The emperor has some clothes on: fairy tales, scary tales and Weapons of Mass Destruction

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Introduction

The debate on the invasion of Iraq revolved around so-called "Weapons of Mass Destruction" (WMD). Thousands of lives were lost, hundreds of billions of dollars spent, alliances fractured, and international relations thrown into turmoil. The debates raged over whether WMD were there or not; whether the UN inspectors should have more time to find them or not; whether Iraq having or seeking WMD justified invasion or not, amongst other issues. There were a myriad of differing positions on the value of the war, but the idea that WMD are a distinct and special class of weapons has remained essentially uncontested.

It was the innocence, and perhaps ignorance, of a child that saw through the emperor's new clothes. In the case of WMD it is the reverse – only when we have a basic understanding of what these weapons are, how they work and what they can do, can we start to assess the value of the term "WMD", and – I will argue – see the fundamental problems it causes for policymakers, and for electorates of democratic countries in knowing how to react to those policies. This paper also suggests that the classification "WMD", as it is now used, has allowed the development, deployment and usage of terrible weapons that are deemed for arbitrary reasons not to be WMD.

The technologies behind many of the weapon-systems that have become known as WMD may be complex, but the principles are not. They can be explained to non-specialists, as this paper aims to do. Once this is done, the ramifications of conflating what will be shown to be very different weapons under one title become clearer.

“Weapons of Mass Destruction” and massively destructive weapons: not necessarily synonymous

There are reports from the 1991 Gulf War that a British SAS reconnaissance patrol far behind enemy lines thought that they had witnessed the use of a tactical nuclear weapon by the US-led allied forces. It was subsequently revealed that it was not a nuclear bomb they saw explode, but rather a 6,800 kg US BLU-82B bomb, now famously known as a “daisy cutter” – a bomb so large that it has to be dropped out of the rear of a transport plane, rather than carried by a conventional bomber. Designed originally for clearing helicopter landing zones in the dense jungles of Vietnam (one bomb would clear approximately a 75-metre-diameter circle of dense jungle), daisy cutters are reputed to be the largest and most powerful non-nuclear bombs in existence. They were used in the 1991 Gulf War to clear minefields, against enemy personnel in trenches, and for their psychological effects on the enemy, resulting from their witnessing such a huge explosion. They were deployed again in Afghanistan for much the same reason as well as against tunnels and cave complexes.[1] Another terrifying weapon that has come to prominence since the 2001 attack on Afghanistan, are thermobaric bombs. As one of these weapons nears its target, it releases a highly flammable aerosol-cloud of fuel (often petroleum) which is ignited by the conventional explosive part of the bomb that explodes on hitting the target. Along with the heat and fire, the sudden ignition of the air-fuel mix creates a massive pressure wave that does huge damage – literally crushing to death those not killed by the fire of the explosion. Even those beyond the range of the fire may still suffer serious internal injuries from the blast wave. BLU-118/B thermobaric bombs were used in Afghanistan against cave and bunker complexes. The

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[1] Federation of American Scientists (FAS) http://www.fas.org/man/dod-101/sys/dumb/blu-82.htm; Global Security.org “BLU-82 Commando Vault/Daisy Cutter” http://www.globalsecurity.org/military/systems/munitions/blu-82.htm

pressure wave of the weapon would kill those deep within the caves by crushing them to death, whereas the explosion of ordinary bombs would not.[2]

And yet, these weapons that undeniably cause mass destruction are not referred to as WMD in the sense that the term is commonly used by politicians, the public and many so-called experts. The recently produced "EU Strategy Against Weapons of Mass Destruction" does not clearly define what WMD means, although it does on its first page state that a major risk facing the world is that "terrorists will acquire *chemical, biological, radiological or fissile materials* and their means of delivery"[3] (emphasis added). The December 2002 United States "National Strategy to Combat Weapons of Mass Destruction" defines them in its first line as "nuclear, biological and chemical"[4]. In effect, both the US and the EU seem to suggest that *all non-conventional* weapons *are* WMD, whilst *all conventional* weapons *are not* WMD.

The flip-side of *not* calling a daisy cutter a WMD, is calling a 'weapon' that does very little damage, or even none at all, a WMD. On the 2 February "Diane Rehm Show" on National Public Radio in the US, a caller to the programme described the October 2001 anthrax scares, as well as that day's discovery of ricin in a letter sent to the Senate Majority Leader Bill Frist, as "WMD attacks". Neither the programme's host – a veteran journalist, or the two studio guests, James Woolsey – a former head of the CIA, and Lt General William Odom – a counter terrorism (CT) expert – questioned the caller's use

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[2] On thermobarics see: "Analysis: How thermobaric bombs work" ***BBC News*** 4 March 04 (http://news.bbc.co.uk/); FAS (1998) "Fuel/Air explosive (FAE)" http://www.fas.org/man/dod-101/sys/dumb/fae.htm; FAS (1998) "CBU-72 / BLU-73/B Fuel/Air Explosive (FAE)" http://www.fas.org/man/dod-101/sys/dumb/cbu-72.htm;
[3] ***EU strategy against proliferation of weapons of mass destruction*** 10 Dec. 2003 (http://ue.eu.int/pressdata/en/misc/78340 .pdf) (p.1)
[4] ***National Strategy to Combat Weapons of Mass Destruction*** Dec. 2002 (www.whitehouse.gov/news/releases/2002/12/ WMDStrategy.pdf) (p.1)

of the WMD term in these cases. The ricin has not caused *any* casualties – let alone fatalities, whilst the anthrax attack killed five[5]. Where is the mass destruction?

The term "weapons of mass destruction", and in particular the abbreviated form "WMD", has become a shorthand phrase for chemical, biological, radiological and nuclear weapons (CBRN). But these weapons differ from each other to such a degree that it calls into question the very use of the WMD term. Language is central to how we understand the world. We name things so we can share our experience or knowledge of them with others, and try to understand them. The WMD term as it is currently used does not help us to understand, rather it is the opposite: it distorts reality. It leads to single policy responses being given to very different problems. If governments continue to use the term in an undifferentiated way as they seem happy to be now doing, it may become a significant factor in the further undermining of trust in democratic systems of government.

Using the term WMD too loosely to begin with, creates unnecessary alarm amongst populations. This has clearly been visible in events in the US where people have become ill *en masse*, believing that they have been attacked with chemical or biological weapons. This has been called "mass sociogenic illness". [6] Other examples of illogical behaviour from irrational fear are people suffocating themselves in an attempt to gain protection from an anticipated WMD attack – a recent sad example of this was a mother and two sons who died in Israel[7], but there have been others. But as with "the boy who

[5] One writer notes that during the same period more people died from an outbreak of Legionella in Stavanger, Norway. See Bremer Mærli, M. (2003) ***The Real Weapons of Mass Destruction: Nuclear, biological and chemical warfare in the era of terrorism and "rogue" states*** Norwegian Atlantic Committee Security Policy Library 1-2003 (p.7)
[6] Durodié, Bill (2002) "Perception and Threat: Why Vulnerability-led Response will Fail" ***Security Monitor*** November 2002 Vol.1 no. 4 London, RUSI (p.17)
[7] AP, 17th March 2003 "Mother and sons die in room sealed against chemical attack"

cried wolf", eventually publics will stop reacting to such threat warnings with alarm, the reaction will become indifference and ultimately contempt. The widespread ridicule of the colour-coded terrorist warning system currently used by the United States government illustrates this clearly.

The danger is that eventually an attack will take place and the warning system will not work because people will have stopped taking any heed of it. Another danger lies in the cynicism with which publics are now treating governments' claims on the WMD capability of other states, as a result of the 'missing' WMD in Iraq. A nuclear-armed Iraq under Saddam Hussein was a terrifying prospect that both the US and UK governments rightly feared. But believing that evidence of a nuclear programme wasn't enough, the US and UK tried to persuade the world that Saddam had chemical and biological weapons, as he had had in the past. When the expected stockpiles of these weapons (that never constituted a severe threat to Europe or North America) failed to materialise after the war, the cynicism it created will close down future policy options to stop the proliferation of nuclear weapons – something that should concern us greatly.

Before we go on to consider the actual weapons that are described as WMD, it is worth considering the history of the term.

The etymology of a flexible term

Throughout the Cold War the term "Weapons of Mass Destruction" was associated with nuclear weapons, but it appears not to have started out this way. According to *Wikipedia*, the online-collaborative encyclopaedia, the phrase originated in 1937 in British press reports of German bombing raids on Spanish cities during the Spanish

Civil War.[8] An etymology website, *WordOrigins.org*, agrees with this and makes specific reference to the *Times* of London on 28 December 1937, where it was written: "Who can think without horror of what another widespread war would mean, waged as it would be with all the new weapons of mass destruction?"[9] Therefore the earliest uses of the term appear to have focused on destruction caused by conventional weaponry.

Only after WWII did the term become associated with nuclear weaponry, and was used predominantly within the arms control and defence communities. At the strategic level during this period, the blurring of the distinction between nuclear weapons on the one hand, and chemical and biological on the other, began. Chemical and biological weapons were seen by some as "the poor man's atomic bomb"; a way that developing countries could counter the nuclear arsenals of the superpowers. This fitted the deterrence concepts of the time but it "blurred the distinctive attributes of, and difference amongst nuclear, biological and chemical weapons."[10]

Yet, this blurring was also taking place on the tactical level. NATO has long used the abbreviation NBC (nuclear, biological, chemical). Although this term does not suggest the comparative scale of destruction that 'WMD' does, it still lumps together the three different types of weapons because of the similarity in the ways that military forces attempt to protect themselves from these weapons. Clearly there is no way to shield troops who are in the kill zone of a nuclear explosion, but in Cold War scenarios of NATO fighting Warsaw Pact troops on the plains of Northern Europe it was thought that the troops must be prepared to fight in areas affected by radioactive fallout and

[8] http://en.wikipedia.org/wiki/Weapon_of_mass_destruction; see also http://news.bbc.co.uk/1/hi/uk/2744411.stm
[9] http://www.wordorigins.org/wordorw.htm

contamination. The respirators and suits that give limited protection against radioactive particles, were designed to also protect soldiers against possible Soviet chemical or biological weapons. Therefore for those within professional military circles, the tactics and equipment needed for fighting in NBC environments tended to lead to the grouping of nuclear, biological and chemical weapons together.

The institutionalisation of WMD as meaning nuclear, biological and chemical weapons, came with UN Security Council Resolution 687 in 1991, which mentions Iraq's chemical and biological weapons and also its attempts to gain nuclear weapons and then states:

"Conscious of the threat that all weapons of mass destruction pose to peace and security in the area and of the need to work towards the establishment in the Middle East of a zone free of such weapons".[11]

Nevertheless, WMD after the Gulf War of 1991 was still predominantly linked to state actions (Iraq), rather than the fear of terrorists using these weapons. An editor of a leading Australian newspaper noted that in that paper, after infrequent appearances of the term "WMD" from the Gulf War onwards, there was a sudden 'spike' in the usage in the late summer of 1998 when al-Qaeda attacked the American embassies in Kenya and Tanzania.[12] This suggests that the media began connecting WMD and terrorism before September 11, although it was those horrific events that brought WMD to the level of everyday use around the world that we are witnessing now.

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[10] Reichart, John F. (2001) "Adversary Use of NBC Weapons: A Neglected Challenge" ***Strategic Forum*** No. 187 December 2001 Institute for National Strategic Studies, National Defense University (p.1-2)

[11] UN S/RES/687 (1991), 8 April 1991

[12] Carroll, Vic "Some words can make a war cry foul" ***Sydney Morning Herald*** 28 May 2003

This then is a brief history of how "WMD" became one of the most common phrases heard globally in discussions on international politics. The US has a policy on WMD, as the EU now does, yet neither of these important documents attempts to differentiate between the different types of weapons that are considered to be WMD. What has developed is a "one-size-fits-all" policy approach, but as will be shown below, we are talking of weapons that differ hugely in size – suggesting that if the policies fit at all, they will fit badly.

Nuclear[13]

Certain advances in military technologies have radically altered the way mankind fights and hence history itself: the stirrup that allowed horses to be used in combat rather than just as a method of getting to the battlefield; the English Longbow that allowed the opposition to be killed at great distance; gun-powder; the machine gun; the tank. All of these technological advances changed history, but none threatened to end it in the way that the splitting of the atom did in 1945. Nuclear weapons have been used on only two occasions in warfare, on Hiroshima and Nagasaki where two bombs killed around 250,000 people. Man has developed many other ways to create carnage amongst his fellow men – but nothing even approaches atomic weapons' power to destroy.

Types of nuclear weapon: There are two main types of nuclear weapon, those based on fission – the splitting of atoms – and those based on fusion – the putting of two atoms together. The original nuclear weapons were all fission bombs using the uranium isotope U-235, and then later using the plutonium isotope Pu-239. A refinement of a plutonium fission bomb is called a boosted weapon. Here, at the moment of detonation, fusion material is added to the plutonium core. The energy released by the splitting of the Pu atoms is enough to begin fusing the very light nuclei of the fusion material (isotopes of hydrogen – tritium and deuterium). The fusion process releases yet more energy which, in turn, leads to the fission of more Pu-239. This has a multiplying effect on the amount of energy released in the explosion – meaning that typically for the same weight of fissile material, the bomb can be ten times as powerful as a simple fission device. The bomb that destroyed Nagasaki on 9 August 1945 had an explosive power of 20 kT (kilo-tonnes – one kilo-tonne being the equivalent of 1000 tonnes of TNT explosive). Boosted weapons can have explosive powers of 500 kT; in other words, the equivalent of 25 Nagasaki weapons being used at once, and enough to destroy a large city completely.

The only weapons with even more destructive power than this are hydrogen bombs – often referred to as thermonuclear weapons. Thermonuclear weapons have a fission weapon in them, and the explosion of this creates the heat and pressure necessary to begin the fusion of hydrogen isotopes. This process is essentially what gives the sun its power. Vast amounts of energy are released in the fusion process. In 1962 the Soviet Union exploded a fusion device at its test area on Novaya Zemlya with the force of 60,000 kT or 3,000 Nagasaki bombs. This is far more power than is necessary to destroy the largest cities on earth and every living thing in them.

Quite clearly, there are big differences between different types of nuclear weapons. Through the Cold War nuclear weapon designers did not just design large weapons for destroying the enemy's cities, industrial capability, and hopefully the opposing nuclear

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[13] Major sources: Barnaby, F. (2003) ***How to Build a Nuclear Bomb and other Weapons of Mass Destruction*** London, Granta Books; FAS (1998) "Nuclear Weapons Design" ***Special Weapons Primer*** www.fas.org/nuke/intro/nuke/design.htm

forces; they also designed small nuclear devices for all sorts of tactical battlefield roles. These included nuclear artillery shells, torpedoes, nuclear depth-charges for use in anti-submarine warfare, and nuclear demolition charges for destroying infrastructure such as large bridges to deny their use to enemy forces.

A nuclear explosion: When a nuclear weapon explodes there are sequential and distinct bursts of energy, following each other very rapidly but with differing effects. The first is of ultraviolet light, followed by a second of thermal energy. This heat wave will kill or seriously burn all those exposed for some distance (depending on the size of the bomb and climatic conditions) and will also start fires – a previously underestimated part of the destructive power of nuclear weapons.[14] It is the thermal radiation that accounts for the horrific burns that are well known from pictures of the immediate aftermath of the Hiroshima and Nagasaki bombs. The third burst of energy is the blast wave which demolishes buildings and structures. In urban areas it would not be the actual blast wave itself that would kill, but its indirect effects – as buildings fall onto their occupants and debris is hurled outwards at great speed. After the forces of the explosion – the heat and pressure wave have passed – the slower effects of radiation will become apparent. The mushroom cloud caused by the bomb sucks up huge amounts of dust and other matter into the atmosphere. These are rendered radioactive by the energy of the explosion. The cloud will move with the direction of the wind and these particles and nuclear fission products will slowly fall back towards the earth, contaminating with radiation all that they come into contact with. If exposed to high doses of ionising radiation, people will exhibit symptoms of radiation sickness within minutes and most deaths will occur within a couple of months. Those who are contaminated by lower doses may see effects such as

[14] Eden, Lynn (2004) “City on Fire” ***Bulletin of Atomic Scientists*** January/February 2004 Vol. 60 No.1 pp.33-43 (available at http://www.thebulletin.org/issues/2004/jf04/jf04eden.html accessed 20 Feb. 04)

leukaemia within a couple of years – but some types of resulting cancer may only become apparent many decades later.

Building a nuclear weapon: Fusion weapons rely on complex technology and difficult-to-obtain materials. They have only been produced by states with advanced nuclear weapons programmes, and therefore it is not thought that a non-state actor could produce one. Fission weapons are relatively simple in comparison, but this is not the same as saying that they are simple to produce. Iraq had a nuclear weapons programme from the mid-1970s up to the 1991 Gulf War (and in a very limited way beyond, due to UN sanctions). It is now known that Libya had a nuclear programme for well over a decade. Yet neither of these countries managed to produce a nuclear weapon. The US Congress Office of Technical Assessments estimated in 1993 that the minimum cost of an overt weapons programme producing one nuclear bomb a year would be USD 200 million[15], and that Iraq probably spent 10 to 20 times this investigating various technical paths, and attempting to keep the programme covert (and still failed to produce a weapon).

If a state or non-state group was able to get fissile material, there are two main types of fission weapons that they could try and make. Firstly, there is the "gun" model, in which an amount of fissile material is 'fired' into a larger piece, the two together reaching critical mass where the nuclear chain reaction begins that leads to a nuclear explosion. This is a very reliable form of design, so much so that the engineers that produced "Little Boy", the gun-type bomb that destroyed Nagasaki, did not even test their design

[15] Not only is this a "1993 price", not allowing for inflation, it should be underlined that this is for an *overt* programme. The assertive anti-proliferation stance taken by the US (and UK) since 9/11 will make it harder and harder for any state in the future to develop nuclear programmes. For states, it is questionable whether the political advantages of having nuclear weapons will outweigh the political advantages of NOT having them. It appears that Colonel Qaddafi may well have made this calculation.

before the weapon was used. This type of weapon needs highly enriched uranium (U-235) to work successfully. The second type of device is the “implosion” type. Here a ball of sub-critical fissile material is surrounded by high explosive (HE). When the HE explodes, the power of the explosion compresses the fissile material – making it smaller for the same mass – where, at the higher density, it becomes super-critical. The chain reaction begins and a nuclear explosion then occurs. Implosion devices can be built with either U-235 (as Iraq attempted) or with Pu-239 (as North Korea has done).

U-235 and Pu-239 are not commonly available substances. Pu is only produced in nuclear reactors, and is made by reprocessing uranium fuel. So to produce Pu a country needs to have nuclear reactors (as North Korea does). This would be virtually impossible for a non-state group, although the possibility of buying plutonium on the black market, or stealing it from a civilian reactor is not beyond the realm of possibility. Highly enriched uranium can be produced via various routes. Uranium is a naturally occurring element and can be mined, but the uranium-ore (the now famous “yellow-cake” – which is purified to produce uranium oxide: U_3O_8) that can be dug up in many places around the world is far from usable and needs extensive refinement and enrichment. Naturally occurring uranium is only about 0.7 per cent U-235 – the rest being U-238. U-238 will not produce the supercritical mass that is needed to make a nuclear explosion, so the U-235 needs to be separated . This enrichment process is the technical crux of a weapons programme. There are different methods of doing this but they tend to rely on the difference in mass between the U-235 and U-238 atoms. Gas-diffusion is one method, but it requires vast amounts of electricity – gas-diffusion plants often having their own power plants. This makes it very difficult to do covertly. The second enrichment method, which has been used by Pakistan and was attempted by Iraq, is with gas-centrifuges. The uranium is turned into a gas and then put into the centrifuge. Spinning at very high speeds the fractionally heavier U-238 atoms concentrate further out in the centrifuge drums and can be separated from the lighter U-235 atoms. This is a slow process, as the uranium needs to be around 90 per cent U-235 to make it "weapons grade". The normal method is for a "cascade" of centrifuges that work in sequence, each enriching the uranium a little more. The centrifuges themselves need high precision engineering in materials such as carbon fibre and maraging steel. Building the centrifuges was clearly one of the main difficulties that the Iraqi nuclear programme faced, particularly with sanctions in place.

Once the fissile material has been produced or procured, the actual forming of it into the necessary shapes for the bomb is not technically complex, but still presents certain technical challenges that probably require access to very accurate machine tools.[16] The gun-type device is technically easier to produce than the implosion type, but necessitates highly enriched uranium, which may well be harder for terrorists to come by than plutonium, which is traded legitimately and internationally for use in civil reactors.

The "Nth Country Experiment" carried out in the US between 1964 and 67 showed dramatically that two post-doctoral physicists with access to a decent University library and some basic engineering support, but no confidential information, could produce a working nuclear weapon.[17] Many experts believe that a basic nuclear weapon is not impossible to manufacture for a well-organised, motivated and funded terrorist group.

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[16] The Nobel laureate physicist, and member of the original Manhattan Project, Luis Alvarez has said that "if separated, highly enriched uranium is at hand, it's a trivial job to set off a nuclear explosion… even a high school kid could make a bomb in short order." See Stober, D. (2003) "No Experience Necessary" ***Bulletin of Atomic Scientists*** March/April 2003, Vol. 59 No.2 pp.56-63 (http://www.thebulletin.org/issues/2003/ma03/ma03stober.html accessed 23 Feb. 04) Other sources suggest that technical equipment is necessary such as "precision calibrated computer-guided machine tools (= 25,000 rpms) with laser-interferometer, air-bearing lathe, and artificial room ventilation with built-in air cleaner". Steinhausler, Friedrich (2003) "What it Takes to Become a Nuclear Terrorist" ***American Behavioral Scientist*** Vol.46, No. 6, February 2003 Sage Publications (p.792)

[17] Sober, D. (2003) op. cit.

The main obstacle lies in getting the fissile material, and that should therefore be the focus of anti-proliferation efforts that aim to stop non-state groups, as well as other states, getting these uniquely dangerous weapons – weapons that do indeed deserve the classification of "mass destruction".

Chemical[18]

Chemical weapons (CW) were first used extensively in World War I. The horror of the effects of mustard gas, amongst other agents, led to the Geneva Protocol of 1925 banning CW (although some countries interpret it as meaning no first use of CW). Many of the earliest CW were common industrial chemicals that were known to have deleterious effects and were taken into military use – such as phosgene and hydrogen cyanide.

Blister agents such as mustard gas cause burns and blisters even at low exposures. Mustard gas does not necessarily kill, part of its military value is that it incapacitates large numbers of soldiers, entailing significant resources to evacuate and treat them. In the 1982-87 Iran-Iraq war both sides used mustard gas; in particular Iraq used it in an attempt to stop Iranian "human wave" attacks. The effects of mustard gas are not instantaneous, they can take up to 12 hours to develop, so scientists went on to develop blister agents that begin to work on contact – lewisite being the most prominent.

Nerve agents began to be produced in Germany in the 1930s and were developed by many countries during WWII, but fortunately never used. Nerve agents are split into V-and G-type agents. G agents (such as tabun and sarin) tend to work by being inhaled, whilst V agents (such as VX) can be absorbed through the skin. V agents tend to be longer lasting and more deadly. Nerve agents act by paralysing nerve cells (neurons): an enzyme called acetylcholinesterase is necessary to allow neurons to function, the nerve agent inhibits this enzyme from working and very soon the neurons can no longer send the messages from the brain to the rest of the body. Tiny doses of nerve agent can kill, for example a drop of VX the size of a pinhead will lead to death within 20 minutes. Iraq used nerve agents during its war with Iran, but the most horrific use of the weapons was by the Iraqis against the civilian population of the town of Halabja in the Kurdish area of Iraq, on 16 March 1988. The attack used aircraft and artillery and in addition to nerve agents, mustard gas and cyanide were also used. It is estimated that 5,000 men, women and children were killed.

The horrendous effects that nerve agents have on the human body are not in dispute, but whether chemical weapons should be termed "WMD" is. Their military utility is severely limited, as was discovered in WWI. Gas attacks depended on the wind – it was not unknown for the wind to change and blow the gas back onto the attacking side's own troops. Even if the gas did strike the enemy, the effects were only limited: approximately two to three per cent of those gassed on the Western Front died from the effects, whereas those injured by 'traditional weapons' were 10 to 12 times more likely to die. Some chemical agents are also difficult to deliver – if fired in artillery shells the explosion on impact tends to immolate the agent.[19] In modern warfare the utility might increase by using them not against frontline troops (where they are also a danger to your

[18] Major sources: Barnaby (2003) op. cit. (chp.3); Organisation for the Prohibition of Chemical Weapons (2003) ***Basic Facts on Chemical Disarmament*** The Hague, OPWC; FAS (1998) "Chemical Weapons – Introduction" ***Special Weapons Primer*** (www.fas.org/nuke/intro/cw/intro.html)
[19] Easterbrook, Gregg (2002) "Term Limits: the meaninglessness of 'WMD'." ***The New Republic*** October 7, 2002 (p.23)

own troops) but against the enemy's rear – attacking and disrupting the supply lines and reserves.[20] Yet it is arguable whether they represent more of a disruptive force than a destructive one when pitted against modern, well-equipped armed forces. NBC suits and respirators offer troops protection from these weapons, and for instance the American main battle tank, the M1 Abrams, along with the M2 Bradley fighting vehicle, are pressure sealed, allowing them to operate in NBC environments.[21]

Chemical weapons remain a danger to civilian populations, but so do all weapons: Gregg Easterbrook writes that it is "hard to see a moral distinction between being killed by gas and being blown up."[22] There is some evidence that suggests that even against civilian populations, CW are not as destructive as might at first be assumed. The attack on Halabja took place over many hours and "Iraqi airforce planes made repeated, low-level, unopposed passes over defenceless civilians. Regular bombs and strafing would have caused similar slaughter."[23] It is perhaps worth remembering again at this point that the first use of the term "weapons of mass destruction" was in connection with fascist air raids using conventional weapons on Spanish towns such as Guernica. The type of attack suffered by the civilians of Halabja would not be possible against any population protected with even basic air defences. Since 9/11, governments around the world have become much more aware of these dangers; air space near cities is being more tightly controlled, more air-to-air defence capabilities are being kept at readiness, and the chances of strangers enquiring about crop-dusting planes (as Mohammed Atta did in Florida in February 2001[24]) without it being reported to the authorities seem remote.

[20] see Reichart, John F. (2001) op. cit. (p.3)
[21] Easterbrook, Gregg (2002) op. cit. (p.23)
[22] ibid. (p.22)
[23] ibid. (p.23)

Climatic and topographic conditions also greatly affect the effectiveness of the most dangerous nerve agents, as do basic civil defence precautions. The US Congress Office for Technology Assessment notes that:

"medium to large-scale attacks with chemical weapons (e.g. tens of tons) may kill many more unprotected people (e.g. thousands) than would the equivalent amount of high explosives. On the other hand, the many uncertainties involved in dispersing chemical agents efficiently – as well as the effectiveness of relatively simple civil defence measures (e.g. wearing gas masks and remaining inside living spaces that are sealed off during attack) – could keep casualties relatively low".[25]

The same study suggests that 1,000 kg of sarin, delivered by aeroplane "assuming a highly efficient, line source delivery" against an unprotected city could in the optimum conditions (a clear, calm night) kill between 3,000 and 8,000 people. But if the same attack was launched on a clear, sunny and breezy day the effect could be lowered to the death of between 300 and 700 people.[26]

A study for the US War College on the use of chemical weapons in the Iran-Iraq war concluded that the death/injury rates even with Iraq using relatively advanced nerve agents like sarin: "further reinforces the position that we must not think of chemical weapons as 'a poor man's nuclear weapon'. While such weapons have great psychological potential, they are not killers or destroyers on the scale of nuclear or biological weapons."[27] Their conclusion can be supported by the case of a terrorist attack using sarin nerve agent: the 20 March 1995 attack on the Tokyo subway carried

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[24] Corbin, J. (2002) ***The Base: Al-Qaeda and the changing face of global terror*** London, Pocket Books (p.189)

[25] US Congress, Office of Technology Assessment (1993) ***Proliferation of Weapons of Mass Destruction: Assessing the Risks*** Washington DC, US Government Printing Office (p.62)

[26] ibid. (p.54)

[27] Pelletiere, S. and Johnson, D. (1990) ***Lessons Learned: The Iran-Iraq War*** Carlisle Barracks PA., Strategic Studies Institute – US Army War College (p.102)

out by the Aum Shinrikyo.[28] This attack killed 12 and injured 5,500. It was a cruel and bizarre act, but it was not an act of mass destruction – plenty of suicide bombings in Israel have killed more. The Aum cult was bizarre in its beliefs, but very organised in its actions. It recruited graduates from the best universities and developed businesses that made large amounts of money. It is believed that as early as March 1990 they decided to make chemical and biological weapons. They sprayed Japanese parliamentarians with botulinum toxin (to no effect) in April 1990, they sent teams to the then Zaire to collect samples of the Ebola virus, and they bought a huge ranch in the remote outback of Australia where their experiments resulted in piles of dead sheep. The first sarin attack was on 27 June 1994, when Aum members drove a truck loaded with sarin into the city of Matsumoto. Seven people died and 250 were hospitalised, but the Japanese authorities misdiagnosed the symptoms and decided the cause was an insecticide. Including the Matsumoto attack, Aum launched nine attacks with chemical and biological agents before the Tokyo attack, and even another two afterwards.[29] The Tokyo attack took place at 7.45 am, and it was not until 10.30 am that one emergency doctor finally realised that the hundreds of people being brought to hospitals were exhibiting symptoms of a nerve agent attack. And only at 1.30 pm did the first emergency personnel using military chemical protection suits arrive on the scene. The group did not weaponise their sarin well and the climatic conditions of the subway also worked against the vaporisation of the agent; otherwise many more could have been killed. But the fact that this group – who had access to such large amounts of capital (both financial and intellectual) and had been allowed the opportunity to do numerous tests in relative peace – were unable to cause more injury to unprotected and unprepared civilians (including a badly organised and prepared emergency response) than they did,

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[28] The information on the Tokyo attack is taken from Benjamin, D. and Simon, S. (2002) ***The Age of Sacred Terror*** New York, Random House. (pp.432-439) and Barnaby, F. (2003) op.cit. (p.64)
[29] Bremer Mærli, M. (2003) op. cit. (p.8)

suggests that chemical weapons are really not weapons of mass destruction. A good comparison would be with the February 2004 bombing on the Moscow subway – probably carried out by Chechen separatists – which would have been simpler to organise and a fraction of the cost, but resulted in far more devastation and loss of life.

Biological[30]

Biological weapons (BW) have a long history in warfare. In medieval times and even earlier, the bodies of plague victims were hurled by catapult over the walls of besieged cities, wells and other water sources were contaminated with animal carcasses or worse. In 1793 British troops in North America gave blankets taken from smallpox victims to Native Americans, leading to the decimation of many tribes. There was some very limited use in WWII, but mercifully the anthrax that Great Britain weaponised was never used.

Biological weapons can be classified by the organisms that they contain: *Bacteria* – single-cell free living organisms (that cause diseases such as: anthrax, plague, cholera), can often be treated with antibiotics; *Viruses* – organisms dependent on living cells in order to replicate (e.g. smallpox, Ebola, polio), generally cannot be treated with antibiotics; *Rickettsiae* – micro-organisms with certain traits of both bacteria and viruses (e.g. Q-fever, typhus), susceptible to antibiotics; *Chlamydia* – intracellular parasites, like viruses they need living cells for multiplication but are susceptible to antibiotics; *Fungi* – primitive plants that reproduce by forming spores which can spread diseases (e.g. coccidiomycosis); *Toxins* – poisonous substances derived from plants (e.g. ricin).

[30] Main sources: Barnaby (2003) op. cit. (chp. 2); FAS (1999) "Biological Weapons" ***Special Weapons Primer*** (www.fas.org/nuke/intro/bw/intro.htm)

Many of the diverse biological agents that are often listed[31] remain more ‘potential weapons’ than current weapons – any unpleasant infectious disease is a potential BW. The most suitable tend to be pathogens that can withstand environmental stresses, or can be dried (desiccation) to enable better weaponisation. One frightening fact is that modern bio-science now allows genetic manipulation to promote these properties, meaning that pathogens which in the past have not been easy to deploy as some form of weapon, might well become so in the future.

Biological weapons have a limited battlefield utility, very few pathogens produce symptoms in less than 24 hours, for example inhalation anthrax does not begin to cause symptoms for between one and six days. Clearly this is not a way to stop an armoured attack, but arguably they have some strategic use if they could be delivered behind enemy front-lines where they could cause havoc amongst reserves and supply personnel. Most large countries had BW programmes during the Cold War but gave them up as an offensive weapon due to BW being too unpredictable to serve any military purpose. The superpowers in particular had nuclear weapons if they needed to cause devastation amongst their opponents’ civilian population. The unpredictability would probably not concern terrorists but, as one expert suggests, they may be psychologically inclined towards the immediacy of an explosion, as opposed to the delayed effects of an illness brought on by a BW.[32] Indeed there have been a number of cases that can be described as terrorist attacks using BW which were not recognised as such at the time: the 1984 poisoning of 751 people in Oregon (no fatalities) by the Rajneeshee cult using

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[31] An example list is maintained by the Federation of American Scientists at: http://www.fas.org/nuke/intro/bw/agent.htm

[32] Parachini, John (2001) ***Anthrax attacks, biological terrorism and preventative responses*** Testimony before the Subcommittee on Technology, Terrorism and Government Information, US Senate Judiciary

salmonella, being the most obvious example.[33] The danger that the world might not even recognise your attack might be a serious disincentive to the use of BW by terrorists.

The anthrax attacks on the US in the autumn of 2001 killed 5 and infected another 17 people.[34] The method of dispersal was very crude, but the anthrax spores themselves were not. It seems increasingly likely that the attack originated from within the US bio-weapons establishment itself (the FBI has gone as far as naming one US weapons scientist as a "person of interest"). The anthrax spores were very finely milled, allowing them to drift into the atmosphere easily. The technology required to produce this quality of anthrax is supposedly advanced, and this quickly led investigators to suspect an 'insider'. Five deaths is a tragedy, but again – like the Tokyo sarin attack – it would not seem to merit the description "mass destruction". The public health system did work in the case of the anthrax attack. 17 other people were infected but recovered after medical treatment. Thousands more were given prophylactic antibiotics.

The 1993 Office of Technology Assessment (OTA) considered various scenarios for an attack with anthrax on an unprotected city.[35] The assumptions are the same as in the sarin attack scenario outlined on p. 18 above: "a highly efficient, line source delivery" – a plane flying south to north at a relatively slow speed, west of a large city with a westerly wind distributing 100 kg of high-grade anthrax spores evenly. This scenario could indeed be an attack of truly massive destruction of life – the OTA estimates that in optimal conditions (a clear, calm night) this could lead to the deaths of between 1,000,000 and 3,000,000 people. Even in sub-optimal conditions, the OTA still

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Committee 6 Nov. 2001 (available at: http://www.rand.org/publications/CT/CT186/CT186.pdf accessed 25 Feb. 04)

[33] The Aum Shinrykio botulinum and anthrax attacks being others.

[34] see http://www.ph.ucla.edu/epi/bioter/detect/antdetect_list.html

[35] US Congress, Office of Technology Assessment (1993) ibid. (p.54)

estimates between 130,000 and 460,000 deaths. A 1970 World Health Organisation (WHO) expert committee estimated that a 50 kg release of anthrax spores over an urban area of 5,000,000 would lead to 100,000 deaths if those infected were not treated.[36] These figures are alarming, but it does show the huge variables that are at play in the use of even a well-researched biological agent such as anthrax. For example, the decay rate[37] of anthrax spores in the atmosphere differs greatly from, at most, 0.1 per cent per minute during the night, to 5 per cent per minute during the day.[38] This means that an attack in daylight hours would be many times less effective than at night. There are also different strains of the anthrax bacteria: in June 1993 the Aum Shinrikyo cult started pumping anthrax into the atmosphere from a office building in Tokyo, but no one fell ill. It is not clear whether this incident was a 'test-run' and the cult knew that they were using a strain of the agent that is not harmful to people, or whether they had just failed to produce a strain that was indeed harmful.[39] Subsequent study has shown that the anthrax used by Aum had been developed from a strain that is commercially available in Japan for the vaccination of animals against anthrax.[40] One other incident deserves mention, the Sverdlovsk (now called Ekaterinburg) anthrax leak of 1979. In this case there was an accidental release of weapons- grade anthrax spores from a BW plant in the USSR. 94 people were infected and at least 64 of them died.[41] According to one scientist who

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[36] quoted in Inglesby, T. et al (1999) "Anthrax as a Biological Weapon: Medical and Public Health Management" ***Journal of the American Medical Association*** May 12, 1999 Vol. 281, No. 18 (p.1736)
[37] "most biological agents, with some important exceptions, decay rapidly once dispersed – either because they dehydrate,
because ambient ultraviolet light kills them (especially in the daylight), or because other environmental effects take a toll." Chow, B. et al (1998) ***Air Force Operations in a Chemical and Biological Environment*** RAND, DB-189/1-AF (p.28)
[38] ibid. (p.29-30)
[39] Olson, K. (1999) "Aum Shinrikyo: Once and Future Threat?" ***Emerging Infectious Diseases*** Vol. 5, No. 4, July/August 1999 Atlanta GA, National Centre for Infectious Diseases (CDC) (p.514)
[40] Takahashi, H. et al "*Bacillus anthracis* incident, Kameido, Tokyo, 1993" ***Emerging Infectious Diseases*** Vol. 10, No. 1 January 2004 www.cdc.gov/eid
[41] Frontline ***Plague war*** (website supporting TV programme) PBS
http://www.pbs.org/wgbh/pages/frontline/shows/plague/

defected from the USSR/Russian BW programme, the amount released at Sverdlovsk was 100 grams, but the relatively small number of fatalities was the result of the wind blowing the anthrax away from the city; had it been blown into the city, he believes the result could have potentially been tens if not hundreds of thousands of casualties.[42]

In addition to those BW which have already been identified, due to rapid advances in biotechnology and life-sciences, there is the possibility that new BW will be developed, are being developed or have been developed. Oft-cited examples of such are, firstly, the 2002 creation of a synthetic polio virus by US researchers, who built the virus using a genome map available on the internet and gene-sequences bought mail-order from a scientific supplier.[43] It should be pointed out that the polio virus is rather simple, particularly in comparison to something such as smallpox (7,741 DNA base pairs and over 200,000 respectively), which means that the artificial creation of smallpox remains years in the future – even for the best researchers in the best-equipped institutions.[44] Secondly, there is the case of Australian researchers who accidentally created a virulent

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[42] see http://www.pbs.org/wgbh/pages/frontline/shows/plague/interviews/alibekov.html Kanatjan Alibekov, now known as Kenneth Alibek, a senior scientist in the Soviet BW programme who left for the US in the early 90s, made this claim. He has become a prominent critic of what he claims is Russia's continuing offensive BW programme, and has consistently rung the alarm bell over bio-terrorism. Some critics imply that Dr. Alibek has a financial interest in spreading concern about BW; the company that he is president of – Hadron Advanced Biosystems – had by late 2001 already received over USD 12 million in research funding from the Defense Advanced Research Projects Agency (DARPA) of the Pentagon, and from the United States Army Medical Research and Materiel Command and the National Institute of Health. Hadron is engaged in research to find ways of boosting the overall human immune system to allow it to resist bio-attacks, which a smallpox scientist working for the US Army has compared to "cold fusion: a great idea, but where is the experimental basis?". See Analex Press Release 20 December 2001 "Hadron Advanced Biosystems Announces Research Plans and Product Development Strategies for Broad Defense against Biological Weapons" (http://www.analex.com/html/press/absprdctdvlp.shtml), Chase, M. "To Fight Bioterror, Doctors Look For Ways to Spur Immune System" ***Wall Street Journal*** 24 September 2002.

[43] See "First synthetic virus created" ***BBC News*** 11 July 2002 http://news.bbc.co.uk/1/hi/sci/tech/2122619.stm

[44] Tucker, J. (2003) ***Biosecurity: Limiting Terrorist Access to Deadly Pathogens*** Washington DC, United States Institute of Peace (p.18)

strain of mouse-pox (for mice) by adding an immune-system protein to the virus – making it fatal even for a majority of mice that had been vaccinated against the virus.[45] The obvious implication is that a similar method could be found to genetically engineer a form of the smallpox virus that is dangerous even to people who have been vaccinated against the disease.

It is difficult for a non-specialist to develop an accurate sense of how big a threat genetically- engineered BW could potentially be. But the writer has, in conversation and correspondence with various researchers in the life-sciences, all of whom are at the PhD level or studying for one, heard these professionals say on a number of separate occasions that for someone with their skills and access to a basic lab and supplies – as one immunologist put it – “it’s just a question of motivation and a couple of years of hard work” to produce – as a biochemist suggested – “something rather nasty”.

So do biological weapons warrant the title of “weapons of mass destruction”? It is clear that, in the past, states – particularly the Soviet Union – created biological weapons that were indeed worthy of that name[46], in terms of the mass destruction of human lives if not in terms of physical destruction. The attempts we have seen so far by non-state actors to create BW have (fortunately) not warranted the WMD tag. Whilst the materials needed in their manufacture may be far more easily available than in the case of nuclear weapons, it appears that the actual production of the agents, or the weaponisation of those agents, still involves significant technical barriers to producing something that should be called a WMD. Nevertheless, two factors appear to make BW more of a threat than CW. Firstly, science in this field – in particular genetic engineering – is developing

[45] Nowak, R. (2001) “Disaster in the making” ***New Scientist*** vol. 169 issue 2273 - 13 January 2001 (p.4)

rapidly, implying that the possibilities for producing new types of bio-weapons are huge. This should be compared to the relatively static technology in relation to chemical and nuclear weapons. Secondly, many BW produce contagious diseases, meaning that the damage done only begins with the original attack, which might have been on a very small scale. One person exposed to a chemical agent such as VX will probably die, but no one else will. One person exposed to smallpox could trigger an epidemic that infects and potentially kills thousands or more. Yet this is also the 'silver lining' with regard to BW – public health systems may well be able to contain such an epidemic and medical science may control it.

A final mention should be made of the toxin ricin, as it has come to prominence in connection with the 2003 arrests in the UK of a number of Algerians linked – perhaps tenuously – to al-Qaeda, and also in the US with an envelope of the material being sent to the Senate Majority Leader in February 2004. Ricin is a deadly biological toxin for which there is no antidote, but it needs to enter the victim's bloodstream to be effective. In the famous case of the Bulgarian dissident, Georgi Markov, killed by the Bulgarian secret service in London in 1978, the dissident was injected with a ricin-covered pellet from a modified umbrella.[47] The toxin is not infectious in any way. It is a biological weapon – a product of castor beans – but it is in no sense a weapon of mass destruction.

Radiological

Now often referred to in the media as "dirty bombs", radiological dispersal weapons (RDW) do not necessarily have to be bombs. The concept differs greatly from nuclear

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[46] See Tucker, J. (1999) "Biological weapons in the former Soviet Union: an interview with Dr. Kenneth Alibek" ***The Non-proliferation Review*** vol. 6 no. 3 Spring/Summer 1999 (pp.2-6)

weapons, where the radiation is, in effect, a byproduct of the powerful explosion that results from the atomic fission or fusion. RDW do not *make* radiation, but rather *spread* pre-existing radioactive materials over a larger area. The most obvious example is the concept of a 'dirty bomb': standard explosives with some form of radioactive material packed around them. When the bomb explodes, this material is blasted outwards by the explosion and when it comes to rest around the blast zone it will contaminate that area. There are other alternatives for dispersing radiation such as some form of aerosol system, but a bomb remains the most likely due to its relative simplicity.

It is known that the US military did some testing in the 1940s and 50s on RDW, but they were deemed to be of little military utility, and research never progressed far. Some interest in RDW was again shown around the time of the 1991 Gulf War as there was a fear that the Iraqis had some kind of unconventional weapons. The US Defense Intelligence Agency considered the effects of radioactive materials being delivered by an Iraqi SCUD, but the study suggested that against US forces trained and equipped for NBC warfare, it would not be "militarily significant".[48] The 1993 bombing of the World Trade Center in New York awakened fears of terrorists using dirty bombs – particularly as Ramzi Yousef added sodium cyanide to the bomb, hoping to cause extra injuries (the cyanide was fortunately burnt up by the heat of the explosion). September 11 just added to this sense of vulnerability.

There have been a couple of limited uses of RDW by non-state groups. In the early 90s a Russian businessman "became a victim of organized crime due to a [radioactive] source

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[47] "Biological Weapons: Ricin" BBC http://news.bbc.co.uk/1/hi/world/2815595.stm
[48] Ford, J. (1998) "Radiological Dispersal Devices: Assessing the Transnational Threat" ***Strategic Forum*** No. 136 March 1998 Washington DC, Institute for National Strategic Studies - National Defense University (http://www.ndu.edu/inss/strforum/SF136/forum136.html)

implanted in his chair."[49] Another example was when Chechen rebels buried approximately 14 kilograms of radioactive cesium in a Moscow park; they informed both the media and the authorities, seemingly to demonstrate their access to such materials.[50] There is also some indication from al-Qaeda captives and evidence found in Afghanistan that al-Qaeda did at least do some research into the feasibility of RDW.[51]

There are numerous different potential radioactive sources that could be used in a dirty bomb. Commonly found ones include: Cobalt-60 (used in cancer treatment and to irradiate food); Cesium-137 (used in both scientific and medical equipment); Americium-241 (used in smoke detectors and engineering asphalt-moisture gauges); Tritium (used for luminous exit signs); Iridium-192 (used in cameras that detect flaws in concrete and welding); Nickel-63 (used for chemical analysis).[52] Despite the fact that radioactive sources are very commonly available, the ones that are easy to get do not necessarily pose a great threat, whilst the ones that are potentially dangerous would be both hard to get and dangerous and difficult to handle. For example, Co-60 is very radioactive, but the 18-inch rods (46 cm) of the metal used for food sterilisation would give a potential thief a lethal dose of radiation in about a minute if they tried to handle them without shielding (causing death within two weeks), while twenty minutes' exposure would lead to incapacitation and death almost immediately.[53] The type and amount of radioactive source used will also clearly have major effects on the results of the explosion. Ford (1998) discusses "current DOD studies" that compare two dirty bombs, both made of 100 lbs (45 kg) of high explosive, but where one contains 5000

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[49] Steinhausler, Friedrich (2003) op. cit. (p.786)
[50] ibid. (p.787) and Ford, J. (1998) op. cit.
[51] See Carafano, J. and Spencer, J. (2004) "Dealing with Dirty Bombs: Plain Facts, Practical Solutions ***Heritage Foundation Backgrounders*** Washington DC, Heritage Foundation (p.2)
[52] Center for International Security and Cooperation (CISAC) ***Backgrounder: Understanding Nuclear Terrorism*** http://ldml.stanford.edu/cisac/pdf/Nuc_terr_back.pdf
[53] ibid.

curies of Co-60[54] while the other contains 50 kg of bundled one-year-old spent fuel rods (presumably uranium, possibly plutonium[55]). The radiation dosage from the first, even at the point of the blast, would be nowhere near a lethal amount. In contrast, the second would produce a radiation dose at the centre of the blast 250 times greater than the first and approximately 12 times the lethal dose – with the circle of potentially lethal dosage extending approximately a kilometre from the blast.[56] The more dangerous a dirty bomb attack, the less likely it is to take place: most radioactive materials are difficult to handle; difficult to get hold of; and in particular difficult to get hold of in larger amounts. Nevertheless, the risk of RDW should not be ignored – the theft of a nuclear power source for a Russian unmanned lighthouse in the Gulf of Finland in 2003 indicates that suitable radioactive sources are unguarded and available. Although in this case it is presumed that the thieves did not know what they were doing, and will have died from the exposure to the source.[57]

In conclusion, most experts tend to agree that the danger from RDW is limited – the greatest danger would most likely still be from the blast of the conventional explosives. Nevertheless, if a bomb did include radioactive material it would greatly increase the psychological effects of an attack. It would also almost certainly lead to a decontamination and clean-up process that would add time and considerable expense to the recovery from a terrorist attack. For example, in September 1987 in the city of Goiania in Brazil, locals found a canister in an abandoned cancer clinic. At some later date it was opened and found to contain a luminous blue powder. People found it

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[54] Physicist acquaintances suggest that this would be approximately 4.5 grams in mass.
[55] Oppenheimer, A. (2003) "A Sickening Episode: Nuclear Looting in Iraq and the Global Threat from Radiological Weapons" ***Disarmament Diplomacy*** No. 73, Oct./Nov. 2003 (http://www.acronym.org.uk/dd/dd73/73op03.htm)
[56] Ford, J. (1998) op. cit.
[57] ***Helsingin Sanomat International*** "Thief discards radioactive parts of Russian lighthouse in Gulf of Finland" 16 April 2003 (http://www.helsinki-hs.net/news.asp?id=20030416IE7)

attractive and rubbed it on themselves – samples of the powder were given out to friends and family. The powder turned out to be Cesium-137. Four people died and hundreds were irradiated, 34 of whom needed extensive medical treatment for radiation sickness and burns. Houses were found to be contaminated, some had to be destroyed, and all together 5,000 m^3 of material that had become radioactively contaminated had to be removed.[58] If this had occurred in the financial district of a major city, one could imagine the incredible cost that the clean-up would have entailed. Nevertheless, this is potentially a weapon of mass *disruption* for a modern society, not one of mass *destruction*.

Is there an alternative term for "WMD"?

The problem does not really lie in the descriptive term "WMD", but rather in the bundling together of very different weapon types into one classification. Therefore there would seem to be no particular advantages in replacing "WMD" with one of the existing alternatives such as "NBC" (increasingly being replaced in NATO documents with "CBRN" – chemical, biological, radiological, nuclear), or the binary "conventional/unconventional" classification. These terms still tend to conflate very different types of weapons with each other and do not offer more clarity than "WMD".

One of the major problems with the WMD concept is that the effects of the weapons are central to the classification – "mass destruction" – but as we have seen above, some of these weapons would be massively destructive in terms of both physical infrastructure

[58] Oppenheimer, A. (2003) op. cit.; Steinhausler, F. (2003) op. cit. (p.786) and Neifert, A. (2003) "Case Study: Accidental Leakage of Cesium-137 in Goiania, Brazil in 1987" ***Medical NBC Online Information Server*** Army Medical Department Center and School Distance Learning: http://www.nbc-med.org/SiteContent/MedRef/OnlineRef/CaseStudies/csgoiania.html

and human life; others could cause huge loss of life but do little physical damage, whilst others would do neither. Therefore some writers have argued that we should reclassify weapons according to a realistic appraisal of their effect – this being particularly due to terrorists who use unlikely and novel types of "weapons" such as fuel-laden civilian airliners. Garth Whitty has suggested the term 'weapons of catastrophic effect' in recognition of the fact that:

"death, injury, the destruction of buildings and environmental contamination are not the only manifestations of a successful attack. Uncertainty, panic, fear, a sense of hopelessness and forced modification of routine behaviour all have a deleterious effect on individuals, societies and the economy that underpins the society."[59]

Whitty discusses attacks such as the Bali bombing, which not only claimed a great many innocent lives but also decimated the tourist industry of Bali. He even considers the "Washington Sniper" case where two men started to paralyse normal life across a huge area of Washington DC and its surrounding suburbs. This approach may have many benefits when it comes to classifying the tactics of certain terrorist groups – but it is of little assistance in considering the actions of states.

It may well be wiser to just reject the WMD concept completely. For example, the challenges that confront Europe and the US from Syrian chemical weapons production are very different from those of the North Korean nuclear programme.[60] The term "WMD" does not differentiate between these very different weapons programmes and the threats that result, and is therefore unhelpful in forming policy on them.

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[59] Whitty, G (2002) "Confronting Weapons of Catastrophic Effect" ***Security Monitor*** Nov. 2002 Vol.1 No.4 London, RUSI (p.10)

[60] For a comparison of North Korean and Syrian "WMD" capability see relevant Nuclear Threat Initiative "Country Overviews": http://www.nti.org/e_research/profiles/NK/index.html; http://www.nti.org/e_research/profiles/Syria/index.html

What are the implications of undifferentiated use?

The concept of what is and isn't a WMD is clearly having political effects. In the autumn of 1999 the Russian army re-entered Chechnya and headed for Grozny. The advance halted after the Chechen separatists were pushed back into the mountains and into the city. After the heavy losses suffered by the Russian army in the battle for Grozny in 1994/95, they were far more cautious about confronting the enemy within the city. It is reported that two different weapons were suggested for dislodging the Chechen forces – chemical and thermobaric weapons – but the Russian political leadership told the military that they must not use chemical weapons but would allow them to use thermobarics.[61] For those who are not immediately burnt or crushed to death by the explosion of a thermobaric weapon: "the crushing injuries from the overpressure can create air embolism within blood vessels, concussions, multiple internal haemorrhages in the liver and spleen, collapsed lungs, rupture of the eardrums and displacement of the eyes from their sockets. Displacement and tearing of internal organs can lead to peritonitis."[62] It seems morally repugnant to argue over whether this is a somehow better way to die than being gassed, yet politically it clearly is – as the Russian decision demonstrates. Like Russia, the US had no moral qualms about using thermobaric weapons in Afghanistan and, reports indicate, also in Iraq.[63] The irony in this latter case is that it was Iraqi WMD that were given as the reason for going to war, but this did not stop the US from using weapons that are massively destructive, but not classed as 'WMD', in response.

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[61] Grau, L. and Smith, T. (2000) "A 'Crushing' Victory: Fuel-Air Explosives and Grozny 2000" ***Marine Corp Gazette***
August 2000 reproduced by Foreign Military Studies Office, Fort Leavenworth KS (http://fmso.leavenworth.army.mil/ fmsopubs/issues/fuelair/fuelair.htm)
[62] ibid.
[63] ***Sydney Morning Herald*** "US used new missile in Iraq: Rumsfeld" 15 May 2003

The separate moral category that has been assigned to WMD as a class of weapons has led to some remarkable political statements. The British Defence Secretary, Geoff Hoon, said in 2002 that if British troops were about to be attacked with chemical or biological weapons, Britain would be willing to use its nuclear weapons in response.[64] Is it really credible to believe that if Iraq had used, for the sake of argument, mustard gas against British troops in Iraq in the spring of 2002, that the UK would have responded with a nuclear strike even against a military target? It would be a completely disproportionate response – as well as illegal under Britain's commitment to the Non-proliferation Treaty (NPT) – conditioned not by what chemical weapons actually are, but by what people believe them to be. The reverse of the danger of over-reaction is under-reaction: that publics will not fear any WMD, but rather become cynical of the whole concept. The failure to find WMD in Iraq is clearly resulting in cynicism, but whether that cynicism will tie the hands of governments in dealing with the very real threat of a nuclear- *and* ballistic-missile-armed North Korea remains to be seen. One of the anti-American reactions to the US invasion of Iraq is hearing voices beginning to argue that nuclear-multipolarity – or in other words, nuclear proliferation – is a good thing because it lessens the United States' hegemony. It is scary to think that the experience of the Cold War arms race can be forgotten so quickly.

In conclusion

There are clear research questions that ensue from distinguishing between the different types of weapons that are currently classed as WMD. Most centrally: if the conflation of

[64] Archer, T. (2002) ***Telos or Brick Wall: British Nuclear Posture and European Defence Integration*** UPI Working Paper No. 36. Helsinki, Finnish Institute International Affairs

different weapon types under one title – WMD – is a political or social construct, rather than a technical classification, why was it constructed in this way? What political, social or strategic purpose does it serve? Is the concept of WMD even a moral classification: that WMD are weapons only possessed by states or groups we do not approve of? Why was it unacceptable for Iraq under Saddam to have WMD but acceptable for Pakistan under military dictatorship to have them? Perhaps the most pressing question in light of recent international events is what combination of weapons systems and political systems justify the use of pre-emptive force? All of these are worthy future studies, but go beyond the scope of this paper, which aims at being a basic investigation of technologies that are described as WMD and to consider what the term does and should mean.

In this respect, the emperor is not naked. But some claim to see some clothes that are not really there. Amongst what has become classed as 'WMD' are weapons that are truly terrible – that do deserve to be treated as special cases militarily, politically and indeed morally – but not all of them do. So to try and equate the known cataclysmic damage that would be done by a strategic nuclear weapon with the variable effects produced by chemical weapons, let alone a radiological weapon, is ridiculous. Biological weapons appear to be somewhere between; the potential for advances in this form of weapons technology is huge, in addition to the already-known deadly effects of agents such as anthrax.

To try and create policies that deal with WMD, as both the US and the EU have done, runs the risk of making policies that attempt to deal with all unconventional weapons in the same manner. This is doomed to failure: there is clearly the danger of creating policies that use sledgehammers to crack nuts. But the reverse is also true – and more likely for the EU – that there might come a time when a policy sledgehammer is necessary, and all that is available is a nutcracker.

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