



Military Operations in Gaza Dec '08 – Jan '09:

Issues Relating to Weapons Used During that Operation

By Desmond Travers, Retired Colonel and member of the UN fact-finding mission that produced the Goldstone Report

Part 1

“The Mission recommends that the General Assembly should promote an urgent discussion on the future legality of the use of certain weapons referred to in this Report and in particular white phosphorus, flechettes and heavy metal such as tungsten. In such discussion the General Assembly should draw inter alia on the expertise of the International Committee of the Red Cross (ICRC). The Mission further recommends that the Government of Israel should undertake a moratorium on the use of such weapons in the light of human suffering and damage they caused in the Gaza Strip.”

[Paragraph 1971(d) of the Report*]

Introduction

The Report¹ of the United Nations Fact Finding Mission (FFM) to Gaza, which has become known as The Goldstone Report, after Justice Richard Goldstone, has been in the public domain for almost six months. In that time, the Report has had an impact worldwide and is still debated to this day. The Report is not without controversy. Much of this controversy has been in the form of refutations of the Report's findings or by abuse of one kind or another. The broad trust of such criticisms seem to be devoted to a presumption of bias by the mission and by the calling into question of the integrity of its work.

The Report's integrity stands and I do not intend to defend it before the Russell Tribunal on Palestine.

Objective

¹ “Human Rights in Palestine and Other Occupied Arab Territories: Report of the United Nations Fact-Finding Mission on the Gaza Conflict” Human Rights Council, Twelfth Session, Agenda Item 7. 23 Sept 2009.

My purpose, therefore, is to highlight aspects of the Report relating to the use of certain weapons and to advance, by producing further evidence, the recommended discussion outlined in the banner headline to this Part of the paper (above).

The need to highlight such matters is apparent especially where there are ongoing consequences, post-report, that ought to be addressed as matters of concern.

[* Will be referred to as “the Report” throughout this paper].

Approach

Concerns regarding such weapons have implications beyond the incidents in Gaza. As these weapons are in the armouries and arsenals of many armies and are in use in campaigns elsewhere, there is a need for this Tribunal to give consideration to the wider implications of the continued acceptance of such weapons, even in conventional warfare.

There is also the need to give consideration to the international monitoring mechanisms on conventional weapons in order to proscribe weapons hitherto deemed acceptable and to make recommendations for future monitoring mechanisms which may prevent oversights occurring in the future.

It must, however, be borne in mind that the greater preponderance of the weapons and munitions that were used in Gaza were conventional weapons whose use in combat operations, against legitimate targets, are accepted under the Conventions. These weapons will not form part of this paper except where their use has been called into question in the Report. The reason for this is that such weapons have not, so far as is known, left a legacy of ongoing destruction or hazard above the ordinary. A broad exception will be made in considerations of the ongoing deterioration of the environment. Further, their use, or misuse, has already been dealt with in the Report and no further comment seems necessary here.

In addition to the use of conventional weapons and the infrastructural damage that they brought in their wake, mention must be made of destructions wrought by equipments that are not weapons per se. This refers to the destruction by bulldozers of factories, houses, other habitations and livelihoods. This destruction, effected in the closing days of Operation Cast Lead (OCL), was a sub-operation of OCL nicknamed by the IDF as “for the day after”. Destruction was also inflicted on the agricultural infrastructure.

Use of these weapons has resulted in alleged consequences. During these attacks, fruit trees, agricultural land and wells – some three hundred and five wells – were destroyed. Consequences to the environment in some areas of Gaza have been set in motion. Such consequences have been further assured by, for example, the refusal to permit entry into Gaza of water pumps – a necessity in the repair of those agricultural wells. The land served by the wells is drying out. Lands bulldozed for various reasons have had their chemical nature so altered in recent times that they have, in some circumstances, rejected re-planting. Some two hundred square kilometres of agricultural land has been removed from productive use or damaged.

It is further alleged that the use of the weapons and the ensuing blockade have together subjected these lands to a cocktail of assaults: coastal salination, sewage saturation (as a consequence of the

attacks on the sewage plant south of Gaza city), nitrification of the soil (the UNEP report confirms this), drying out (especially along the buffer zone and in areas affected by the destruction of wells) and chemical and munition debris hazards (to domestic animals, humans and ultimately the food chain).

Purpose

The purpose, therefore, of this submission is to highlight the consequences of the over use of certain weapons and to question their continued use; to alert the Tribunal to toxicities which remain in Gaza as a consequence of the discharge of such weapons; to raise the issue of the need for monitoring for such toxicities known or suspected to have been deposited.

Format

This submission will discuss the issue under the following headings:

- White Phosphorous (WP),
- Tungsten Shrapnel and DIME munitions,
- Flechettes,
- Other weapons (and environmental hazards from weapons used or suspected of use).
- Quis custodiet?

Part 2

White Phosphorus (WP)

“The Mission therefore believes that serious consideration should be given to banning the use of white phosphorus as an obscurant.”

[Paragraph 901 of the Report]

“... you learn that white phosphorus is not used and you’re taught that it’s not humane...”

[IDF Soldier’s testimony in “Breaking the Silence”, P. 28]

General

During OCL, one of the sights flashed onto TV screens around the world was of White Phosphorous (WP) artillery shells air bursting over the city of Gaza. These scenes were captured by telephoto lenses from the Gaza Israeli border. WP shells were certainly in most, if not all, cases discharged by 155mm artillery self-propelled (SP) guns. Each shell is designed to discharge it’s cargo

of WP impregnated felt 'wedges' in a fan-like pattern over an area to be screened usually forward of advancing troops.

Employment in Gaza

Some three thousand five hundred (3500) shells are known to have been fired in the vicinity of Gaza city. In most cases, the Report found no tactical or operational reason for such an act as there were no Israeli troops in need of screening in those areas of the city at time of firing. However, there are soldiers' accounts of the use of WP in order to initiate improvised explosive devices (IED's or 'booby traps') in houses suspected of containing them. Others were fired on, or near, the buffer zone and may have been, unlike those fired over Gaza, used to obscure the troops entering Gaza during the commencement of the ground offensive of OCL.

Each shell or, to be more precise, 'container shell' jettisons one hundred and sixteen (116) wedges into the air, usually by the initiation of a small detonation, over a designated target area. The dispersion of wedges and of the container shell may be assumed to be in an area of 125m radius from point of initiation (that is 'air burst').

Therefore four hundred thousand plus WP wedges were discharged over the city and its environs

WP – The Chemical

WP is a very efficient obscurant when used for such and an equally efficient illuminant when used for that purpose. It is, however, a highly volatile and toxic material. It is, first and foremost, a pyrophoric material in that it does not need an initiator – a fuse or a flame – to ignite it. It will burn once it is exposed to oxygen and will continue to do so until deprived of such or until its energy is expended. Munitions, post-WW 11, which were dumped (legally) into the Irish Sea subsequently, over half a century later², washed ashore onto an Irish beach and caught fire. WP therefore may lie dormant in an oxygen deprived environment for an indefinite period. For this reason WP is stored under water.

WP wedges were known to be active twenty one and twenty four days after being dropped over Gaza and did cause injury. Wedges fired into Gaza, which landed in drains, sewers or indeed in rooftop water tanks may still be active.

The fumes from WP wedges are sweet smelling - similar in odour to almonds or garlic, according to witnesses - and seem to attract the interest of children. They are also known to be toxic and have nauseated medical teams who were treating wound victims in Gaza. These fumes constitute a respiratory hazard. Medical precautions in the treatment of victims specifically mention such hazards.

“...Prolonged exposure to phosphorus can cause systemic intoxication; signs and symptoms include irritation of the eyes and the respiratory tract; skin and eye burns; abdominal pain, nausea, and jaundice; anaemia, cachexia, pain, and loosening of the teeth, excessive salivation

² Lt Col Raymond Lane, Chief Instructor Ordnance School, Irish Defence Forces presentation to the FFM, Geneva.

and pain and swelling of the jaw and necrosis of bone, involving typically the maxilla and mandible also known as 'phossy jaw', a form of osteomyelitis....."³

Treatment and Other Consequences

WP coming in contact with flesh will burn literally to the bone or until it is deprived of oxygen. Moreover, relatively light burns of as little as 10% of the body area can prove fatal as WP attacks the central nervous system. Patients treated with light burns in Gaza returned to hospital days later with complications. Twelve people are reported to have died in Gaza as a direct consequence of being burned by WP. The Chief Medical Officer of the Israeli Defence Force (IDF) states:

"... kidney failure and infections are characteristic long-term outcomes....A wound caused by explosive ordnance containing phosphorus is potentially extremely dangerous to tissue.."⁴

Simon Kuttab, professor of chemistry and dean of the science faculty at Birzeit University in Ramallah, said that the degree and seriousness of the burns it can cause makes it a significant hazard for civilians caught in its path, particularly as Gaza's hospitals are ill-equipped to treat them.

"... Gaza's climate and humidity could also serve to increase the lethality of [WP] because, after being exposed to air, it oxidises rapidly to phosphorus pentoxide, while also producing phosphoric acid and becomes spontaneously flammable.."⁵

155mm WP Container Shells

In addition to the hazards arising from the use of WP, the container shells themselves have hazards associated with them. A container shell weighs 37 kg. Several people were killed when a container shell crashed through a house.

More recently, a group of scientists based in Italy⁶, carried out tests on a number of sites in Gaza where WP container shells impacted and conducted tests on the container shell debris found at them. These findings are to be found at the website: www.newweapons.org

In summary, the findings from their researches, which involved an examination of thirty-five metals from four impact sites, indicate the presence of carcinogenic and toxic agents. These results prompt the need for further investigation.

³ "Technical Report to the UN Fact Finding Mission on the Gaza Conflict" Ch. 8, P.3-4. Document submitted to the Mission by Lt Col Lane, July Geneva.

⁴ "Identification of Explosive White Phosphorus Injury and its Treatment", by Dr. Gil Hirshorn, Colonel, Head of Trauma Unit, HQ of Chief Military Medical Officer, Ref Cast Lead SH9 01293409. As quoted in "Rain of Fire: Israel's Unlawful Use of White Phosphorus in Gaza", Published by Human Rights Watch, © 2009, P.11 (From the Hebrew. Translation available)

⁵ "Israel May be using DIME in Gaza", Mohammed Najib, Janes Defence Weekly, © Janes Information Group 2009

⁶ Prof Paola Manduca, Professor of genetics, U of Genova. Prof Mario Barbieri, Professor of geochemistry, Rome, and Prof Maurizio Barbieri, Professor of environmental geochemistry, Rome

Discussion

In this more environmentally conscious era the use of WP which constitutes a hazard when used, even in artillery ranges, should be reviewed. Wedges that fall into wet or marshy areas may subsequently become active when the season changes. A wild animal, such as a deer or mountain goat, may stumble over such a wedge and initiate it losing a limb and suffering great agony before death. The Irish Defence Force authorities saw fit to withdraw all WP munitions from its arsenals in the 1970's. It is now time for other forces to consider doing the same.

WP is certainly the most efficient chemical agent for the production of obscuration or smoke screens. Nevertheless, it is not the only chemical that can be used for this purpose – red phosphorous and titanium tetrachloride come readily to mind. The suggestion that it is an indispensable agent is therefore invalid.

The delivery means, especially by air burst, may further exacerbate the hazards of WP.

Part 3

Tungsten Micro-Shrapnel and DIME

“The Mission also observes, however, that there remain a high risk of harming civilians when using these weapons in built-up areas and that concerns have been expressed that DIME weapons could have a particularly adverse impact on the enjoyment to the right to health of survivor, which could go beyond the impact generally associated with being affected by anti-personnel weapons in an armed conflict.”

[Paragraph 910 of the Report]

General

Air-to-surface missile attacks were a common feature of OCL. More often than not, the launch platform for such attacks was an Unarmed Aviation Vehicle (UAV or 'drone'). The FFM investigated two sites where death and injury occurred as a consequence of the use of these missiles: the police academy graduation ceremony and the Makadmah Mosque.

Pieces of shrapnel of 4x4x4mm and of 2x4x4mm measurement were retrieved from both sites. These pieces of 'micro-shrapnel' were analysed and found to be a tungsten-alloy metal.⁷

Human Rights Watch (HRW) also reported other sites in which this type of attack occurred and also analysed samples of shrapnel from them. The analyses established that the micro-shrapnel was of tungsten-alloy.⁸

⁷ Samples from Makadmah Mosque provided by the writer to Lt Col R. Lane and analysed in a Dublin laboratory.

⁸ "Human Rights Watch reports missile attacks on Gazan civilians" Doug Richardson in Jane's Missiles and Rockets, 3 Aug 2009

"... Samples of missile parts and metal cubes taken from two of the attack sites had been analysed by the Institute for Energy Technology (IFE) in Oslo, Norway. The IFE reported that the cube was a metal alloy consisting primarily of tungsten, along with traces of nickel and iron.

Amnesty International report that forty-eight Gazans were killed as a consequence of UAV missile attacks.

The development of missiles to meet counter-insurgency roles may have given rise to their adaptation as an anti-personnel weapon. The missile(s) suspected of having been adapted for such purposes is the Spike or Helfire anti-armour family of missiles:

"...To provide the [Helfire] series with an anti-personnel/anti-material capability, a scheme was developed to optimise fragment lethality against a broad range of targets.... Developed to meet an urgent operational requirement, it involved fitting a steel fragmentation sleeve around the main charge of the warhead.⁹

Hazards to Health

Tungsten, a heavy metal, has been proven to be highly carcinogenic when introduced into living tissue in laboratory conditions.

"The high-dose .. implanted rats developed extremely aggressive tumors surrounding the [tungsten] pellets within 4-5 months after implantation. The low-dose implanted rats.. and nickel-implanted rats.. also developed tumors surrounding the pellets but at a slower rate. Rats implanted with tantalum.. an inert control metal, did not develop tumors. Tumor yield was 100% in both the low- and high-dose.. groups.

The tumors,... rapidly metastasized to the lung and necessitated euthanasia of the animal. Significant hematologic changes, indicative of polycythemia, were also observed in the high-dose ..implanted rats. These changes were apparent as early as 1 month post implantation in the high-dose .. rats, well before any overt signs of tumor development. These results point out the need for further studies investigating the health effects of tungsten and tungsten-based alloys".¹⁰

Consideration

While death occurred to many as a consequence of these missile attacks, there are survivors. The FFM met some of them including a young man who has a piece of this shrapnel embedded in his spine. The shrapnel cannot be removed, as the procedure would endanger him further. He may also be at risk by the very presence of the shrapnel in his system.

⁹ Janes Defence Systems

¹⁰ "Embedded weapons-grade tungsten alloy shrapnel rapidly induces metastatic high-grade rhabdomyosarcomas in F344 rats" in Environ Health Perspect, 2005 Jun;113(6):729-34, by Kalinich JF, Emond CA, Dalton TK, Mog SR, Coleman GD, Kordell JE, Miller AC, McClain DE

Tungsten, a heavy metal, is known to be carcinogenic¹¹ as indeed are many other heavy metals. Others injured by tungsten micro-shrapnel have had the shrapnel removed but the corpus of work on the carcinogenic effects if any, post-removal or treatment, are not known. There is a requirement to subject this aspect to research and to monitor survivors in this category.

DIME

(Dense Inert Metal Explosive)

General

Dense Inert Metal Explosive (DIME) is an explosive in which a heavy metal, usually of tungsten alloy in powder form, is mixed with it. The purpose of such a mix is to enhance the lethality of the explosive. Its effect, thus optimized, is achieved over a more precisely defined area from point of detonation. In other words, it is more efficient in a more restricted area: ideal therefore for an attack against personnel and lightly protected equipment.

The nature of certain injuries and death among victims in Gaza gives rise to suspicions that DIME munitions were used. Expert witnesses to the FFM raised such suspicions more than once. References to the use of DIME in Gaza are also reported in professional journals.¹² In the case of suspected DIME attacks in Gaza, it seems that while the energy of the explosive is evenly distributed, the energies nevertheless seem to have been optimized in order to attack a target a given height above ground level. Adult victims therefore suffered from severed limbs, usually above the knee. Children were cut in half. The specific nature of the severing of limbs has been described¹³ which has lead Dr Mads Gilbert to believe that DIME was used. It prompted Lt Col Raymond Lane to discuss the DIME issue before the FFM though he was unable to confirm its use.

Considerations

DIME by virtue of the metal used in the explosive mix, in this case tungsten, presents the same hazards to human life and especially to the injured as does tungsten in micro-shrapnel form. In addition, however, the nature of the composition of the tungsten is such that if embedded in tissue it may be undetectable and therefore beyond further treatment. Even if detectable it may be beyond guarantees of complete removal. The risks of the development of carcinogens prevail.

Doctors who gave evidence to the FFM instanced circumstances of being overwhelmed by the amount and variety of injuries they had to deal with. In such circumstances, the likelihood of a DIME injury victim receiving the kind of treatment appropriate for the removal of all metallic powders, if such treatment indeed exists, remains problematical.

¹¹ "Technical Report to the UN Fact Finding Mission on the Gaza Conflict", DF Ord School, Irl. Ch. 7 P. 11 and footnotes.

¹² The Lancet, Janes information Systems and the " Technical Report to the UN Fact Finding Mission on the Gaza Conflict" by the Irish Defence Forces Ordnance School, Ch.7 Pp. 10-12.

¹³ Gilbert M, Fosse E. Inside Gaza's Al-Shifa hospital. Lancet 2009; **373**:

It has long been practice in the development of conventional weapons to produce means not to kill but not incapacitate. The argument, in justification of such means, is that combatants, so injured, impose a logistic and medical burden on enemy resources thereby contributing to the achievement of the war effort. An injured soldier imposes a burden on five other soldiers in the battlefield; a dead soldier, none. DIME may be in such a category of weapon.

Part 4

Flechettes

“Flechettes are known to bend, break or “tumble” on impact with human flesh. Such performances are often part of the flechettes design characteristic and are marketed as such. “Tumbling” in particular is adjudged to be a further determination of the projectiles “incapacitation” effect. ”

[Paragraph 905 of the Report]

General

The flechettes most commonly encountered in Gaza are dart-like objects of 40mm length, 2-4 mm in diameter and of approximately 13.5 grm weight. They are made of a composite metal alloy. They are fired in salvo, most usually from a tank shell, each salvo comprising 8,000 such darts or flechettes. When such a shell is fired from a tank the shell travels a short distance from the muzzle of the gun, usually less than 100metres and then arms or jettisons the flechettes forward at high velocity. They disperse to form a cone which widens as they travel creating a ‘zone of risk’ 150m wide at the maximum effective distance of travel of 300m.

The purpose of such a munition being used by a tank is to clear an area, usually of underbrush, forward of it so that a would-be infiltrator with an anti-tank gun may be killed, injured or deterred from approaching the tank. Being an area weapon, it is indiscriminate The use of such a weapon against unarmed civilians in Gaza was considered unacceptable by the FFM.

Flechette use in Gaza

Flechettes were commonly fired from Merkava tanks. Flechette-delivering missiles were also used in at least one incident. Several incidents of unarmed civilians, women and children, being hit by them, were reported.

Discussion

Flechettes, by virtue of a combination of their weight, dimensions and their velocity are unstable in flight. This is further enhanced by the salvo effect as the air turbulence of the passage of flechettes in close proximity to each other, creates further instabilities. These cumulative instabilities may only be manifested on impact especially when such impacts are onto tissue. Such instabilities may be acceptable and in accordance with the Conventions in weapon development.

Flechettes on entering tissue are likely to 'tumble', bend, (and then tumble or travel off true) or break¹⁴. Any or all of these impact effects contribute considerably to increasing the incapacitation of the victim. Where a number of such impacts occur against one target or victim a treatment complication and a treatment overload may occur. Where such effects are inbuilt into the design of the flechette then a concern about their use under the Conventions arises. The question is: are such instabilities on impact inbuilt into the design?

A United States report formerly classified as "Secret" may shed some light on this question¹⁵. The abstract sets out the purpose of the research, which is to determine whether hits with a series of flechettes, "*which tumble within a soldier*" will incapacitate that soldier. The report then goes on to advance a formula involving; the weight of the flechette, its velocity and design as a means of producing precisely such effects. Optimum velocities are then discussed as achieving "*relatively quick tumbling occurs ... for flechettes with striking velocities greater than 3000 fps*". When such velocities were applied "*..grosser wounds..*" were observed [my emphasis].

The report goes on to suggest that the flechette's weight should not exceed 13 grains, "*else the tumbling will occur too late after entrance*."

The report goes on to produce the result of trials using various hypothetical scenarios in which an enemy soldier is likely to be engaged, whether in attack or defense, in winter uniform, or nude. The research and trials using gelatin and goats (emphasizing the usefulness of angora goats for this) test the firing of flechettes that tumble on impact with those that do not, in order to gauge the relative increase in incapacitation of one as opposed to the other.

A series of tables and graphs are then produced in which the values of 'tumbling' are shown against various parts of the anatomy and through various thicknesses of apparel. These levels of incapacitation are compared with tests using flechettes and metal 'shrapnel' in order to reveal the increase in such incapacitation when using a 'tumbling' flechette. This shows a substantial increase in all cases but one. The increases suggest an incremental 'value' without additional 'costs' in the use of such devices in battle.

The report's purpose seems clearly to produce recommendations for the development of a flechette that achieves the optimum incapacitation by tumbling on impact.

¹⁴ <http://www.guardian.co.uk/graphic/0,,2274464,00.html>

¹⁵ "Criteria for Incapacitating soldiers with fragments and flechettes" William Kokinakis and Joseph Sperrazza, US Army Materiel Command, Ballistic Research Laboratories, Aberdeen Proving Ground, Maryland. BRL Report No. 1269. May 4, 1965

Recommendations

While X-rays of flechette wounds in Gaza are to hand, there is no evidence in them to suggest that tumbling occurred. Nor is there evidence that the flechettes used in Gaza were specifically designed to tumble.

Nevertheless, the investigation of such incidents in Gaza has given rise to the whole issue of tumbling in the design consideration. There is enough evidence to suggest that tumbling is inbuilt into the design criteria in some flechettes and the delivery systems that are part of achieving that end.

Where tumbling is built into the design the question that arises is: is such criteria in breach of the Conventions. The Conventions regarding weapons which are designed to optimise their incapacitating effect may be considered to be found in various provisions, some of which are as follows:

"1.2.2.2 General prohibitions or restrictions on weapons, means and methods of warfare under customary international law

.....

Prohibition to use means and methods of warfare which are of a nature to cause superfluous injury or unnecessary suffering " ¹⁶

The Martens Clause makes provision for weapons, not hitherto covered, under existing provisions, which may be considered contrary to this Clause if it is determined to **contravene the principles of humanity or the dictates of public conscience**. [Emphasis mine]

Part 5

¹⁶ "Guide to the Legal Review of New Weapons, Means and Methods of Warfare: Measures to Implement Articles 36 of Additional Protocol 1 of 1977", ICR C Geneva, January 2006, Pp16,17.

Other Weapons

“In view of the allegations and reports about long-term environmental damage that may have been created by certain munitions or debris from munitions, the Mission recommends that a programme of environmental monitoring should take place under the auspices of the United Nations, for as long as deemed necessary. The programme should include the Gaza Strip and areas within Southern Israel close to impact sites. The environmental monitoring programme should be in accordance with the recommendations of an independent body, and samples and analyses should be analysed by one or more independent expert institutions. Such recommendations, at least at the outset, should include measurement mechanisms which address the fears of the population of Gaza and southern Israel at this time and should at a minimum be in a position to determine the presence of heavy metals of all varieties, white phosphorus, tungsten micro-shrapnel and granules and such other chemicals as may be revealed by the investigation. ”

[Paragraph 1975 (e) of the Report]

General

The Report makes reference to other weapons suspected to have been use in Gaza. It makes reference to weapons previously mentioned in this paper and in particular to depleted uranium (DU) in this regard¹⁷. It refers to the receipt of a submission which alleged that the analyses of an ambulance which was operating in the Beit Lahia area of Gaza showing unusually high levels of non-depleted uranium and niobium in its air filter. The question of hazards from DU has long been controversial in the scientific world and current literature and thinking on the subject would have to be applied. Nevertheless this paper accepts the views and concerns in existing UN publications on the matter as a guide¹⁸ and suggests that further discussion is required

In addition, the use of ‘bunker-buster’ or deep penetrator munitions to destroy the tunnels along the “Philadelphia Corridor” (the border between Gaza and Egypt) seems unlikely to have been achieved without munitions with hardened warheads. Such warheads typically are comprised of metal alloys and compounds that leave tracing in the soils and elsewhere of toxicities, which are hazardous in many and various ways.

If such munitions were used then there may be implications for the environment generally. This is especially significant in the case of Gaza whose environment, in many respects, was vulnerable prior to the invasion. The bombardments which occurred may then have affected the soils, the water (including sea-water) and the air. Some of the destruction to the arable land could to be permanent. Elsewhere it could be degrading to permanent.

¹⁷ In “ XII. The use of certain weapons “, Sub-section “E. Allegations regarding the use of depleted uranium and non-depleted uranium munitions by the Israeli Armed Forces”, Paragraphs 911 and 912 of the Report.

¹⁸ “Disarmament Forum: on uranium weapons”. Issue Three. 2008, by the United Nations Institute for Disarmament Research,

Such munitions may have produced dusts, which are also hazardous. Because of the prevailing winds in the Levant, which are westerly, it may be necessary to consider a monitoring programme outside of Gaza and into Southern Israel itself.¹⁹

One of the secondary effects of the bombardment has been the damage to the water-table which serves Gaza. This damage has a run-on effect north into the territories of coastal Israel and south into coastal Egypt.

Consideration

There is an urgent necessity to apply the recommendations of the Report with regard to monitoring of the environment, not alone in the territories of Gaza, but also in territories contiguous to it in Israel and Egypt. Such monitoring must have regard to the totality of the environment on land, on sea and in the air in order to produce data of relevance for the future.

It has been argued, that some of the extreme consequence of not doing so, will be seen in years to come as the evidence of the weapons' after-effects emerge. Some such evidences, it has been suggested, will be in the degradation in human reproductive health and in mutations and associated foetal and birth deformities.²⁰

¹⁹ " Environmental Assessment of the Gaza Strip following the escalation of hostilities in December 2008 -January 2009"

²⁰ Op cit. Prof Manduca in the New Weapons report.

Part 6

“Quis custodiet... ”

General

All of the weapons discussed in this paper, with the exception of uranium and depleted uranium, have been in use in many armies throughout the world for almost a century. White phosphorus, flechettes and tungsten have been seen in one form or another since the Great War, 1914-18. Their use at present and as demonstrated in Gaza, shows use that is likely to have been developed and little changed since the Cold War period.

The question that arises is: how can such weapons, long in service, be deemed, now, to be unacceptable, especially when one of them at least – WP – has not been considered to be a ‘weapon’ per se? In order to suggest an answer to this question it is necessary to offer a mélange of possibilities, as follows;

The development of conventional weapons in the Cold War era was not seen perhaps as needing the constraints of the Conventions when the concerns of the time were focused on nuclear war and its consequences especially ‘mutually assured destruction’. Nevertheless, it was noticeable that when some conventional weapons were produced by one belligerent, there was a rush by the other to replicate or ‘up-replicate’ it. The Conventions were often set aside in the race to produce an equivalent or an antidote.

Recent years have seen the rise of a number of developments that have brought, hitherto acceptable, weapons into the limelight. The first is the rise of political ideological conflicts where the public found themselves in confrontation with the forces of the state and became victims of contextually repressive weaponry. The weapons and tactics put in place for war contingencies, were often all that was available to the state and were inappropriate for public order issues.

Such public were articulate and intolerant of measures that they might have considered acceptable when inflicted in an earlier era. A human rights consideration developed and has today evolved to be the global influence of our time. Demands were made for citizens’ rights and the proper behavior of organizations and institutions in ensuring or maintaining those rights.

In more recent times, the latest development in ensuring the public’s rights has been legislations and provisions with regard to a citizens’ health and safety. When applied to armed forces on operations it may translate into risk aversion procedures, which may have negative consequences for others.

The development of issues and protections related to the person seem now to have superseded considerations of national security and together with the other influences mentioned here has given rise to a greater awareness of hazards and dangers which may now be considered unacceptable. The weapons mentioned in this paper, it is argued, now fall into this category.

The Conventions

The Geneva Conventions and all their modifications, additions and formulations with regard to the control as to the type of weapons that may be developed for combat are complete and thorough. They seem to embrace every conceivable aspect of weapons development and yet there is a

possibility that these provisions may not be formulated to bring some weapons into question. This then remains the first challenge in pursuing the purpose of this paper.

A question arises as to why the existing monitoring mechanisms were unable to regulate or control the development of such weapons. In answering this question it seems likely that an examination will have to be undertaken in pursuit of such enquiries. That said, it seems evident that the responsibility of each nation producer of weapons to regulate itself will not be fulfilled.

A second consideration is the need to review all existing conventional weapons in armouries worldwide in the fore-going context.

The third consideration is to make recommendations to enhance the monitoring mechanisms that apply to the Conventions with regard to the development of weapons in the future in order to prevent recurrences of this nature.