même de l'ampleur des explosions causées par les bombes à dépression utilisées actuellement, l'auteur conclut qu'elles ne pourraient être utilisées de façon discriminatoire. Il note en outre que certains chercheurs craignent que l'utilisation de bombes à dépression dans les Balkans et en Afghanistan n'y ait déclenché des tremblements de terre.

L'auteur admet l'impossibilité d'énumérer toutes les armes susceptibles d'être considérées comme causant des dommages ou des souffrances inutiles, mais souligne que toutes les armes examinées dans le présent document pourraient être classées dans ces deux catégories.

Il évalue ensuite de façon approfondie les armes contenant de l'uranium appauvri. Il définit l'uranium appauvri, indique les endroits où il a été utilisé dans le cadre d'opérations militaires: région du Golfe, Balkans, peut-être Afghanistan et, semble-t-il, Moyen-Orient. L'auteur souligne que l'uranium appauvri est classé dans la catégorie II de la Convention sur la protection physique des matières nucléaires, mais que comme il n'existe aucun traité spécifique l'interdisant, il faudrait déterminer sa licéité sur la base des règles énoncées dans le présent document, y compris l'évaluation avant emploi. L'auteur énonce ensuite les propriétés fondamentales de l'uranium appauvri en précisant qu'il est pyrophorique (hautement inflammable) et qu'il a, lorsqu'il brûle, un effet «aérosol»; c'est là la principale raison de la forte létalité et de l'absence de discrimination des armes contenant de l'uranium appauvri. Une fois inhalées, les particules d'uranium appauvri présentes sous forme d'aérosol demeurent dans les poumons plusieurs années, émettant des rayonnements. De nombreuses années plus tard, le vent peut réintroduire dans l'air de l'uranium appauvri qui s'était déposé sur le sol.

Le document recense un certain nombre d'incidents et d'études illustrant la mortalité et la morbidité liées à l'inhalation de l'uranium appauvri, qui a pour principales conséquences l'apparition de cancers chez les individus exposés et de malformations congénitales chez les enfants nés de personnes ayant inhalé de l'uranium appauvri. Les troubles signalés aux États-Unis, au Royaume-Uni et en Iraq par les anciens combattants de la guerre du Golfe, ainsi que par les civils iraquiens, sont la conséquence médicale notoire d'une exposition à des rayonnements de faible intensité. L'auteur montre également que les utilisateurs d'uranium appauvri ont tenté de maintenir secrets les effets de l'uranium appauvri, et recense plusieurs études entachées d'erreur (dont l'une réalisée par une entreprise militaire) et actes délictueux. Il souligne également que grâce aux pressions exercées par les anciens combattants de la guerre du Golfe et par d'autres personnes, plusieurs initiatives importantes sont menées actuellement, notamment par l'Organisation mondiale de la santé, le Programme des Nations Unies pour l'environnement et le Ministère de la défense britannique. L'auteur termine cette section en énumérant certains des nombreux appels lancés en faveur d'un moratoire sur l'emploi des munitions à l'uranium appauvri.

Il conclut en faisant valoir que la paix et la sécurité peuvent être instaurées non en recourant à ces armes terribles, mais en respectant le droit humanitaire et les droits de l'homme. Il s'inquiète également de la militarisation de l'espace, aspect qu'il n'a pu traiter dans le présent document.

Annex

HUMAN RIGHTS AND WEAPONS OF MASS DESTRUCTION, OR WITH INDISCRIMINATE EFFECT, OR OF A NATURE TO CAUSE SUPERFLUOUS INJURY OR UNNECESSARY SUFFERING

Working paper by Y.K.J. Yeung Sik Yuen

CONTENTS

Introduction

The mandate

1. In its resolution 1996/16 of 29 August 1996, the Sub-Commission on the Promotion and Protection of Human Rights expressed its concern that weapons of mass destruction or with indiscriminate effect may be used against both armed forces and the civilian population with serious consequences of death, injury or disability. It also expressed concern about serious long effects of certain weapons both in terms of human life and for the environment. Further, the Sub-Commission expressed its conviction that the production, sale and use of such weaponry is incompatible with international humanitarian law and human rights. Calling on States to eliminate, in particular, a number of named weapons, including weaponry containing depleted uranium, the Sub-Commission requested the Secretary-General to seek information from a wide range of sources on these weapons and to prepare a report to be presented to the Sub-Commission at its forty-ninth session.

2. The Secretary-General submitted his report (E/CN.4/Sub.2/1997/27) to the Sub-Commission at its forty-ninth session.[1] The Sub-Commission, in its resolution 1997/36 of 28 August 1997, reiterated its concerns about these weapons expressed in its resolution 1996/16 and authorized Sub-Commission member Ms. Clemencia Forero Ucros to prepare a working paper on this topic. In its resolution 1997/37 of 28 August 1997, the Sub-Commission decided to include the question of illicit transfer of arms into the working paper.

3. In its decision 2001/36 of 16 August 2001, the Sub-Commission, recalling its resolutions 1997/36 and 1997/37 of 28 August 1997, authorized Mr. Y.K.J. Yeung Sik Yuen to prepare, without financial implications, in the context of human rights and humanitarian norms, the working paper originally assigned to Ms. Forero Ucros. The Sub-Commission emphasized assessing the utility, scope and structure of a study on the real and potential dangers to the effective enjoyment of human rights posed by the testing, production, storage, transfer, trafficking or use of weapons of mass destruction or with indiscriminate effect, or of a nature to cause superfluous injury or unnecessary suffering, including the use of weaponry containing depleted uranium, in the working paper to be submitted to the Sub-Commission at its fifty-fourth session.

Humanitarian law and human rights

4. The terms of the mandate pose the problem of identifying the relevant humanitarian law and norms relative to the weapons listed above and the human rights likely to be affected by such deployment. Issues of humanitarian law do converge with issues of human rights since there is a minimum standard of ethics common to both fields. The notable difference is that the main United Nations Covenants and regional human rights instruments have no “threshold” and apply to all situations irrespective of whether there is armed conflict or not. These matters will be considered in Part I of this paper.

The weapons

5. The specific types of weapons listed in Sub-Commission resolutions 1996/16 and 1997/36 are nuclear weapons, chemical weapons, fuel-air bombs, napalm, cluster bombs, biological weaponry and weaponry containing depleted uranium.

6. The mandate identifies four categories of weapons:

(a) Weapons of mass destruction (WMD);

(b) Weapons with indiscriminate effect (WIE);

(c) Weapons of a nature to cause superfluous injury (WSI);

(d) Weapons of a nature to cause unnecessary suffering (WUS).

7. The four categories of weapons do not fall within self-contained or hermetically sealed categories of weapons. There is often overlapping and one weapon may have all four characteristics. Although etymologically a distinction can be made between WSI and WUS in practical terms, both terms refer to the same weapons and can be considered together.[2] The relevance of the classification, however, is self-evident since it pinpoints categories of weapons that when used as attack weapons are banned by humanitarian law, and that also infringe basic human rights.

8. Weapons containing depleted uranium are but a specific type of weapon which has been included within the compass of this working paper because of the novelty of these weapons and also because the effects of their use are such that they would equally infringe both humanitarian law and basic human rights. If weapons containing depleted uranium may not fit within the WMD class, there are indications that they fit within classes 2, 3 and 4, i.e. WIE, WSI and WUS.

9. The need to identify specific weapons which fit within the enumerated categories of weapons must be considered from the perspectives that they either do not conform with human rights and humanitarian law outright or they may not be compliant where their use is not curtailed within specific and clearly defined parameters which this working paper will try to delineate. All these matters will be considered in Part II of this paper.

I. HUMANITARIAN LAW AND THE HUMAN RIGHTS IN QUESTION

A. Human rights

10. Human rights are rights to be enjoyed by everyone at all times. However, in situations of armed conflict, some are likely to be infringed more often and in a particularly pronounced degree, especially in terms of rights that may be partially curtailed during armed conflict. Those rights are found in a number of international and regional documents including the International Covenant on Civil and Political Rights (ICCPR), the Genocide Convention[3] and the Convention against Torture.[4] Article 4 of the ICCPR, of course, grants States the right to derogate certain rights in times of war but prohibits any derogation of other rights.

1. The ICCPR, the Universal Declaration of Human Rights and the Charter of the United Nations

(a) The ICCPR

11. The main non-derogable human rights under the ICCPR that immediately come to mind as likely to be infringed by use of these types and categories of weapons in armed conflict are:

(a) The right to life (art. 6). The scope of the "right to life" was considered by the ICJ in its Advisory Opinion, "Legality of the threat or use of nuclear weapons".[5] Invoking article 6 of the ICCPR, the ICJ held that "in principle, the right not arbitrarily to be deprived of one's life applies also in hostilities";[6]

(b) Freedom from torture or cruel, inhuman or degrading treatment or punishment (art. 7).

The enjoyment of those rights are also protected in the main regional instruments, such as the European Convention for the Protection of Human Rights and Fundamental Freedoms, the American Convention on Human Rights and the African Charter on Human and Peoples Rights. The infringement of those two basic rights and freedoms can also be linked with the potential infringement of other human rights, namely:

(c) Freedom from slavery (art. 8);

(d) The rights to liberty and security of the person and the freedom from arbitrary arrest or detention (art. 9);

(e) The right of persons lawfully deprived of their liberty to be treated with humanity and respect consistent with human dignity (art. 10); freedom of thought, conscience and religion, including freedom from coercion which would implant one's freedom to have or to adopt a religion or belief of one's choice (art. 18).

(b) The Universal Declaration of Human Rights

12. The "right to life" is also prescribed in article 3 of the Universal Declaration[7] which states: "everyone has the right to life, liberty and security of person". The fundamental provisions of the Universal Declaration and of the ICCPR have been vindicated generally by the comity of nations to constitute customary international law.

13. Article 25 (1) of the Universal Declaration sets out the right of everyone to a standard of living adequate for health and well-being. In effect it recognizes the right to health and well-being.[8] Even before the Universal Declaration, the Constitution of the World Health Organization (1946) recognized the enjoyment of the highest attainable standard of health as one of the fundamental rights of every human being. The present status of State duties with regard to health is that State duties have now passed beyond the field of good intentions into the realm of binding international law. There is no doubt that State obligations in regard to health will be violated by the use of most of the weapons within the purview of this paper.

(c) The Charter of the United Nations

14. Article 2 of the Charter sets down the principle of sovereign equality of all States. In its paragraph 3, States are enjoined to settle their international disputes by peaceful means in such a manner that international peace and security, and justice, are not endangered. Most important are the provisions of paragraph 4 which spell out that States shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any State, or in any other manner inconsistent with the purposes of the United Nations. It is obvious that a State in possession of the weapons under review here would have substantial "threat power" over a State that did not, and that the threat of use could provoke significant curtailment of the rights and duties of States.

2. The Genocide Convention

15. Article II of the Genocide Convention defines genocide as meaning any of a number of acts committed with intent to destroy, in whole or in part, a national, ethnical, racial or religious group, including:

(a) Killing members of the group;

(b) Causing serious bodily or mental harm to members of the group;

(c) Deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or part;

(d) Imposing measures intended to prevent births within the group.

16. Armed conflicts often carry political, ethnic, racial or religious undertones. History has shown that birth, colour, and religion have at times been considered an element of discomfort, discontent and division and led to war and genocide. Deliberate use of weaponry of the type and category under review when used in certain situations of armed conflict could be characterized as genocide.

3. The Convention against Torture

17. The Convention against Torture is to be read with article 5 of the Universal Declaration of Human Rights, article 7 of the ICCPR and the Declaration on the Protection against Torture.[9] Significantly, article 1 of the Convention against Torture describes the term "torture" as "any act by which severe pain or suffering, whether physical or mental, is intentionally inflicted on a person for such purposes as … punishing him for an act he or a third person has committed or is suspected of having committed …" and article 2 provides that "no exceptional circumstances whatsoever, *whether a State of war or a threat of war* … may be invoked as a justification of torture" (emphasis added). Similar provisions exist in regional documents such as the Inter-American Convention on Torture.[10] The use or threat of use of certain of these weapons could be viewed as intimidating or coercing both the combatants of the opposing forces but also the civilian population.

4. Concluding comments

18. It will be submitted that the effects of the weapons under study infringe some if not all the human rights elicited above, at least insofar as the use of those weapons affect civilians.

B. Humanitarian law

19. Humanitarian law or the law of armed conflict can be viewed from different perspectives. The law of armed conflict consists of treaties which are binding on the signatories akin to parties to a normal contract and also that part of "customary international law", an expression of the "law of civilized nations", relating to armed conflict.

20. Customary law as a whole arises where there is a uniform, consistent and general repetition of similar acts by competent State authorities (usage) and a recognition by States that such practice is binding upon them as law. The existence of customary law is dependent upon general agreement, not unanimous agreement. Thus, a State may be bound by a treaty that expresses customary international law, although it is not a party to that treaty. Customary humanitarian law consists of all aspects of armed conflict not specifically addressed in the treaties governing armed conflict. It is binding on all States, whether or not States have ratified specific treaties. All the major treaties governing humanitarian law, including the Hague Conventions of 1899 and 1907, the Geneva Conventions of 1949 and the two Additional Protocols of 1977, themselves incorporate customary international law in a number of ways, as will be set out below.

21. Reference to customary international law (as a source of law) is also contained both in the Charter of the United Nations as well as in the Statute of the International Court of Justice. The Charter of the United Nations begins with "We the peoples of the United Nations determined … to establish conditions under which justice and respect for the obligations arising from treaties and other sources of international law can be maintained …" and article 38 of the Statute of the International Court of Justice states:

> "the Court, whose function is to decide in accordance with international law such disputes as are submitted to it, shall apply:
>
> "(a) international conventions …;
>
> "(b) international customs, as evidence of a general practice accepted as law;
>
> "(c) the general principles of law recognized by civilized nations;
>
> "(d) judicial decisions and the teachings of the most highly qualified publicists … as a subsidiary means for the determination of rules of law."

1. The Hague Conventions of 1899 and 1907

(a) Mindset of the Conventions

22. Reference to customary international law is found in the 1899 Hague Convention on the Laws and Customs of War on Land (Hague IV) and the 1907 Hague Convention. Paragraph 3 of the preamble defines one of the objects of the Convention as "to revise the general laws and customs of war, either with a view to defining them with greater precision or to confining them within such limits as would mitigate their severity as far as possible". It was felt necessary in the preamble to state that it has not been possible in the Convention to cover all the circumstances which can arise in practice.

(b) The Martens Clause

23. Of particular importance, the High Contracting Parties have proclaimed that they do not intend that unforeseen cases should, in the absence of a written undertaking, be left to the arbitrary judgement of military commanders. Instead, they have deemed it expedient to declare that "in cases not included in the Regulations adopted by them, the inhabitants and the belligerents remain under the protection and the rule of the principles of the law of nations, as they result from the usages established among civilized persons, from the laws of humanity, and the dictates of the public conscience".[11] The above clause, which is commonly known as the Martens Clause, therefore represents a link between treaty law and customary international law dealing with the law of armed conflict and it recognizes "customary international law" as the ultimate yardstick when measuring legitimacy of the means and measures used in armed conflicts.

(c) Proportionality

24. It is of interest that in section II of the Regulations, entitled "Hostilities", there is an important article 22 that proclaims: "The right of belligerents to adopt means of injuring the enemy is not unlimited." Article 22 in fact underlines a "proportionality" test so that the use of weapons must not be out of proportion with the pursuit of legitimate military action.

(d) Weapons causing unnecessary suffering and superfluous injury

25. Article 23 states that, in addition to the prohibitions provided by special conventions, it is especially forbidden to do certain things which include "to employ poison or poisoned weapons" and "to employ arms, projectiles, or material calculated to cause unnecessary suffering". It will be noted that the earlier Convention (1899) employed instead the formula "or material of a nature to cause superfluous injury" so that the two terms "calculated to cause unnecessary suffering" and "of a nature to cause superfluous injury" could be employed, mutatis mutandis, as covering the same situations.

2. The four Geneva Conventions of 1949

26. The four Geneva Conventions of 1949[12] and the two Additional Protocols to the Conventions which were adopted in 1977[13] are the major international instruments protecting victims of armed conflict. A key element in the 1949 Conventions is the enumeration of protections for the civilian population. The whole of Geneva Conventions I-IV, providing for minimum protections for both combatants and civilians, include a number of provisions that can clearly be applied to threat or use of weapons.

(a) Article 3

27. Common article 3 of the Geneva Conventions provides basic protections for combatants and civilians in armed conflict.[14] It provides that:

> "In the case of armed conflict … occurring in the territory of one of the High Contracting Parties, each Party to the conflict shall be bound to apply, as a minimum, the following provisions:
>
> > '1.Persons taking no active part in the hostilities, including members of armed forces who have laid down their arms and those placed hors de combat by sickness, wounds, detention, or any other cause, shall in all circumstances be treated humanely, without any adverse distinction founded on race, colour, religion or faith, sex, birth or wealth, or any other similar criteria.
> >
> > To this end, the following acts are and shall remain prohibited at any time and in any place whatsoever with respect to the above-mentioned persons:
> >
> > '(a) Violence to life and person, in particular murder of all kinds, mutilation, cruel treatment and torture;
> >
> > '(b) Taking of hostages;
> >
> > '(c) Outrages upon personal dignity, in particular humiliating and degrading treatment;
> >
> > '(d) The passing of sentences and the carrying out of executions without previous judgment pronounced by a regularly constituted court, affording all the judicial guarantees which are recognized as indispensable by civilized peoples.'"

(b) Civilians to be spared and weapons not to be of indiscriminate effect

28. Common article 3 therefore establishes the principle that a distinction must be made between civilians and persons who have laid down their arms on the one side and combatants on the other side. The former must be treated humanely and cannot be subjected to violence. Weapons deployed against combatants and military targets should not therefore be of

indiscriminate effect so as to affect civilians or combatants hors de combat. As individuals they enjoy fundamental rights that must be respected by hostile parties in armed conflict. This article has been determined by the ICJ to apply as a "common yardstick" in any armed conflict, whether or not a particular State is an active participant in an armed conflict.[15] This decision clearly affects issues relating to the sale and trafficking as well as actual military use in armed conflict of the types and categories of weapons under review here and reinforces the large role played by customary humanitarian law.

3. Additional Protocol I

(a) General

29. Protocol I relating to the Protection of Victims of International Armed Conflicts recalls in its preamble that "every State has the duty, in conformity with the Charter of the United Nations, to refrain in its international relations from the threat or use of force against the sovereignty, territorial integrity or political independence of any State, or in any other manner inconsistent with the purposes of the United Nations". The same formula is adopted in the Conventional Weapons Convention.[16] Where breaches occur and situations of armed conflict arise, Protocol I caters for a whole list of protections.

(b) Protection of civilians

30. In its general provisions at article 1 (2), Protocol I sets down a general principle that "civilians and combatants remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience".

31. The protection of the civilian population against the effect of hostilities is specifically covered by the "Basic Rule": "In order to ensure respect for and protection of the civilian population and civilian objects, the Parties to the conflict shall at all times distinguish between the civilian population and combatants and between civilian objects and military objectives and accordingly shall direct their operations only against military objectives."[17]

32. Article 52 (2) in fact prescribes that "attacks shall be limited strictly to military objectives" which are defined as being "limited to those objects which by their nature, location, purpose or use make an effective contribution to military action and whose total or partial destruction, capture or neutralization offers a definite military advantage". In case of doubt whether an object that is normally dedicated to civilian purposes, such as a place of worship, a house or a school is being used to make an effective contribution to military action, it shall be presumed not to be so used (art. 52 (3)).

33. There are a number of additional provisions that specifically protect the civilian population. A few notable ones are:

(a) Article 50 (3), which states that the presence within the civilian population of individuals who do not come within the definition of civilians does not deprive the population of its civilian character;

(b) Article 51 (1), which declares that the civilian population and individual civilians shall enjoy general protection against dangers arising from military operations;

(c) Article 51 (2), which enjoins that the civilian population as such, as well as individual civilians, shall not be the object of attack and that acts or threats of violence which have for prime purpose the spreading of terror among the civilian population are prohibited;

(d) Article 51 (4) and (5), which prohibit indiscriminate attacks against civilians or civilian objects as opposed to military targets;

(e) Article 54, which prohibits starvation of civilians as a method of warfare.

It is accordingly prohibited to attack, destroy or render useless objects indispensable to the survival of the civilian populations which must be protected. Such objects would include foodstuffs, agricultural areas for the production of foodstuffs, crops, livestock, drinking water installations and supplies and irrigation works.

34. The need to protect civilians against the effect of hostilities emulates principles whereby weapons should not be directed against civilians and when used on military targets should not have an indiscriminate effect on civilians. The above-cited articles of Protocol I specifically establish those principles which are underpinned by common article 3 and the Fourth Geneva Convention.[18]

(c) New weapons

35. The conditions which must exist before "new weapons" can be used are also confirmed in Protocol I. A party to the Protocol is under an obligation to determine, "in the study, development, acquisition or adoption of a new weapon, means or method of warfare", whether its employment would, "in some or all circumstances be prohibited by this Protocol or by any other rule of international law applicable to the High Contracting Party". This is one of the few provisions of humanitarian law that imposes obligations on States at all times, not only when there is an armed conflict. The obligation of prior study of weapons to ensure that their use will not violate the laws and customs of war or any other international law was also stressed by the International Court of Justice in its Advisory Opinion on the legality of the threat or use of nuclear weapons.[19]

(d) Protection of the environment

36. The protection of the natural environment during warfare is covered by article 35 (3) and article 55 of Protocol I. Care must be taken to protect the environment against widespread, long-term and severe damage. The use of methods or means of warfare that are intended or may be expected to cause such damage to the environment and thereby prejudice the health or survival of the population is prohibited under the Protocol. At paragraph 31 of its Advisory Opinion, the ICJ finds that article 35 (3) of Protocol I also prohibits attacks against the natural environment by way of reprisals. The gist of the two above-mentioned articles is restated in article 1 of the Environmental Modification Convention of 1977:[20] "each State party to this

Convention undertakes not to engage in military or any other hostile use of environmental modification techniques having widespread, long-lasting or severe effects as the means of destruction, damage or injury to any other State party."

37. On 25 November 1992 the General Assembly, in its resolution 47/37,[21] affirmed the general view that environmental considerations must be taken into account in armed conflict in the following terms: "destruction of the environment, not justified by military necessity and carried out wantonly, is clearly contrary to existing international law".

4. The Conventional Weapons Convention 1980[22]

38. The Conventional Weapons Convention, along with its four Protocols,[23] have been adhered to by a number of countries - 88 for the Convention and 61 for Protocol IV. The preamble to the Convention recalls a number of principles to which we have already adverted:

(a) Paragraph 3 - "the general principle of the protection of civilian population against the effects of hostilities";

(b) Paragraph 4 - "the principle that prohibits the employment in armed conflicts of weapons, projectiles and materials and methods of warfare of a nature to cause superfluous injury or unnecessary suffering";

(c) Paragraph 5 - "the principle prohibiting the employment of methods or means of warfare which are intended, or may be expected, to cause widespread, long-term and severe damage to the natural environment";

(d) Paragraph 6 - "the principle that in cases not covered by this Convention and its annexed Protocols or by other international agreements, the civilian population and the combatants shall at all times remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of the public conscience".

Principles (a), (b) and (d) are also reproduced in the Anti-Personnel Mine Ban Convention.[24]

5. Concluding comments

39. The various international instruments cited above, which are by no means exhaustive, taken together with the precepts of customary international law show that a number of legal principles banning or limiting certain arms use are now firmly established.

40. Weapons are to be considered banned if:

(a) Their use has indiscriminate effects (no effective distinction between civilians and belligerents);

(b) Their use is out of proportion with the pursuit of legitimate military objectives;

(c) Their use adversely affects the environment in a widespread, long-term and severe manner;

(d) Their use causes superfluous injury and unnecessary suffering.

II. THE WEAPONS

A. Weapons of mass destruction

1. Nuclear weapons

41. Nuclear weapons (NWs) are explosive devices whose energy results from the fusion or fission of the atom. The process releases huge amounts of heat and energy and also powerful and prolonged radiation causing superfluous injury and unnecessary suffering to victims. The destructive powers of NWs cannot be contained in either space or time and are indiscriminate. The effects of NWs are catastrophic and have the potentiality of annihilating the whole mankind and the entire ecosystem of the planet. NWs therefore infringe humanitarian and human rights law outlined in Part I of this paper.

(a) The General Assembly of the United Nations and nuclear weapons

42. The General Assembly of the United Nations has on numerous occasions condemned the use of nuclear weapons as illegal, a violation of the Charter and a crime against humanity.[25] A few States, obviously NW States, maintain the contrary - on the theory that as NWs are not specifically prohibited by any international treaty they are not illegal. The author finds that theory to be flimsy and likens it to the scenario whereby an illiterate person would insist that writing does not exist.

43. On 15 December 1994 the General Assembly decided to seek an Advisory Opinion from the ICJ on the legality of the threat or use of nuclear weapons. It also referred to resolution 46/40 of 14 May 1993 of the World Health Assembly, in which the ICJ was requested to give an Advisory Opinion on whether the use of nuclear weapons by a State in war or other armed conflict would be a breach of its obligations under international law, including the constitution of WHO. In the resolution, WHO recognized that no health service in the world could alleviate in any significant way a situation resulting from the use of even one single nuclear weapon and that the use of nuclear weapons would have long-term environmental consequences affecting human health for generations, thereby impacting on development. WHO concluded that prevention was the only appropriate means to deal with the health and environmental effects of the use of nuclear weapons.

44. In its reference to the ICJ the General Assembly expressed its conviction that the complete elimination of nuclear weapons was the only guarantee against the threat of nuclear war.

(b) The Advisory Opinion of the ICJ on the use and threat of NWs

45. In its Advisory Opinion the ICJ noted that NW States had generally accepted that their "independence to act" was curtailed by the principles and rules of international law, more particularly humanitarian law. There is further no doubt that humanitarian law applies not only to conventional weapons but also to NWs although NWs were invented after most of the principles and rules of humanitarian law applicable in armed conflict had been elaborated. The Court cited with approval a passage in the written statement submitted by the Government of New Zealand:

> "In general, international humanitarian law bears on the threat or use of nuclear weapons as it does on other weapons. International humanitarian law has evolved to meet contemporary circumstances, and is not limited in its application to weaponry of an earlier time. The fundamental principles of this law endure: to mitigate and circumscribe the cruelty of war for humanitarian reasons."

46. The Court observed that the right to life guaranteed by article 6 of the ICCPR did not cease in times of war, that the use of NWs against a group as such may infringe article III of the Genocide Convention where the element of intent was manifest.

47. The Court also recognized that the use of NWs could be catastrophic for the environment, which "represents the living space, the quality of life and the very health of human beings, including generations unborn".

48. The Court considered, however, that "it does not have sufficient elements to enable it to conclude with certainty that the use of NWs would necessarily be at variance with the principles and rules of law applicable in armed conflict in any circumstance".[26] Whilst the ICJ could hardly have claimed that it was able to encompass all the factual uncertainties of a purely hypothetical problem, it went on to observe:

> "in view of the present state of international law viewed as a whole … and of the elements of fact at its disposal, the Court is led to observe that it cannot reach a definitive conclusion on the legality or illegality of the use of nuclear weapons by a State in an extreme circumstance of self-defence in which its very survival would be at stake."[27]

49. The author is of the view that more has remained unsaid than has been said in the paragraphs of the Advisory Opinion referred to above. The ICJ did not want to commit itself to any firm pronouncement based on a simple hypothesis which was expressed in general terms. It never said that the use of NWs for self-defence purposes, albeit in an extreme case, could be justified. It merely left the question open.

50. Emphasis must however be placed on paragraph 2 (c) of the *dispositif*[28] of the Advisory Opinion which contains the essence of the opinion: the Court unanimously ruled that "a threat or use of force by means of nuclear weapons that is contrary to Article *2*, paragraph 4, of the United Nations Charter and that fails to meet all the requirements of Article 51, is unlawful".

(c) Nuclear winter

51. During the period 1983-1989 extensive investigations were carried out on nuclear winter. Although the nuclear arsenals of the two major nuclear powers are reported to have been significantly reduced in both number and capacity, yet scientific studies still leave no doubt that any nuclear war will likely result in a nuclear winter. Only a few hundred nuclear detonations, or less if selectively targeted (i.e. on petroleum facilities or built-up areas) seem to be sufficient to bring about at least a "nominal" nuclear winter. A "nominal" class III nuclear winter would carry in its wake significant cooling and darkening, drought, massive quantities of generated pyrotoxins, widespread radioactive fallout and other atmospheric perturbations. Average land temperature would drop about 10° C. At noon, the sun would have about one third its usual brightness. Months later, sunlight would return to more than its usual intensity, enhanced in the ultraviolet range by depletion of the high-altitude ozone layer.[29]

52. Under the latest arms reduction agreement,[30] the leaders of the two major NW States pledged to reduce their present declared 6,000 nuclear warheads on launch-ready status by two thirds over the next decade. Only a fraction of what remains would suffice to cause global havoc.

53. A study made by WHO and chaired by a former Nobel laureate[31] found that a nuclear war between the two major nuclear-weapon countries could kill 1 billion people outright. It could also produce a nuclear winter that would probably kill an additional 1 billion people.

54. A study by Professor Alan Robock reached the same findings. His views are that: "Everything from purely mathematical models to forest fire studies shows that even a small nuclear war would devastate the earth."[32]

55. Of more immediate significance, in view of the volatile relations existing between India and Pakistan at time of writing, scientists predict that a limited nuclear war by them would kill at least 3 million people.[33] More chilling calculations are revealed on the basis of only a tenth of the NWs of the two countries being exploded above 10 of their largest cities.

(d) Transfer of nuclear material

56. The need to control the availability and movement of nuclear material is self-evident. Nuclear material also includes nuclear waste which is costly to dispose of. The temptation to disperse such waste on economic grounds into the backyard of developing countries under misleading and false descriptions is a real threat that has been addressed by treaty.[34]

57. The declared objectives of the Convention are to facilitate the safe transfer of nuclear material and to establish effective measures for its physical protection.

58. The parties to the Convention undertake:

(a) That they will ensure that, within their territories, nuclear material is duly protected during international nuclear transport (art. 3);

(b) That they will not export nuclear material unless they have received assurances that such material will be protected during international transport (art. 4, para. 1);

(c) That they will not import nuclear material from a State not a party to the Convention unless they have received assurances that such material will be protected during international transport (art. 4, para. 2);

(d) That they will not allow the transit of nuclear material between States not parties to the Convention through their territories unless they have received assurances that the nuclear material will be protected (art. 4, para. 3).

59. The States parties also undertake to pass appropriate municipal legislation to penalize illicit dealings with nuclear material including theft and fraudulent obtaining of nuclear material or threat to use such material (art. 7). In case of theft or any unlawful taking of nuclear material States parties undertake to provide cooperation and assistance to recover and protect such material to any State that so requests (art. 5, para. 2).

60. The International Atomic Energy (IAEA) is constituted as the central authority and point of contact having responsibility for the physical protection of nuclear material at the international level (art. 5, para. 1).

(e) Stand of NWs States on a nuclear ban

61. Considering the peculiarities of NWs and the devastating effects that will result from any such deployment, the author has tried to understand the reason behind the striking non-existence of a full-fledged NW ban treaty. A marked degree of double standards, one for the international forums and one for the military drawing board, has been observed from the major NW States with regard to the issue. This is amply made out when examining some treaties.

(i) The Non-Proliferation Treaty and the resolution on security assurances

62. In 1970 the Treaty on the Non-Proliferation of Nuclear Weapons[35] (NPT) came into force after it was initiated by the United Kingdom, the then USSR and the United States in July 1968. The treaty focuses on a number of concerns relating to the development of nuclear weapons, namely:

(a) The devastation likely to be caused to mankind by a nuclear war and the need to avert the danger of such a war and to take measures to safeguard the security of peoples;

(b) The proliferation of nuclear arms would seriously enhance the danger of nuclear war;

(c) The intention to achieve the early cessation of the nuclear arms race and to undertake effective measures for nuclear disarmament.

63. Signatories also expressed their desire to ease international tension and to strengthen trust between States in order to facilitate the cessation of the manufacture of NWs, the liquidation of all existing stockpiles, and the elimination of NWs from the national arsenals. In fact, in order to make those pious wishes workable two basic and interrelated understandings and agreements were grafted upon them, namely:

(a) NW States would cease manufacturing and would also eliminate present and future stockpiling of NWs;

(b) Non-NW States would undertake not to manufacture or seek to manufacture NWs and in exchange would receive an undertaking from the NW States that NWs would not be used against them.[36]

64. Those understandings can be reckoned as the most practical and realistic in the circumstances considering that no one can now uninvent NWs. Confidence-building is here essential since NWs will remain in practice in the hands of an elite few who have the technology to produce them at will. In spite of their promises not to manufacture and stockpile NWs at a given time, NW States may have the human fickleness and technology to change their mind. The revelation of the Nuclear Posture Review which was leaked in March 2002 has the potential of sending the NPT to the shredding machine. If actions follow words, the NPT will only have served as a guarantee of hegemony and a self-serving package devised by some to keep others at boot.

(ii) The Nuclear Test-Ban Treaty

65. The same scenario can be observed when the Nuclear Test-Ban Treaty[37] was initiated by the United States, the then USSR and the United Kingdom in 1963. The "Original Parties" proclaimed in the preamble that their principal aim was the speediest possible achievement of an agreement on general and *complete disarmament under strict international control in accordance with the objectives of the United Nations* which would put an end to the armaments race and eliminate the incentive to the production and testing of all kinds of weapons, including NWs (emphasis added). The original parties claimed that the discontinuance of all test explosions of NWs for all time was being sought in a desire to put an end to the contamination of man's environment by radioactive substances so that each of the parties to the Treaty undertook "to prohibit, to prevent, and not to carry out any NW test explosion, or any other nuclear explosion at any place under its jurisdiction or control in the atmosphere or under water or in any other environment if such explosion causes radioactive debris to be present outside the territorial limits of the State under whose jurisdiction or control such explosion is conducted".

66. A first observation is that the Treaty does not hinder the continuation of underground nuclear tests. Indeed, at a meeting of the Disarmament Committee held the previous year, the Soviet delegate,[38] addressing himself to two draft treaties concerning the total and partial ban on tests of NWs which were advanced on 29 August 1962 by the delegation of Great Britain and the United States and which contain similar provisions, pointed out that the continuation of underground nuclear blasts would not lead to an end to the nuclear armaments race, and that the threat of thermonuclear war would only increase. He pointed out that the "legalization" of

underground tests would be a stimulus to States that wanted to develop their own NWs. He felt that the proposal was aimed at providing Western powers with one-sided military advantages, considering that the United States had been using underground tests to improve its NWs. Should underground nuclear tests be legalized with a simultaneous prohibition of such tests in the atmosphere, that would mean that the United States could continue improving its NWs whereas the Soviet Union would have "its hands bound". An offer was made to reach agreement on the ending of all NW tests no matter in what medium they were held with a memorandum, submitted by "eight neutralist States", serving as a basis of discussion.

67. The author of this paper can only observe that the sound and laudable observations of Mr. Kuznetsov were not taken heed of by the Soviet authorities one year later when the USSR signed the Treaty as one of the three "Original Parties".

68. In an editor's note which appeared in Hsinhua[39] in its edition of 29 July 1963 some of the underlying motives behind the Treaty were laid bare. In a public statement made on 26 July 1963 President John F. Kennedy pointed out that the Treaty:

(a) Would not "eliminate the danger of war", "nor [did] this treaty mean an end to the threat of nuclear war";

(b) Would not affect the United States strength of NWs of "entirely sufficient yield";

(c) Would permit, and did not prohibit, the United States from continuing its underground nuclear testing;

(d) Would not restrict continued production and stockpiling of NWs by the United States;

(e) Would not restrict the use of NWs by the United States in time of war;

(f) Would not restrict United States "assistance" to other nations.

69. In addition, Kennedy said that the United States would benefit from the treaty which could prevent the non-NW States from possessing NWs and that at any rate the United States stood "ready to withdraw (from the Treaty) and to resume all forms of testing, if [it] must".

70. The French newspaper *Le Monde* found the Treaty to be of little significance. It summarized its impact as follows: "It [the Treaty] does not make the signatories promise much since they keep without any control stocks of [nuclear] weapons sufficient for destroying the planet many times and they are able to increase their stocks at will."

71. But the most enlightened opinion came from the *Ghanaian Times*, which focused on the fact that "the ultimate objective of the peoples of the world is to secure a ban on all NWs, their manufacture, testing and stockpiling. It is only on such a condition that the threat of a nuclear conflagration can be completely removed and peace thus safeguarded."[40]

2. Mini-nukes and bunker busters

72. In December 1996 four complete retrofit kits of the B61-11 earth-penetrating nuclear bombs were delivered to the United States Air Force. This was stated by the Director of Sandia National Laboratories, C. Paul Robinson, before a subcommittee of the Senate Armed Services Committee.[41]

73. The B61-11 is reported to have a specially hardened nose of depleted uranium. The new case design allows soil penetration of some 25 feet upon which the nuclear bomb would detonate. The Pentagon now wants a bomb four times heavier than the actual 1,200-lb B61-11 for deeper penetration.

74. The B61-11 was introduced to replace the B53, an 8,900-lb, nine-megaton bomb that was developed as a "city buster". Since the deterrent value of older weapons designed to destroy entire cities is virtually nil because no one thinks they will be used, some believe that "rogue States" and "terrorist groups" will apprehend that the United States may more likely retaliate with smaller tactical NWs which, for comparative purposes, are still several times more powerful than the atomic bombs dropped on Japan in 1945.

75. A classified United States Nuclear Posture Review (NPR) leaked in March this year[42] indicates that the Pentagon had been ordered by the Government to draw up war plans for the first use of NWs against seven States, reputedly termed "axis of evil", namely Iraq, the Islamic Republic of Iran, the Democratic People's Republic of Korea, the Libyan Arab Jamahiriya, the Syrian Arab Republic, the Russian Federation and China. The first five countries are not nuclear armed.

76. Concerns have been expressed that the development of the B61-11 contravenes the Comprehensive Test-Ban Treaty since it is a new weapon developed after the treaty was signed, though not ratified, by the United States in September 1996.

77. It is said to be new because it gives the United States a new capability to destroy deeply buried targets like command and control bunkers. The position of the United States Government is that the B61-11 is only a modification of the existing B61-7 bomb utilizing an existing nuclear package that has not required a nuclear test.

78. Concerns have been expressed that the B61-11 may call into question the "security assurances" whereby the United States pledged not to use NWs against any non-NW State that is a party to the Nuclear Non-Proliferation Treaty (NPT).

79. The author has no doubt that the NPR instructions are contrary to humanitarian and human rights law because:

(a) Mini-nukes are still NWs that fall under WMD, WIE and WUS and that further cause permanent ill effects on the environment;

(b) The United States would be in breach of the "security assurances" given by it as an express condition for the renewal by non-NW States of the NPT.

80. The NPR is an indication that the United States is prepared to violate a world taboo, cross the threshold and break the firewall by adopting a policy of first-strike nuclear attack.

81. There cannot be a better illustration of a good scholar following the advice of a bad teacher than to quote the recent stand of H.E. Munir Akram, Pakistan's Ambassador to the United Nations, who is reported to have said that while Pakistan would not attack India unless it was first attacked, it had never subscribed to a doctrine of "no first use" of nuclear arms against its neighbour.[43]

3. Biological and chemical weapons

82. Biological and chemical weapons are considered as weapons of mass destruction (WMD) because of their destructive potential. They also cause unnecessary suffering and may affect the civilian population in an indiscriminate manner. Their prohibition and total destruction must therefore be a priority objective of the comity of nations. A naming of some of the more notorious chemical and biological agents that can be used as WMD will help situate the debate.

83. Some of the chemical agents are:

(a) Mustard gas, first used as a weapon in the First World War. It causes blisters and can be fatal if inhaled;

(b) Hydrogen cyanide, a blood agent used worldwide to manufacture acrylic polymers and which was reportedly employed during the Iran-Iraq war;

(c) Sarin, a nerve agent developed during the Second World War that causes respiratory failure. In 1995, *Aum Shinrikyo*, a Japanese cult, used it to kill 13 people in a Tokyo subway. The attack also caused some 5,500 non-fatal casualties;

(d) Soman, a nerve agent that made up much of the former Soviet Union's chemical arsenal;

(e) CS, the commonly used tear gas for riot control. It can be deadly if inhaled in high concentrations;

(f) Phosgene, a dangerous choking agent that accounted for 80 per cent of chemical deaths in the First World War.

84. Among biological agents the following are the more notorious:

(a) Anthrax - the much-talked-about white powder sent through United States mail following 11 September 2001. It can be particularly deadly if spread by aerosol. It causes respiratory failure and is lethal. Antibiotics (CIPRO, in particular) help if taken early;

(b) Ebola - a virus which decimated some African countries and which *Aum Shinrikyo* tried to obtain;

(c) Cholera - a bacterium which is stable in water and which can be used to contaminate reservoirs;

(d) Smallpox - a highly contagious virus that was eradicated in 1977. It officially exists, however, in two laboratories in the United States and Russia. Only limited amounts of vaccine exist.

85. The two major treaties banning the production, storage and use of chemical and biological weapons are the Chemical Weapons Convention 1993 (CWC)[44] and the Biological and Toxin Weapons Convention 1972 (BWC).[45] In the preamble to both conventions reference is made to the Poisonous Gas Protocol of 1925,[46] which is thus supplemented by the two conventions.

(a) The BWC

86. The BWC prohibits the development, production, stockpiling and acquisitions of biological (bacteriological) and toxin (organic poisons) weapons. These weapons are dangerous weapons of mass destruction, the use of which is "repugnant to the conscience of mankind" - as mentioned in the last paragraph of the preamble. Paragraph 1 of the Poisonous Gas Protocol also states that their prohibition is "universally accepted as a part of International Law, binding alike the conscience and the Practice of nations". Relatively small amounts of biological or chemical warfare agents are reported to be able to produce huge numbers of casualties - according to some estimates, casualties could run into hundreds of thousands.[47] The main weakness of the BWC is the lack of an independent mechanism for verifying compliance. The difficulty in distinguishing biological agents used for legitimate, e.g. medical and pharmaceutical, purposes and those used for purposes of biological warfare can be real. The strain of a bacterium needed to make a biological weapon may be the same as for cultivating a vaccine. In March 2000, however, at a symposium marking the twenty-fifth anniversary of the BWC, the Chairman of the Ad Hoc Group of States Parties to that Convention stated that a verification protocol to the Convention was being negotiated.

(b) The CWC

87. The CWC is a global treaty that bans an entire category of weapons of mass destruction. Negotiations took some 20 years to reach fruition at the Conference on Disarmament. The Convention's scope, the obligations assumed by the States and, more especially, the monitoring system for compliance have brought new ideas and a ray of hope. The CWC is an arms control treaty which impacts directly on companies engaged in the commerce of dual-use chemicals that can be turned into chemical weapons. Those companies are required to submit reports to their respective Government and are subject to inspection by the Organization for the Prohibition of Chemical Weapons, the international body that administers the treaty in The Hague.

88. As of 1 January 2001, 141 States had ratified or acceded to the Convention and a further 35 States had signed it. Eighteen members of the United Nations have neither signed nor ratified the CWC including Iraq, the Democratic People's Republic of Korea, the Libyan Arab Jamahiriya, Egypt, Angola and Somalia.

4. Biological and chemical versus nuclear weapons

89. Far from making an apology for the illegality and criminality of the use of biological and chemical weapons which are banned for all purposes by customary international law and by treaties which are largely adhered to by the vast majority of nations, the author cannot help reflecting on the glaring fact that no agreement, on a global and comparable scale, to ban completely the production, stockpiling and use of nuclear weapons exists.

90. Legitimate questions can be asked as to why less success has been achieved in securing a treaty banning NWs although the ill effects of NWs are far more consequential and obnoxious than those of biological chemical weapons.

91. The latter are sometimes referred to, with some degree of derision, as the poor men's NWs. That derogatory term underscores two facts:

(a) Biological and chemical weapons are weapons of mass destruction; and

(b) The production, transfer, stockpiling and use of certain biological and chemical weapons do not require the high technology which remains the exclusive domain of rich, industrialized and dominant countries.

92. There are reports that *Aum Shinrikyo* had set up its own complex of chemical factories and biological laboratories. The sarin was thus home brewed.

93. One may wonder if it is not because these weapons can be produced in poor countries, but also because they can be smuggled and used elsewhere that it has become imperative for the world at large to curtail their use through treaties to which certain nations may otherwise have been reticent to adhere.

94. On the other hand, since NW States belong to a small, select club where the membership is constrained by the members themselves, there may not appear to be any pressing need to adhere to any corresponding treaty banning NWs. One may wonder whether bilateral agreements reached and usually announced with great pomp to limit the proliferation of such weapons, as opposed to banning them, are not in the nature of periodic public relations exercises rather than dictated by higher moral considerations to genuinely decrease the real risks of nuclear war.

B. Weapons with indiscriminate effect

95. WIE are weapons the effects of whose use cannot be limited to military objectives but strike civilians and civilian objects as well without distinction.

96. Article 51 (4) of Protocol I which prohibits indiscriminate attacks defines such attacks as follows:

(a) Those which are not directed at a specific military objective;

(b) Those which employ a method or means of combat which cannot be directed at a specific military objective; or

(c) Those which employ a method or means of combat the effects of which cannot be limited as required by the Protocol and consequently, in each such case, are of a nature to strike military objectives and civilians or civilian objects without distinction.[48]

97. Furthermore, article 51 (5) particularizes the following types of attacks, among others, as indiscriminate:

(a) An attack or bombardment by any methods or means which treat as a single military objective a number of clearly separated and distinct military objectives located in any area containing a similar concentration of civilian or civilian objects;

(b) An attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated.[49]

98. The prohibition against indiscriminate attack carries a necessary corollary, in that the presence or movements of the civilian population or individual civilians shall not be used to render certain areas immune from military operations, in particular in attempts to create human shields to protect military objectives from attacks.[50]

99. It is clear that the use of the word "indiscriminate", both in article 51 (4) (c) of Protocol I with regard to the term "indiscriminate attacks" and in the terms of reference of this working paper with reference to the term "weapons with indiscriminate effect", apply, mutatis mutandis. This working paper therefore is concerned with weapons, the effect of which cannot be limited to military objectives and whose use could be in breach of humanitarian law.

100. The following weapons will be studied in turn as an illustration of what some of the WIE are, namely anti-personnel mines, cluster bombs (CBs) and fuel air explosives. They are, however, by no means limitative. As we have already seen, weapons of mass destruction are by definition equally indiscriminate in effects.

1. Anti-personnel mines

101. The preamble to the Anti-Personnel Mines Convention (APMC)[51] reminds us that anti-personnel mines (APMs) are treacherous weapons which "kill or maim hundreds of people every week; mostly innocent and defenceless civilians and especially children". APMs, therefore, "obstruct economic development and reconstruction, inhibit the repatriation of refugees and internally displaced persons, and have other severe consequences for years after emplacement".

102. An anti-personnel mine is defined as "a mine designed to be exploded by the presence, proximity or contact of a person and that will incapacitate, injure or kill one or more persons". But the use of an anti-personnel mine that is detonated manually from a remote or protected

position using, for example, a land line or electronic signal is not prohibited. It is the indiscriminate effect of anti-personnel landmines which automatically explode by the presence, proximity or contact of a person that primarily renders them illegal.

103. The APMC imposes broad restrictions on the States parties:

(a) They cannot use APMs (art. 1 (1));

(b) They cannot develop, produce, acquire, stockpile, retain or transfer APMs;

(c) They cannot assist, encourage or induce activities prohibited under the Convention.

104. The APMC has set ambitious goals for member States which are required to destroy their stockpiles within 4 years (art. 4) and clear any existing mined areas under their jurisdiction or control within 10 years from the time the Convention enters into force for them (art. 5). To ensure compliance, States parties are required to take national implementation measures, including imposition of penal sanctions to prevent and suppress any activity prohibited by the Convention which may be carried out within their jurisdiction. They are also to report on their stockpile of APMs and undertake decommissioning programmes.

105. There are presently 122 States parties to the Convention with 11 more who have signed. Whilst APM transfers appear to have virtually stopped and mine-related accidents are declining, it must be noted that many militarily significant countries such as the United States, Russia, China, India and Pakistan still remain outside the Convention.

106. The rationale of certain Governments in refusing to sign the APMC is that they may need to use the weapons one day. It is said that even Hollywood seems to have lately sent the message to ban APMs. "In an era of ever more precise smart-bomb technology, landmines are the ultimate in imbecilic weaponry. They are the psycho-killers of modern arms: cross their path and they blow you away - for absolutely no reason whatsoever."[52]

2. Cluster bombs

(a) Definition and use of cluster bombs

107. Cluster bombs (CBs) are munition containers which open in mid-air and disperse smaller munitions or submunitions. They are usually dropped from aircraft or delivered by surface artillery or rockets.[53] The large number of munitions dispersed increases the density of explosives in the target area, with submunitions designed to strike every few feet or so. CBs saturate an area with explosives and tiny flying shards of steel. Depending on the type of delivery the submunitions can be dispersed to areas as large as several football fields.

108. CBs are usually designed to explode on impact, just before impact or a short time after impact. CBs and landmines are therefore different in design and intended function and only landmines are intended to rest in the soil until they explode when disturbed. CBs, however, have

a failure rate that is reported to be between 5 and 30 per cent. Any use of CBs therefore will in effect result in creating unregulated minefields since "failure" does not mean that the weapons are harmless. They may explode with the slightest touch, when picked up by children or when inadvertently stepped upon by an unsuspecting passer-by.

109. According to the United States Office of Munitions, some 30 million submunitions were dropped over Iraq and Kuwait during the Gulf war.[54] Assuming a low failure rate of 5 per cent, that would still leave 1.5 million pieces of unexploded ordnance (UXOs) in that region.

110. In 1991 Iraq reported that as at August of that year, 440 injuries and 168 deaths had befallen Iraqi civilians because of UXOs dropped by the United States. UXOs were responsible for the death of nearly 10 per cent of the United States fatalities in the Gulf war. Although there were claims that CBs were self-deactivating, hundreds of Iraqi civilians have been killed or injured by those devices which never got round to self-deactivating. The percentage of CB failures in the Gulf was reported to be as high as 20 per cent.

111. CBs were reportedly used in the Lao People's Democratic Republic from 1964 to 1973 by the United States. Even today in Xieng Khouang, believed to be infested with anti-personnel UXOs, farmers and civilians who were not yet born when the war ended are being maimed and killed in their rice fields from defective bombs dropped more than 20 years before.[55]

112. In Afghanistan, during the Soviet occupation the Soviet army is reported to have used CBs against civilians in 1995.[56] Last year and early this year the United States dropped CBs in Afghanistan in its fight against the Taliban. The anti-personnel submunitions meant to explode shortly after they were dropped had bright yellow casings of the same colour as the food packets which the United States had airdropped some time before.

113. CBs are reported to have been also used in Angola, Azerbaijan, the countries of the former Yugoslavia, Chechnya, Colombia, Ethiopia, Georgia, Lebanon, Nicaragua, Sierra Leone and Turkey.[57]

(b) Types of CBs

(i) CBU-87

114. One of the latest CBs in the United States arsenal is the CBU-87 combined effects munition. Combining light anti-armour with anti-personnel capabilities together with incendiary effects, it was the first weapon to include all three "kill mechanisms".

(ii) The *Belouga* and others

115. Cluster munitions have also been built by several nations: France has its *Giboulée*, *Belouga* and Thomson-Brandt BAP-200. The second name is no caviar, and the last named is a cratering bomb. The United Kingdom built and dropped one of its CBs, the BL-755, on Argentine troops in the Falklands. More recently, the JP-233's cluster weapons were extensively used by RAF Tornado aircraft in the Gulf war. Germany too has built its own CB, the

MBB-Diehl MW-1, a "multipurpose" weapon. Russia has developed the RBK-500, a CB in the 500-kilogramme class. Israel has developed at least one type of CB, designated the TAL-2. Chile and South Africa are also known to have produced CBs and it is likely that such weapons are made by other countries not listed in this paper.

(c) The illegality of CBs

116. The Anti-Personnel Mines Convention 1997 describes "anti-personnel mine" as meaning "a mine designed to be exploded by the presence, proximity or contact of a person and that will incapacitate, injure or kill one or more persons". That definition would include an unexploded cluster munition that would turn into a landmine. This has been part of the concern of the United States in not joining the APMC. The preamble to that Convention at paragraph 4 recognizes that "a *total ban* of anti-personnel mines would also be an important confidence-building measure" (emphasis added).

117. It cannot be gainsaid that munition manufacturers and military decision makers take into account the failure rate of munitions when computing the kill rates of cluster bombs in various situations. They also have foreknowledge that civilians are likely to be injured by UXOs. Considering the vast amount of munitions dispensed by CBs and the corresponding large number of UXOs which will result and will likely affect civilians, the author has no doubt that CBs are indiscriminate and accordingly contrary to humanitarian and human rights law. Weapons that lurk in the soil, often buried deeply underneath, waiting for the unborn to live so that they may be killed are indiscriminate in the extreme.

118. The International Committee of the Red Cross (ICRC) has asked for a moratorium on the use of cluster bombs.

3. Fuel-air explosives (FAEs) or daisy-cutters

(a) BLU-82, the 15,000-pound bomb

119. The *Washington Post* reported on 6 November 2001 that two BLU-82 bombs were dropped on Afghanistan. The BLU-82, a "fuel-air explosive" (FAE) 15,000-pound bomb, is reported to be the world's biggest non-nuclear device. Nicknamed "Big Blue" by the Associated Press, the BLU-82 is as large as a Volkswagen beetle, though heavier. FAEs are also known as hypobarometric bombs, or daisy-cutters.

120. The name "hypobarometric" refers to the fact that these bombs are activated above ground surface by means of a barometer or atmospheric pressure sensor that is activated upon deployment. The explosive is first dispersed in the atmosphere before being ignited by a detonator. According to Laura Flanders,[58] a journalist and broadcaster, the result is "a firestorm that incinerates an area the size of five football fields, consumes oxygen, and creates a shock wave and vacuum pressure that destroys the internal organs of anyone within range".

121. The name daisy-cutter comes from the shape of the crater left by the bomb.

122. In a briefing, a high-ranking officer of the United States military said: "As you would expect, they make a heck of a bang when they go off and the intent is to kill people." [59]

123. FAEs were first used in the Korean war. They were used in Viet Nam to create instant helicopter landing pads and in the Gulf war to detonate minefields and terrorize Iraqi troops. The first generation used gasoline, making them huge Molotov cocktails. The second generation, in current use, uses aluminium powder which burns at around 10,000 degrees Fahrenheit. A blast would cover an area a mile in diameter and generate pressure sufficient to crush underground tunnels, including reinforced arches, 12 feet deep. The third generation FAEs use uranium powder which burns even hotter.[60] Both second and third generation FAEs are easily mistaken for nuclear weapons since they produce the familiar mushroom cloud.

(b) The illegality of FAEs

124. The writer does not see how civilian casualties can be avoided when a weapon of the magnitude of the "Big Blue" is used. Its effect would, in all probabilities, be indiscriminate. One can also imagine the not unlikely scenario where one of those bombs could run amiss of its target. Further, there have lately been increased concerns that those weapons of tremendous destructive power may be the cause of earthquakes. The *Agence France Presse* (AFP) reported on 6 March 2002 that a severe earthquake which had struck northern Afghanistan on the previous day could have been caused by the massive use of powerful bombs by United States troops. An unnamed Russian source was said to have stated that some of the bombs were known to provoke landslides. The quake, which measured 7.2 on the Richter scale, was unprecedented in Afghanistan. It triggered landslides in Dahari Zoa in northern Afghanistan, burying houses and damming up the river which then flooded other houses. Weapons watchers have also made a correlation between the heavy bombing of bunkers in Serbia with the massive earthquake in neighbouring Turkey sometime after.

125. Whilst these weapons qualify as weapons with indiscriminate effect they may also be a menace to the environment.

C. Weapons of a nature to cause superfluous injury

126. As explained in Part I, the two terms "weapons causing superfluous injury" (WSI) and "weapons causing unnecessary suffering" (WUS) mean more or less the same thing and can be used, mutatis mutandis. "Superfluous" means "more than is needed, not needed, unnecessary".[61] The word "unnecessary" is easily understood. The two terms used in conjunction in fact make up the gist of the title of the Conventional Weapons Convention.[62] Recourse to some amount of violence to injure or to kill is bound to be necessary in an armed conflict. Soldiers, at least those in "Dad's army", used to have a rifle and perhaps a bayonet to fight with. However, not every type of ammunition is permitted. One that expands or flattens on impact (the so-called "dum-dum" bullet), which causes a gaping wound that is difficult to treat, is prohibited precisely on the ground that it causes superfluous injury and unnecessary suffering. Again, whilst the use of the bayonet is permitted, the bayonet should not bear notches which would cause a jagged wound resulting in suffering which is out of proportion and unnecessary.

127. It is not possible to enumerate with any degree of precision and completeness a list of weapons that would be prohibited on the ground that they fall under WUS or WSI. This is a factual issue and must be assessed case by case in an objective manner. Suffice it to say that all the types of weapons under consideration in this paper would equally fall under the classification of WUS and WSI.

D. Weapons containing depleted uranium

1. General

128. Weapons containing DU are of relatively recent use. Although experiments using DU in armour-piercing weapons began in the late 1950s in the United States and the USSR, DU weapons were reportedly used for the first time in combat in 1974 by the Israeli army under United States supervision during the Yom Kippur war.[63] The experiments resulted in mass production of DU munitions in the United States.

129. DU, a heavy metal almost twice as dense as lead, is a waste product of nuclear bomb production. The United States Department of Energy is reported to have a stockpile of some 500,000 metric tons accumulated ever since the earliest atomic projects of the 1940s. Civilian uses of DU include uses as ballast and counterweights in aircrafts, radiation shields in medical radiation therapy units and containers for the transport of radioactive materials.[64] DU is also used for protection of military vehicles like tanks and in ammunition designed to penetrate armour plate. In fact, almost the entire American arsenal of current armour-piercing bullets is made of DU.

2. Widescale military use of DU

130. DU ammunition was first used on a wide scale during the Gulf war in 1991. The Pentagon has officially confirmed that at least 320 metric tons of DU were left behind on the battlefields of Iraq, Kuwait and Saudi Arabia.[65] Russian military experts believe that 1,000 metric tons would be nearer the actual amount.[66] In a paper submitted to the United Nations Commission on Human Rights,[67] Dr. Beatrice Boctor, a well-known anti-DU activist,[68] reports that estimates based on information obtained through the Freedom of the Information Act suggest that United States, British and possibly Saudi Arabian forces fired 944,000 rounds, that is 2,686 tons, of DU-tipped bullets.[69] At least 350 metric tons of DU fragments still lie in the battlefields and more in the form of aerosols from the explosions. These will continue to pollute the ecosystem of the Gulf for generations. A British Atomic Energy Authority (AEA) report declares that some 500,000 will die before the end of the century from the radioactive debris left in the desert.[70]

131. DU shells were also used by the United States forces in the Balkans. This was confirmed in a United States Department of Defence news briefing on 3 May 2001. Information on the quantity of DU ammunition used by NATO in the 1999 “Operation Allied Force” against Yugoslavia was given by the NATO Secretary-General, Lord Robertson, to United Nations Secretary-General Kofi Annan. DU was used during approximately 100 missions and approximately 31,000 rounds of DU ammunition were used.[71] Comparatively, there were at least 100 times more DU munitions used in the Gulf than in the Balkans.

132. There is every likelihood that DU shells have also been used in Afghanistan. The first hint that they may have been used came in January this year. Reuters reported on 16 January that Donald Rumsfeld, the United States Defence Secretary, said that: "One site registered an increased level of radioactivity but it appeared to be a result of depleted uranium in some warheads and not from any nuclear or radiological weapon of mass destruction."[72] Review and assessment in this area are essential, as soon as possible and for obvious reasons.

3. Legal compliance of weapons containing DU as a new weapon

133. Annex II to the Convention on the Physical Protection of Nuclear Material 1980 (which became operative on 8 February 1997) classifies DU as a category II nuclear material. Storage and transport rules are set down for that category which indicates that DU is considered sufficiently "hot" and dangerous to warrant these protections. But since weapons containing DU are relatively new weapons no treaty exists yet to regulate, limit or prohibit its use. The legality or illegality of DU weapons must therefore be tested by recourse to the general rules governing the use of weapons under humanitarian and human rights law which have already been analysed in Part I of this paper, and more particularly at paragraph 35 which states that parties to Protocol I to the Geneva Conventions of 1949 have an obligation to ascertain that new weapons do not violate the laws and customs of war or any other international law. As mentioned, the ICJ considers this rule binding customary humanitarian law.

4. Properties of uranium and DU

134. WHO Fact Sheet No. 257 gives clear and simple data on the properties of Uranium and DU:

(a) Uranium:

i) Uranium is a silver-white, lustrous, dense, natural, weakly radioactive element. It is ubiquitous throughout the natural environment, and is found in varying but small amounts in rocks, soils, water, air, plants, animals and in all human beings;

ii) Natural uranium consists of a mixture of three radioactive isotopes which are identified by the mass numbers ^{238}U (99.27% by mass), ^{235}U (0.72%) and ^{234}U (0.0054%);

iii) Uranium is used primarily in nuclear power plants. However, most reactors require uranium in which the ^{235}U content is enriched from 0.72% to about 3%;

(b) Depleted uranium:

i) The uranium remaining after removal of the enriched fraction contains about 99.8% ^{238}U, 0.25% of ^{235}U and 0.001% ^{234}U by mass; this is referred to as depleted uranium or DU;

ii) DU is weakly radioactive and a radiation dose from it would be about 60% of that from purified natural uranium with the same mass;

iii) The behaviour of uranium and DU in the body is identical radiologically and chemically.

135. The human body contains some 90 micrograms of uranium from the food and water it consumes and the air it breathes. Most of the uranium entering the body (>95 per cent) via inhalation or ingestion is not absorbed, but is eliminated via the faeces. Some 90 per cent of the uranium absorbed into the blood is filtered by the kidneys and excreted in the urine within a few days.

5. Ill effects of DU

136. It is generally agreed that penetrators made with DU have great range and velocity which enable them to penetrate most kinds of armour (including otherwise virtually impenetrable DU armour, as Gulf war friendly fire casualties demonstrated).

137. But their battlefield effectiveness is reportedly undermined by other deadly qualities. DU is said to be a highly toxic and radioactive heavy metal with pyrophoric (flammable) properties: it bursts into flames upon impact. The burning uranium then spreads into the atmosphere, creating a small-scale fallout of aerosolized uranium particles that can be inhaled or ingested from the air or by contact with contaminated materials and sites. These particles can travel anywhere that dust goes.[73]

138. Aerosol is reported to be much more hazardous than naturally occurring uranium particles in soil or food, because it is easily breathed into the lungs. It will stay there for some three to four years delivering radiation doses to the tissues since it is not very soluble in water.[74]

139. DU aerosol particles were discovered in 1979 by workers at the Knolls Atomic Laboratory north of Albany, New York, when they found DU contaminants on their own air-filters 42 km from a factory (that of the National Lead Industries (NL)) which was reported to have been manufacturing DU ordnance and counterweights.

140. According to Dr. Leonard Dietz of Knoll, that was by no means the maximum fallout distance for DU aerosol particles. NL was closed down, decontaminated and dismantled in 1983 for emitting more than 150 micro curies (387 grams) of DU.

141. According to United States Government documents, short-term effects of high doses of DU can result in death, while long-term effects of low doses have been implicated in cancer.[75]

142. Although DU is less radioactive than ^{235}U or plutonium, there is no threshold level of radiation below which an exposed person is safe from radiation damage. Besides, DU also remains an extremely harmful substance with the chemically toxic properties of many heavy metals.[76]

143. It must be stressed that the real problem with DU weapons arises when it is fired and when upon combustion the DU particles are formed and aerosolized. The information provided to Senator Sam Nunn by the United States Air Force[77] to the effect that "… these projectiles [DU] are no more hazardous to store, transport, or employ than those composed of lead or copper", and the view echoed in the United States army report to Congress that "the health risks associated with using DU in peacetime are minimal. This includes risks associated with transporting, storing and handling intact DU munitions and armour during peacetime", simply do not address the real issue of health risks to man and environment after DU munitions have been fired, thus dispersing radioactive DU particles which can be inhaled or ingested.

144. DU has been blamed for affecting health in numerous cases. A few are mentioned here:

(a) Nearly 199,000 veterans, more than one in four who served in the Gulf from August 1990 to July 1991, were reported to have filed disability claims, according to the Department of Veterans Affairs.[78] The illnesses complained of include chronic muscle and joint pain, anxiety, fatigue and memory loss, collectively termed Gulf War Syndrome. The Veterans' Administration (VA) had earlier announced that a preliminary study found Gulf war veterans are nearly twice as likely to develop amyotrophic lateral sclerosis (ALS), known as Lou Gehrig's disease, as other military personnel;

(b) DU is cited as the most likely source of the increased number of birth deformities and cancer in Iraq following the Gulf war in 1991. Cancer appears to have increased between seven and ten times and deformities between four and six times;[79]

(c) Dr. Siegwart Horst-Gunther, President of the International Yellow Cross, took pictures between 1993 and 1995 of birth deformities in Iraq. In 1996 he published them in book form.[80] Dr. Gunther has also additional photographs from his unpublished collection, some showing the birth deformities in Gulf war veteran's children. All these deformities are said to be associated with the use of DU;

(d) Dr. Edward de Sutter, a Dutch eye doctor from Groeningen Hospital, visited Iraq following reports he had read on the Internet about the worrying number of anophthalmos cases - babies born without eyes or with just one. The normal incidence of anophthalmos is 1 in 50 million births. Dr. Mohammed A. Salman, an eye surgeon from Baghdad, had reported nine cases in two years with eight babies missing both eyes. Dr. de Sutter reported[81] having personally examined a number of children born without eyes and having seen pictures of children with grotesque anomalies. His colleague, Roland Bonneux, is reported to have examined children with an absent crown of the skull and who were being kept alive in an incubator. According to Dr. Salman, the fathers of seven of the eight anophthalmos babies born with both eyes missing had been exposed in 1991 to United States antitank weapons feared to have contained DU;

(e) Dr. Hari Sharma, a Canadian chemist, has measured uranium 100 times the average concentration in the urine of British Gulf war veterans more than nine years after the war. This was caused by the inhalation of DU particles. His most recent work, in which he

analysed tissue samples of persons in southern Iraq, the report of which is still in draft form, indicates the presence of DU throughout the body. The author must express alarm at these preliminary findings;

(f) A sergeant (Sgt. Clark) and 12 of his men found themselves coughing and choking in smoke from burning Iraqi tanks hit by 30-mm DU-tipped cannon rounds. He has had chronic problems since the war and his daughter was born in September 1992 with purple welts called hemangioma covering not only her face and body, but some internal organs as well. The child has serious breathing problems and was born without a thyroid. The sergeant stated that a geneticist told him that he could have ingested some radiation and that it could affect sperm cells. Almost three years after his exposure to DU, his urine tested positive for uranium.[82] An army nurse (Ms. Picou) and seven other women in her medical team were exposed to DU from burning destroyed Iraqi armour. Dr. Thomas Callender of Lafayette, Louisana, has examined the nurse and said on a television documentary that her outcome bears a striking similarity to other individuals who had exposures to ingested radioactive elements. She has been given a medical discharge. The 7 nurses and the 12 soldiers probably became contaminated with DU. These 21 people are not included in the official list of those recognized by the United States Government as having been exposed to DU. Given the large tonnage of uranium penetrators in cannon rounds that were fired on the battlefields in Iraq and Kuwait, it is likely that many thousands of other soldiers also became contaminated with DU. The United States army and the Veterans Administration balk at giving urinalysis tests and "in vivo" tests (whole-body counting of gamma rays) to measure the amount of DU in the lungs and other bodily organs of Gulf war veterans;

(g) Laura Flanders, reported an astonishingly high rate of birth defects in the families of Gulf war veterans.[83] According to her, the Veterans Administration conducted a state-wide survey of 251 Gulf war veterans families in Mississippi. Of their children conceived and born since the war, 67 per cent have illnesses rated severe or having missing eyes, missing ears, blood infections, respiratory problems and fused fingers. Flanders suspects that the birth defects are linked to the effects of radiation from DU and infection from sand fly bites. Others blame experimental vaccines, chemical warfare pills, the insect repellent DEET and smoke from oil-well fires for causing birth defects.

6. Secrets

145. There have been claims that the United States Department of Defence (DoD) does not want to admit that DU is harmful because it does not want to be held liable. There have even been more serious accusations that the DoD knew of the ill effects of DU before its massive deployment in the Gulf but that nevertheless, for military expediency, it deliberately closed an eye and sent its ground troops into DU-corrupted battlefields without properly briefing them of the possible ill effects and of any possible precaution that could be taken.

146. According to a survey 82 per cent of Gulf war veterans handled DU or entered captured Iraqi vehicles gutted by DU munitions. Many took DU fragments home as souvenirs.[84]

147. Rosalie Bertell[85] expatiates on the case of 24 Gulf War Syndrome patients who were the only ones examined for uranium lung burden. Using old equipment two named doctors were able to identify measurable lung burdens of DU in 14 of the 24. All records were subsequently "lost". Some urine samples never reached the United States army laboratory in Aberdeen, Maryland. Results of other samples again were "lost". A named doctor, recognized as an expert in internal contamination with radioactivity, who gave this testimony to the United States Congress, subsequently lost his job with the Veterans Administration.

148. In her paper[86] Dr. Bertell quotes at length from a memorandum dated 1 March 1991, addressed by a lieutenant colonel at Los Alamos National Laboratory to a major in the Studies and Analysis Branch, on the effectiveness of DU penetrators against Iraqi armour. After mentioning the continued concern about the use of DU, the writer insists on the need to make a case for its effectiveness as a weapon "lest it become politically unacceptable and thus be deleted from the arsenal". That part of the study was released in April 1999.[87] The memorandum ends by recommending, "we should keep this sensitive issue at mind when after-action reports are written".

149. With this revealed tendency to be economical with the truth, it can hardly be expected to have full and fair disclosure of material information on the ill effects of DU from the military or from DU arms manufacturers. DU is in fact a subject which breeds suspicion and even renowned and reputed institutions involved with studies on DU have had their credibility questioned.

7. The Rand Corporation report

150. The Rand Corporation, a military contractor, was commissioned by DoD to carry out a study on Gulf War Syndrome including literature available on natural uranium which, the report claims, exhibits chemical properties similar to those of DU. The report also claims that little research exists on DU which, it also claims, is actually less radioactive than natural uranium. The authors then assert that the health effects of natural and depleted uranium are analogous since the chemical and radiological properties of the two are analogous.[88] This view is not shared by Dr. Bertell and in May 1999 at the Hague Peace Conference she outlined many health risks associated with DU and expressed her considered opinion that DU can be more radioactive than natural uranium given the higher concentrations at which DU is found.[89] Since nothing conclusive was found linking ill health to natural uranium, the Rand Corporation concluded that DU should have no ill effects on health as well.

151. Although the Rand Corporation report is said to have reviewed an extensive body of literature it was not considered comprehensive by the National Gulf War Resource Centre. The Centre's research director presented a report in June 1999[90] outlining matters that the Rand Corporation report had ignored, citing some 62 sources not reviewed by Rand. Attention was drawn to the paucity of references by Rand to studies demonstrating clear health risks to humans, such as the one conducted by the Armed Forces Radiobiology Research Institute (AFRRI), which found "possible relationships between DU and neurological, immunological, carcinogenic, genotoxic, and mutagenic effects".[91]

152. The notion that he who pays the piper chooses the tune may not necessarily be an impossible obstacle when it comes to intellectual studies carried out by professionals, including report writers. But the perception of independence appears to be doubly flawed where the authors of a report on the possible ill effects of a particular weapon happen to be military contractors.

8. The Royal Society findings

153. An investigation by scientists of the Royal Society for the United Kingdom Ministry of Defence (MoD) found no evidence of a link between DU and cancer, whilst conceding that further research was needed.[92] The findings of the Royal Society have been severely criticized by certain war veterans on the ground that the scientific research was incomplete and inadequate, some even accusing the Royal Society of cover-up and other grave misdeeds. Others felt that the MoD had been withholding historically relevant official documents and that officials were selectively steering the outcome of the investigation.

154. One criticism against the Royal Society was that it was trying to argue against the findings of people who had been on the ground in the Gulf in 1991 taking measurements and who had found DU contamination in veterans and had documented the illnesses they had suffered for the previous 10 years.

155. Doug Rokke, a former United States army officer and physicist, was the officer in charge of DU cleanup after the Gulf war. He developed health problems within two weeks of his return from the Middle East. A urinalysis conducted in March 1994 revealed uranium 2,000 per cent beyond normal levels.[93] He was perturbed when he learnt that certain reports,[94] which he had told the Royal Society existed, could not be obtained by the latter from either MoD, the United States Department of Defence or the VA although the documents are cited in numerous DoD reports. This prompted Mr. Rokke to tell the Royal Society that its report was based on incomplete information since essential information had been wilfully withheld.

156. In March 2002, upon the recommendations of the Royal Society, the MoD decided to conduct a study to identify any link between exposure to DU and ill health.

9. European Committee on Radiation Risk

157. The European Committee on Radiation Risk (ECRR) was formed in 1997 to investigate and report on the considerable disagreement existing among expert bodies over the health effects of low-level radiation. The Committee consists of scientists and risk specialists from within Europe but takes evidence and advice from scientists and experts based in other countries. Its remit was to make no assumptions whatever about preceding science and to remain independent from the previous risk assessment committees such as the International Commission on Radiological Protection (ICRP), the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), the European Commission, and risk agencies in EU States.

158. In its 2001 recommendations[95] the ECRR highlighted the dissonance between the risk models of the ICRP and the epidemiological evidence of increased risk of illness, particularly cancer and leukaemia, in populations exposed to internal radioactive isotopes from

anthropogenic sources. It found "unequivocal evidence of harm from internal irradiation at low dose" from studies of infant leukaemia and increased minisatellite DNA mutations following Chernobyl. Those studies, according to the ECRR, undermine the ICRP risk models by upward factors of between 100-fold and 1,000-fold for internal purposes.

159. It is not within the remit of this paper, nor is it within the competence of the author, to say whether the ECRR or the ICRP is right. Suffice it to say that the chasm existing between the views of those two expert bodies is worrying.

10. Pending Issues

160. There are a number of assessments of DU related to health and environmental concerns that are pending at this time. Review of completed studies based on these assessments would greatly assist in the determination of the full extent and long-term impact of DU on health. A few of these pending assessments are set down.

(a) Uranium inquiry ordered by MoD

161. According to a British newspaper,[96] "The Ministry of Defence is to carry out an inquiry into the potential effects on the health of the Armed Forces handling depleted uranium ammunition, after concerns were raised about testing with depleted uranium shells in the Kirkcudbright firing range in Dumfries and Galloway." The article adds:

> "The Ministry of Defence has previously refused to accept any conclusive link between cancer and the use of depleted uranium ammunition.
>
> "However, after recommendations from the Royal Society, the Ministry has now decided to conduct a study 'to identify any links between exposure to depleted uranium and ill-health', including a review of the 'effects of depleted uranium inhalation on the pulmonary lymph nodes'.
>
> "The Ministry of Defence inquiry will cover the effects of used depleted uranium shells on soil and marine environments. A key development is that the inquiry will also investigate safer alternatives to the use of depleted uranium."

(b) WHO and DU

162. In 1999, following public concern about potential ill effects of exposure to DU arising from military conflicts in the Gulf and the Balkans, WHO carried out a review of scientific literature considering health risks from different DU exposure situations. It found that inhalation was the most likely route of DU intake following the use of DU munitions in armed conflict. DU particles in the environment would be re-suspended in the atmosphere by wind or other forms of disturbance and ingestion could happen if drinking water were contaminated by DU. DU could also enter the systemic circulation through open wounds or from embedded DU fragments. Potentially, DU has chemical and radiological toxicity, with the kidneys and the lungs as target organs. Health consequences would be determined by the physical and chemical nature of the DU (soluble or insoluble particles) and the level and duration of exposure.

The review found that only military use of DU was likely to have any significant impact on the environment. It concluded that there were gaps in the knowledge about DU and further research was recommended to allow a better risk assessment and that information could come from studies of populations exposed to elevated concentrations of uranium in water.

163. On 14 September 2001 WHO held a press briefing to announce that it was effecting a mission to Iraq to cover four proposals suggested by the Iraqi health officials:

- health surveillance of cancers;
- health surveillance of congenital malformations and renal diseases;
- studies to explore health effects of environment risk factors, including DU;
- implementation plan for cancer control.

(c) UNEP and DU

164. On 27 March 2002 the United Nations Environment Programme (UNEP), which administers the Secretariat for the Basel Convention, [97] reported that a new study of six sites in Serbia and Montenegro that were struck by DU munitions during the 1999 Kosovo conflict confirmed the presence of widespread, but low-level, DU contamination at five sites. [98] The UNEP study, which was carried out jointly with the International Atomic Energy Agency (IAEA) and WHO, found that there was no immediate radioactive or toxic risks for the environment and for human health but recommended precautionary measures. The most important concern is the potential for future groundwater contamination by corroding DU penetrators. Those recovered by UNEP shared a mass decrease through corrosion of some 10-15 per cent, which renders necessary the yearly monitoring of the underground water. UNEP was surprised to detect, through modern air sampling techniques, airborne DU particles more than two years after the cessation of hostilities. Development projects on those sites would have to be curtailed because of the risk of stirring up potentially toxic soil and dust.

165. UNEP has been invited to effect a visit to Afghanistan in February this year.

11. Moratorium

166. There have been many requests for a moratorium on the use of DU munitions from a number of quarters because of the conclusions of scientific studies.

167. On 17 January 2001 the European Parliament voted to urge NATO to suspend use of DU munitions pending the results of an independent study on the potential health risks of such weapons. This followed reports blaming DU armour-piercing bullets for a string of unexplained cancer deaths and other health problems among soldiers who served in Bosnia and Kosovo in the 1990s.

168. A week before, a similar call for a moratorium from Italy and Germany was reported to have been rebuffed by NATO.

169. On 1 December 2001 Italy reiterated to NATO the call for the institution of a moratorium on the use of DU weapons until more studies were done. This followed the deaths of eight of its soldiers serving under NATO who had died of leukaemia within a period of 18 months. Italy's request for a moratorium was supported by France and Portugal. France then decided to launch an inquiry into the effects of DU on its soldiers in Kosovo whereas Portugal decided to withdraw its soldiers.

170. In 1999 Canada stopped using its own DU weapons and has taken steps to address the concerns of its sick veterans. It has, however, rejected calls for a ban on DU weapons.

171. Considering the disturbing reports on the ill effects of DU weapons in the Gulf and the Balkans, it is saddening to note that so far appeals for a moratorium coming from different quarters have not yet prevailed. Killing first and asking questions later has, however, never been a sensible solution.

III. CONCLUSION

172. Most of the weapons covered by this working paper, although capable of use anywhere, are designed for or meant to be used in enemy territory. It is therefore easier to ignore the "dirtiness" of such weapons. Worse still, the use of such weapons is not calculated to match with a measure of proportionality, hence legality, the degree of the hostile attacks. There are growing fears that in the name of repression of "terrorism" and preservation of "security" retaliatory measures well beyond what is permissible in international law are being planned.

173. "Security" in its wider and often perverted sense will lead to the doing of unacceptable things. The recent use of certain weapons falling within the purview of this working paper and reports of new weapons development and their eventual deployment appear as grotesque as they are unthinkable. Yet we have seriously to start imagining the harrowing effects of the use of "small nukes" against nations which some may consider too hostile or too "rogue". Beyond the physical and material harm that will be caused, the psychological "firewall" would have been broken and the spiral of proving to the world who can be more rogue than rogue itself would have been triggered.

174. Confronted with this new notion of "security" which flouts all humanitarian norms, human rights may not appear to some to be a matter of prime concern or of weighty importance. It is therefore all the more vital that the urgent message be restored that peace cannot be achieved by the threat or the use of such horrific weapons and that real security resides in legality and adherence to international humanitarian law and norms as well as respect for human rights which are of universal application. Otherwise, one may find oneself hoisted by one's own petard. But even then, poetic justice has never been the leitmotiv of humanitarian and human rights law. Legality is.

175. Delimiting all the contours of the mandate within the allotted time frame has not been possible. Apart from the fact that the mandate is wide, new findings and new developments are unfolding every day. Other weapons of grave concern falling within the mandate have come to the attention of the author. These would include the so-called "space weapons", like the directed energy weapons and the mid-infrared advanced chemical laser, but evaluation of these will have to wait for some future time.

Notes

[1] The appendix to the report of the Secretary-General lists all major treaties or declarations since 1868 banning weapons so such a list will not be repeated here.

[2] Article 23 of the Hague Convention 1899 uses the term "superfluous injury" whilst the same article 23 of the later Hague Convention 1907 uses the term "unnecessary suffering."

[3] Convention on the Prevention and Punishment of the Crime of Genocide of 9 December 1948.

[4] Convention against Torture and other Cruel, Inhuman or Degrading Treatment or Punishment.

[5] *ICJ Reports, 1996*.

[6] Ibid., para. 25.

[7] Universal Declaration of Human Rights, adopted and proclaimed by General Assembly resolution 217 A (III) of 10 December 1948.

[8] The right to health is also provided for in article 12 of the International Covenant on Economic, Social and Cultural Rights. This article also requires efforts to reduce stillbirth and infant mortality, as well as the duty to improve the environment in ways supportive of health.

[9] Declaration on the Protection of All Persons from being subjected to Torture and other Cruel, Inhuman or Degrading Treatment or Punishment, adopted by the General Assembly in its resolution 3452 (XXX) of 9 December 1975.

[10] The Inter-American Convention to Prevent and Punish Torture, adopted at Cartagena, Colombia, on 9 December 1985.

[11] While found in both the 1899 and 1907 Hague Conventions, it is usually cited as preambular paragraph 8 of the Hague Convention of 1907.

[12] The four Geneva Conventions which were adopted on 12 August 1949 by the Diplomatic Conference for the Establishment of International Conventions for the Protection of Victims of War are the Conventions:

i) for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field;

ii) for the wounded, sick and shipwrecked members of armed forces at sea;

iii) relative to the Treatment of Prisoners of War;

iv) relative to the Protection of Civilian Persons in time of War.

[13] Protocol relating to the Protection of Victims of International Armed Conflicts (Protocol I) and of Non-International Armed Conflicts (Protocol II).

[14] The author recognizes that common article 3 was originally intended to bring standards of humanitarian law into situations of armed conflict "not of an international character". However, owing to the opinion of the ICJ as set out below, this article is now considered the minimum in any type of war and for any State, and so is cited here as exemplary.

[15] Military and Paramilitary Operations in and against Nicaragua (*Nicaragua v. United States of America*), Merits Judgment, *ICJ Reports 1986*, p. 114. The Court cited its 1949 Corfu Channel case for the obligation of States to respect rules constituting "elementary considerations of humanity".

[16] Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to be Excessively Injurious or to Have Indiscriminate Effects, Geneva, 10 October 1980.

[17] The "Basic Rule" is the title of article 48.

[18] The author notes that similar provisions have been set out in Additional Protocol II relating to non-international armed conflicts.

[19] *ICJ Reports 1996*. The Court also discussed the following provisions of customary humanitarian law relating to weapons: application of the Martens Clause to weapons (para. 87); prohibition of killing or targeting civilians (para. 93); prohibition of weapons causing undue suffering (paras. 78, 92 and 95); and the prohibition from endangering or damaging the environment (paras. 32-33, 35).

[20] Convention on the Prohibition of Military or any other Hostile Use of Environmental Modification Techniques of 18 May 1977 to which the United States is a Party (ENMOD).

[21] Resolution on the protection of the environment in times of armed conflict.

[22] Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to be Excessively Injurious or to Have Indiscriminate Effects, Geneva, 10 October 1980.

[23] The Protocol on Prohibition or Restrictions on the Use of Mines, Booby-traps and Other Devices, as amended on 3 May 1996, is one such protocol.

[24] Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction, 18 September 1997.

[25] Resolutions 1653 (XVI) of 24 November 1961, 33/71B of 14 December 1978, 34/83G of 11 December 1979, 35/152D of 12 December 1980, 36/921 of December 1981, 45/59B of 4 December 1990 and 46/37D of 6 December 1991.

[26] Paragraph 95 of the Advisory Opinion (emphasis added).

[27] Paragraph 97 of the Advisory Opinion.

[28] Paragraph 105 (2) (c).

[29] Carl Sagan and Richard Turco, *A Path No Man Thought*, Random House, 1990, quoted at *www.mothersalert.org/nuclearwinter.html*.

[30] Signed in Moscow on 24 May 2002.

[31] Sune K. Bergstrom, Nobel laureate in 1982 in physiology and medicine.

[32] Alan Robock "New models confirm nuclear winter". *Bulletin of the Atomic Scientist*, quoted by Dean Babst in "Preventing an accidental nuclear winter" at *mothersalert.org/nuclearwinter.html*.

[33] M.V. Ramana of Princeton University, New Jersey, in *New Scientist* magazine.

[34] The Convention on the Physical Protection of Nuclear Material 1980 which entered into force on 8 February1997.

[35] 729 *UNTS* 161, entered into force 5 March 1970 (NPT).

[36] United Nations Security Council resolution 984 (1995) on security assurances.

[37] Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water 1963.

[38] Mr. Kuznetsov, head of the Soviet delegation at the Disarmament Committee meeting held in Geneva on 29 August 1962.

[39] Hsinhua, the official news agency of the People's Republic of China.

[40] Cited in "People of the World Unite, for the Complete, Thorough, Total and Resolute Prohibition and Destruction of Nuclear Weapons", Foreign Languages Press, Peking, 1963.

[41] "Sandia labs says B61-11 (bunker buster) nuclear weapon delivered", DU-WATCH.

[42] William Arkin, *Los Angeles Times*, 10 March 2002.

[43] Reuters, 29-30 May 2002.

[44] Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction 1993, which became operative on 29 April 1997.

[45] Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction 1972.

[46] Protocol for the Prohibition of the Use of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, Geneva, 17 June 1925.

[47] Jean Pascal Zanders, E. Karlsson et al., *Risk Assessment of Terrorism with Chemical and Biological Weapons*.

[48] These rules have long been rules of customary humanitarian law.

[49] These rules have also long been rules of customary humanitarian law.

[50] Article 51 (7).

[51] Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction, 18 September 1997.

[52] See *http://alternet.org/story.html?storyID=12713*.

[53] Eric Prokosch, *The Technology of Killing: A Military and Political History of Antipersonnel Weapons*, Zed Books 1995, p. 82.

[54] Lt. Col. Gary W. Wright, "Scatterrable Munitions = Unexploded Ordnance (UXO) = Fatricide", United States Army War College Study Project, 22 March 1993.

[55] Bruce Shoemaker, *Legacy of the Secret War*, Mennonite Central Committee.

[56] "Afghanistan - The World's Guilty Secret", *Amnesty International Journal*, January/February 1996.

[57] "Drop Today, Kill Tomorrow, Cluster Munitions as Inhumane and Indiscriminate Weapons", Mennonite Central Committee.

[58] Weapons of Mass Destruction/United States is Dropping World's Biggest Non-Nuclear Bomb in Afghanistan.

[59] General Peter Pace, Vice-Chairman of the United States Joint Chiefs of Staff.

[60] Ric Finke, "What are daisy-cutters? The military's final solution".

[61] The New Lexicon, *Webster's Dictionary*.

[62] Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to be Excessively Injurious or to Have Indiscriminate Effects.

[63] Health Risks of Using Depleted Uranium, Venik's Aviation, 3 November 2001.

[64] WHO, Fact Sheet No. 257 on depleted uranium.

[65] Laka Foundation, document 511-5028.

[66] G. Bukowski and D.A. Lopez, "Uranium Battlefields Home and Abroad: Depleted Uranium Use by the United States Department of Defense", March 1993.

[67] Radioactive Desert Storm and its Global Effects.

[68] The author was surprised to find a large number of anti-DU groups and activists - many of whom are leading research scientists or lawyers specializing in humanitarian law. Similar groups and activists have also organized against cluster bombs and some of the other weapons. This activity can be understood as an aspect of the "dictates of the public conscience" of the Martens Clause.

[69] Paul Brown, "Gulf War Debris is Radioactive", *The Guardian*, 18 September 1991.

[70] AEA Secret Report, *The Independent*, November 1991.

[71] "NATO confirms to the UN use of DU during the Kosovo conflict", press release by the United Nations Environment Programme and the United Nations Centre for Human Settlements, 21 March 2001.

[72] Dai Williams, "Depleted Uranium Weapons in 2001-2002: Mystery Metal Nightmare in Afghanistan?", 31 January 2002, at *http://www.eoslifework.co.uk/du 2012.htm*.

[73] "Did the US use Chemical and Radiological Warfare in the Gulf War?", paper presented by Dr. Rosalie Bertell at the Joint Meeting of the Canadian Anthropology Society and the American Ethnological Society at the University of Toronto, Canada, 7 May 1998.

[74] Ibid.

[75] "Metal of Dishonor - Depleted Uranium. How the Pentagon Radiates Soldiers and Civilians with DU weapons", selections compiled and edited by the DU Education Project, International Action Centre, New York, 1997.

[76] Military Toxics Project (DU Citizens Network), "The United States Army's Use of Depleted Uranium and its Consequences for Human Health and the Environment", 1996.

[77] Lt. Col. W. M. Washabaugh, United States Air Force, Congressional Inquiry Division, Office of Legislative Liaison, letter to Sen. Sam Nunn, Chairman, Senate Armed Services Committee, 8 November 1990.

[78] Associated Press, 17 February 2002.

[79] Ross B. Mirkarini, The Arms Control Research Centre, from his report: "The environmental and human health impacts of the Gulf region with special reference to Iraq", May 1992.

[80] "*Uranium Projectiles - Severely Maimed Soldiers, Deformed Babies, Dying Children*", Ahriman Verlag, Netherlands.

[81] *Dutch Journal of Medical Science*, 26 May 2001, translated into English by Henk van der Keur.

[82] NBC TV Dateline programme, "Deadly Fire", 22 February 1994.

[83] L. Flanders, "A lingering sideness", *The Nation*, 29 January 1995, pp. 94-96.

[84] Survey carried out by Victor Sylvester of Operation Desert Shield/Desert Storm between 1991 and 1995 involving 10,051 war veterans. Cited by Bertell, op. cit.

[85] Bertell, op. cit.

[86] Ibid.

[87] *A Review of the Scientific Literature as it Pertains to Gulf War Illness, Volume 7 - Depleted Uranium.*

[88] It must be noted that the health effects of natural uranium and DU are also considered to be analogous by WHO in its Fact Sheet No. 257.

[89] Bertell, op. cit.

[90] Dan Fahey, "DoD Analysis: The Good, the Bad and the Ugly", June 1999, at *http://www.globaldialog.com/KornKven/DOD_Anaysis_II_Fahey.pdf*.

[91] Ibid.

[92] Macer Hall, "Veteran's alert on uranium shells", DU Info Bulletin No. 25 at *www.dailytelegraphnews.com*.

[93] Physicians for Social Responsibility, Depleted Uranium Weapons, July 1999.

[94] Operation Desert Storm DU (Battlefield) Assessment Team Reports for the United States Army Chemical School.

[95] The recommendations are entitled "The Health Effects of Ionising Radiation Exposure at Low Doses and Low Dose Rates for Radiation Protection Purposes".

[96] *The Times*, 15 March 2002.

[97] Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.

[98] The first study was carried out in Kosovo in 2001.
