

CROWD CONTROL TECHNOLOGIES

(An appraisal of technologies for political control)

Final Study

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Author: OMEGA Foundation, Manchester, UK

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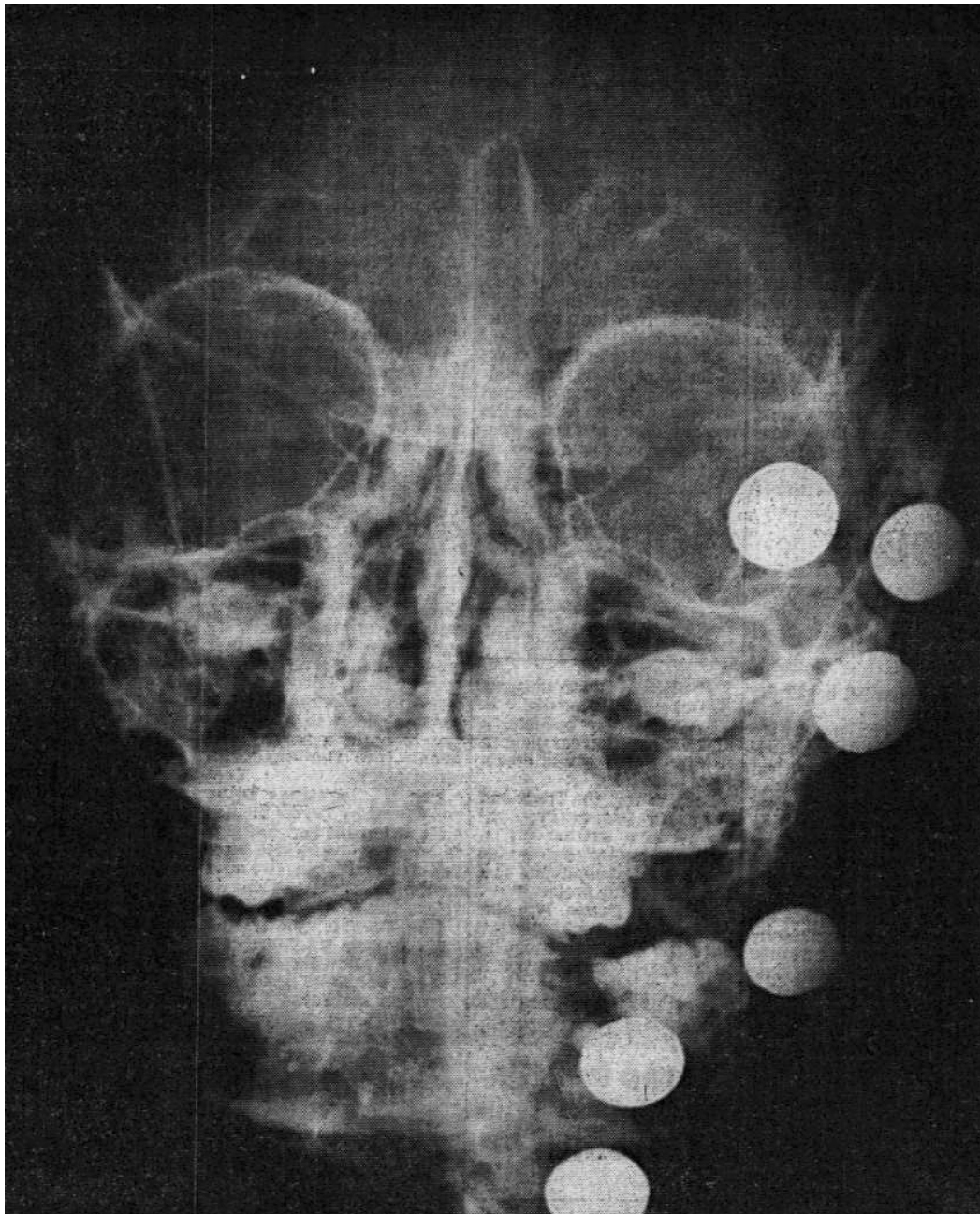
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“Crowd Control Technologies : An Assessment Of Crowd Control Technology Options For The European Union”

**(An Appraisal of the Technologies of Political Control)
(EP/1/1V/B/STOA/99/14/01)**



**The Omega Foundation.
May 2000.**

Crowd Control Technologies - An Assessment Of Crowd Control Technology Options For The European Union

(EP/1V/B/STOA/99/14/01)

FINAL REPORT TO STOA FROM THE OMEGA FOUNDATION

ABSTRACT

This study grew out of the 1997 STOA report, 'An Appraisal of the Technologies of Political Control' and takes that work further. Its focus is two fold: (i) to examine the bio-medical effects and the social & political impacts of currently available crowd control weapons in Europe; (ii) to analyse world wide trends and developments including the implications for Europe of a second generation of so called 'non-lethal' weapons. Seven key areas are covered by the report's project: (a) a review of available crowd control technologies; (b) relevant legislation at national and EU levels; (c) the relative efficiency of crowd control technologies; (d) their physical and mental effects on individuals; (e) the actual and potential abuse of crowd control technologies; (f) an assessment of future technologies and their effects; and finally (g) an appraisal of less damaging alternatives such as CCTV. The report presents a detailed worldwide survey of crowd control weapons and the companies which manufacture supply or distribute them. It was found that at least 110 countries worldwide deploy riot control weapons, including chemical irritants, kinetic energy weapons, water cannon and electro-shock devices. Whilst presented as humane alternatives to the use of lethal force, the study found examples in 47 countries of these so called 'non-lethal' crowd control weapons being used in conjunction with lethal force rather than as a substitute for it, leading directly to injury and fatalities.

Within Europe, the study found that the biomedical research necessary to justify the deployment of certain crowd control technologies was either absent, lacking or incomplete and that there was inadequate quality control at production level to ensure that adverse or even lethal effects were avoided. Evidence is also presented of the misuse of these technologies and the breach of deployment guidelines which can make their effects either severely damaging or lethal. Member States currently have inadequate export controls to prevent the transfer, brokerage or licensed production of crowd control weapons to human rights violators, including weapons such as electroshock devices which have been directly implicated in torture. The report warns against adopting ever more powerful crowd control weapons as 'technical fixes'. It suggests their use should be limited and provides a number of options to make the adoption and use of these weapons more democratically accountable. These include licensing and independent evaluation of the biomedical impacts of such weapons via a formal process of 'Social Impact Assessment'; legal limits on weapons which are exceptionally hazardous or lethal; legally binding rules of engagement; better post incident inquiry procedures and more effective, accountable and transparent export controls.

“Crowd Control Technologies - An Assessment Of Crowd Control Technology Options For The European Union” (EP/1V/B/STOA/99/14/01)

EXECUTIVE SUMMARY

This study grew out of a 1997 STOA report, 'An Appraisal of the Technologies of Political Control' and takes that work further. Its focus is two fold: (i) to examine the bio-medical effects and the social & political impacts of currently available crowd control weapons in Europe; (ii) to analyse world wide trends and developments including the implications for Europe of a second generation of so called 'non-lethal' weapons. Seven key areas are covered by the report's project: (a) a review of available crowd control technologies; (b) relevant legislation at national and EU levels; (c) the relative efficiency of crowd control technologies; (d) their physical and mental effects on individuals; (e) the actual and potential abuse of crowd control technologies; (f) an assessment of future technologies and their effects; and (g) an appraisal of less damaging alternatives such as CCTV.

The report presents a detailed worldwide survey of crowd control weapons and the companies which manufacture supply or distribute them. It was found that at least 110 countries worldwide deploy riot control weapons, including chemical irritants, kinetic energy weapons, water cannon and electro-shock devices. (Appendix 7). Whilst presented as humane alternatives to the use of lethal force, the study found examples in 47 countries of these so called 'non-lethal' crowd control weapons being used in conjunction with lethal force rather than as a substitute for it, leading directly to injury and fatalities. (Appendix 6).

It suggests their use should be limited and provides a number of options to make the adoption and use of these weapons more democratically accountable. Three guiding principles were used in formulating these options, namely (i) the precautionary principle that health and safety considerations should be consistently applied across the EU and these should be independently and objectively assessed; (ii) assertions that a particular crowd control technology is safe within particular rules of engagement should be given legal force, both in terms of the accountability of the crowd control personnel and the alleged quality control and technical specification of a particular weapon; and (iii) human rights considerations should guide the licensing of all exports of crowd control weapons to countries which have a track record of violating them.

Assessments of maintaining the status quo option are compared with the benefits of options which take a more pro-active approach to implementing the provisions of the 1997 Amsterdam Treaty agreements on creating areas of freedom, security and justice for both citizens who enjoy such rights and the officers who are charged with ensuring their protection. These options include licensing and independent evaluation of the biomedical impacts of such weapons via a formal process of 'Social Impact Assessment'; legal limits on weapons which are exceptionally hazardous or lethal; legally binding rules of engagement; better post incident inquiry procedures and more effective, accountable and transparent export controls. The report and the comprehensive appendices provide considerable documentation in support of the policy options presented in Section A: Briefly:-

GENERAL PRINCIPLES - LICENSING Within Europe, the study found that biomedical research necessary to justify the deployment of certain crowd control technologies was either absent, lacking or incomplete and that there was inadequate quality control at production level to ensure that adverse or even lethal effects were avoided. Currently, alleged non-lethality of any crowd control weapon is dependent on its purported technical specification presented by the manufacturer. However, hard evidence has already come to light during the course of the study that certain manufacturers have failed to carry out adequate quality control on their products to ensure that they meet the technical specification required to assure their alleged safety. Thus in the case of certain plastic baton rounds too much propellant was used which meant that the kinetic energy surpassed the technical specification taking the baton round further into the 'severe damage and lethality' range. Likewise, in the case of French CS sprays, a failure to carry out adequate quality control meant that concentrations of the irritant chemicals were far in excess of the technical specifications. Such sloppy quality control would never be permissible in the pharmaceutical industry where alleged standards are subject to independent scrutiny and potential legal redress.

The study suggests that the manufacture, supply, distribution, brokerage and licensed production of crowd control weapons should all be licensed. All products should be subject to common criteria of quality control. In the event of malpractice or lax quality control, licenses should be withdrawn, production curtailed and legal sanctions initiated against those responsible. Further, a publicly available harmonised coding system should be adopted across the European Union Member States.

Past experience has shown that to rely on manufacturers' unsubstantiated claims about the absence of hazards is unwise. In the US, companies making crowd control weapons, (e.g. pepper-gas manufacturer Zarc International), have put their technical data in the public domain without loss of profitability. It would be good practice for all European companies making such weapons to be legally required to do likewise and for all research justifying the alleged harmless status of any less lethal weapon to be published in the open scientific press before authorisation and that any product license granted be subject to such scrutiny. It is also recommended that legal force should be given to the official guidelines or terms of engagement for using such weapons, which would make any officers who breached them, open to prosecution.

CHEMICAL IRRITANTS The study questions the wisdom of maintaining the status quo where government and company research, often undertaken after chemical irritant weapons have been authorised, continues as the main approach to justifying alleged 'harmlessness.' Given that different countries even within the EU have adopted different stances, there is a risk of not having proper regard to health and safety concerns, since many problems with toxic chemicals only emerge many years after operational usage. Both citizens and officers could have a future legal claim if scientific assertions of safety were later found to be less than well informed or negligent. An alternative option would be to further consider the options outlined in a previous STOA report (<http://jya.com/stoa-atpc.htm>) which suggested that all EU Member States should establish the following principles:-

- Research on chemical irritants should be published in open scientific journals before authorization for any usage is permitted and that the safety criteria for such chemicals should be treated as if they were drugs rather than riot control agents;
- Research on the alleged safety of existing crowd control weapons and of all future innovations in crowd control weapons should be placed in the public domain prior to any decision towards deployment;

Within that context, the report takes the view that deployment of OC (pepper-gas) should be halted across the EU until independent research has more fully evaluated the risks it poses to health. Evidence emerging from work undertaken for this study, particularly the way that French chemical irritant sprays were hastily deployed in the United Kingdom, reinforces the need for these principles to be given legal force. The rejection of OC by the Swedish authorities because of its potential for causing eye damage, reinforces the need for a cautious and consistent view to be adopted by all European member states where citizens have equal worth under the commitment to provide universal areas of freedom, security and justice. A further precautionary measure would be to ask Member States within the terms of European data protection legislation, to tag the health records of all those affected by the spray who seek medical treatment, in case common health problems emerge in the future.

KINETIC IMPACT MUNITIONS. Evidence is presented in the study of the misuse of these technologies and the breach of deployment guidelines which can make their effects either severely damaging or lethal. This is particularly so in the case of kinetic energy weapons. Maintaining the status quo in this regard allows potentially lethal crowd control weapons to be used on our streets which because of their inaccuracy could be targeted on to innocent bystanders, children etc. Yet, no European State has the death penalty for public order offences. An alternative option is to assume that all European citizens who enjoy areas of freedom, security and justice in their home member state should have equal enjoyment of such rights no matter where they are within the European Union. Such a notion implies a consistent and harmonised approach to the use of potentially hazardous riot weapons, one based on the precautionary principle that best and safest practices of public order policing should be adopted by all member states on the basis of the highest standards adopted by all.

It is recommended that new limits should restrict inherently unsafe technology which because of its technical and design characteristics is potentially lethal in many of the operational circumstances where it might realistically be deployed. US military data suggests that limits on the kinetic energy of baton round type munitions should be set excluding any weapon with more than 122 joules of kinetic energy. Indeed, the recommendations of one of the most exhaustive official inquiries ever commissioned on the use of kinetic weapons, i.e. those contained within the Patten Commission Report, September 1999, should be considered as providing a sound basis for the future use of kinetic energy weapons anywhere in Europe. These guidelines cover the need for a legalistic approach in defining the guidelines to be used both operationally and post incident when these weapons are used. Patten's view is that "guidance governing deployment and use should be soundly based in law, clearly expressed and readily available as public documents."

Any European wide adoption of these guidelines should incorporate the legal duties of the Member States of the European Parliament police forces to use only 'reasonable force' which means that there needs to be appropriate mechanisms to ensure accountability after any incident where 'less lethal' weapons have been used. Any crowd control weapon capable of producing a lethal impact should be subject to the same legal procedures and post incident inquiry as if it were a lethal firearm. Similarly, any Kinetic Impact Weapons with an energy greater than 122 joules should be considered as a lethal firearm as recommended in the Patten report and their use should be regarded as illegal if the use of lethal firearms in the same context would be illegal, for example where innocent bystanders may become unwitting targets. In this context, steps should be taken to ensure that all Kinetic Energy munitions are ballistically traceable to the weapon and security unit.

ELECTROSHOCK & STUN WEAPONS. The study questions the role, deployment, trade and certification of electroshock weapons. It recommends that if stun weapons are deployed, there is a clear requirement for effective personnel training and transparent recording of usage. However this would enable electroshock weapons to come into the EU from the United States where they can be exported to any NATO member without a licence and for other trade and brokering in these weapons to continue. The question is why, given that so few countries in the EU now use them? This study found that no EU member countries officially admit to using electroshock weapons for policing but that there was significant evidence of EU collusion in supplying this 'universal tool of the torturer' to the torturing states. Further more, the EC has actually given CE quality control markings for such weapons and foreign manufacturers such as those from Taiwan boast that it gives an official seal of approval in promoting their overseas sales (Taiwan bans such weapons for home use). This practice should be terminated and the considered view of the report is that they should no longer be deployed or traded in Europe. The European Union is advised to give consideration to taking up the formal request of the British government made on the 28th July 1997, which asked all of member States to follow their example in taking "the necessary measure[s] to prevent the export or transshipment of "Portable devices designed or modified for riot or control purposes or self-protection to administer an electric shock, including electric-shock batons, electric-shock shields, stun guns, and tasers, and specially designed components for such devices....".

2ND. GENERATION CROWD CONTROL WEAPONS The report warns against adopting ever more powerful crowd control weapons as 'technical fixes' and allowing the policing assumptions of the United States to organise, militarise and market public order options for the European Union without public debate or accountability. Questions over the reliability and safety of certain US crowd policing weapons and practices should urge caution. Technical data in regard to the 2nd. Generation of crowd control weapons from the US are discussed in this report, which advises that they should not be taken at face value. All such weapons should be subject to independent testing and licensing control and until and unless such a checking regime is in place, a moratorium should be considered on accepting any of this technology into European military and police crowd control arsenals. This would mean that no US made or licensed 2nd. generation chemical irritant, kinetic, acoustic, laser, electromagnetic frequency, capture, entanglement, injector or electrical disabling and paralysing weapons, should be deployed within Europe unless legally binding guarantees are forthcoming from the agencies deploying these weapons about their alleged safety

In assessing the effects of such 2nd. Generation weapons, the report advises that adoption of the principles of ICRC (International Committee of the Red Cross) SIrUS project (which suggests that because of their

technical characteristics and human targeting mechanisms, certain weapons should be banned because they are intrinsically inhumane or capable of causing unnecessary suffering). Since much of this work is shrouded in secrecy, the European Parliament may wish to request the Commission to report on the existing liaison arrangements for the second generation of non-lethal weapons to enter European Union from the USA and call for an independent report on their alleged safety as well as their intended and unforeseen social and political effects.

ALTERNATIVES TO CROWD CONTROL WEAPONS The military police industrial complex has spawned an ever growing arsenal of new crowd control weapons offering the dubious promise of even more powerful technical fixes for social and political problems. In practical terms since the main seat of innovation in this area is the United States, this would let an alien American policing culture set the public order agenda in Europe. It would also entail a wealth of unwelcome impacts, including escalation of conflict and a loosening of community support for the police. More socially sensitive alternatives need to be found but there are obvious dangers in substituting one technical fix for another.

SOCIAL IMPACT ASSESSMENT OF POLICE TECHNOLOGIES. The report advocates an alternative option of institutionalising the decision making process so that common parameters are examined when deciding on innovations regarding crowd control weapons. The Committee may wish to consider requesting STOA to formally examine what might be involved in setting up the bureaucratic procedures to achieve such an objective, along the lines of the current environmental impact assessment regimes. In practical terms that would mean having formal, independent 'Social Impact Assessments' of new police technologies before they are deployed. These assessments could establish objective criteria for assessing the biomedical effects of so called 'less lethal' weapons undertaken independent from commercial or governmental research. Some of the other options covered in the report from health and safety, accountability of rules of engagement etc might be appropriately used to provide EU wide recognised benchmarks. Some effective alternative options might be first thought to be counter-intuitive, such as the South Korean police decision to use more highly educated female officers without riot gear to more peacefully police public demonstrations. Members of the Committee may wish to invite the South Korean officials involved in this decision to discuss their thinking and its apparent success. There may be opportunities to emulate this successful change of tactics in Europe.

The report questions whether CCTV cameras could be used throughout European cities to provide a chill effect to dissuade potential rioters from creating civil disturbances as a substitute for crowd control weapons. (The approach is based on algorithmic face recognition systems linked into these networks could then be used to track down and target malefactors). The problem with this option is that it does not enable any real time intervention to further contain trouble as it is breaking out. Experience in those countries which already have mass city centre surveillance, such as the UK, is that they adopt both CCTV and public order tactics and technologies, not either/or. Troublemakers have learnt to mask their face and operate outside of the cameras reach. The other danger here is of course in creating a network of mass supervision which may be used for very different purposes to those for which it was originally intended. To effectively deploy these systems would mean putting the whole of society under continuous surveillance which would be assuming a continuing benign level of political stability which rarely exist in the long term, not even in Europe.

Nevertheless, Crowd control options using biometric based or face recognition systems could still play a powerful role in preventing public disorder occurring at fixed locations such as enclosed sports stadia, where there are inevitably considerable public safety considerations. The report recommends that a series of pilot projects be explored with member states who have had experience of crowd behaviour problems in recent years and that any plans to extend these pilot schemes be made in conjunction with supporters clubs, the police and with government on the basis of the practical experience of how effectively the systems worked in practice.

NEW BIO-WEAPONS FOR CROWD CONTROL Evidence emerged during the course of this study indicating that advances in neuroscience modelling of receptor sites in the human brain, coupled with new knowledge of the human genetic code (emerging from both the Human Genome Project and the Human

Diversity Project), is already opening a path for malign use of the biological sciences for targeted human control. Whilst the research is still embryonic, there is a risk of behaviour modification, race specific crowd control weapons and area denial technologies emerging with profound implications which need to be further assessed in terms of both current capabilities and what the results of these projects might mean in terms of the state of the art, which is rapidly changing. Given that the EC has already agreed to ban any weapons which directly work on the basis of targeting or otherwise interfering with the operation of the human brain, a new STOA study is proposed, covering the potential malign implications of human genetic modification research and related genome projects on human control weapons of the future.

EXPORTS OF CROWD CONTROL WEAPONS TO HUMAN RIGHTS VIOLATORS Member States currently have inadequate export controls to prevent the transfer, brokerage or licensed production of crowd control weapons to human rights violators, including weapons such as electroshock devices which have been directly implicated in torture. EU member states currently have inconsistent policies in regard to controlling the export of certain ‘crowd control’ technologies. If this situation continues, European companies and governments will continue colluding with human rights violations in States that have very poor human rights records. It would be hypocritical for the European Union to define “areas of freedom, justice and security” inside its territories, whilst undermining the same rights of freedom, justice and security because of inappropriate and ineffective export controls and procedures on the supply, licencing and brokerage of crowd control weapons and munitions to other countries.

The report recommends severe restrictions on the creation, deployment, use and export of weapons which cause inhumane treatment, superfluous injury or unnecessary suffering. There is a good case presented in this report for banning electroshock weapons. In this context this would mean not only no manufacture, but no imports, no exports, no transshipment, licensed production, no public access to such devices through the web and of course no use by anyone.

Using the same principled approach, the report recommends that effective limits should be set on the exports or licensed production of any crowd control technology, ancillary equipment and training, which is not seen as acceptable for use within the EU. Clearly, it is hypocritical for European states to export crowd control weapons abroad that had been deemed too hazardous for use on Europeans.

STOA is also advised to consider commissioning a new study on the available evidence revealing the extent to which European companies have profited from the transfer of technologies of political control, which have then been used to perpetrate human rights violations. The purpose of this study would be to present new policies to plug the loopholes in current arms control policies and hence recommend effective mechanisms for implementing the agreed EU common criteria.

To further this process of transparency and accountability, Member States should be requested to dis-aggregate export licences and trade data so that proper scrutiny becomes possible. Common agreement on dis-aggregation of all data relating to the export of crowd control weapons would be an appropriate step in the right direction. Given the EU commitment to the CWC, it would also help members to fulfill their legal responsibilities under this treaty not to proliferate chemical weapons.

OPTIONS BRIEF
“Crowd Control Technologies - An Assessment Of Crowd Control Technology Options For
The European Union”
(EP/1V/B/STOA/99/14/01)

[1] **The status quo option** could be maintained whereby alleged non-lethality of any crowd control weapon is dependent on its purported technical specification presented by the manufacturer.

[2] The manufacture, supply, distribution, brokerage and licensed production of crowd control weapons should all be licensed. All products should be subject to common criteria of quality control. In the event of malpractice or lax quality control, licenses should be withdrawn, production curtailed and legal sanctions initiated against those responsible. A publicly available harmonised coding system should be adopted across the European Union .

[3] Legal force should be given to the terms of engagement which would make any officers who breached their codes of conduct and guidelines for using crowd control weapons, open to prosecution.

[4] **The status quo option** could be maintained where government and company research, often undertaken after chemical irritant weapons have been authorised, continues as the main approach to justifying alleged ‘harmlessness.’

[5] Research on chemical irritants should be published in open scientific journals before authorization for any usage is permitted and that the safety criteria for such chemicals should be treated as if they were drugs rather than riot control agents; Research on the alleged safety of existing crowd control weapons and of all future innovations in crowd control weapons should be placed in the public domain prior to any decision towards deployment;

[6] That deployment of OC (pepper-gas) should be halted across the EU until independent research has more fully evaluated any risks it poses to health. A further precautionary measure would be to ask Member States to tag the health records of all those affected by the spray who seek medical treatment, in case common health problems emerge in the future.

[7] **The Status quo option** could be maintained which allows potentially lethal crowd control weapons to be used on our streets which because of their inaccuracy could be targeted on to innocent bystanders, children etc. However, no European State has the death penalty for public order offences.

[8] New legal limits as suggested by the Patten Commission in Northern Ireland should restrict inherently unsafe technology which because of its technical and design characteristics is potentially lethal in many of the operational circumstances where it might realistically be deployed. Any Kinetic Impact Weapons with an energy greater than 122 joules should be considered as a lethal firearm and their use should be regarded as illegal if the use of lethal firearms in the same context would be illegal. For example, where innocent bystanders may become unwitting targets. In this context, steps should be taken to ensure that all Kinetic Energy munitions are ballistically traceable to the weapon and security unit.

[9] **The Status quo option** on the role, deployment, trade and certification of electroshock weapons could be maintained and the European Commission could continue to give CE quality control markings for such weapons.

[10] Alternatively, the European Union could terminate the practice of giving CE quality control marks to electroshock instruments and give consideration to taking up the formal request of the British government made on the 28th July 1997, which asked all of member States to follow their example in taking “the necessary measure[s] to prevent the export or transshipment of “Portable devices designed or modified for riot or control purposes or self-protection to administer an electric shock, including electric-shock batons, electric-shock shields, stun guns, and tasers, and specially designed components for such devices....”.

[11] **The status quo option** can be maintained which will enable the policing assumption of the United States to organise, militarise and market public order options for the European Union without public debate or accountability.

[12] Alternatively, technical data in regard to the 2nd. Generation of crowd control weapons from the US, discussed in this report, should not be taken at face value. All such weapons should be subject to independent testing and licensing control and, until and unless such a checking regime is in place, a moratorium should be considered on accepting any of this technology into European military and police crowd control arsenals. This would mean that no US made or licensed 2nd. generation chemical irritant, kinetic, acoustic, laser, electromagnetic frequency, capture, entanglement, injector or electrical disabling and paralysing weapons, should be deployed within Europe unless legally binding

guarantees are forthcoming both from the manufacturers and the government agencies deploying these weapons about their alleged safety.. The European Parliament may wish to request the Commission to report on the existing liaison arrangements for the second generation of non-lethal weapons to enter European Union from the USA and call for an independent report on their alleged safety as well as their intended and unforeseen social and political effects.

[13] The ICRC (International Committee of the Red Cross) SIrUS principles (which suggests that because of their technical characteristics and human targeting mechanisms, certain weapons should be banned because they are intrinsically inhumane or capable of causing unnecessary suffering) should be adopted

[14] The decision making process for procuring any new crowd control technologies could be subject to more formal controls so that common parameters are examined when deciding on innovations regarding crowd control weapons. The Committee may wish to consider requesting STOA to formally examine what might be involved in setting up the bureaucratic procedures to achieve such an objective, along the lines of the current environmental impact assessment regimes. In practical terms that would mean having formal, independent 'Social Impact Assessment' of new police technologies before they are deployed.

[15] Other alternatives options to 'Darth Vader' like riot squads to policing protest should not be seen in purely technological terms. Some effective options might be counter-intuitive, such as the Korean police decision to use more highly educated female officers without riot gear to more peacefully police public demonstrations. Members of the Committee may wish to invite the South Korean officials involved in this decision to discuss their thinking and its apparent success. There may be opportunities to emulate this successful change of tactics in Europe.

[16] Crowd control options using biometric based or face recognition systems could play a powerful role in preventing public disorder occurring at fixed locations such as enclosed sports stadia, where there are inevitably considerable public safety considerations. A series of pilot projects be explored with member states who have had experience of crowd behaviour problems in recent years and that any plans to extend these pilot schemes be made in conjunction with supporters clubs, the police and with government on the basis of the practical experience of how effectively the systems worked in practice.

[17] **The status quo option** would be to attempt to assess the risks posed by the new emergent bio technologies only after they had been actually weaponised.

[18] Given that the EC has already agreed to ban any weapons which directly work on the basis of targeting or otherwise interfering with the operation of the human brain, a new STOA study should be commissioned on the potential malign implications of human genetic modification research and related genome projects on human control weapons of the future.

[19] **The EU Status Quo** on exports of crowd control weapons could be maintained, i.e. that following the voluntary EU Code of Conduct on Arms, weapons should not be exported to countries where they can be used for 'internal repression' or contribute to 'external aggression'. However, EU member states have inconsistent policies in regard to controlling the export of certain 'crowd control' technologies. If this situation continues this option will mean that European companies and governments will continue colluding with human rights violations in States that have very poor human rights records. It would be hypocritical for the European Union to define "areas of freedom, justice and security" inside its territories, whilst undermining the same rights of freedom, justice and security because of inappropriate and ineffective export controls and procedures on the supply, licencing and brokerage of crowd control weapons and munitions to other countries.

[20] Effective limits should be set on the exports or licensed production of any crowd control technology, ancillary equipment and training, which is not seen as acceptable for use within the EU. This option begs the case for banning electroshock weapons in this context which would mean no manufacture, no imports, no exports, no licensed production, no use.

[21] STOA should consider commissioning a new study on the extent to which European companies have profited from the transfer of technologies of political control and their role in perpetrating human rights violations. The purpose of this study would be to present new policies to plug the loopholes in current export controls and hence recommend effective mechanisms for implementing the agreed EU common criteria. Member States should be requested to disaggregate export licences and trade data so that proper scrutiny becomes possible.

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Front Cover photograph: X-ray of a Palestinian casualty with six 'plastic bullets' lodged in his head after being shot by Israel Defence Forces in Nablus, December 1988 and who subsequently died.

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An Assessment Of Crowd Control Technology - Options For The European Union

FINAL REPORT(EP/1V/B/STOA/99/14/01)

SECTION A: POLICY OPTIONS

GENERAL PRINCIPLES - LICENSING

Three guiding principles have been used in formulating these options, namely (i) the precautionary principle that health and safety considerations should be consistently applied across the EU and these should be independently and objectively assessed; (ii) assertions that a particular crowd control technology is safe within particular rules of engagement should be given legal force, both in terms of the accountability of the riot squad personnel and the alleged quality control and technical specification of a particular weapon; and (iii) human rights considerations should guide the licensing of all exports of crowd control weapons to regimes which have a track record of violating them. Assessments of maintaining the status quo option (**highlighted**) are compared below with the benefits of options which take a more pro-active approach to implementing the provisions of the 1997 Amsterdam Treaty agreements on creating areas of freedom, security and justice for both citizens who enjoy such rights and the officers who are charged with ensuring their protection.¹

[1] **The status quo option** could be maintained whereby alleged non-lethality of any crowd control weapon is dependent on its purported technical specification presented by the manufacturer. However, hard evidence has already come to light during the course of the study that certain manufacturers have failed to carry out adequate quality control on their products to ensure that they meet the technical specification required to assure their alleged safety. Thus in the case of certain plastic baton rounds too much propellant was used which meant that the kinetic energy surpassed the technical specification taking the baton round further into the 'severe damage and lethality' range. Likewise, in the case of French CS sprays, a failure to carry out adequate quality control meant that concentrations of the irritant chemicals were far in excess of the technical specifications. Such sloppy quality control would never be permissible in the pharmaceutical industry where alleged standards are subject to independent scrutiny and potential legal redress.

[2] The manufacture, supply, distribution, brokerage and licensed production of crowd control weapons should all be licensed. All products should be subject to common criteria of quality control. In the event of malpractice or lax quality control, licenses should be withdrawn, production curtailed and legal sanctions initiated against those responsible. A publicly available harmonised coding system should be adopted across the European Union Member States.

[3] Past experience has shown that to rely on manufacturers' unsubstantiated claims about the absence of hazards is unwise. In the US, companies making crowd control weapons, (e.g. pepper-gas manufacturer Zarc International), have put their technical data in the public domain without loss of profitability. It would be good practice for all European companies making such weapons to be legally required to do likewise and for all research justifying the alleged harmless status of any less lethal weapon to be published in the open scientific press before authorisation and that any product license granted be subject to such scrutiny.

[4] Legal force should be given to the terms of engagement which would make any officers who breached their codes of conduct and guidelines for using crowd control weapons, open to prosecution.

CHEMICAL IRRITANTS

[5] **The status quo option** could be maintained where government and company research, often undertaken after chemical irritant weapons have been authorised, continues as the main approach to justifying alleged 'harmlessness.' Given that different countries even within the EU have adopted different stances, there is a risk in adopting this option of not having proper regard to health and safety

concerns, since many problems with toxic chemicals only emerge many years after operational usage. Both citizens and officers could have a future legal claim if scientific assertions of safety were later found to be less than well informed or negligent.

[6] An alternative option would be to further consider the options outlined in a previous STOA report (<http://jya.com/stoa-atpc.htm>) which suggested that all EU Member States should establish the following principles, that:

[7] Research on chemical irritants should be published in open scientific journals before authorization for any usage is permitted and that the safety criteria for such chemicals should be treated as if they were drugs rather than riot control agents;

[8] Research on the alleged safety of existing crowd control weapons and of all future innovations in crowd control weapons should be placed in the public domain prior to any decision towards deployment;

[9] That deployment of OC (pepper-gas) should be halted across the EU until independent research has more fully evaluated any risks it poses to health. Evidence emerging from work undertaken for this study, particularly the way that French chemical irritant sprays were hastily deployed in the United Kingdom reinforce the need for principles [7] and [8] to be given legal force. The rejection of OC by the Swedish authorities because of its potential for causing eye damage together with the fact that the US Marine Corps delayed training with this agent because of health & safety fears reinforce the need for a cautious and consistent view to be adopted by all European member states where citizens have equal worth under the commitment to provide universal areas of freedom, security and justice.

[10] A further precautionary measure would be to ask Member States within the terms of European data protection legislation, to tag the health records of all those affected by the spray who seek medical treatment, in case common health problems emerge in the future.

KINETIC IMPACT

[11] **The Status quo option** could be maintained which allows potentially lethal crowd control weapons to be used on our streets which because of their inaccuracy could be targeted on to innocent bystanders, children etc. However, no European State has the death penalty for public order offences.

[12] An alternative option is to assume that all European citizens who enjoy areas of freedom, security and justice in their home member state should have equal enjoyment of such rights no matter where they are within the European Union. Such a notion implies a consistent and harmonised approach to the use of potentially hazardous riot weapons, one based on the precautionary principle that best and safest practices of public order policing should be adopted by all member states on the basis of the highest standards adopted by all.

[13] New limits should restrict inherently unsafe technology which because of its technical and design characteristics is potentially lethal in many of the operational circumstances where it might realistically be deployed. US military data suggests that limits on the kinetic energy of baton round type munitions should be set excluding any weapon with more than 122 joules of kinetic energy.

[14] The recommendations of one of the most exhaustive official inquiries ever commissioned on the use of kinetic weapons, i.e. those contained within the Patten Commission Report, September 1999,² should be considered as providing a sound basis for the future use of kinetic energy weapons anywhere in Europe. These guidelines cover the need for a legalistic approach in defining the guidelines to be used both operationally and post incident when these weapons are used. Patten's view is that "guidance governing deployment and use should be soundly based in law, clearly expressed and readily available as public documents."

[15] Any European wide adoption of these guidelines should incorporate the legal duties of the Member States of the European Parliament police forces to use only 'reasonable force' which means that there needs to be appropriate mechanisms to ensure accountability after any incident where 'less lethal' weapons have been used. Any crowd control weapon capable of producing a lethal impact should be subject to the same legal procedures and post incident inquiry as if it were a lethal firearm. Similarly, any Kinetic Impact Weapons with an energy greater than 122 joules should be considered as a lethal firearm as recommended in the Patten report and their use should be regarded as illegal if the use of lethal firearms in the same context would be illegal, for example where innocent bystanders may become unwitting targets. In this context, steps should be taken to ensure that all Kinetic Energy munitions are ballistically traceable to the weapon and security unit.

ELECTROSHOCK & STUN WEAPONS

[16] **The Status quo option** on the role, deployment, trade and certification of electroshock weapons could be maintained. This would enable electroshock weapons to come into the EU from the United States where they can be exported to any NATO member without a licence and for other trade and brokering in these weapons to continue. The question is why given that so few countries in the EU now use them? This study found that no EU member countries who officially admit to using electroshock weapons for policing but that there was significant evidence of EU collusion in supplying this 'universal tool of the torturer' to the torturing states. Further more, the EC has actually given CE quality control markings for such weapons and foreign manufacturers such as those from Taiwan boast as an official seal of approval in promoting their overseas sales (Taiwan bans such weapons for home use). This practice should be terminated.

[17] Alternatively, the European Union could give consideration to taking up the formal request of the British government made on the 28th July 1997, which asked all of member States to follow their example in taking "the necessary measure[s] to prevent the export or transshipment of "Portable devices designed or modified for riot or control purposes or self-protection to administer an electric shock, including electric-shock batons, electric-shock shields, stun guns, and tasers, and specially designed components for such devices....".³

2ND. GENERATION CROWD CONTROL WEAPONS

[18] **The status quo option** can be maintained which will enable the policing assumption of the United States to organise, militarise and market public order options for the European Union without public debate or accountability. Questions over the reliability and safety of certain US crowd policing weapons and practices should urge caution

[19] Alternatively, technical data in regard to the 2nd. Generation of crowd control weapons from the US, discussed in this report, should not be taken at face value. All such weapons should be subject to independent testing and licensing control and until and unless such a checking regime is in place, a moratorium should be considered on accepting any of this technology into European military and police crowd control arsenals. This would mean that no US made or licensed 2nd. generation chemical irritant, kinetic, acoustic, laser, electromagnetic frequency, capture, entanglement, injector or electrical disabling and paralysing weapons, should be deployed within Europe unless legally binding guarantees are forthcoming both from the manufacturers and the government agencies deploying these weapons about their alleged safety

[20] In assessing the effects of such 2nd. Generation weapons, note should be taken of the ICRC (International Committee of the Red Cross) SIrUS project which suggests that because of their technical characteristics and human targeting mechanisms, certain weapons should be banned because they are intrinsically inhumane or capable of causing unnecessary suffering. Since much of this work is shrouded in secrecy, the European Parliament may wish to request the Commission to report on the existing liaison arrangements for the second generation of non-lethal weapons to enter European Union from the USA and call for an independent report on their alleged safety as well as their intended and unforeseen social and political effects.

ALTERNATIVES TO CROWD CONTROL WEAPONS

[21] **The Status Quo option** could be maintained whereby new crowd control weapons emerge offering even more powerful technical fixes for social and political problems. In practical terms since the main seat of innovation in this area is the United States, this would let an alien American policing culture set the public order agenda in Europe. It would also entail a wealth of unwelcome impacts in their including escalation of conflict and a loosening of community support for the police. More socially sensitive alternatives need to be found but there are obvious dangers in substituting one technical fix for another.

SOCIAL IMPACT ASSESSMENT OF POLICE TECHNOLOGIES.

[22] An alternative option is to institutionalise the decision making process so that common parameters are examined when deciding on innovations regarding crowd control weapons. The Committee may wish to consider requesting STOA to formally examine what might be involved in setting up the bureaucratic procedures to achieve such an objective, along the lines of the current environmental impact assessment regimes. In practical terms that would mean having formal, independent 'Social Impact Assessment' of new police technologies before they are deployed. These assessments could establish objective criteria for assessing the biomedical effects of so called 'less lethal' weapons undertaken independent from commercial or governmental research. Some of the other options covered in this report from a health and safety, accountability of rules of engagement etc might be appropriately used in this process to provide EU wide recognised bench marks.

[23] Other alternatives options to Darth Vader like riot squads to policing protest should not be seen in purely technological terms. Some effective options might be counter-intuitive, such as the Korean police decision to use more highly educated female officers without riot gear to more peacefully police public demonstrations. Members of the Committee may wish to invite the South Korean officials involved in this decision to discuss their thinking and its apparent success. There may be opportunities to emulate this successful change of tactics in Europe.

[24] One option included in this project's task brief is that CCTV cameras could be used throughout European cities to provide a chill effect to dissuade potential rioters from creating civil disturbances. Algorithmic face recognition systems linked into these networks could then be used to track down and target malefactors. The problem with this option is that it does not enable any real time intervention to further contain trouble as it is breaking out. Experience in those countries which already have mass city centre surveillance, such as the UK, is that they adopt both CCTV and public order tactics and technologies, not either or. Troublemakers have learnt to mask their face and operate outside of the cameras reach. The other danger here is of course in creating a network of mass supervision which may be used for very different purposes to those for which it was originally intended. To effectively deploy these systems would mean putting the whole of society under continuous surveillance which would be assuming a continuing benign level of political stability which rarely exist in the long term, not even in Europe.

[25] Nevertheless, crowd control options using biometric based or face recognition systems could still play a powerful role in preventing public disorder occurring at fixed locations such as enclosed sports stadia, where there are inevitably considerable public safety considerations. In some stadia, the structure and seating configuration of supporters from opposing teams or countries, can lead to the creation of classic flash points. In these settings, such systems could have a double impact. Not only could they aid the process of quickly identifying troublemakers and the individual police officers who were actively involved in the incident, they could also have a public safety role in emergencies. It is recommended that a series of pilot projects be explored with member states who have had experience of crowd behaviour problems in recent years and that any plans to extend these pilot schemes be made in conjunction with supporters clubs, the police and with government on the basis of the practical experience of how effectively the systems worked in practice.

NEW BIO-WEAPONS FOR CROWD CONTROL

[26] **The status quo option** would be to attempt to assess the risks posed by the new emergent bio technologies only after they had been actually weaponised. However, evidence emerged during the course of this study indicating that advances in neuroscience modelling of receptor sites in the human brain, coupled with new knowledge of the human genetic code (emerging from both the Human Genome Project and the Human Diversity Project), is already opening a path for malign use of the biological sciences for targeted human control. Whilst the research is still embryonic, there is a risk of behaviour modification, race specific crowd control weapons and area denial technologies emerging with profound implications which need to be further assessed in terms of both current capabilities and what the results of these projects might mean in terms of the state of the art, which is rapidly changing.

[27] Given that the EC has already agreed to ban any weapons which directly work on the basis of targeting or otherwise interfering with the operation of the human brain⁴, a new STOA study should be commissioned on the potential malign implications of human genetic modification research and related genome projects on human control weapons of the future.

EXPORTS OF CROWD CONTROL WEAPONS TO HUMAN RIGHTS VIOLATORS

[28] **The EU Status Quo** on exports of crowd control weapons could be maintained, i.e. that following the voluntary EU Code of Conduct on Arms, weapons should not be exported to countries where they can be used for 'internal repression' or contribute to 'external aggression'. However, EU member states have inconsistent policies in regard to controlling the export of certain 'crowd control' technologies. If this situation continues this option will mean that European companies and governments will continue colluding with human rights violations in States that have very poor human rights records. It would be hypocritical for the European Union to define "areas of freedom, justice and security" inside its territories, whilst undermining the same rights of freedom, justice and security because of inappropriate and ineffective export controls and procedures on the supply, licencing and brokerage of crowd control weapons and munitions to other countries.

[29] There should be severe restrictions on the creation, deployment, use and export of weapons which cause inhumane treatment, superfluous injury or unnecessary suffering. There is a good case presented in this study for banning electroshock weapons in this context which would mean no manufacture, no imports, no exports, no licensed production, no use.

[30] Using the same principled approach, effective limits should be set on the exports or licensed production of any crowd control technology, ancillary equipment and training, which is not seen as acceptable for use within the EU. Clearly, it is hypocritical for European states to export crowd control weapons abroad that had been deemed too hazardous for use on Europeans.

[31] STOA should consider commissioning a new study on the available evidence revealing the extent to which European companies have profited from the transfer of technologies of political control, which have then been used to perpetrate human rights violations. The purpose of this study would be to present new policies to plug the loopholes in current arms control policies and hence recommend effective mechanisms for implementing the agreed EU common criteria.⁵

[32] Member States should be requested to dis-aggregate export licences and trade data so that proper scrutiny becomes possible. Common agreement on dis-aggregation of all data relating to the export of crowd control weapons would be an appropriate step in the right direction. Given the EU commitment to the CWC, it would also help members to fulfill their legal responsibilities under this treaty not to proliferate chemical weapons.

SECTION B: ARGUMENTS AND EVIDENCE

1. INTRODUCTION

This present study grew out of a 1997 STOA report, 'An Appraisal of the Technologies of Political Control' of which crowd control weapons were a part, and takes that work further.⁶ Its focus is two fold:-

- (i) to examine the bio-medical effects and the social & political impacts of currently available crowd control weapons in Europe;
- (ii) to analyse world wide trends and developments including the implications for Europe of a second generation of so called 'non-lethal' weapons originating from the national nuclear laboratories of the United States & private corporations.

Seven key areas are covered by the report's project brief, (for both within and outside the European Union), namely: (a) a review of available crowd control technologies; (b) relevant legislation at national and EU levels; (c) the relative efficiency of crowd control technologies; (d) their physical and mental effects on individuals; (e) the actual and potential abuse of crowd control technologies; (f) an assessment of future technologies and their effects; and finally (g) an appraisal of less damaging alternatives such as CCTV.

Whilst allegedly 'non-lethal' crowd control weapons have gained increasing prominence in recent years as tools for managing contemporary internal security demands, there has been a long standing search for, and deployment of, such weapons throughout the 20th Century dating from their use in the former European colonies. Historic examples include so called 'tear gas', wooden and rubber bullets, electric cattle prods and watercannon used by British colonial forces in Cyprus and Hong Kong, who also developed a new set of riot control techniques.⁷ The earlier STOA report on this subject (PE 166.499) emphasised that new crowd control technologies encompassed not just the 'hardware' or apparatus of technical performance, but also the 'software' - the standard operating procedures, routines, skills and associated tactics for deploying public control weapons. Thus these riot control tactics themselves can be considered as a technology, capable of refinement and transfer and consisting of a spectrum of options containing increasing levels of coercion.

Many of these riot control techniques have been further systematized in terms of collective tactics e.g. using wedges, shields, batons, horses and riot weapons which work on a formulaic basis according to the military model which spawned them. It is now widely recognised that this process can militarise the police into 'Special Weapons and Tactics' Units such as the Grenz Schutz Gruppe in Germany; the Gendarmeries in France, the Carabinieri in Italy; the Special Patrol and Tactical Aid Groups in the UK and the FBI, DEA and BATF paramilitary teams in the USA. Such groups undertake tactical training that is the mirror image of their military counterparts involved in 'operations other than war' and adopt the same weapons technologies. The perceived utility of this class of technology derives from the flexibility it supposedly offers states in their use of force during public order operations, whether organised by the police, military or another force in between.

The subject matter presented here is inevitably sensitive since there is little agreement on what constitutes a 'non-lethal' weapon. There is little agreement on terminology with 'less lethal', 'less than lethal' and 'non lethal' used as interchangeable terms, even though as this report makes clear in certain circumstances could be described as 'lethal' or 'pre-lethal' technologies. A key concern here is public relations. For example, one US definition from the Department of Defence has defined 'non-lethal' weapons as "discriminate weapons that are explicitly designed and employed so as to incapacitate personnel or material, while minimising fatalities and undesired damage to property and environment."⁸ However, significant grounds can be presented for challenging this stance. There has been a revolution in the availability of crowd control weapons and a second generation of weapons is emerging including new chemical irritants and calmatives; kinetic and electroshock weapons; sticky foams; entanglements; directed energy acoustic devices, pulsed plasma and radio frequency weapons, which are further elaborated in Section 6 below and tabulated in Appendix 4.⁹ Fuelled by 'operations other

than war' in Bosnia, Somalia and Kosova, an accompanying revolution in military affairs has created a new demand for 'intervention technologies' where direct contact with divided populations will become more common place, meaning that insurgents and non-combatants will be targeted together.

Yet despite the rapidly expanding literature on 'non-lethal' weapons, few commentators have scrutinized them in a systematic fashion. What might be seen as relatively minimum force when used by the military during 'peacekeeping interventions', may be plainly illegal when used by police in a democratic country where they are legally bound to operate in a discriminate way using minimum force. Much depends on the accountability of the forces using these weapons and whether their extant codes of practice have been adhered to or ignored. Proponents of such weapons present them as providing additional options for intervention between the use of lethal force and no response at all. A sliding scale of options has been presented which offers the possibility of defeating 'trouble makers' with minimum aggression; less-lethal weapons allow force to be viewed as a continuum.

Opponents have charged that this perspective is naive since the potential blurring of boundaries between lethal and 'non-lethal' weapons and the associated blurring of boundaries between police and military operations, has awesome implications for human rights, civil liberties and 'due-process' and may actually undermine the effectiveness of state security forces. In such circumstances they are essentially 'less-lethal' weapons and merely a fall back option to complement lethal force.¹⁰ Substantive evidence and examples of 'less-lethal' weapons augmenting rather than replacing lethal weapons is presented below as Appendix 6.

Such differences of opinion are more than academic, since significant resources are being invested in creating new 'less-lethal' weapons and NATO approved a new 'Non-Lethal Doctrine' in October 1999, to legally facilitate their future deployment.¹¹ A key consequence is that as technical innovations take place, powerful new tools are placed at the disposal of states in need of solutions to pressing social and political problems whilst the 'control' they offer may be more imaginary than real. The social, political and physical effects are often uncertain, potentially severe and perhaps fundamental in character. The phenomena of militarisation of the police and para-militarisation of the military could have far reaching consequences on the way that future episodes of sub-state conflict are handled and whether those involved are reconciled, managed, alienated or repressed.

Clearly, any sensible framework for coping with the uncertainty associated with deploying weapons against citizens who have certain rights under the law, means preventing unacceptable consequences. Whilst it is impossible to establish an authoritative set of precautions, most commentators would agree that the following negative effects are worth avoiding, namely: (i)causing unnecessary or harmful effects to users and recipients; (ii) exacerbating conflict;(iii)spurring weapons research and development;(iv)proliferating 'less-lethal' weapons to human rights violators;(v)reducing public confidence in security forces; (vi)breaching or undermining international human rights conventions or extant weapons conventions, EU directives and agreements.¹²

Through a series of case examples (including practices in countries such as Northern Ireland where the Patten Commission makes new recommendations on 'less potentially lethal' weapons, Hong Kong, Zambia, Kenya, Malaysia, South Korea, Israel/Palestine, Spain, and Indonesia, as well as examples of particular technologies in action), the report examines the extent to which such weapons have led to human rights abuses and whether or not such technologies have replaced or augmented the State's use of lethal force. These case examples take up the intrinsic abusability of some of these weapons and their utility for street punishment, torture and extra-judicial execution.

Questions of culpability in international law are also raised, specifically the issue of the responsibility of law enforcement officers to use minimum force and for countries to stay within the limits of international conventions such as those covering human rights, torture and chemical and biological weapons. A scientific approach has been applied to objectively assessing the extent to which commonly used 'non-lethal' weapons are hazardous or harmless. This study also covers the human rights, legal, biomedical and health impacts of so called 'non-lethal' crowd control weapons. Specific examples are provided on the lack of quality control in achieving a 'non-lethal' force in certain

European kinetic energy weapons and in the strengths of certain chemical incapacitating weapons. A key focus of the report is to present policy options which can ensure that such commercial irresponsibility or failure to implement adequate health and safety precautions, do not negate or undermine the recent provisions of the 1997 Treaty of Amsterdam which protects the rights of European citizens to live in 'areas of freedom, security and justice'.¹³

This report provides detailed technical data on existing weapons and those which now lie on the horizon. It also seeks to examine the extent to which certain of these weapons are intrinsically 'abusable'. Such concerns are also used to assess and evaluate the second generation of 'non-lethal' weapons which are emerging from national military and nuclear weapons laboratories in the United States as part of the Clinton Administration's 'Non-lethal Warfare' doctrine, now adopted in turn by NATO. These devices include weapons using chemical, optical, kinetic impact, electroshock, directed energy beam, sticky foam, radio frequency, laser and acoustic mechanisms to incapacitate human targets. Open source documentation is presented to evaluate both the official justification for deploying such technologies and whether or not commercial pressures may lead to uncontrolled proliferation of such systems into the hands of human rights violators.

This report has been compiled using data derived from commercial and scientific sources as well as a postal survey of crowd control weapons, conducted by Amnesty International. (See Appendix 2). It places this data in the context of the secrecy surrounding the evolution and deployment of these weapons and the political and military ideologies surrounding their use. It relies heavily on data from the United Kingdom since the ongoing conflict in Northern Ireland has seen the most intense use of so called 'non-lethal' weapons out of all the European Member states. Britain also relies most heavily on electronic surveillance and has the most experience of using weapons and surveillance in counter-insurgency operations providing a suitable case study of whether or not such control technologies can substitute for each other or whether it is a case of both and more.

A key responsibility here is to suggest options which deny deployment of any so called 'non-lethal' weapons which are not safe or properly tested, or any other weapons technology which has inherent characteristics which lend themselves to human rights violations. Therefore a section of this report looks at the proliferation of these weapons, including the variety of mechanisms used in different states to effect licencing and end user control, if any. A key concern is the relative lack of transparency in the official data publicly provided on these transfers and how this failing undermines efforts to achieve proper parliamentary accountability and scrutiny of such transfers.

2. CURRENTLY AVAILABLE CROWD CONTROL WEAPONS AND THEIR EFFECTS.

Over the last 30 years the range of available crowd control weapons and the number of companies and countries supplying them has massively increased. For example, authoritative reference works in the 1970's such as Jane's Infantry Weapons (1978)¹⁴ and Dewar (1979)¹⁵ identify only 13 companies in 5 countries (only 2 of which, Israel and the USA, were non-European) supplying crowd control weapons. By 1999, 10 of the 15 EU countries were involved in the manufacture, supply or distribution of crowd control weapons. Indeed, according to company information held by the Omega Foundation this figure had grown to more than 369 major manufacturers, suppliers or distributors across 40 countries (See Appendix 1).

The current market in crowd control weapons covers everything from basic truncheons; side-handle batons¹⁶; riot shields¹⁷; kinetic impact weapons such as rubber and PVC plastic baton rounds;¹⁸ single and multi-shot riot guns¹⁹; water cannon which have been enhanced to fire 'slugs' or 'bullets' of water, marker dye and a range of chemical irritants for punishing demonstrators²⁰; stun grenades;²¹ a wide variety of chemical irritant grenades²²; tear gas projectiles²³; aerosols²⁴; and bulk sprayers²⁵ (yet all based primarily on 5 disabling chemicals namely CS, CN, CR, OC and Pava); a range of electro-shock weapons including 50,000 volt riot shields and hand held shock batons varying from 50,000 to 400,000 volts.²⁶ (A comprehensive list of these technologies and effects is provided as Appendix 3). (Figures 1-4 provide examples of some currently available technologies).

Most of these crowd control weapons have also been configured into vehicle or aircraft launched formats, some of which are served by a crew acting as a mobile riot dispersal unit. Examples include water cannon, armoured personnel carriers & internal security vehicles with CS dispensers, plastic baton guns, helicopters equipped with CS sprayers, electrified riot control vehicles and mobile razor wire dispensing vehicles. Many of these 'non lethal' weapon platforms also carry lethal weapons and munitions.

This increasing availability means that many more countries are now willing to actually use these technologies. A key finding of this study is that at least 110 countries worldwide have deployed 'crowd control weapons' including chemical irritants, kinetic weapons and water cannon. (See Appendix 7). This figure is an underestimate because not all countries report on their crowd control arsenals. Of these 110 countries, it was found that 44 also manufacture, supply or distribute such crowd control weapons and ammunition. One of the most salient findings of this study concerns the alleged effectiveness of these weapons as an humane substitute for lethal force. The present study found many examples in 47 countries, of these so called 'non-lethal' alternatives being used in conjunction with lethal force, in many cases leading directly to injury and fatalities. (See Appendix 6). Again this assessment probably underestimates the level of augmentation of lethal and 'non lethal' weapons deployment. The survey conducted via Amnesty International for this study found that some States themselves are ignorant about the crowd control weapon holdings of their Military, Security, Police forces. (See Appendix 2) The commitments made in the Amsterdam Treaty cannot possibly be fulfilled whilst governments are ignorant of their own instruments and capabilities for crowd control. All European governments should be in a position to report on their crowd control weapon holdings as a matter of policy and this data should be readily available as public documents. For example, it was of concern that the German Embassy responded that **"according to the German Authorities, the detailed information in the form requested is not held centrally and could only be obtained at disproportionate cost"**. This inability to supply data on chemical irritant holdings would appear puzzling, given the German governments' obligation to provide such data to the Chemical Weapons Convention Inspectorate in the Hague, as stipulated by the CWC Treaty.

In the mid 1990's, the range of available 'non lethal' weapon technologies rapidly changed in the wake of the US 'non-lethal' weapons doctrine and procurement program discussed in Section 6 below. These include some of the variants already mentioned such as crowd control agents, kinetic energy weapons and others which are coming into use such as capture nets and entanglements as well as a range of what are colloquially known as 'stick-ums' and 'slick-ums'. NATO has quite recently adopted (on 27th September 1999) a new "NATO policy on non-lethal weapons" which cover a range of options for military commanders especially for the purposes of peace-keeping and peace-enforcement. A key motivation behind this policy statement is thought to be a political one i.e. removing the political and legal obstacles to deploying these technologies, which is further discussed in Section 6 below.

Nevertheless, despite this substantial proliferation, until fairly recently the forms of technology commonly available were almost identical to the 34 categories of crowd control weapons identified in the 1972 US National Science Foundation report on "Non-Lethal Weapons".²⁷ At the end of the 1990's, outside of the USA, this typology of crowd control weapons continues to consist largely of systems based on chemical irritant; kinetic energy; water jets; thunder flashes (stun-grenades); and electro-shock devices. What has changed is the relative power, sophistication and the combination of different operational effects within single weapon systems to achieve enhanced dispersion, capture, control or punishment.

Overall performance characteristics of all crowd control weapons generally fall into two categories namely:- (i) those that determine the effect on the target if the target is hit (muzzle velocity, projectile weight and drag), and (ii) those that determine if the target is hit (accuracy and reliability). The relative importance of these two categories will vary from weapon to weapon. For example, with chemical devices even though the performance characteristics fall into the same two categories, the distinction between a "hit" and a "no-hit" is not required to be so precise as compared with kinetic energy

devices.²⁸ What follows is a brief account of the lines of research that have produced today's chemical irritant, kinetic energy and electro-shock weapons.

2.1 Chemical Crowd Control Weapons - Design & Effects. Disabling chemical weapons used for law enforcement consist of a disabling chemical and a dispersion mechanism. There are inherent difficulties inevitable in marrying a chemical which has high effectiveness at very low doses with the requirement of low toxicity. Intensive work began in the 1950's, particularly in the USA and the UK, who shared their information on Chemical & Biological Weapons (CBW). In 1956, the UK War Office established the need for a chemical weapon able to drive back "fanatical rioters" which led to the adoption of CS, (then code numbered T792) for use in the colonies of Cyprus and British Guyana. In 1958, a Task Group on CBW was set up in the USA. The US Chemical Corps recommended two CW agents for consideration, namely CS and the vomiting agent DM, whilst describing mustard gas as "primarily a non-lethal agent."²⁹ Work also began on searching for chemical incapacitants "particularly 'non-lethal' persistent chemical agents that are capable of attacking through the skin and can produce incapacitation for one to three weeks."³⁰

Nowadays, the Chemical Weapons Convention permits the use of 'tear gas' and other toxic temporarily disabling chemicals and their precursors for law enforcement and domestic riot control purposes (which it does not define) as long as the chemicals listed in Schedule 1 of the convention are not used.³¹ This provision rules out DM, which is a toxic arsenic based substance previously held by certain countries outside the EU, including South Africa, which secretly explored the use of MDMA (Ecstasy) as a crowd control incapacitant.³²

2.1.1 Disabling Chemical Irritant and Harassing Agents. By the 1970's, 15 different chemicals with sensory irritant properties had been reported for use in civil disturbances.³³ However, despite intensive research,³⁴ only four chemicals are commonly used for crowd control purposes, namely CN (1-chloroacetophenone), CS (2-chlorobenzylidene malononitrile), CR (dibenz (b:f)-1:4 oxazepine), and OC (Oleoresin Capsicum). Until recently, the two former agents were the ones most likely to be found in European police arsenals but increasingly European security forces are introducing OC. Whilst CR is usually a special forces weapon, although one company in India has packaged it for crowd control operations.³⁵ In the Nineties, various US companies started to aggressively promote the use of Oleoresin Capsicum (OC) - a plant toxin extract derived from hot chilli peppers and therefore popularly known as 'pepper-gas' and later a more standardized synthetic variant emerged, known as PAVA (Pelargonic Acid Vanillylamide).³⁶

CN was first prepared by Graebe in 1871 and like most so called 'tear gas' weapons is a solid which becomes a fine mist of particles when distributed. Thus technically speaking, the riot control agents are not gases but aerosols. In concentrations of about 10 mg/m³ it produces burning or stinging sensations in the throat, eyes and nose accompanied by excess salivation and profuse crying. It also causes exposed skin to sting and constricting sensations in the chest. In high concentrations this riot agent kills. It has a very low vapour pressure and is therefore persistent, contaminating room areas, vehicles, clothing and furniture all of which will require decontamination if untoward biomedical implications are to be avoided.

CS was first synthesized in the US by Corson and Stoughton in 1928 and is up to 5 times more potent than CN (based on the concentration per cubic metre that would be intolerable to 50% of an exposed population (IC_{t50}) see Table 1), with marked harassment at concentrations of 4mg/m³. CS causes a burning sensation in the eyes which may be severe enough to precipitate involuntary eye closure (blepharospasm). It also produces severe irritation of the respiratory tract, burning pain in the nose, sneezing, soreness and tightness of the chest with coughing bouts following initial exposure and is a primary irritant of the skin. Even very light exposures can cause a rapid rise in blood pressure and as this increases, these effects become more intense with gagging, nausea and vomiting. A temporary fear of light, or photophobia is an associated side effect which occurs in roughly 10% of the people exposed.

CR was first synthesized by Higginbottom and Suchitzsky at Salford College of Technology (UK) in 1962 and is even more potent being six times more powerful than CS and 30 times more powerful than CN. It does not hydrolyse (i.e. split up or breakdown in water) which means that it can be dispersed from water cannon. The effects are mainly upon the eye and skin with the most severe effect on exposed mucous membranes. Concentrations as low as 0.01 -0.1% (0.1-1mg CR/ml) when splashed onto the face result in immediate eye pain and temporary blindness which persists for about 15-30 minutes. Over all areas of exposed skin contact, a nettle stinging sensation is produced which grows more severe as exposure increases. Even after a person is removed from the contaminated area, these effects will persist. Other effects include raised blood pressure, inner eye pressure, and, because of the general shock of the effects upon some individuals, hysteria.

OC is a mixture of extracts from the chilli pepper family, the exact constituency of which varies depending on the identity of the particular crop of pepper chosen to manufacture the OC product. **PAVA** is a synthetic formulation of one active OC constituent (known as capsaicinoids) which has been standardized to a specific level of irritant activity, measured in Heat Scoville Units (HSU) which register the relative level of heat inducing power. OC is the most potent of all of the commonly available riot control irritants although the IC_{t50} is unreported. OC and PAVA are classified as inflammatories, causing acute burning and closing of the eyes, along with severe inflammation of the mucous membranes and upper respiratory system. OC causes temporary blindness and uncontrollable coughing fits as the rapid inflammation of the respiratory tract restricts breathing. Being an organic agent, OC is usually mixed with a carrier agent for dispersion, normally an oil, alcohol or kerosene etc.

2.1.2 Delivery & Dispersion Mechanisms. There are essentially two ways of delivering chemical crowd control agents either by a pyrotechnically delivered aerosol or as a sprayed solution. Many hand thrown cartridges are available consisting of a fused primer, irritant and a pyrotechnic ejection charge which delivers a dense cloud of irritant smoke. Some varieties fragment, others eject the chemical via a number of pierced holes in the container body. Manufacturers have also produced varieties which 'jump' across the ground erratically to avoid being thrown back. Micro-pulverised versions of irritants such as CS1 and CS2 are available for more effective dispersal via blast grenades such as the ISPRA 404D. Special barricade penetration devices such as Mace International's Ferret, have been designed to pierce doors, cars, plate glass windows etc, from a range of 100 metres.

Many pyrotechnic chemical irritant grenades are designed to be fired from both standard adapted conventional rifles or from a variety of 37/38mm multipurpose riot guns. Bulk distribution has been facilitated by manpack devices such as the Manroy mist sprayer which can spray up to two kilograms of specially formulated micronised CS at a rate of 300 grams per minute with a range of up to 17 metres using a 14 kg. two stroke engine.

The other main method of delivery is by a 'fly-spray' type cannister consisting of the irritant dissolved in a solvent with a propellant under pressure which is used to eject the chemical via a spray-nozzle, delivering either a cone of spray or a direct and targetable stream. CN, CS and OC can all be delivered this way via a variety of solvents and propellants. SAE Alsetex's CS sprays for example, use a 5% solution of CS in the solvent MIBK (methyl iso-butyl ketone). Other U.S manufacturers such as Advanced Defense Technologies and Federal Laboratories use the solvent methylene chloride. Zarc International quantify their spray delivery of capsaicinoids at 43,000 - 1,300,000 micro grams, per burst and is capable of a range of between 4.5 - 300 metres depending on the product. Many of the manufacturers of spray cannister chemical irritants also produce bulk delivery crowd control versions. Increasingly, manufacturers are fitting chemical irritant delivery systems to their internal security vehicles, helicopter and aircraft. Purpose built chemical irritant packs for water cannon are now appearing on the market.³⁷ The cannon operator just adds the pack to the water cannon tanks for a specific concentration of chemical.

2.2 Kinetic Impact Weapons and Their Effects. Kinetic impact weapons can be defined as a class of weapon that on impact with the human body, produce a deterrent or punishment effect through the transfer of kinetic energy in the form of blunt or penetrating trauma. They include wooden, rubber and

plastic projectiles (also called Speciality Impact Munitions - SIM³⁸ or Extended Range Impact weapons³⁹), truncheons of all descriptions and water cannon.

2.2.1 Truncheons, clubs, batons, night-sticks, billys and slappers have been the standard police crowd control weapon for the past two centuries. They are made in a multitude of materials and lengths including: wood, bamboo, rubber, plastic, composite plastics, leather, metal and range in length from about 30 to 200cm. They are generally used one handed but the longer riot batons can be wielded two handed. Modern developments have produced extendable or telescopic batons, side-handle batons and “control” batons used to subdue subjects and provide the possibility of control by leverage applied to the limbs. Since truncheons are usually hand held, they force personnel into close proximity with the subject.

2.2.2 Impact Projectile Effects. The need for the security personnel to put distance between themselves and the subject to be controlled led to the development of weapons that provide a “stand off” capability (ie the ability to “control” a situation at a greater distance).⁴⁰ Impact projectiles gain their energy from the explosion of the munitions’ propellant charge. The projectile is fired at high muzzle velocity with a kinetic energy of between 120 and 265 joules (see Table 2), which is transferred to the target on impact, causing tissue cells to move away from the path of the projectile. This energy may be in the form of fluid shock or the kinetic energy transfer of a solid object that strikes a fluid mass object such as the human body. The physical consequences of this action, depending on the rate of speed of the cell displacement or the effects of fluid shock, may result in two possible outcomes: blunt or penetrating trauma. The most desired “design effect” of a kinetic energy munition is blunt trauma, i.e. the impact from an object that leaves the body surface intact, but may cause sufficient (“non life threatening”) injury to incapacitate, whereas the most undesired “design effect” is penetrating trauma.

2.2.3 Delivery Mechanisms include hand thrown munitions, based upon the same principle as a military hand grenade where an explosive charge is activated by either pulling out a pin or releasing a lever mechanism, or by a time delay fuse. The grenade is thrown at the individual or group and explodes, ejecting high speed projectiles. It is indiscriminate and inaccurate. This type of weapon necessitates close proximity to the target. Types include rubber ball grenades, rubber pellets and stun grenades.⁴¹ To give the possibility of a much greater distance between launcher and target, many of these projectiles are designed to be weapon delivered. Two types are common, those that can be fired from conventional lethal weapons without modification and those that require special weapons such as grenade launchers.

2.2.4 Delivery of Kinetic Impact Rounds By Conventional Weapons such as the 12 gauge shotgun or riot gun and the standard rifle. A wide range of ammunition is available for 12 gauge delivery, including single baton, multiple baton, “bird shot” pellet & bean bag. Rifle launched projectiles are fired by fitting the launch device over the end of a standard rifle barrel - generally called a rifle grenade. A standard bullet is fired and is trapped in the launcher device and its energy launches the projectile. Grenades firing single or multiple projectiles are available. Grenade launchers are basically a weapon with a large barrel and the standard for crowd control is 1.5 inches (37/38mm) or 40mm. They can be either a smooth bore or rifled weapon (intended to give a higher degree of accuracy). Grenade launchers can be carried like conventional weapons or ground launched with up to seven tubes. They can be single or multi shot (between 3 and 12 shot) and can be vehicle mounted. Very high rates of fire are achievable by some of the weapons, for example the South African TFM Slingshot is capable of 170 rounds per minute.⁴²

2.2.5 Varieties of Kinetic Impact Munitions are manufactured in a range of types but can be classified as follows: high or low energy, flexible or non-flexible (rigid) projectiles, single or multiple, direct or indirect fire or by method of delivery. High and low energy refers to the amount of the munitions’ propellant charge enabling either short or long range fire and not to the energy delivered to the target. Flexible projectiles are generally composed of powdered lead, lead shot, a gelatin substance or silica housed in a heavy square or circular bag made from cloth, canvas or nylon.⁴³ Non-flexible projectiles are generally composed of rigid or semi-rigid materials such as wood, rubber, plastic or dense foam. They consist of blocks, balls or slugs of material and cover a number of standard types

and some speciality ones. These include 12 gauge rubber fin-stabilized rounds, rubber sabots, single wood/rubber/plastic blocks, multiple pellets, small balls, or single large tennis balls⁴⁴. Another standard is the 37/38mm munition, available as a single baton (a solid cylinder of material), multi baton - basically the single split into 3 or 5 sections or the "cross cartridge" (which is similar to the single baton but split lengthways into quarters, opening out in flight to present a larger profile and commensurate chance of hitting a target). Other varieties include multiple rubber pellets or segments, large balls⁴⁵, beanbags, balls joined together with wire/string. A rather more lethal variation consists of essentially steel balls coated in rubber or plastic - a type much favoured by the Israeli military.⁴⁶ (See front cover for an illustration of the lethal impact of these bullets).

2.2.6 Water cannon are essentially crew served high pressure pumping systems, usually mounted on a heavy truck, designed to shoot jets of water at the target. Early water cannon vehicles were heavy and cumbersome and had little control of the water jet, they ran out of water quickly needing frequent refilling and were of little utility.⁴⁷ Their unwieldy nature meant that they were most often used to police static assemblies or slow moving processions. The pressure of the water can be varied from low pressure, to soak the target and deter or demoralise, to high pressure to impart a blunt trauma which can push back the target or knock people to the ground.

More recent developments have led to a pulse jet cannon system where small quantities of water - as little as 5 litres - are shot out at high pressure, in effect "bullets" or "shells" of water.⁴⁸ An even higher pressure "water gun" shooting as little as 0.25 litres of water per shot is now on the market. This new flexibility has led to a renewed role for the water cannon in breaking up and punishing even fast moving protests. To increase the effectiveness of the water cannon chemical agents or dye are added. The chemical agent has a higher deterrent effect on the target than water. Generally the tear agents CS or CN are used. The dye can be used to ruin clothes or mark out individuals for later identification and 'snatch squad' capture.

2.3 Electro-shock Stun Weapons Technologies and Their Effects. Whilst the truncheon or baton has been the standard police riot control weapon for the last two centuries or more,⁴⁹ in the last 20 years it has been supplemented by batons, and other devices, using electronic stun technology for crowd control purposes. Such devices are commonly known as stun batons, stun guns, shock batons, electric riot sticks, electronic batons or electric prongs. The stun technology has also been used to produce electronic capture shields and electronic restraint staffs. It is important to note that the modern stun weapons are based on different electrical technology to that which is used in the old-style 'cattle prods'. Cattle prods are non-incapacitating devices that produce a continuous, low frequency alternating current. Electric stun batons produce high intensity, short duration (high frequency) pulses and are capable of causing temporary incapacitation of the whole body.

The stun baton is a portable, hand held device, with a length of between 45 - 90cms. The weapons are typically powered by a 9v battery which, via a switching circuit, inverter transformer, capacitor and output coil, will produce a high voltage, low amperage discharge from electrodes at the end of the baton. The electrical discharge is represented by a spark and a sharp crackling noise. The baton does not have to be in contact with skin as the electric shock will pass through clothes. However, the thickness of the clothes, condition of skin and the humidity will affect the impact of the electric shock. Manufacturers advertise output voltages ranging from 50,000 to 400,000 volts but it should be noted that these values are often significantly lower when independently tested.⁵⁰

A range of other devices are available that use the same stun technology. For example, stun guns are smaller, hand held weapons but tend not to be marketed for crowd control purposes as their short length would not provide significant 'stand off' distance. Electronic riot shields are available with metal strips on the front of the shield which act as the electrodes and produce 50,000 volt sparks when activated. Some countries, such as the USA, use such shields for 'cell extraction' of prisoners, whilst the United Kingdom has authorised police forces to use them against 'dangerous dogs'. These shields are marketed by a number of manufacturers for crowd control purposes. Some manufacturers also provide stun weapons that fire darts over distances of up to 5-7 metres, which have trailing wires that deliver 50,000+ volt shocks when the darts hit their target. The two US manufacturers, Tasertron and

Taser International (formerly Air Taser), market these weapons to the civilian and law enforcement markets for personal protection. However, Tasertron provide an optional 'probe pack' for the TE-86/95 that "can be plugged into the TASER unit to give the officer up to three feet of touch stun capability."⁵¹

The effects of stun weapons, depend on the length of time of application and the characteristics of the recipient. However frequently reported effects include: a discharge up to 0.5 seconds startles and repels the victim; 1 to 2 seconds and the victim loses the ability to stand up; 3 to 5 seconds and the victim is immobilised, incapacitated, left dazed and weak for at least five, perhaps, fifteen minutes. Other reported short term effects include severe pain, loss of muscle control, nausea, convulsions, fainting, and involuntary defecation and urination. Longer-term effects from electric shock can reportedly include muscle stiffness, impotence, damage to teeth, scarring of skin, hair loss, as well as post-traumatic stress disorder, severe depression, chronic anxiety, memory loss and sleep disturbance. In cases where there are physical signs of electric shock torture such as skin reddening and scarring, these usually fade within weeks.^{52 53 54}

There are a wide range of manufacturers and suppliers of these devices worldwide and many European Union member states continue to allow companies in their countries to manufacture, supply and export such electro-shock weapons. Appendix 1 provides details of companies in Belgium, France and Germany who have manufactured, supplied or distributed electro-shock weapons between 1990 and the present. Some of these companies continue to trade.

2.4 Stun Grenades, percussion grenades, thunderflashes and flash-bangs are essentially hand grenade devices whose cases are designed to split rather than fragment. Their effects include an extremely loud blast and a brilliant flash of light designed to disorientate and shock rather than cause outright injury. The grenade consists of a standard military fuse with a pull ring and safety lever, sub-munition charge container of cardboard to alleviate the danger of fragments and an explosive. Stun grenades are used to effect hostage rescue, although several states (e.g. Poland, Russia) have used them as a means of terrifying protestors - a softening up tactic before other riot tactics and technologies are used. Some varieties create a smokescreen as well.

2.5 Area Denial and Barrier technologies include a variety of different perimeter and zone exclusion devices which can either be passive or active. Traditionally barrier devices were merely a series of mobile fences (or in some cases just a roll of chequered police tape) which could be deployed around streets, thoroughfares and buildings. However for the purposes of 'corralling' more determined protestors modern technologies include a capacity to inflict pain or some other form of punishment when its limits are infringed (for example concertinas of razor wire or barriers consisting of sprayed irritant foam). In recent times these technologies have been deployed for "active" area denial by means of motorized rapid deployment which can "seal in" or "seal out" a crowd. For example, the Cochrane 'Modular Razor Wire Rapid Deployment System' capable of deploying 75 metres of 3 coil razor wire in 20 seconds. Some of these systems are already mounted on permanent standby at "strategic gateways".⁵⁵

Some Examples of Currently Available Crowd Control Technologies.



Fig 1. Arwen Multi-shot riot gun & ammunition. © David Hoffman

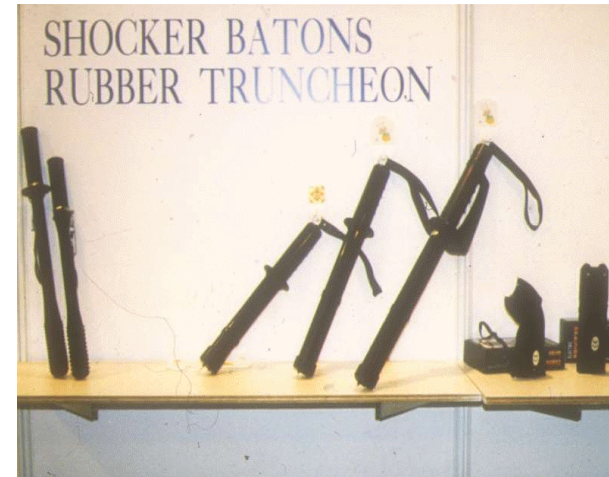


Fig 2. Shock batons & Stun guns on display at Taiwanese Security Fair. © R. Ballantyne.



Fig 3. ISPRA Projectojet Bulk Chemical Irritant Sprayer. © David Hoffman

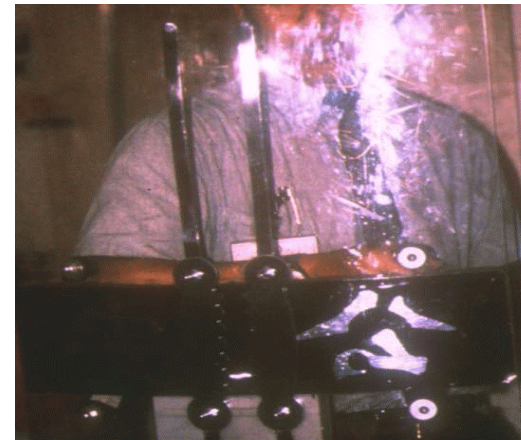


Fig 4. Chinese Electrified Riot Shield. © R. Ballantyne.

3. LEGISLATION AT INTERNATIONAL, EU AND NATIONAL LEVELS.

Existing international, EU and national legislation was not specifically designed to accommodate modern crowd control weapons, some future developments of which may have the potential to undermine international treaties. If crowd control weapons are not to be used in ways which go beyond the limits of the law, it is important to identify which specific national and international laws currently apply and to treat their legality within existing legislation.⁵⁶

At present, such legislation covers the different dimensions of weapons usage. These include the manner in which the weapons are deployed, the intrinsic effects of particular weapons on both the human body and psyche and whether rules of engagement have been implemented in practice.

Such considerations cover the notion of minimum force, proportionality, discriminate use and any codes of conduct in regard to specific technologies. More general EU and national legislation covering health and safety, the sale of goods in relation to quality control and the adherence to technical standards are also pertinent.

There are many different levels of potential control that need to be considered in this context. For example, there are general laws governing specific rights which can be undermined by the deployment of inappropriate crowd control apparatus and public order policing tactics. Such legislation includes the 1948 UN Declaration of Human Rights⁵⁷; the International Covenant on Civil and Political Rights(1976); the International Covenant on Economic, Social and Cultural Rights(1976)⁵⁸ and the European Convention for the Protection of Human Rights and Fundamental freedoms(1950) and more recently, the provisions of the Treaty of Amsterdam which refers to implementing areas of Freedom, Security and Justice. In theory, this legislation should protect the right to life and the right of assembly. However, the exercise of these rights will be undermined if lethal or sub-lethal crowd control weapons are deployed against those citizens who exercise them.

Therefore four legal elements need to be considered, namely: (i) the alleged harmlessness of the weapons technology; (ii) whether they are discriminate or indiscriminate (i.e. affecting anyone in a control zone whether innocent or guilty of any public order crimes or misdemeanours); (iii) codes of conduct governing minimum force and correct adherence by law enforcement personnel to approved rules of engagement and appropriate usage of the particular weapons and (iv) appropriate accountability procedures where code of conducts or guidelines are breached. Such matters are also reflected in the obligations of law enforcement personnel under the UN Code of Conduct for Law Enforcement officers.⁵⁹

A key issue is whether case law in each state suggests that any abuse of these technologies will result in a successful prosecution. Many states pay lip service to rules of minimum force but even where very good evidence exists that these weapons have been abused, few prosecutions result and the perception of immunity of state law enforcement officers from prosecution for human rights violations persists.⁶⁰ Some 'non lethal' weapons (such as electroshock and stun technology) ostensibly designed for crowd control, have intrinsic features such as the facility to inflict excruciating pain without leaving tell tale marks, which make them useful instruments for torture. Crowd control weapons on the horizon which create paralysis, immobility, the removal of certain brain and hearing functions, the induction of vomiting or involuntary defecation have similar potential utility for implementing gross human rights violations, including mass rape or summary street executions.

3.1 Proposed EU Ban on Weapons Directly Interfering With Brain Functioning. The European Parliament has already approved a resolution in January 1999 which called for “an international convention for a global ban on all research and development, whether military or civilian, which seeks to apply knowledge of the chemical, electrical, sound vibration or other functioning of the human brain to the development of weapons which might enable the manipulation of human beings, including a ban on any actual or possible deployment of such systems.”⁶¹

3.2 The International Committee Of The Red Cross's (ICRC) SlrUS Project. The ICRC is already beginning to explore the extent to which their SlrUS Project ("Superficial Injury or Unnecessary Suffering") can be applied to specific effects caused by 'less-lethal weapons'. Their concern regarding superfluous injury and unnecessary suffering relates to design-dependent effects of specific weapons on health.⁶² Based on considerable experience, ICRC's view is that conventional weapons are not necessarily fatal. Their statistics gathered as part of the SlrUS project indicate that the proportion of wounded who die in the field from injuries inflicted by so called lethal weapons is less than 25%, 60% of those wounded by conventional weapons suffer no "permanent injury" and go on to complete physical recovery. Such findings underline the fact that so called 'non-lethal weapons' **cannot** be considered as a separate unique category of weapons but rather according to ICRC as new weapons coming within the scope of the existing laws of war. Whilst any 'non lethal' weapons need to be measured against the norms and principles of international humanitarian law particularly before they can be used in United Nation mandated operations, it has to be recognised in this context that much of international humanitarian law is only applicable to armed conflicts where war has been declared.⁶³

3.3 International Human Rights Law & Crowd Control Weapons Of The Future. The development of certain types of weapons such as radio frequency, acoustic or directed energy weapons like the plasma gun, depends on a knowledge of patho-physiological or psychological effects. A victim may not even be aware that an attack is taking place or be able to surrender and, if wounded, may not be able to seek medical assistance. Unlike other restrictions on weapons created in biomedical laboratories such as chemical and biological weapons, no specific international treaty yet applies. However, some of these weapons present the risk of permanent disability or long lived post traumatic stress syndrome (PTSS) which will require specialised treatment. For example those subject to electro-shock torture with stun batons or targeted by sticky foam and left adhered to the ground all day under a tropical sun, are likely to suffer some PTSS requiring specialist treatment if that person is to be fully rehabilitated and not suffer 'flashbacks'. In the light of continued development of 'non lethal' weapons, ICRC are proposing amendments to the SlrUS proposals.^{64 65}

3.4 International Legal Prohibitions Against Torture & Blinding Systems. The practice of torture is already covered by the Code of Conduct for Law enforcement Officials, adopted by the UN in 1979; Article 5 of the Universal Declaration of Human Rights; Article 7 of the Convention of Civil and Political Rights; Article 3 of Human Rights European Convention and the principles of medical ethics adopted by the UN General Assembly in 1982. More specifically torture is banned by the Convention Against Torture and Other Cruel, Inhumane or Degrading Treatment or Punishment (12th April 1949); and the 1997 European Convention for the Prevention of Torture and Inhuman or Degrading Treatment or Punishment. This report submits that the use of torture weaponry is also covered by 'The Certain Conventional Weapons Convention (Inhumane Weapons Convention) of 1980. Some crowd control technologies are also covered by the provisions of international legislation which encompasses their modus operandi. For example, the Blinding Laser Weapon Ban of 1995 has implications for future UV tetanizing lasers which can induce electroshock in human muscle tissue at a distance.

3.5 Limits Imposed by Provisions of the Chemical Weapons Convention (CWC). Careful interpretation of this international legislation is required to determine the extent to which it encompasses current and future crowd control weapons. For example, the Biological Weapons Convention of 1972 applies to weapons which use plant toxins to create dispersal effects and the Chemical Weapons Convention of 1993, (updating and extending the Geneva Protocols of 1925) has implications for mass use of calmativ drugs or rocket delivered pre-encapsulated chemical immobilising agents.⁶⁶ Within the CWC, riot agents are classified as toxic chemicals, falling under the general purpose criterion.⁶⁷ Although the CWC makes specific exceptions which allow the usage of chemicals for law enforcement purposes, the treaty does not define exactly what is meant by 'law enforcement'.⁶⁸ This issue becomes particularly vexed in relation to so-called 'peacekeeping operations', where the line between law enforcement and use as a method of warfare can become blurred should UN troops be deployed between hostile factions. This has happened in recent times, for example on 28 August 1997 the NATO SFOR contingent had to evacuate part of its International Police Task Forces from the Bosnian Serb town of Brcko. After clashes erupted between civilians and NATO peacekeeping forces, US helicopters dropped teargas and soldiers fired warning shots to effect

crowd dispersal.⁶⁹ In such situations, the key question is establishing who has the requisite legal authority to use chemical weapons for law enforcement purposes.⁷⁰ According to SIPRI, in this instance, there were at least three separate sources of authority.⁷¹

The duties of the CWC contracting parties also include a responsibility not to proliferate chemical weapons, a responsibility which will be examined in greater detail in the policy options (Section A). There is an urgent need to clarify this issue if chemical weapons are not going to be used as a normal means of waging internal security conflicts. At the moment the Hague based Organisation for the Prohibition of Chemical Weapons (OPCW) has no independent intelligence gathering capacity to check the accuracy of submissions by governments which are legally required under the treaty. Further controls by the EU in meeting Member State obligations under the CWC would ensure that any such transfers were both transparent and subject to appropriate parliamentary scrutiny. In addition to international legislation, some countries also have national legislation which prohibits certain types of weapons for crowd control, setting out various codes of conduct to control the operational usage of the weapons which are permitted. Also relevant are the different protocols governing the reporting and assessment of any post-incident justification for weapons deployment, which vary from nation to nation.

3.6 Universal Declaration On Human Genome & Human Rights & Genetic Weapons. Human genome research is an area of rapid innovation and scientific development is making potentially awesome capabilities available to the State to manipulate and manage human crowd behaviour. A good case in point is the Human Genome Project and the Human Diversity project discussed in section 6.4 which have the potential to release race specific control functions and to create weapons which induce heightened levels of anxiety and submission. International agreements are already in place which attempt to prevent the abuse of such innovations e.g the Universal Declaration on the Human Genome and Human Rights, adopted by UNESCO on November 11, 1997.⁷² Such legislation needs to be more effective particularly in guarding against the import of relatively alien US concepts of crowd domination and control (using technologies which have been literally dreamt up in their national atomic laboratories). European democratic traditions are quite different. Options and mechanisms are presented above which could make such legislation more effective in regard to regulating the appropriate usage of crowd control weapons and further restricting any abuse of such systems in creating gross human rights violations. (Policy options. Section A).

3.7 EU & National Laws & Exports To Human Rights Violators Finally, there is the facility of extant legislation to effectively control the export and proliferation of crowd control technologies. If further human rights violations are not to continue to be perpetrated against foreign citizens abroad with EU manufactured or brokered crowd control weapons, policy changes need to be made to ensure that national and EU export controls are more effective. Current indications reveal that export licence data is aggregated to such an extent that meaningful parliamentary monitoring and scrutiny is not possible.

4. HEALTH AND SAFETY ISSUES

In purely technical terms a particular device can be evaluated using some basic performance data against technical specifications. Yet the safety and efficiency of disabling crowd control weapons are often mutually antagonistic concepts. An earlier STOA report (PE 166.499, Section 5.1) suggested that a dominant assumption behind the acquisition of new crowd control weapons was a belief that they can create both a faster policing response time and a greater cost-effectiveness. That report suggested that this logic was flawed. The concept of efficiency covers the capability that a system has of actually doing what may be required. It encompasses notions of effectiveness, i.e. that the results produced are those intended. Crowd control weapons are deployed because they save policing resources by either automating certain control functions, amplifying the rate of particular control activities or decreasing the number of officers required to perform them.

Since crowd control weapons are functionally designed to yield an extension of the scope, efficiency and growth of policing power, they enable security force personnel to distribute more

coercion to a greater number of people. The most efficient crowd control weapons, if efficiency was the only criterion, would be lethal. However, the Omega Foundation's Scoping report for this study suggested that efficiency was probably not the best way of describing these technologies,⁷³ since in terms of dispersal potential, a machine gun is a rather efficient crowd control weapon and according to data gathered by the SIrUS programme of the International Committee of the Red Cross (ICRC), is surprisingly less-lethal with only 25% of fatalities amongst those successfully targeted. Yet no responsible authority in Europe would hold that such usage would be either appropriate or legal.⁷⁴

Since such weapons need to be deployed lawfully, the concept of minimum force and non-lethality must apply and there needs to be some means of ensuring that such weapons are deployed discriminately at identified 'law-breakers' rather than randomly against innocent bystanders. Thus this notion of efficiency also means that the weapons actually deliver their intended non-lethal effects. That is: (a) their technical specification and the manner in which they are used are commensurate with this objective; (b) they are legally seen to be so and (c) that accountable and enforceable disciplinary and compensatory measures are in force to bring either manufacturers or personnel to account when this is not the case.

Health and safety considerations must therefore address three linked themes: (i) the extent to which the technical specifications actually deliver 'non-lethality'; (ii) an assessment of whether codes of conduct and training are currently adequate to ensure the prevention of 'abuse' (See section 5 below) and (iii) whether the deployment of crowd control technologies as a dispersal mechanism in a context of lethal weapon usage can lead to indiscriminate public order policing tactics which lead to greater fatalities (see section 8 and the analysis of worldwide incidents, presented as Appendix 6). It is inconsistent for different EU member states to have contradictory notions of safety in regard to specific crowd control weapons. These safety standards should be founded on the precautionary principle to establish benchmarks which apply objective criteria based on scientific evidence. Such standards should be untainted by either commercial pressures or immediate political demands for technical "quick fixes" arising from any particularly pressing public order episode of the day.

4.1 Health & Safety Issues Regarding Chemical Irritant Weapons. The Chemical Weapons Convention defines toxic chemicals as 'any chemical which through its chemical action on life processes can cause death, temporary incapacitation or permanent harm to humans or animals'.⁷⁵ Within this definition, all chemical irritants used for riot control should rightly be considered as toxic chemicals. Scientists working at the UK Chemical Defence Establishment had no illusions about any such toxic chemicals being given an absolutely safe bill of health.⁷⁶ Indeed other scientists have argued that it is almost impossible to have a low toxicity weapon which is effective and safe at low concentrations.⁷⁷ Does this comment apply to the most commonly used crowd control irritants?

There are five elements to the alleged safety of any crowd control weapons based on the use of toxic chemicals to induce disabling effects, namely: the (i) innate relative toxicity of the chemical used; (ii) ability of security force personnel to use the dispersion mechanisms to deliver a measured dose which remains non-damaging and 'non-lethal'; (iii) relative toxicity and safe dose of any carrier, solvent or propellant used to deliver the chemical to target subject(s); (iv) safety from blast damage or fire hazard of any pyrotechnically dispersed irritant munition; (v) professionalism and training of any operatives to ensure that such devices are used within the context of their training, codes of conduct and in accordance with manufactures instructions. Any failures in fulfilling set standards in these five elements must imply that the munition can no longer be described as non-hazardous or 'non-lethal'. Considering the hazards associated with each of these element in turn:-

4.1.1 Hazards of Crowd Control Chemicals are associated with the way chemical irritants enter the human body via skin, lungs, mouth, nose and eye. To assess whether the epithet 'safe' can be applied to the currently authorised chemical crowd control irritants, it is worth examining the biomedical research literature used to justify their introduction, particularly in regard to lung and eye damage, carcinogenicity, mutagenesis, effects on heart rate, positional asphyxia and alleged 'non-lethality'. Experts on chemical warfare refer to safety margins i.e. the ratio of the lethal to the incapacitating dose. This is a finite measure. If it is surpassed, deaths will occur. However such agents are capable of

producing a range of permanent injuries and such considerations are legally important when the targeting of the irritant is less than discriminate and innocent bystanders fall prey to any effects.

CN has always been associated with potential hazards particularly in regard to its effects on skin and eyes, which provided the impetus to find a standard replacement. It was found to be between 3 and 10 times more toxic than CS in rats, rabbits, mice and guinea pigs.⁷⁸ (See Table 1). It creates more severe damage to the lung with more edema, patchy acute inflammatory cell infiltration of the trachea, bronchi and bronchioles and more evidence of early bronchopneumonia.⁷⁹ Very early on it was noted that CN can induce primary irritant dermatitis.⁸⁰ In skin tests it was found CS caused no effects below 20 mg, whereas moist CN caused vesication (blistering) in most subjects.⁸¹ It is also a more potent skin sensitizer than CS⁸² with several people developing allergic dermatitis.⁸³ CN has also been associated with longer lasting burning of the cornea⁸⁴ and even permanent eye injuries,⁸⁵ particularly if the irritant has been propelled into the eye at short range.⁸⁶ In higher doses it is lethal,⁸⁷ particularly in enclosed spaces where even one 128g grenade in a 27 m³ room, is sufficient to kill.⁸⁸

CS - There is extensive scientific literature on CS, one recent search claims to have found 115,107 articles.⁸⁹ Only some of the most salient aspects can be discussed here. Advocates of CS claim that high levels of exposure to CS are precluded because people are adverse to remaining where this agent is present.⁹⁰ More critical authors have noted the lack of epidemiologic inquiry on its use in actual field conditions.⁹¹ However, operational usage sometimes means individuals face additional punishment or even death if they seek to leave a contaminated zone. (See examples in Appendix 6). At higher levels of exposure, inhalation toxicology studies indicate CS can cause chemical pneumonitis and fatal pulmonary edema. (Victims die by drowning in their own lung fluids).⁹² CS exposure can also lead to reactive airways dysfunction.⁹³ Oral toxicological studies note the facility of CS to cause severe gastro enteritis with perforation.⁹⁴ CS is a primary skin irritant and some individuals will develop contact dermatitis even after what appears to be an unproblematic initial exposure and severe blistering can emerge several hours later.⁹⁵ An exposure to even a low concentration of CS raises blood pressure and there is a particular risk of health damage to anyone over 30, under physical strain or having an undetected aneurysm.⁹⁶ At higher levels CS has been associated with heart failure, hepatocellular (liver) damage and death.^{97 98} One US based CS manufacturer, Federal Laboratories, has warned that "Firing one Federal No. 230 Flite-Rite [tear gas projectile] in a room [eight-feet by eight-feet by seven-feet], could endanger the life of an average subject if he stayed in the room for seven minutes".⁹⁹ CS from canisters has also caused acute mass chemical burns.¹⁰⁰ (Figure 5 illustrates the severe blistering following exposure to French CS Spray).

In vitro laboratory testing has shown CS to be clastogenic, (i.e. causes disruption of chromosomes) and mutagenic (ie it has a facility to cause inheritable genetic changes in organisms).¹⁰¹ Other studies have shown CS to cause an increase in the number of abnormal chromosomes.¹⁰² The risks of a build up of exposure are increased because of the acquisition of tolerance to CS.¹⁰³ This tolerance is stronger in those of higher commitment and or intelligence¹⁰⁴. One military study on the carcinogenicity (cancer causing) potential of CS was inconclusive but observed that chronic exposure to very low concentrations of CS is of greater concern and should be further studied.¹⁰⁵ This is an important safety consideration for police officers who may be regularly exposed to cross contamination when using CS which is particularly persistent. Military CS1, a micronised powder version (and CS2 - a siliconized, micro-encapsulated version of CS1) are even more persistent and therefore form an environmental clean up hazard.

CR - is normally restricted to special operations units, like the SAS, engaged in anti-terrorist operations. Only one EU member State, the UK is definitely known to hold stocks. However, when the relevant Home Office department was asked by researchers about its holdings of this agent, it simply omitted data which in fact was already in the public domain.¹⁰⁶ Whilst a range of studies have been presented to suggest that CR is less toxic and more potent than CS or CN,¹⁰⁷ (See Table 1)



Severe involvement of the face 24 hours after exposure.

Fig 5. Severe blistering following exposure to French CS Spray.

there are no operational case studies, only military studies on human volunteers.¹⁰⁸ These studies found that CR increased blood pressure and anxiety and later studies asserted that there was significantly less risk of eye damage than with CN and CS¹⁰⁹, neither was CR teratogenic (the facility to cause congenital foetal abnormalities, ie birth defects).¹¹⁰

In the UK, the real significance of CR was as a test case for the Himsworth recommendations following the massive use of CS in Northern Ireland. Himsworth said that in future riot agents should be treated more as drugs with full reporting of the data justifying assertions of safety in the open scientific press before they could be authorised for use.¹¹¹ Despite assertions that it followed Himsworth's recommendations, the UK Government failed the test - when asked about studies used to justify claims that CR was not mutagenic or carcinogenic, it quoted studies published several years after authorisation had been given.¹¹²

For legal reasons, it is difficult to think of a drug that would be given the go-ahead in such circumstances where the biomedical effects had not been properly evaluated before the drug goes on to the market. Yet given the Health and Safety implications of the use of chemical irritants (not only on those targeted but on the police and security officers who may be exposed on a regular basis) it is important that these biomedical effects are understood and analysed, as if these chemical irritants were in fact new drugs. For reasons of public safety, this report suggests that such studies should be a legal requirement. Then any assertions of safety and less-lethality can be properly defended in a court of law, so that in the future should such assertions prove untrue, it is possible to firmly establish where culpability lies, either with the manufacturer or with the operator.

OC & PAVA An earlier STOA Report(PE 166.499) covered the alleged hazardous health effects of Peppergas particularly for those with asthma, taking other medical or recreational drugs or subject to restraining techniques which restrict the breathing passages posing a risk of death. The Los Angeles Times reported at least 61 deaths associated with OC since 1990 in the US and there have been more since.¹¹³ Much of the disquiet was associated with the corruption which took place in regard to the FBI approval of this chemical irritant for police use. FBI special agent Thomas WW Ward was later prosecuted for taking a kickback of \$57,000 from a pepper gas manufacturer. Claims that OC was mutagenic and a neurotoxin were later rejected by the US Marines.¹¹⁴ However for a period afterwards the Marines restricted field training with the irritant because of worries about its safety. US police are enthusiastic about the alleged 90% effectiveness of this irritant in incapacitating humans and reducing injuries to officers.¹¹⁵ It is easy to understand the need for such an aggressive alternative in the highly armed context of the US. In Europe however, it may be wiser to be more circumspect especially given the need to medically supervise anyone who has been sprayed with peppergas. The previous STOA report advised the European Parliament to err on the side of caution and called for a moratorium on the acquisition, sale and deployment of Oleoresin Capsicum irritant sprays, until independent research is undertaken on its safety and published in full in the scientific press for peer review. Such work is beginning. For example in the Netherlands,¹¹⁶ the UK and in Sweden. However, different EU States have reached different conclusions, for example Sweden has refused to adopt the agent, partially because of research findings that there was a risk of severe damage to the cornea.¹¹⁷ These findings are consistent with those of researchers in North Carolina (USA) which report that capsicum is mutagenic, leads to degeneration of nerve fibres in the cornea with associated neuroparalytic keratitis (manifested by corneal edema), brain and nerve damage, liver damage, an increase in peptic ulcer disease and kidney damage. Stopford also stated that there was a range of medical risks associated with the use of OC spray including eye damage; skin blistering and allergic dermatitis; laryngospasm (constriction of breathing passages) and respiratory arrest (with asthmatics being more sensitive with up to 40% decrease in air flow compared to health individuals); pulmonary oedema (fluid in the lungs - the risk of which significantly increases with prior infection); airways reactivity and broncho-spasm; hypertensive crisis leading to acute elevation of blood pressure and hypothermia.¹¹⁸

There are also contradictory positions on PAVA (the synthetic OC irritant) between different EU states. Whilst IDC of Freienbach, Switzerland, the key European distributor of PAVA (with 18 European patents¹¹⁹) claims its PAVA products are both safe and legal in Switzerland, Austria, and Germany, the UK position is that the "Home Office Police Scientific Development Branch considers the information

currently available is not sufficient to allow the use of PAVA as an incapacitant in the United Kingdom at present".¹²⁰ However, Civil Defence Supply Ltd has been awarded £45,000 from the UK Department of Trade and Industry to research PAVA as an allegedly safer alternative to CS to become what the company hopes will be the 'incapacitant for the millennium'.¹²¹

Finally, in regard to safety, it is worth recalling that way back in 1975, the Stockholm International Peace Research Institute was warning about delayed toxic effects from chemical warfare agents including tear-gases.¹²² Not all the effects of using these chemicals will emerge straight away and just as the full implications of tobacco and asbestos only became apparent many years after their popular usage, so might be the case with chemical crowd control agents. Given the overall costs of litigation associated with tobacco and asbestos, it is worth reminding ourselves that the precautionary principle pays off in the longer term.

4.1.2 Hazards of Dispensing Excess Levels of Chemical Irritant There are many instances of the police and the military using CS either excessively or indiscriminately. For example, the South Korean government admitted to using 351,000 canisters and grenades of CS throughout the major cities, in June 1987.¹²³ There are reports of demonstrators passing out or experiencing heart attacks during episodes where helicopters were used to spray teargas.¹²⁴ No official scientific studies on the bio-medical impacts of this CS barrage on the health implications for those working in Seoul, including the police themselves appear to have been published either then or since.¹²⁵ However, in 1999 the South Korean authorities in Seoul announced a policy of not using CS as a crowd control option. (See Section 7).

When such indiscriminate mass sprayings involve different riot agents, the health risks are compounded. For example, severe health problems were reported in at the anti WTO protests in Seattle last December, where the police used a combination of CS, CN and OC.¹²⁶ Even some of the manufacturers of these products warn about the synergistic consequences of such mixing "which can prove harmful or even fatal in real life situations". Zarc International also asserts that a mixture of CS with OC in pepper sprays has caused "documented eye injury and blindness".¹²⁷

The issue of excessive delivery of agent to subject also touches on product design and actual adherence to technical specification. For example, in November 1996, a UK Channel 4 Dispatches programme found that the concentration of CS in UK sprays at 5%, was five times higher than similar sprays in the USA and the flow rate was also five times greater which means that anyone targeted in the UK would receive 25 times the amount of chemical irritant used in America.¹²⁸ Even that figure may be an underestimate. An internal Home Office note suggests that the French manufactured CS sprays may contain an even higher concentration than the stipulated 5%. Spot checks carried out by one UK police force revealed concentrations of CS between 5.4 and 6.8 per cent, ie a CS "dump rate" of between 27 and 34 times that used in the USA.¹²⁹ The Home Office has asked SAE Alsetex, which manufactures the spray, about their alleged failure to ensure product quality control in terms of the higher than stipulated concentrations. According to the note of February 1997, the company simply said that they had not been measuring the concentrations of CS in their canisters up to that point. The UK Home Office admitted that it had no system of regular spot checking these devices. When forces do undertake such an inspection the results are worrying. In December 1997 another force checked their canisters and found concentrations of 8.5 % or a "dump rate" of 42.5 times more than would be permissible in the USA.

Other hazards of excess application of chemical irritants are related to the development of tolerance. Such tolerance has been associated with people taking medication because of mental health problems and/or recreational drug users, factors which can diminish the effectiveness of the chemical irritants. Why tolerance occurs in these groups is unclear but it may be related to reduced anxiety.¹³⁰ A recent report by the UK Police Complaints Authority has recommended that where mental illness is involved "that training should emphasise the risks involved in using the spray on those who are vulnerable through mental illness, alcohol or drugs, and that the [CS] spray may not work in these circumstances and may also exacerbate a violent situation" and "that training should reinforce the need for consultation with family and mental health professionals where possible, to find alternatives to the

spray as suggested in ACPO's 1999 guidance".¹³¹ However no guidance is provided on how mentally ill people are recognised at a distance.

The tolerance phenomena is proportionally significant. For example, in regard to CS, the UK Police Complaints Authority reported a failure of subject response at 18%.¹³² Cincinnati police in Ohio reported a 13% failure rate with CS and cited this as the main reason for testing OC products because of the manufacturers claims that it is effective on psychotics and persons under the influence of drugs or alcohol.¹³³ However, analysis of the effectiveness of OC pepper spray in Berkeley contradicted this notion, reporting OC to be ineffective 35% of the time.¹³⁴ Such tolerance has implications for dosage levels since it is experienced by the spraying officers as ineffectiveness or potency of their weapon. A common reaction to such a lack of impact is for officers to use more of the irritant. Often police guidelines contradict those provided by the manufacturers. A worrying example of the implications of such confusion regarding appropriate dosage is the Novato (California, USA) police case which led to the death of a man who was sprayed with OC. Novato police OC guidelines advise that suspects "shall not be exposed to oleoresin capsicum (pepper spray) for longer than absolutely necessary to accomplish control". John Crew, Director of the Police Practices Project for the ACLU of Northern California stated that, "this contradicts how the manufacturers say pepper spray should be used because it implies that you spray until the suspect is subdued... the manufacturers advise that if you hit the suspect's target area, and it doesn't work, it's not going to work, and improperly prolonged spraying poses a health risk to the suspect".¹³⁵

Other hazards associated with excess dosage include delayed allergic contact dermatitis, the severity depending on the level of exposure¹³⁶ - in some cases leading to vesication, the time course of which is the same as that for skin damage caused by exposure to mustard gas.¹³⁷

4.1.3 Hazards of Carrier Solvents & Propellants can be illustrated by the case of French made CS sprays being prematurely introduced into the UK on 1 March 1996, before the requisite scientific research was accomplished. One of the key issues considered by the UK Department of Health Committee (subsequently set up to assess the product's safety) were the hazards posed by the solvent Methyl Isobutyl Ketone (MIBK) - used to dissolve solid CS so that it can be used as a targetable spray. Official reports show that government scientists have warned on at least two occasions that MIBK is too dangerous to be used in CS sprays. But the UK Home Office and Police Forces ignored both reports and continued using MIBK. Four years ago the Home Office commissioned scientists at Porton Down to compare the toxicities of MIBK and an alternative solvent methylene chloride.

In July 1996, the Porton scientists "strongly recommended" that the police should use methylene chloride, rather than MIBK in their CS sprays. Just a month before Home Secretary Michael Howard introduced MIBK based CS sprays, Porton Down was advocating that the available information would suggest that methylene chloride, in the vapour form, is likely to be less hazardous than MIBK.^{138 139 140} In addition, Porton Down was of the view that methylene chloride would pose a significantly reduced risk given that the current handheld spray containing CS dissolved in MIBK delivers liquid droplets rather than solid particulate CS. This comment is significant because it raises questions about the controllability of the amount of chemical irritant and associated solvent dumped on the target. In the following year, Porton scientists were again commissioned by the Home Office to scrutinize 28 solvents to advise on one which would be both safe and effective in CS sprays. Again they concluded that MIBK was 'a serious hazard' and put it into a group of chemicals which were 'clearly' not safe solvents because they were "either confirmed or suspected carcinogens with associated mutagenic potential." This time, the Porton Down scientists' considered advice was that for a definitive answer on a low toxicity solvent for CS spray devices the properties of di(propylene) glycol and polyethylene glycol should be investigated.¹⁴¹ As before, this report was brushed aside in a way which would be politically and legally unforgivable if these substances were drugs rather than riot control agents. Yet the UK Committees on Toxicity, Mutagenicity and Carcinogenicity gave the product the all clear despite noting "the sparsity of data on the combination of CS dissolved in MIBK".¹⁴² The UK Police Complaints Authority report already referred to has also advised that research should be progressed rapidly on finding alternatives to the solvent MIBK.

4.1.4 Hazards Of Pyrotechnic & Blast Chemical Irritant Delivery Systems. Blast injuries from fragmentation devices are far from uncommon. The fact that pyrotechnic devices are incendiary creates both a risk of burn injuries and the initiation of a fire. For example 96 cases of acute burn injuries were reported when teargas was used against refugees in a Hong Kong Detention centre.¹⁴³ The Material safety sheet on CS assigns a flammability rating of 4 (on a scale 0-4) and some commentators now ascribe incendiary CS grenades as a large contributor to the conflagration which burned the Branch Davidian Compound and its inhabitants at Waco, Texas, in 1993¹⁴⁴.

4.1.5 Training & Professional Codes Of Conduct. The notion that such chemical irritants are ‘non-lethal’ is based on an assumption that they are used in accordance with manufacturers instructions and not in enclosed spaces. When disputes over appropriate usage occur, there needs to be a clear line of accountability. In Canada, when an innocent man was sprayed with pepper-gas and suffered injuries to his eyes and lungs he sued the local police because of the longer term effects (bronchial asthma and reactive airways dysfunction syndrome). The police officers in Ottawa defended the claim by filing a third party claim against the manufacturer Defense Technology (Def-Tec). However, the company claimed the fault was that of the police for failing to train its officers properly. The company alleged that “police negligently caused the product to be activated for an excessive period of time¹⁴⁵.”

In the UK, complaints about tear gas by members of the public have ballooned. In the year up to March 1998, the Police Complaints Authority received 425 complaints about the sprays compared to 254 in the previous year. The UK guidelines insist that CS spray was introduced only for self defence, yet the UK Police Complaints Authority Report already referred to, revealed that in nearly 40 % of the cases in their study, it was not used primarily in self defence. Similarly, the original guidelines said the sprays would not be used in crowd control, however, the new Association of Chief Police Officers (ACPO) guidelines enable it to have a public order role. Such drift in the ground rules which originally legitimated the introduction of this weapon illustrates the threat to civil liberties well. If Chemical irritant weapons are not to become indiscriminate weapons then codes of conduct should have legal weight.

4.2 Kinetic Impact Weapons - Health and Safety Issues. In compiling this report it has become clear that there is a lack of independently conducted research into kinetic impact weapons. The country that has seen, by far, the greatest use of kinetic impact weapons in Europe is Northern Ireland. More data and medical reports exist from the usage there than in any other country and will be used as a baseline for the discussions that follow.

In January 1977, the UK Secretary of State for Defence was asked about the research on the likely death and injury rates from rubber and plastic bullets carried out **prior** to their introduction. His reply referred to a report by four surgeons working at the Victoria Hospital in Belfast in 1972 - two years **after** rubber bullets had been used in Northern Ireland - and said that comparable data for plastic bullets was not available¹⁴⁶. The UK's inability to carry out basic safety testing was revealed by US military scientists who developed a comprehensive set of procedures to evaluate blunt trauma impact devices to establish their injury potential and the relevant characteristics that would enable them to operate safely.¹⁴⁷ The US researchers also found that the injury potential of a projectile was dependant on its kinetic impact energy. The researchers described Impact energies below 15 foot lbs (20.3 Joules) are safe or low hazard (provided the projectile is large enough not to damage the eyes); between 30 and 90 foot pounds (40.7 - 122 Joules) as a dangerous area for impact energy and impacts above 90 foot pounds (122 Joules) as being in the severe damage region.¹⁴⁸ The present study has assessed a number of currently deployed riot weapons against this baseline for safety (see Table 2). Figures for different types of kinetic energy weapons, including eight from Europe, are presented. At the range that the weapon is intended to strike its target, seven of the European weapons were in the “severe damage” region and one was in the “dangerous” region. Thus nearly all of the kinetic energy weapons currently authorised for use in Europe operate in the severe damage region and are therefore potentially lethal. One European government has announced that it will fund research into a less damaging alternative. Given the findings of this report this research be reported in public forums and not, as in the past, kept secret.¹⁴⁹

The fundamental problem with kinetic impact weapons is that, as one US specialist has written “there is only a small margin of safety between a high velocity, small cross section impact which would knock one off balance or stun and the infliction of permanent or deadly injury”,¹⁵⁰ i.e. at short range where it may be accurate, its kinetic energy will be too lethal, and at a range where the impact is less lethal, it will be inaccurate¹⁵¹. This is graphically illustrated by the plastic bullet which at 20m (the minimum range it is designed to be “less lethal”) it will neatly punch through plywood up to 11mm thick.¹⁵² Manufacturers descriptions of the effect of kinetic impact munitions on an individual give an impression of the level of impact, ranging from “the stopping power of a .38 special”¹⁵³ to “a punch from a professional boxer”¹⁵⁴ - however a punch that may leave one person unaffected may well injure or kill another.

Safety problems of kinetic impact weapons include the weapon, the ammunition and the guidelines for their use. The defence industry seems unable to agree on the efficacy of the weapons with some manufacturers claiming their weapon can be fired accurately at an individual,¹⁵⁵ whilst others say this is impossible to achieve in a riot situation,^{156 157}. Other manufacturers warn against firing baton rounds directly at people but only to ricochet them off the ground.¹⁵⁸ The accuracy of the weapon is vital if areas of the body most susceptible to injury are to be avoided. Examples of accuracy figures provided by manufacturers give figures for the spread of shots of 17cm,¹⁵⁹ 20cm,¹⁶⁰ 2.4 metres¹⁶¹ and up to 3m.¹⁶² It is doubtful whether any riot weapon currently in use is sufficiently accurate to rule out a potentially lethal shot to a vulnerable area of the body, or indeed of even hitting the target at all. Accuracy further deteriorates when multiple batons or balls are used because these spread out in flight and cannot be targeted at an individual.¹⁶³ However countries such as Israel, continue to use multiple projectiles against individuals.¹⁶⁴ The implication of this finding is that if kinetic impact munitions are not targeted precisely, which is currently the case, then there is much more likelihood of severe injury or death. The temptation given this level of inaccuracy is for security force personnel to move closer, further exacerbating the risk of injury or fatalities.

Crowd control weapons often have sighting mechanisms that whilst simple to use are too crude to be effective. The weapon currently in use in Northern Ireland, the Heckler and Koch riot gun, has a fixed sight front and rear for quick shooting at 25 to 50m range, plus folding sights for firing at ranges of 20, 50 and 75m¹⁶⁵. It is debatable whether in the confusion of a riot these interchangeable sights would be correctly used. Even if a weapon can be made to fire accurately the ammunition has been found to cause many problems. In Northern Ireland difficulties have arisen because the plastic batons expanded in hot weather causing breach explosions (and injuries to over 20 security personnel).¹⁶⁶ Lack of quality control in the manufacture led to excessive muzzle velocities and hence increased injury potential of the ammunition in France¹⁶⁷ and in Northern Ireland over 300,000 bullets were withdrawn because they either had excessive muzzle velocities or weight.^{168 169} A technological fix to overcome propellant problems has been tried by a number of manufacturers of gas powered weapons - however muzzle velocity here is greatly affected by ambient temperature and one weapon whose stated muzzle velocity is 300 feet per second was found to be 425 fps on a hot day greatly increasing its kinetic energy and contradicting its stated ‘non lethality’.¹⁷⁰

In the countries where kinetic energy weapons have been most widely used the authorities have frequently tried to reassure the public by stating that strict guidelines cover their lawful and safe use. However, in Northern Ireland until 1997 the guidelines were secret. Once published they were found to permit use of such weapons in many situations other than for riot or crowd control, including “to protect life or property, preserve the peace, prevent crime or detect crime”. The wording of the Northern Ireland guidelines and similar ones in Israel are so ambiguous and ill defined that they have proved ineffective and unenforceable.¹⁷¹

Such considerations are of growing importance given the attempts by US DoD (Defense Department) and National Institute of Justice funded researchers to develop more accurate targeting of these weapons to specific parts of the human body. A consequence of this effort is a recalibration of the very process of risk assessment in regard to these weapons. Based on the so-called “three rib machine modelling” of the human body, this research calculates different impact levels of munitions

on particular parts of the human body. Little public data has emerged to justify the US effort to move the risk assessment goalposts which could lead to a justification of higher kinetic impact energies targeted to less vulnerable parts of the body. On the basis of past experience the EU should not take these findings at face value but must independently test and evaluate any kinetic weapons imported from the US to ensure they do not breach the provisions of the Amsterdam Treaty.

4.2.1 Hand held baton technology has developed from the simple straight, short truncheons to the introduction of types which increase the kinetic energy of the blow, such as the side handled baton and expandable or telescopic batons. Batons are used in a variety of ways, such as striking, jabbing or crushing / compression, that can produce specific injuries - all are blunt trauma impact injuries. The most common types of injuries inflicted by batons are minor cuts, bruises and sprains. Studies by the Los Angeles Police Department show that suspects sustained moderate to major injuries in 61% of the cases involving batons.¹⁷² Serious injuries or death can occur when vulnerable areas of the body are targeted, such as temple, ears, eyes, bridge of nose, upper lip, throat, collar bone, knee joint and the hollow behind the ear.^{173 174} They include laceration, bruising, fracture of limbs, mandibles, eye socket, shattering of joints and depressed fractures of the skull.^{175 176} The newer types of baton have been recognised as presenting a problem especially in relation to the type of training given to officers.¹⁷⁷ Some forces have started to withdraw batons because of excessive injuries,¹⁷⁸ and because forms of striking have been found to cause excessive force, such as overarm or over-the-head strikes. However, the newer types of baton allow even short stabs and swings to be extremely powerful. One US security firm has trained its guards to strike in a certain way that looks benign but inflicts severe pain,¹⁷⁹ they also enable a much higher level of leverage or twisting force to be applied to the subject. This “allows all officers, even those without significant upper body strength, to use leverage and pain compliance to quickly bring an adversary into an escort position without striking”.¹⁸⁰ However there is a danger that stronger officers could easily apply excessive force and there is some evidence to indicate that as at least one European police force adopting US side handle batons has tended to use them more often. These weapons give the police more confidence, so they are used more frequently.¹⁸¹

4.2.2 Water Cannon are predominantly used in conjunction with other riot technologies. Although there are many reports of their deployment, unless injuries are of a very specific nature they tend to be aggregated with the general injuries recorded from other weapons such as batons or chemical irritants. Experience has shown that water cannon can be highly dangerous. An obvious danger is that of a large, heavy, unwieldy vehicle being used in the middle of a crowd and several deaths have been reported of people crushed or run down by water cannon vehicles.¹⁸² Jets of water have high kinetic energy and can knock people to the ground. Injuries such as fractures, bruising and concussion have been reported when people are bowled over.¹⁸³ For example, a German case reported a water jet knocking a person to the ground causing broken bones as well as shattering their spectacle lenses and forcing the glass into their eyes.¹⁸⁴

When security forces direct water jets at people who have fallen down, debris or broken glass can be picked up by the water jet and fired at the prone bodies. Its force can also roll them over directly into solid objects such as lamp-posts etc. The direct strength of the water jet has been found to strip the bark off tree trunks, split clothes, cause cases of massive bruising to the thighs and the whole rib cage. Cases of internal injury from the water jet have also been reported, one of which required gynaecological examination.¹⁸⁵ The potential of water cannon to cause injury has been recognised by the UK police. Although a parliamentary answer on the suitability of water cannon ruled them out due to tactical disadvantages, privately the police had concluded from their testing that there was a “real danger of killing innocent people with the force of the water”.¹⁸⁶ With the more powerful pulse jet water cannon system¹⁸⁷ and higher pressures now available, the dangers of inflicting injuries and fatalities will increase.

The eye is the most vulnerable part of the body when exposed to water cannon. A senior UK police officer was reported as saying of water cannon that “they could tear your eyes out”.¹⁸⁸ The danger to the eyes is highlighted in a number of medical reports. For example, a blast of water has been reported to cause loss of the globe of the eye.¹⁸⁹ A report on low pressure water jets (150 lbs/in² (psi) pressure) found them to cause serious eye injuries with permanent damage.¹⁹⁰ A further report on 3 people

injured by an Israeli water cannon used for crowd dispersal, operating at 177 psi, found eye injuries and permanent damage. It concluded that “injuries caused by water jets may be more severe than those caused by solid objects because of the high kinetic energy of the water jet, and the longer duration of the impact”.¹⁹¹ A report from Finland on a water jet travelling at 120 Km/h also detailed severe damage, including rupturing and laceration of the eye.¹⁹²

These medical reports contradict the biomedical research carried out at Porton Down that was used to justify the safety of water cannon. This research utilised relatively low pressure water jets and concluded that no damage was likely to occur.^{193 194} As eye damage is related to the kinetic impact energy and duration of the blow, the pressure, speed and mass of water delivered is of vital importance. Most modern water cannon now operate at much higher pressures and faster jet speeds than those reported in the medical press, typically at between 175 and 360psi¹⁹⁵ and would therefore be expected to be more dangerous and damaging, especially with the common practice of adding chemical irritants to the water stream. Little research has been reported in the scientific literature on these aspects. (Figure 6. provides an example of a modern Israeli pulsed jet water cannon).

4.2.3 Kinetic Impact Munitions are by far the most dangerous weapons used for crowd control and have caused a huge number and range of injuries and deaths and have been reported from their earliest usage. Wooden baton rounds first used in Hong Kong in the 1960's killed a 14 year old girl and reported injuries included broken limbs and serious splinter wounds¹⁹⁶. Rubber and plastic bullets have proved even more dangerous with numerous deaths and injuries including fractured skulls, brain damage, blindings, scalpings, broken bones, permanent disability, soft tissue damage to internal organs such as kidney, liver, spleen, intestine and heart, loss of sense of smell, psychological problems and post traumatic stress.¹⁹⁷

The specialist security press has reported that, “all officers must understand that speciality impact munitions can and sometimes do cause serious injuries. Many of these injuries are serious and can be fatal”¹⁹⁸ A survey by the US National Tactical Officers Association showed that in 95% cases where special impact munitions were used some injuries were caused. These included bruising or abrasions (73%), penetration wounds (4%) , fracture (5%), laceration (2.5%), internal injury (<1%) and death (2%).¹⁹⁹ The defence industry recognises their lethality, Robert Oliver, the chief executive of Defense Technologies, a US manufacturer of less lethal weapons has been quoted as saying “ rubber bullets can be as lethal as lead bullets”.²⁰⁰

The ongoing conflict in Northern Ireland has witnessed the most intensive use of kinetic energy munitions in Europe and has produced the most reliable scientific and biomedical data. Outside Europe, hard data has been difficult to access but the case examples of the Occupied Territories and South Africa have been used here to illustrate a convergence of the problems discussed.

4.2.4 Northern Ireland. Three deaths occurred with rubber bullets and a death rate of 1 in 18,500 rubber bullets fired has been calculated.²⁰¹ In total 14 people have been killed by plastic bullets in Northern Ireland, half of them children under the age of 16 years old. Five were killed when plastic bullets impacted on the chest, 9 killed by impact to the head. A death rate of 1 in 5,000 plastic bullets fired has been calculated.²⁰² Doctors in Northern Ireland have reported chest injuries to children²⁰³, scalping, skin lacerations, fractures of limbs and facial bones, eye damage including eye lid laceration, damage to the eye ball or complete destruction of the eyes leading to blindness, damaged liver, ruptured spleen, damaged intestine and 17 cases of permanent disability or disfigurement caused by rubber bullets.²⁰⁴

Plastic bullets were introduced to Northern Ireland in 1973 and completely replaced rubber bullets by the end of 1975. Because they are more aerodynamically stable than rubber bullets they do not generally tumble in flight, and therefore usually hit the target end on, delivering the maximum kinetic energy to a small area and creating the so called “target lesion”. They have proved to be even

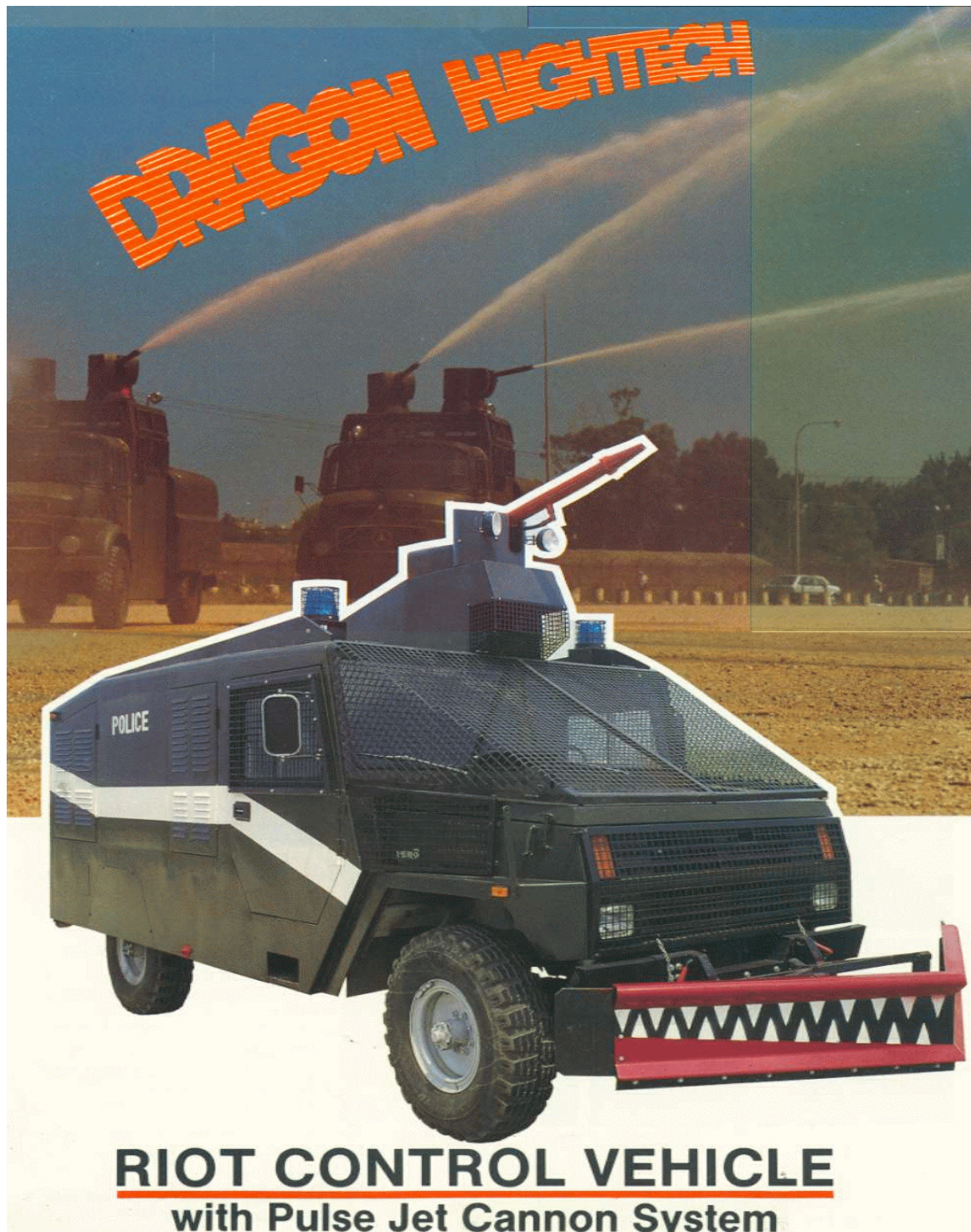


Fig 6. Modern Israeli pulsed jet Water Cannon.

more fatal than rubber bullets, with impact to the chest or head particularly life threatening.²⁰⁵ Rocke reported injuries such as scalp lacerations, skull and brain injuries, concussion, blindings, facial fractures, rib fractures, limb fractures, lung contusion, spleen, liver and gut damage²⁰⁶ and Redgrave also reported loss of sense of smell, psychological and emotional damage.²⁰⁷ An example of this was Gary Lawlor who was two weeks short of his 14th birthday when he was shot in the head in July 1997. He spent four days on a life support machine, and was close to death. However he began to improve, but still in March 1988 his mother said of him: "he is not the same boy as before... he can't eat and he can't sleep. He has been taking epileptic fits since he came out of hospital. He is deaf in one ear and has lost his sense of smell. His right hand trembles and he trails his right leg behind him".²⁰⁸

The type and number of injuries caused by rubber and plastic bullets in Northern Ireland is impossible to quantify for a number of reasons. Record keeping by the security forces is inaccurate.²⁰⁹ During a riot security force personnel are stationed at the hospital casualty departments to intercept any injured people thus physically deterring those seeking medical treatment²¹⁰, and finally any "gunshot wounds", which includes plastic bullet injuries, are immediately reported to the security forces leading to possible charges of riot - this obviously deters people, even innocent bystanders, from seeking medical advice and indeed street hospitals and medical stations are frequently set up during periods of unrest. Because of this, it is likely that there is under reporting of injuries.

4.2.5 Occupied Territories. Deaths and serious injuries have also been reported from the Occupied Territories where rubber coated metal ammunition (balls or cylinders) and plastic/metal composite ammunition is used. The rubber ammunition is fired from an adaptor fitted over the end of the muzzle of the rifle, the plastic ammunition is fired as normal from the rifle. Hiss et al reported more than 20 deaths from rubber and plastic ammunition. In 17 cases of death, mostly on teenagers, death was caused by penetrating wounds to the head, lung, and heart and by non penetrating blunt trauma to the head and spinal cord. The wounds were characteristic of high velocity ammunition and of missiles fired from low ranges.²¹¹ Yellin et al reported on penetrating thoracic wounds to 26 Palestinian casualties, two of whom died.²¹² Damage to the eye was reported by Jaouni and O'Shea who identified 154 cases of injuries caused by rubber or plastic ammunition, of which 67 led to loss of the eye.²¹³ A report on a similar, but less dense, ammunition to the Israeli plastic type conclude that it had a "reasonable capacity to incapacitate" at short range.²¹⁴

According to a report by B'Tselem (Israeli Information for Human Rights in the Occupied Territories) from January 1988 to November 1998, at least 58 Palestinians were killed by rubber coated steel bullets. This figure includes 28 children under the age of 17 years of whom thirteen were under 13 years of age. They note that the figures are an under-estimate because in many instance autopsies are not conducted and it is impossible to determine which type of bullet was involved.²¹⁵ (Figures 7 and 8 illustrate some of the severe damage caused by Kinetic Impact munitions).

4.2.6 Worldwide. Reports from South Africa detail injuries to the face and jaws which were severe, resulting in soft and hard tissue damage, eye rupture, mandible fracture and severe bruising²¹⁶. A report by Dr Clifford Goldsmith of the South African Bishops' Conference described injuries including chest muscles "ripped open" and other muscles "ripped down to the bone".²¹⁷

Four case studies in Austria have shown that a 12 gauge rubber pellet cartridge described as an "anticrime cartridge" can cause fatal penetrating wounds when shot from distances of 4-5m at susceptible target areas of persons wearing light clothing.²¹⁸ This type of munition is widely advertised and used for crowd control.

Other types of kinetic impact weapon have also been reported to cause deaths and serious injury. For example in Prince George's County, USA, a 61 year old woman with osteoporosis died in 1992 when an Arwen plastic baton round shot by sheriff's deputies broke three of her ribs, and a bone splinter punctured her heart.²¹⁹ Bean bags (cloth bags filled with lead shot) have also proved to be fatal, despite manufacturers claims to the contrary. Ian Hogg, editor of the authoritative Jane's Infantry Weapons has been reported as saying "I once witnessed the test of a "stun bag" designed to stop but not kill a criminal...it blew a hole in a sheep".²²⁰ In New Mexico beanbags have caused fatalities

Severe skull damage caused by Kinetic Impact munitions.



Fig 7. Severe jaw damage caused by plastic bullet impact on South African victim.

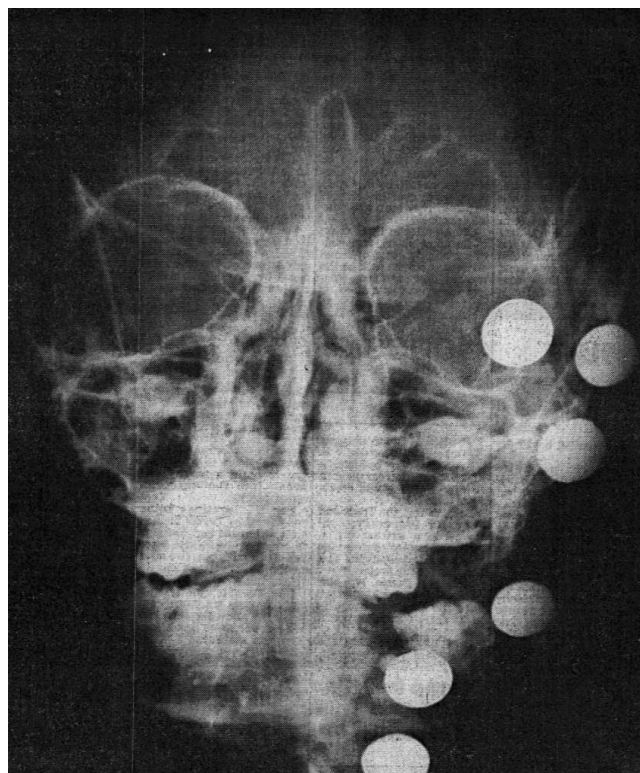


Fig 8. X-ray of a Palestinian casualty with six 'plastic bullets' lodged in his head after being shot by Israel Defence Forces in Nablus, December 1988 and who subsequently died.

when fired at too close a range.²²¹ In Canada, the Ottawa-Carleton regional police agreed to stop using beanbag shotguns after a man died shortly after being struck by a projectile. The autopsy indicated that the beanbag shot was lodged inside the mans body.²²² Penetrating injuries have also occurred when the bean bag bursts.²²³

Recently doctors in Northern Ireland re-graded their calculations of the relative lethality of plastic bullets by including any impact on the body on the abdomen or above as being fatal. Previously medical reports had assumed that only impacts on the chest or above were potentially lethal.²²⁴ Despite these medical reports, the newly introduced guidelines for plastic bullet usage in the UK actually recommends shots up to the abdomen.²²⁵ Failure to absorb scientific and biomedical research into operational procedures in regard to crowd control weapons is a depressing feature common to many of the technologies covered in this report. It highlights the need for proper independent social impact assessment procedures for all these weapons. (Discussed in section 7).

4.3 Electro-shock weapons. The health, medical and safety effects of stun weapons can be considered within two key areas, namely: a) the intended design and use effects of the weapon, and b) the effects resulting from the use (and abuse) of such weapons. A number of medical professionals and human rights organisations have highlighted the lack of independent medical, safety and scientific evaluation of stun technology - a lack identified in a Amnesty International report, 'Arming the Torturers', published in March 1997.²²⁶ Since that publication, a growing number of reports of injuries sustained from the use of stun weapons and reports of fatalities associated with the use of such weapons has made the need for independent medical and scientific evaluation an urgent requirement.

Whilst most of the consideration of health and safety relates to the impact of stun weapons on the subject, it is important to note that such weapons can have health and safety implications for the user, especially if badly designed. For example, badly designed on/off switches that can result in self-activation and excessive current leakage from the activation switch which can cause significant pain.²²⁷

4.3.1 Intended effects of stun weapons according to the stated design criteria, are to temporarily immobilize the recipient by delivering a series of short duration, high voltage pulses that lead to tetanic contraction of the body's muscles. Thus the body is involuntarily paralysed as long as the current is flowing.²²⁸ Most manufacturers and suppliers of stun weapons such as Stun Tech Products²²⁹ and Taser International (formerly Air Taser Inc)^{230 231} state that the devices are medically safe and non-lethal, although some manufacturers caution against the possibility of fatalities.²³²

A range of other effects have been claimed, e.g. some stun gun suppliers have claimed that stun guns were an effective treatment for venomous snakebites.²³³ Yet medical studies have refuted these claims and found that *"Shocks delivered by the Parali/azer Stun gun actually delayed wound healing..."*²³⁴ Indeed, most of the manufacturers' research and evaluation reports of stun weapons refer to non-lethality in relation to "normally healthy people"²³⁵. The impact on people with existing medical conditions has received less attention. For example, in December, 1995, Harry Landis, a Texas correctional worker, who had a history of heart problems²³⁶ was reported to have died after receiving two 45,000 volt shocks from an electronic riot shield.^{237 238}

Why the discrepancy between alleged safety and reported fatalities of such weapons? Some members of the medical profession have highlighted the lack of independent medical research. A 1991 study reviewing the safety of electronic weapons reported that, *"Electronic weapons represent a new class of weapon available to law enforcement and the lay public. Although these weapons have been available for several years, there is inadequate research to document their safety or efficacy."* This study found that whilst the electronic weapon was initially and is currently approved by the US Consumer Product Safety Commission, this questionable approval was based on the theoretical calculations of the physical effects of *"damped sinusoidal pulses"*, not on the basis of animal or human studies.

The report also stated that *“these devices are widely available and heavily promoted, despite limited research into their safety or efficiency and despite recent animal studies documenting their potential for lethality”*.²³⁹ In 1991, the US Consumer Product Safety Commission stated that *“The only electronic weapon evaluated by the US Consumer Product Safety Commission was the TASER in 1976”*.²⁴⁰ However the Commission noted that *“...At the outset, it was recognised that the product, as manufactured, is a “dangerous weapon” and that the Commission’s role was to **assess the risk of unreasonable injury**’ rather than the **unreasonable risk of injury**”* [emphasis added].²⁴¹ Despite only testing the TASER, Stun guns using similar theory were introduced without further evaluation. *“In 1983, the stun gun was introduced, reportedly using the same electrical theory as the TASER. The output of the device was designed to be just slightly less than that of the TASER in its shock values and pulse profiles. ...The manufacturer stated that the stun gun was “designed under standards set by the Underwriters Labs, the US Government Product Safety Commission, and the US Bureau of Standards after they conducted extensive tests on pulsed electric fields.... It was claimed that “under the guidelines set by the United States Government Consumer Product Safety Commission...it would effectively immobilize an attacker without any risk of being lethal or causing injury”*.²⁴²

The Office of the General Counsel of the US Product Safety Commission, in a series of letters and memoranda, responded to the manufacturer claims by stating that *“Although no agency of the United States government exists which is called the ‘United States Government Product Safety Commission,’ the name is sufficiently similar to the United States Consumer Product Safety Commission to lead the public to believe that this agency is the one to which the advertisement makes reference”* and went on to state that *“Any and all statements that the commission has ‘endorsed’ the safety of this product are false. The fact that we tested the TASER has no bearing on the Nova XR-5000 (stun gun) which we have never seen”*... *“Your consumer brochure indicated that the Commission has set safety guidelines, which it has not. Furthermore your police brochure indicates that the Commission declared that it would be impossible for harm to result from this combination of voltage, amperage, and pulse. I am not aware of any staff document containing such a statement”*.²⁴³

In 1984, the Douglas County, Nebraska Sheriff’s office commissioned an evaluation of the Nova XR-5000 Electronic Stun gun.²⁴⁴ The report concluded that *“cardiac muscle tissue appears to be completely insensitive to its effects”*. The author draws a similar conclusion from a later study²⁴⁵ but a conclusion that is contradicted by a 1989 report that describes apparent ventricular fibrillation associated with the direct epicardial application of a stun gun to exposed pig hearts.²⁴⁶ Research conducted by United Kingdom Home Office scientists on stun guns indicated that they can cause high levels of pain and even death through ventricular fibrillation in certain circumstances.²⁴⁷

Injuries and deaths associated with stun weapons have been reported in Los Angeles,²⁴⁸ 249 250, other cities in the USA²⁵¹, within US prisons²⁵² and the UK.²⁵³ 254 Stun weapons have also been reported as having a causal link with the miscarriage of a pregnant woman.²⁵⁵ The author of the report on miscarriage stated that *“As use of the TASER becomes more common, obstetrical clinicians may encounter complications from the TASER more often”*. It was reported in November 1994 that a woman had killed her 7-month nephew with an electric stun gun in an effort to stop him crying.²⁵⁶

It is not only incidents in the United States that have highlighted the lack of independent technical, medical or legal evaluations. The need for such investigations on electric batons was one of the key conclusions of the South African Joint Committee report on the 31 July 1996 incident at Tembisa railway station. The report noted that *“Even the manufacturers concede that the electric baton is experienced differently by different people. The electric batons may cause current induced effects on the heart or on other electro-sensitive parts”* and that *“Even the International Electrotechnical Commission (IEC), an international body which represents international technical consensus on electrical equipment does not yet offer any reference points for evaluating certain kinds of electric pulses as far as their effects on human organism are concerned. The use of electric batons may entail secondary heart and circulation effects which may constitute a danger in the case of persons with*

*unstable circulation, hypertensive patients or carriers of heart pacemakers. That the use of the electric batons may result in a sudden fall in blood pressure and cause the collapse of such a person ”.*²⁵⁷

Many suppliers of electro-shock batons have cited research undertaken in 1985 by a professor at Dusseldorf University, Germany. However, the professor stated that *“his expert opinion only referred to an apparatus type ‘Paralyser’ produced by the company Dicom Electronics Ltd, which was on the market at the time”* and that *“as far as I know this specific model we examined is not any more on the market..it is the nature of things that risk assessments only apply to a very concrete version of an apparatus of this kind and that it is impossible to derive any general clearance certificates in respect to technical variants of these systems ”... ‘If manufacturers refer to my expert opinion as proof their products are ‘unobjectionable’; they do so without being authorised ’.* [emphasis added].²⁵⁸

An increased awareness of the dangers of stun weapons amongst the medical profession is emerging - illustrated by reports of their possible involvement in the sudden deaths of men restrained in the prone position by police officers.²⁵⁹

4.3.2 Effects from the deployment of stun weapons. Whilst the health and safety impacts of the stun weapons’ intended effects are disputed, it is clear that there are a number of negative impacts caused by the deployment of such weapons. Some of these effects have unintended or unforeseen consequences and result from the interaction with other crowd control technologies or their facility to induce panic or fear reactions. For example, it was reported in 1990 that New York police officers use of a stun gun inadvertently set fire to a young boy who had been sprayed with pepper-spray which contained a flammable propellant.²⁶⁰

An incident in Tembisa, South Africa in 1996 also highlighted the dangers associated with the deployment of electric batons for crowd control purposes. Following the use of electric batons by railway security personnel, 16 passengers were crushed to death in the ensuing panic. The subsequent inquiry established that there was no legal or regulatory framework within which electric batons were manufactured, sold or used in South Africa. The inquiry recommended that *“the use of electric batons be banned in South Africa. This should remain the case until a regulatory framework exists for the manufacture, sale and use of electric batons and reliable and independent medical and legal research establishes that the use of the electric baton on any person would not subject such a person to cruel, inhuman and degrading treatment or punishment.”*²⁶¹

Stun weapon manufacturers and law enforcement agencies recognise the need for adequate training before deployment of these weapons. However, even where training is available and existing systems or accountability and oversight are in place there have been reports of unacceptable use. For example, it was reported that the “Greek Government had outlawed the use of such weapons by law enforcement agencies following cases of severe ill-treatment by the Greek police”.²⁶² If stun weapons are deployed there is a clear requirement for effective personnel training; effective and transparent recording of usage, together with the establishment and maintenance of appropriate accountability and disciplinary procedures. However, the considered view of this report is that they should no longer be deployed or traded in Europe.

5. ABUSE OF TECHNOLOGIES

There are many and varied ways in which either the design or the operational usage of crowd control weapons facilitate human rights violations. Abuse of these weapons consists of the breach of several layers of alleged safeguards. These include undermining set rules of engagement; a failure to ensure that any deployment of force is appropriate, transparent and accountable and the inherent characteristics of the technology itself which might lend themselves to abuse. To understand abusability we also need to understand the context and the extent to which police and military culture permit or even encourage such abusability and whether or not these cultures punish members who breach extant human and civil rights protocols. One of the most undermining trends in recent years is the militarisation of the police which has cross-fertilized what should be two very different operational

cultures. This process is perhaps most pronounced in the United States where for the last twenty years Congress has encouraged the US military to supply new weapons and training to the civilian police forces. This has institutionalised Special Weapons and Tactics (SWAT) squads in almost every state.²⁶³ A new study by the US CATO Institute warns that ‘the mindset of the soldier is simply not appropriate for the civilian police officer. Police officers confront not an ‘enemy’ but individuals who are protected by the Bill of Rights.’²⁶⁴

According to the Cato Institute study, since such armaments are only necessary in extraordinary circumstances, the deployment of such units should therefore be infrequent rather than routine. Instead, the Cato Institute reports that SWAT Teams “are everywhere, doing everything... Police are now patrolling mundane non-emergency situations, serve warrants etc in full battledress. Confusing the police functions with the military function can lead to dangerous and unintended consequences - such as unnecessary shootings and killings.”²⁶⁵ Soldiers expect a war of attrition which can often be indiscriminate. Police officers however, work within the premises of a legal framework predicated on minimum force and discriminate control rather than free-fire zones. Unfortunately, once this process of militarisation of the police begins, it is quickly normalised and justified in new budget allocation proposals and institutionalised standard working procedures.²⁶⁶ Thus by 1994, the Department of Justice and the Department of Defense had signed a memorandum of understanding which enabled the military to transfer technology to state and local police forces giving civilian police high-tech military hardware previously only issued during wartime. These technologies have included some of the crowd control weapons which are the subject of this present study.²⁶⁷ Any move towards adopting these ‘alien’ principles in Europe will undermine agreements made under the Amsterdam Treaty in 1997, to create zones of freedom, security and justice within the European Union.²⁶⁸

5.1 Chemical Irritant Weapons can facilitate human rights abuses in several different ways including the infliction of street punishment, an activity explicitly prohibited in most guidelines. There is a long history of such practices, in the US for example.²⁶⁹ More recently, the UN Committee Against Torture criticised the USA about the number of cases of police ill-treatment of civilians. Evidence submitted to the UN Committee by Amnesty International covered the misuse of pepper-gas spray. On the 4th May 2000 the San Francisco Federal Appeals Court ruled that “Oleoresin Capsicum (OC) spray (also known as “pepper spray”) may in some circumstances constitute an unconstitutionally and ‘unreasonable use of force’.”²⁷⁰ This ruling stemmed from cases of officers deliberately breaching guidelines by using OC (pepper-gas) to inflict punishment. Video evidence showed California police deputies pulling back the heads of environmental protestors, opening their eyelids and swabbing the burning liquid directly onto their eyeballs - an action described by Amnesty International as ‘tantamount to torture.’²⁷¹ The US police had subsequently continued to use this strategy as evidenced by the treatment of non-violent protestors during the WTO demonstrations in Seattle, November 1999 (some non-violent protestors who refused to leave Police buses on arrival at Seattle detention centers have alleged that police officers pulled back their eyelids and put pepper spray or gel into their eyes, nose and mouth).

Amnesty International has stated that the San Francisco Federal ruling “**should clearly signal to law enforcement officers that it is no longer acceptable to use pepper spray in such a calculated and deliberate way to inflict pain as a way of subduing demonstrators who pose no threat**”. Amnesty further stated that “we now hope it will influence police practices not only in California, but in the USA as a whole”. Europe is not immune from such abusive practices. Evidence has emerged in the UK of police abusing CS sprays in breach guidelines to make the targets more compliant. More seriously, in Austria the UN Committee on the Prevention of Torture found a recent case of pepper gas being used by the Austrian police to carry out a racial attack.²⁷² It is reasonable to suggest that Amnesty International’s advice should also be adopted by any European Union member that deploys any chemical irritant weapons.

There is a risk when lethal weapons are used in conjunction with chemical irritants (and other crowd control technologies) that escape is inhibited or prevented leading to excessive exposure. This is particularly true when “carpet gas bombing” tactics are used by security forces. These should always be seen as an abuse because there is no way of distinguishing targets from innocents. The excessive use of chemical irritants is widespread as is their use in conjunction with more lethal

weapons. Appendix 6 catalogues some cases where disabling chemicals were used to incapacitate a target prior to executing, wounding or beating the victim in a manner where a whole community was punished indiscriminately by blanket gassing.

Targets have included hospitals where victims have no means of escaping the build up of toxic gas. Such practices were for example common in the late 1980s, in the Occupied Territories.²⁷³ However, as detailed in Appendix 6, far too often disabling chemicals are used to expel civilians from safe sanctuary to enable their beating, wounding or extra-judicial execution. Anyone trapped or injured will be vulnerable.²⁷⁴ (Also, see case examples in Section 8)

5.2 Kinetic Weapons.

Systematic misuse of truncheons has almost become a metaphor of the archetypal repressive police state.²⁷⁵ Modern kinetic energy weapons have also been systematically abused, particularly in Northern Ireland, the Occupied Territories and South Africa in a wide range of ways including: i) doctoring of projectiles to enhance lethality;²⁷⁶ ii) breaching of guidelines on:- use only as a last resort²⁷⁷, firing below the minimum distance²⁷⁸, firing at areas of the body that should not be targeted (ie head, face, neck or chest)²⁷⁹ shot out of moving vehicles²⁸⁰; iii) used as street punishment for example during zone clearing operations,²⁸¹ iv) intimidation,²⁸² v) denial of the right to peaceful protest²⁸³, vi) used in a sectarian or racist manner,²⁸⁴ and vii) used as disproportionate and excessive force.²⁸⁵ (Figure 9 illustrates an the misuse of Kinetic Energy weapons against protestors in Seattle)

Even when these weapons are used in a criminal way, for example when children are targeted leading to fears of street execution, the weapons leave no ballistic trail that could be used in an enquiry to trace the officers responsible.²⁸⁶ A failure by the authorities to prosecute officers who use excessive force or who breach the guidelines has led to a culture of impunity, a disregard for the rules of law and made the use of these weapons ordinary instead of extra-ordinary. This is especially true in Northern Ireland²⁸⁷ and Israel.²⁸⁸ However whilst failing to prosecute the officers, governments have acknowledged the misuse of the weapons by offering financial compensation to victims and families, often on condition of secret payment and the cessation of any criminal charges being laid.²⁸⁹ Such “cheque book litigation” has ensured that the full examination and public disclosure of the misuse of these weapons has been avoided by the authorities.

5.3 Electro-shock weapon manufacturers and proponents cite the ‘non-lethal’ characteristics of such weapons as reasons to deploy them instead of lethal force or other types of crowd control weapons such as blunt trauma batons. These characteristics include the claims that stun weapons are: ‘non-lethal’, do not cause blunt trauma injuries and leave no long-term physical effects. However, these characteristics are exactly those that have led human rights organisations and medical personnel helping to rehabilitate victims of torture to suggest that stun weapons have inherent characteristics that facilitate abuse, ill-treatment and torture. What makes the abusability factors with stun weapons so high is not just their apparent degree of unreliability, technical variability or very narrow safety range of the technology, but also the practical difficulty of finding evidence which proves they have been used to facilitate human rights violations.

Due to her experience with victims who have been tortured with electro-shock weapons, the Director of the London-based, Medical Foundation for the Treatment and Rehabilitation of Torture Victims has described electro-shock batons as “the modern *universal tool of the Torturer*”.²⁹⁰ The Executive Director of Amnesty International USA has highlighted the contradiction between the law enforcement use of stun weapons and their widespread use worldwide as instruments of torture and ill-treatment.²⁹¹ The potential for abuse has been also highlighted by other health professionals working in law enforcement and correctional services.²⁹²



Fig. 9. Police officer targets WTO protestor in Seattle. A misuse of Kinetic Impact weapons.
© AP / Wide World Photos.

Electro-shock weapons have been deliberately, and often repeatedly, applied to sensitive parts of prisoners' bodies, including their: armpits, necks, faces, chests, abdomens, the inside parts of legs, the soles of the feet, inside mouths and ears, on genitals and inside vaginas, rectums and on the back. Such practices are often combined with other forms of torture and ill-treatment, including psychological torture. In many cases electro-shock weapons are used against women in addition to rape or other sexual assaults. A Mexican woman, Layda Silva reported how the Cobras security force had used electro-shock batons on her. ***"I fell to the ground, but they carried on giving me the shocks - on my breasts, vagina, stomach, legs, all over my body,"***²⁹³

In March 1997, Amnesty International published a report which documented electric shock torture and ill-treatment in 50 countries worldwide since 1990. In 18 of these countries there was evidence that hand-held electro-shock weapons had been used to commit such human rights violations. These countries included: Algeria, Austria, Bulgaria, China, Egypt, Greece, Lebanon, Russian Federation, Saudi Arabia, South Africa, Sudan, Turkey, United States of America, Uruguay, Vietnam, Yugoslavia (Kosovo), Zaire.²⁹⁴ Despite their stated adherence to the basic principles of international human rights laws, including ratifying international human rights treaties, governments continue to permit electric shock torture and ill-treatment in prisons, detention centres and police stations.

Some of these cases have occurred in European member states. In October 1996, the Austrian government agreed to the publication of a report by a delegation from the ECPT [Council of Europe's Committee for the Prevention of Torture] which contained serious allegations that detainees of Austrian as well as foreign nationality were at risk of grave ill-treatment particularly while detained at the Bureau of Security in Vienna.²⁹⁵ There are also reports of the police use of electric batons against protestors in Nicosia, Cyprus in March 1996²⁹⁶ and in States that are seeking membership of the European Union. For example, in July 1997, the Special Rapporteur of the United Nations Commission on Human Rights advised the Bulgarian Government that he had received information on what was alleged to be a substantial incidence of torture or other ill-treatment inflicted by members of the police against street children, especially those of Roma ethnicity. The ill-treatment, which was said to take place both at the time of arrest and during detention at police stations, was allegedly carried out to intimidate or extract a "confession". The children so detained were reportedly sometimes picked up on suspicion of such crimes as theft, but might also be arrested as part of generalized "street sweeps". The abuses reported included: *"beatings with fists, boots, electric shock batons, clubs, chains, rubber hosing, boxing gloves or a metal rod with a ball attached to its end (beech) and beatings on the soles of the feet, sometimes with electric batons (falaka)"*.²⁹⁷ Bulgaria's police force was re-equipped with new anti-riot equipment in 1990 including electro-shock batons.²⁹⁸

Recent reports by the United Nations Commission on Human Rights document the use of torture in a wide range of countries including Turkey. One report stated that the "torture of men, women and children continues to be widespread throughout Turkey, and people have 'disappeared' or died in police custody".²⁹⁹ Other reports have identified specific police units that practice widespread torture including electric shock torture and ill-treatment.³⁰⁰ In the United States, the record of electro-shock weapons is far from unblemished. Prison guards in Arizona, California, New Mexico³⁰¹ and Texas^{302 303} have been accused of tormenting inmates with stun batons. There have also been allegations that officers of the INS (Immigration & Naturalisation Service) have used stun weapons against detainees.³⁰⁴ The UN Special Rapporteur on Torture raised a series of cases where it had been reported that stun weapons had contributed to ill-treatment or abuse in the US.³⁰⁵

Some stun weapon manufacturers and suppliers offer training as a means to ensure safety, but such training is not available to all those able to acquire electro-shock weapons. The human rights content of training courses appears to be weak or non-existent. One US course manual claims that "should an officer misuse or abuse someone with less-than-lethal electronic weaponry, the consequence or error could, at the very worst, be a minor non-permanent injury." The evidence in this report shows how misleading such statements are. US law enforcement officers who have received training in the use of stun guns, report using them variously on assailants for 1 to 2 seconds on the legs, but also on the torso for 3 to 5 seconds. The Amnesty International report quotes a 1992 report

that stated "Less aggressive officers may experience negative results [the stun gun not inflicting incapacitation]...due to the fact that you must physically make contact and hold that contact for up to six or eight seconds."³⁰⁶ One design feature in a modern stun gun is an automatic switch-off after 15 seconds of use, which is reactivated after 5 seconds. It would appear, therefore, that prolonged or repeated application of a stun belt, gun or baton constituting severe ill-treatment or torture is not prevented by their technological design and remains an ever-present danger. The characteristic lack of physical signs of injuries also ensures that ill-treatment, abuse and torture with stun weapons will, in all likelihood, remain under-reported and this now includes child targets.³⁰⁷

Human rights organisations continue to document increasing numbers of cases where torture and ill-treatment are committed with electro-shock weapons. Meanwhile, many European Union member states continue to allow their companies to manufacture, supply and export such electro-shock weapons. Some of these exports are to countries where torture and ill-treatment have been documented. Appendix 1 provides details of companies in Belgium, France and Germany who have manufactured, supplied or distributed electro-shock weapons between 1990 and the present. Some of these companies continue to trade. Further more, the EC has actually given CE quality control markings for such weapons and foreign manufacturers such as those from Taiwan boast as an official seal of approval in promoting their overseas sales (Taiwan bans such weapons for home use). This practice should be terminated. (Figure 10 shows an example of Taiwanese electro-shock batons with CE markings).

6. AN ASSESSMENT OF FUTURE TECHNOLOGIES & THEIR EFFECTS

6.1 History. The emergence of a second generation of 'non lethal' weapons from the United States in the early 1990's resulted from military strategists eager to embrace the oxymoronic doctrine of non-lethal warfare. The doctrine's promoters were primarily futurologists such as Alvin and Heidi Toffler,³⁰⁸ naive Quaker science fiction writers Chris & Janet Morris,³⁰⁹ and a former deputy director of the CIA Ray Cline, and his US Global Strategy Council in Washington. They found willing ears not only amongst the former chiefs of staff of the US Army and the Strategic Air Command but also the US National Nuclear Laboratories at Los Alamos, Lawrence Livermore and Oakridge.

The 1990 seminal work of the Morris's, 'Non-Lethality :A Global Challenge'³¹⁰ defined the new ideology as 'a revolutionary new strategy of deterring and containing aggression with non-lethal and highly constrained force that provides utility across the continuum of conflicts'. The disingenuous non-lethal ideology was further championed by Col. John Alexander who co-authored a book with Janet Morris, 'The Warriors Edge'.³¹¹ Alexander spearheaded the "special technologies" group of the Los Alamos National Laboratory and co-ordinated their early efforts on 'non-lethal' weapons. Ironically, Alexander made his name in the rather more lethal Phoenix assassination programs in the Vietnam War (and later became a proponent of psychic warfare).³¹²

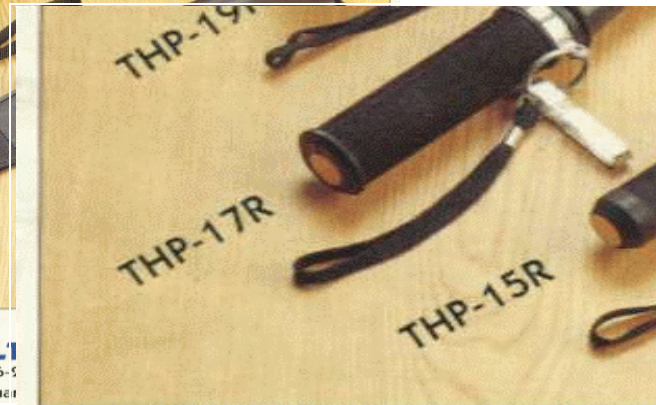
Statements from advocates of the doctrine present it as a humane alternative to more lethal warfare and a logical response to the changes in the global security environment. For example "As major conventional conflict becomes rare, 'less-than-lethal-war' violence, instigated by those immune to world opinion and economic costs associated with making war, has become common". Such stances have been used to justify the so called 'revolution in military affairs'.³¹³ Others are more cynical about such claims for the moral high ground, viewing these new initiatives as an "institutional rice bowls" response with scientists and the military looking for new weapons projects to justify their careers and massive expenditures, once the end of the Cold War made many of the old "containment" stances redundant.³¹⁴ The Morris's came up with a new philosophy, what they called 'the containment of barbarism' aimed at controlling disruptive behaviour, rather than any particular ideology.

In May 1993, the US Attorney General Janet Reno appeared before Congress to describe the FBI role the standoff with the Branch Davidian cult at Waco. She expressed the wish that there had been a 'magic non-lethal bullet' that could have saved the lives of the children who were incinerated in the fire at the compound.³¹⁵ Later in October that year, the US military were stinging with the

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Fig 10. Example of Taiwenese manufactured Electro-shock weapons with European CE markings.

humiliation they had suffered in Somalia at the hands of unruly crowds and a ragtag militia during operation 'Restore Hope.' Despite deploying much superior firepower on the streets of Mogadishu, 18 US soldiers were slaughtered and filmed being slaughtered. In the ensuing battle 300 Somali citizens, both civilians and guerrillas were also dead - a highly embarrassing debacle which did not restore hope.

It was thought that weapons which might be able to target guerillas and civilians together might just do the trick. In 1995, the Pentagon and the US Justice Department signed a secret memorandum of understanding authorising the Pentagon to receive almost \$50 million for additional 'black box' or secret research programme funding for 'less-lethal weapon' research.³¹⁶ There was now a mutual desire to find 'a magic bullet' that would neutralise the 'CNN Factor'. Whilst the full range of many of these highly secretive programmes may never be known, some of the projects have been reported as being associated with particular research laboratories. Eg. Laser research (ARPA, ARDEC, Los Alamos, Army Communication Electronic Command); Optical munitions (ARDEC/Los Alamos and Phillips Laboratories); Acoustics (SARA, ARDEC, Los Alamos); Electromagnetic pulse (ARDEC, Los Alamos, Harry Diamond Laboratory, Eglin Air Force Base); Foam and Slickums (Sandia); Grenade launched foam (ARDEC, Army Research Laboratory), rubber bullets (ARDEC/ARL).³¹⁷

Critics both inside and outside the US government saw many dangers in such unaccountable 'black programme funding'. It was reported that, "One of the immediate consequences of the excessive secrecy is a wasteful duplication of effort. Justice Department officials who surveyed some of the black budget programmes for possible law enforcement applications found the same technologies being developed in as many as six independent programmes.....The waste results from a lack of independent oversight of non-lethal programmes, which like other highly classified 'special access' or 'black' programmes in defence and intelligence - operate beyond the reach of the checks and balances that US citizens take for granted."³¹⁸ By 1999, the Pentagon benefited even further from this post cold-war doctrine, with a gold plated spending increase of \$110 billion over six years to boost "military readiness". According to William Hartung, senior research fellow at the US World Policy Institute at The New School, the total US military budget of \$260 billion plus, only makes sense in terms of politics and economics, rather than any real threat to American security since it is "already twice as large as the combined budgets of every conceivable U.S adversary, including major powers like China and Russia and regional 'rogue states' such as Iraq, North Korea and Libya".³¹⁹ For Hartung, the weapon makers are shaping US foreign and military policy. He might have also added by default, NATO & UN 'peace keeping' strategies. By 1998, the US had an integrated product team: consisting of the Marines, Airforce, Special Operations Command, Army, Navy, Joint Staff and the Joint Chiefs of Staff, and Departments of Transportation, Justice and Energy.³²⁰

In October 1999, NATO announced a new policy on 'non-lethal' weapons and their place in allied arsenals. Officials said that the policy's purpose "was two fold, namely to clarify the legal ambiguities surrounding the use of non-lethal weapons and to broaden the range of combat options for military commanders, especially for purposes of peacekeeping and peace enforcement".³²¹ The NATO doctrine confirms that:-

- "The availability of Non-Lethal Weapons shall in no way limit a commander's or individual's inherent right and obligation to use all necessary means and to take all appropriate action in self defence." In other words,

- “Neither the existence, the presence nor the potential effect of Non-lethal Weapons shall constitute an obligation to use Non-Lethal Weapons or impose a higher standard for, or additional restriction on, the use of lethal force. In all cases NATO forces shall retain the option for immediate use of lethal weapons consistent with applicable national and international law and approved Rules of Engagement.”
- “Non-Lethal Weapons shall not be required to have zero probability of causing fatalities or permanent injuries. However, while complete avoidance of these effects is not guaranteed or expected, Non-Lethal Weapons should significantly reduce such effects when compared with the employment of conventional lethal weapons under the same circumstances.”
- “Non-Lethal Weapons may be used in conjunction with lethal weapon systems to enhance the latter’s effectiveness and efficiency across the full spectrum of military operations.”³²²

6.2 Design, Role & Function of 2nd Generation ‘Less-Lethal’ Weapons According to the new NATO doctrine, ‘non-lethal’ weapons should enhance the capability of NATO forces to achieve objectives such as, to “(i) accomplish military missions and tasks in situations and conditions where the use of lethal force, although not prohibited, may not be necessary or desired; (ii) discourage, delay, prevent or respond to hostile activities; (iii) limit or control escalation; (iv) improve force protection; (v) repel or temporarily incapacitate personnel; (vi) disable equipment or facilities; (vii) Help decrease the post-conflict costs of reconstruction.”³²³

Current doctrine says it is unrealistic to “assume away” civilians and non combatants, taking the view that the US must be able to execute its missions in spite of and/or operating in the midst of civilians. Therefore the US Army ‘Non-Lethal Warfare Requirements’ assume a ‘dirty battlefield’ which means ‘civilians and noncombatants will be mixed’ and therefore targeted together. In such circumstances, seven ‘non-lethal common tasks’ were identified at a 1996 conference on Non-lethal weapons (hosted by the American Defense Preparedness Society), namely (i) incapacitate /stop an individual (in a room, in a crowd, fleeing); (ii) distract individual (in a room, in a crowd); (iii) seize individual (in a crowd, singly/stationary, moving); (iv) stop a vehicle (approaching, retreating); (v) block an area (to vehicles, to personnel); (vi) control crowds (Stop approach, Encourage dispersal) and (vii) disarm/neutralize equipment.³²⁴ In 1996, the non-lethal tools identified by the Army for these missions included anti-traction; acoustics; entanglements/nets; malodorous munitions; barriers; foams; ‘non lethal’ mines; directed energy systems; isotropic radiators and radio frequency weapons. Three years later the chairman of that conference (the former head of Los Alamos’ Disabling Weapons Program, Col. John B Alexander), identified potential target categories for these ‘non-lethal weapons’ as: combatants, criminals, hostages, hostages(willing), non combatants, rioters, refugees and disaster victims.³²⁵

A dubious Pandoras Box of new crowd control/crowd punishment weapons has emerged, designed to be media-friendly and appear, rather than be, safe. If these weapons, when deliberately targeted at innocent civilians, can actually maim and kill we are not talking about humane, bloodless ‘operations other than war.’ Despite the epithet ‘non-lethal’, what we have at work here is an innovative multi-million dollar public relations exercise, on a mission of winning friends and influencing people. As Steve Metz of the Strategic Studies Institute at the US Army War College in Pennsylvania puts it, ‘There is always a marine with a rifle standing behind the one with a glue gun’.³²⁶

6.3 Varieties of 2nd Generation ‘Less-Lethal’ Weapons. There is now a wide literature on what we have called 2nd generation Crowd Control weapons,³²⁷ and indeed a wide variety of technologies either being marketed as a result of contracts let or at the prototype or testing stages, (Samples of which are covered in Appendix 6). With the new NATO ‘non-lethal’ doctrine, some of these technologies have moved from tactical to potentially strategic roles in any new programme of military intervention. It is worth briefly describing some of these developments and the problems their presentation has encountered by reference to a series of Non Lethal Weapons (NLW) conferences organised by the

Jane's Group, where much of the new doctrines and associated technologies have been showcased since 1997. It is predominantly US based but increasingly, EU Member States have been co-operating with such work, creating various bridgeheads into European crowd control perspectives. (It is worth stressing that much of the public side of this work is presentational and several of these programmes have been running for several years under different budget headings, whilst the remainder, perhaps the most powerful developments, remain shrouded in secrecy). A good example of how such old programmes have been rejuvenated as new programmes is the case of caltivate and other chemical crowd control weapons. (Figures 11 -1 4 provide examples of 2nd Generation 'Non Lethal' weapons).

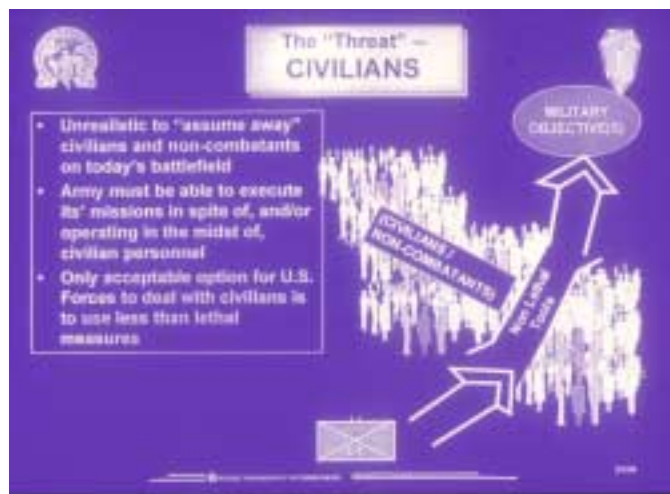
Some Examples of 2nd Generation 'Non Lethal' Weapons.



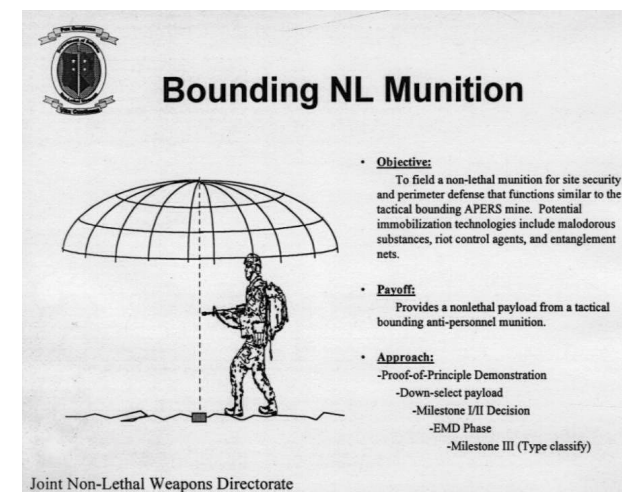
Fig.11. Blinding Laser Weapon



Fig. 12. Flight stabilised capture net.



xlvi



Joint Non-Lethal Weapons Directorate

Fig13. US Military doctrine to target civilians and “insurgents” together.

Fig 14. Bounding ‘non-lethal’ landmine.

6.3.1 Calmatives The human brain has thousands of so called receptor sites. A receptor has been defined by Dr. Mathew Meselson as a “molecule on a cell which when a certain other kind of molecule called a ligand binds to it, causes something to happen.” For example “There are receptors in our brain called opioid receptors. The body manufactures molecules called enkephalins and endorphins, which bind with these receptors; if the proper molecule binds to some of these receptors it alleviates pain, or brings on sleep, or slows down breathing or affects various emotions”.³²⁸ As discussed in 6.4 (below) the Human Genome project will map these receptor sites, and eventually those which evoke sleep, obedience, submission, sexual display etc. The US military have undertaken research on these receptor sites for many years. “Of the few that have been identified, some can cause temporary blindness; can make you think you are smelling something that is not there; can cause submissiveness or extreme anxiety”.³²⁹

Meselson informs us that a few synthetic chemicals bind very specifically to opioid receptors and induce sleep. From these have been developed chemical crowd control weapons many of which are based on analgesics which induce sleep, called calmatives. One of this group of chemicals is the fentanyl family of morphine like analgesics, which started to be examined in CBW labs around 1963, after which they were introduced into surgical practice as injectable anaesthetics.³³⁰ Certain derivatives of fentanyl e.g. carfentanyl are extremely toxic, more so than nerve agents like VX with ten micrograms per kilogram body weight being able to induce paralysis. However, one defect is potential fatalities since these opioids can cause respiratory collapse. A second family referred to in the open literature are the bis-quaternary pyridium compounds which were evaluated alongside the fentanyls and congeners in 1984. Other candidate analgesics for disabling weapons include (some only given code names) EA 3382[a dart gun paralyzant for clandestine ops]; the benzomorphans oripavine and thebaine; TL 2636 and its iso-amyl congener M-140; etophine(used in the chemical restraint of large animals); the phenothiazine family (such as EA 5202); butyrophenone tranquillisers(such as CAR 302,089, the 3-methyl homologue of spirodol) and the anticholinergic glycollates of which there are several hundred. Some of these produce mental confusion, elevated blood pressure, vomiting, prostration and coma and their effects can last for just a short duration(e.g. EA 3834 and CAR 302,668), others last hours or even days (e.g.EA 3167). In the mid seventies, work was undertaken to spread these agents via a solution in the sensory irritant methoxycycloheptatriene, possibly with the skin transferral agent DMSO. The US Chemical Corp issued a technical memorandum proposing several of these agents as candidates for law enforcement and riot control.³³¹ In 1991, this incapacitating chemical program was transferred to a new budget head - the “Advanced Riot Control Agent Technology” or ARCAT.³³²

It should be remembered that the US for the purposes of the Chemical Weapons Convention (CWC) has a different set of definitions on what is permissible and what is excluded for riot control under the general purpose criterion of the convention. Under Executive order 11850 of April 1974, four examples are given where the US can use riot control agents, namely; (a) “in riot control situations in areas under direct and distinct US military control, to control rioting prisoners of war; (b) in situations in which civilians are used to mask or screen attacks and civilian casualties can be reduced or avoided; (c) in rescue missions in remote isolated areas, of downed aircrews and passengers and escaping prisoners and (d) in rear echelon areas outside the zone of immediate combat to protect convoys from civil disturbances, terrorists and paramilitary organizations”.³³³

It does not take much imagination, given the failure of the CWC to define domestic riot control and law enforcement, that in operations other than war, such as peacekeeping missions, the US might feel it was legitimate to deploy new agents and dissemination systems. By 1991 the US Army said they now had a device which “could deliver a potent riot control compound.” They advised “A class of compounds has been selected and viable analogues are under evaluation for acceptability in meeting initial generic requirements”.³³⁴ It is likely that these agents are part of the fentanyl family.³³⁵ In operational circumstances, it is very difficult to control levels of individual intake and one person's sleeping draft would be another's lethal dose. Used in conjunction with lethal weapons or where a crowd was fleeing, additional fatalities could occur from either falling or crush injuries or simply being a

sitting target for a nervous recruit expecting the worst. The war in the former Yugoslavia has shown how men engaged in ethnic conflicts use mass rape as a weapon and immobilising chemicals could easily form an adjunct to such policies but one which few commanders will ever admit.

By 1994 this work was well on its way to completion and President Clinton was able to say, "I will..direct the Office of the Secretary of Defense to accelerate efforts to field non-chemical, non-lethal alternatives to Riot Control Agents for use in situations where combatants and non-combatants are intermingled".³³⁶ By 1998 other paralysing tunable weapons for layered defence and less-lethal area denial munitions were selected for funding - including overhead chemical agent dispensers and rocket delivered micro-encapsulated malodorous substances.³³⁷ Future "non-lethal" weapons identified by the US Marines for 2000 onwards include pulsed energy systems, microwave systems, advanced delivery robotics and unmanned vehicles carrying less-lethal weapons etc.³³⁸ A few examples of what has emerged already are discussed below. Some attempt has been made to say which technologies are now available, which are on the horizon or at prototype stages and which lie some years off but for which preparatory research programmes are already in place.

6.3.2 Upgrades of Existing Crowd Control Technologies Much of what has been promoted for 'non-lethal' munitions has been around in various guises for some time. In 1995, the US Joint Non-Lethal Weapons working Group had tested various 'off the shelf' candidates including blunt impact devices, chemical irritants, entanglements and aqueous foam barriers. Fiscal Year (FY) 1995 Non Lethal accomplishments were identified by Charles Thornton, Division Chief of the Dismounted Battle Laboratory, TDADOC as blunt impact (12 gauge muzzle launched 37/40mm); chemical irritants such (such as OC & CS and what he calls RCA's) Disorientating Tech's Set beam and Maxi-beam(these are dazzling light torches) entanglements; barriers - aqueous foam; 40mm sponge grenades, soft munitions and ballistic entanglements. BY FY 1996, technologies listed still included blunt impact, entanglements, slippery barriers and sticky foam but also alternatives to land mines (CALTROPS/Volcano), distraction devices and acoustic weapons.³³⁹ Also in 1996, the US Army Research Laboratory was developing a 'Variable Velocity Rifle System' which allows the operator to select between lethal and non-lethal on a shot by shot basis using so called dual purpose 'bruiser ammunition'. (This device works by a venting system which keeps padding around the sabot style ammunition during low velocity firings which is released at higher more lethal speeds).³⁴⁰ At the same time, the Federal Bureau of prisons was looking at off the shelf candidates for prison riot control such as chemicals, OC, smoke, flash-bang grenades, electronic stun belts and some future applications such as anaesthetic darts/pellets.³⁴¹

6.3.3 Entanglements - popularly known as 'stick'em and slick'em. By 1997, after several TV and magazine articles on less-lethal weapons, the image of the sticky foamed target of a glue gun had become almost the symbol of the 2nd. Generation of less-lethal weapons. Net guns used for personal capture are now in operational use. For example police in Western Australia recently ordered them. In 1997³⁴² Alliant Tech, better known for making mines, made an industry perspective on non-lethal weapon systems which looked at spider net entanglements, foams to block an area and super slippery substances which make roads and pathways impassable.³⁴³ However, at the same conference, Hilda Libby no longer talked of sticky foam as a 'stick em' - it was seen more as an area denial munition. Why? Because despite the massive Public Relations exercise promoting its 'benign use' to paralyse targets, it took hours to decontaminate a subject from the foam (using baby oil) and there is a real risk of suffocation if the foam covers the mouth and nose. Little is being said about such failures. Likewise a dart weapon for prisons has also apparently been quietly dropped after fears about lethal effects emerged.³⁴⁴

6.3.4 Directed Energy Weapons - These weapons have created the most heated debate. Some variants such as isotropic radiators have come on to the market as omni-directional 'laser bright' rounds, where precision targeting is impossible. They are being promoted as cheap dazzle devices against people and optics but little has emerged in the way of technical data. Other more directional lasers have been used as dazzle devices for example the USAF Saber 203 laser dazzle system, prototypes of which were used by the US Marines in Somalia.³⁴⁵ Blinding laser weapons are banned by the blinding laser convention,³⁴⁶ nevertheless, even after this treaty, their use is still being promoted for law enforcement.³⁴⁷ A recent development has been using a UV laser which can ionize the air sufficiently for it to conduct an electric charge. This enables an electric shock to be delivered over some

distance to create muscle paralysis or tetanization.³⁴⁸ A fully working prototype is still some way off but the principle has been successfully tested using a Lumonics Hyper-X 400 excimer laser at the University of California at San Diego.³⁴⁹

Other Directed Energy Weapons are being explored. For example in 1997, Edward Scannel of the US Army Laboratory identified a Vortex Ring Gun which is a combustion Ring Gun creating vortices for impulse or chemical delivery and a range of high powered acoustic technology.³⁵⁰ The literature talks of acoustic bullets, beams and blastwave projectors. Comments on acoustic weapons have suggested they can be tunable radiating a directed energy beam of 90-120 decibels to provide anything from extreme levels of annoyance and distraction through to 140-150 decibels for “strong physical bodily trauma and damage to tissues” to shockwave levels of more than 170 decibels “producing instantaneous blastwave like trauma” which could be lethal.³⁵¹ The current leader in acoustic technology in the US is a small company in Huntington Beach, California called Scientific Applications and Research Associates which is reported to have made vortices which are capable of providing an area denial function.³⁵²

However, despite the claims of powerful infra-sound weapons capable of making people sick and causing involuntary defecation, a presentation by Jurgen Altman of the University of Dortmund at the 1999 Jane’s conference, ‘Fielding Weapons for the New Millennium said such claims were based on Physics not as we know it. In a more detailed technical study Altman provides a tightly argued case for doubting the technical workability of such weapons over longer distances. At shorter distances with explosive driven strong sound blast waves there would be a case for including such weapons within the SIrUS criteria of banning weapons which target a particular aspect of human anatomy.³⁵³

The most controversial ‘non-lethal’ crowd control and anti-materiel technology proposed by the US are so called Radio Frequency or Directed Energy Weapons that can allegedly manipulate human behaviour in a variety of unusual ways. Some microwave systems have been proposed which can raise body temperature to between 105 to 107 degrees F, to provide a disabling effect in a manner based on the microwave cooker principle. However, the greatest concern is with systems which can directly interact with the human nervous system. There are many reports on so called psychotronic weapons which are beyond the brief of this study but one comment can be made.³⁵⁴ The research undertaken to-date both in the US and in Russia can be divided into two related areas: (i) individual mind control and (ii) crowd control. That the US has undertaken a variety of ‘mind control programmes in the past such as MkULTRA and MkDELTA is a matter of public record and those using electromagnetic radiation such as PANDORA have been the focus of researchers in para-politics for many years.³⁵⁵ More recently, authors such as Begich and Roderick have alleged significant breakthroughs in the ability of military high frequency electromagnetic technologies to manipulate human behaviour.³⁵⁶

What is admitted by the military authorities in the US is that research programmes using so called directed energy weapons for anti-personnel and anti-material purposes are proceeding into prototype stages³⁵⁷. The military utility of these weapons is that they provide a tunable or rheostat ability a “need” that is emerging as part of the new US military intervention doctrine of so called ‘layered defence.’ This means in practice an “onion style” of risk where anyone coming into contact with the outer shell may be sickened, paralysed. Entering subsequent levels may lead to being physically harmed, disabled or permanently maimed whilst the core of the zone is protected by lethal technology, contact with which is fatal.

6.3.5 Area Denial Munitions - are victim initiated technologies which have in the past been used at borders and along the perimeters of control zones to prevent entry or exit. At the 1997 Jane’s NLW conference, the systems manager for the US non-lethal material programme, Hilda Libby, advocated a range of such technologies to ‘insert into existing weapons platforms’ including many area denial munitions.³⁵⁸ The US has said that it will not sign the Landmines Treaty until 2006 when there are non-lethal alternatives.

Therefore it does not come as a surprise that the search for suitable alternatives covered by Libby included 'non-lethal' anti-personnel land mines based on the bounding APERS Mine (volcano M16A2) but with entanglement payload and including potential immobilization enhancers - adhesive net and electric sting net; cannister-launched area denial systems.³⁵⁹ Allegedly 'non-lethal' versions of the Claymore mine containing plastic rather than steel balls have been also been showcased. However, little hard data has been presented on fragment kinetic energies to judge such assertions by the criteria outlined in Section 4 and in Table 2 (below). Given the number of such mines which will need to be replaced along borders such as that dividing North and South Korea, there is tremendous commercial incentive to compete for these contracts. A recent addition has been by the electric stun weapon manufacturer Tasertron, who recently announced two devices - a Taser Area denial device (TADD) and a 'Volcano Launched Taser Munition', for border control and perimeter protection. Triggering the TADD device leads to electric shock darts firing in a multi-directional pattern whereas the Volcano's darts go in one direction only.³⁶⁰

Other second generation area denial technologies which are already available are malodorous stench chemicals (which can be used to contaminate an area deemed to be off limits, the chemicals can be chosen to be offensive to particular cultural or ethnic groups and sensibilities)³⁶¹ and aqueous foam barriers (which are essentially a biodegradable form of suds which can be piled as high as four feet).³⁶²

6.4 Designer Bio-Weapons For Selective Mass Control The rapid change in biotechnology including genetic engineering is already revolutionizing medicine and agriculture. However relatively little attention has been paid to its potential malign use as surgically targetable future technologies of political control. This possibility of a malign breakthrough was recognised in the early Nineties when important advances in the Human Genome Project (involving the mapping of some 3 billion pairs of human DNA) and the human diversity project (which looked at the genetic basis for racial differences), were already taking place.³⁶³ Whilst the idea of genetic weapons is not new³⁶⁴, it was previously thought such targeting was impossible because humans are so similar genetically.³⁶⁵

However the Genome Diversity Project which stores genetic material from 500 populations around the world has found significant differences in blood group proteins. These differences are now thought to be sufficiently stable and large to be targeted either by using genetically modified organisms or toxins which select a particular genetic marker. Given the heterogeneous nature of many populations including those of the US, only certain political areas and borders could be targeted without the risk of so called friendly fire. The biotechnology revolution will bring enormous benefits to our understanding and our ability to intervene in life processes. Many commercial activities will be transformed by such research such as tailor-making drugs more exactly for human receptor sites known to be linked to particular metabolic pathways. One indicator of the awesome rate of change in this area is the meteoric rise in the number of patent requests filed at the US Patent and Trademark Office for nucleic acid sequences: 4,000 in 1991 and 500,000 in 1996.³⁶⁶ Multinational drug companies are currently doing a complete survey of each of the constituent nucleotides for each human genome group. A major driving force is thwarting cancer: some genes force cell growth, some genes inhibit cell growth. The Holy Grail of this research is to find a biochemical tool which can enter cancer cells, correct cell growth then stop. However, the mirror image of this research is that it will yield knowledge on how to go the other way. As the data on human receptor sites accumulates, the risk of breakthroughs in malign targeting of suitable micro-organisms at either cell membrane level, or via viral vectors, grows correspondingly.³⁶⁷

The development of such genetic based weapons is currently banned under the 1972 Biological & Toxin Weapons Convention (BTWC), the 1925 Geneva Protocols and the 1948 Genocide Convention. Alas, unlike the CWC, there are currently no verification procedures for the BTWC, it is a gentleman's agreement³⁶⁸. The emergence of pepper-gas as a weapon for crowd control is a case in point - as a plant toxin it is covered by the BTWC but has simply slipped through the net in terms of internal security operations. Other natural and synthetic toxins used for such purposes may be even more hazardous, particularly if they are re-engineered. Already the properties of saxitoxin, banned under the CWC and

the bio-regulator endothelia (which is a very powerful constrictor of blood vessels and can produce aneurysms) have been noted. The potential for malign applications emerging for semi-lethal crowd control from this research should not be dismissed. Arguably there should be a set of new norms regarding the use of such momentous knowledge of life processes for human manipulation and control.³⁶⁹

The issue is too complex to be adequately covered by this study but the potential significance of developments in biotechnology leading to a third generation of instruments to manipulate human behaviour deserves a specialist study in its own right. If such a study could be completed in time for the BTWC 2001 review conference, it could help produce a greater scientific knowledge of these issues and gain further support for strengthening the convention.

6.5 International Humanitarian Agencies have been very circumspect about the alleged non-lethality of these technologies. Dominique Loe of the ICRC has emphasized that:- “there is an urgent need to study carefully the potential physical and psychological effects of new technologies such as infra-sound, electromagnetic waves or even sticky foam on humans. We would hope, for example, that it is not the aim of the weapons research community to introduce into police and military arsenals technologies which may be non-lethal but which will have permanent or non-treatable effects. Yet even the temporary effects may need specialised medical treatment which is not available in many countries and which is very often not available on the battlefield. We also hope that it is not the intention of the promoters of ‘non-lethal’ weapons to increase the lethality of warfare. Yet these weapons could do just that if used in conjunction with lethal force, which is how we understand they are to be deployed.”³⁷⁰

His colleague, surgeon Robin Coupland has pointed out that under article 35 of the Geneva protocols, 150 countries have already agreed to ban “weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering.” Since the protocol was signed in 1977 little effort has been made to work out what this means in practice. Coupland asks if it is right that weapons manufacturers and the military should decide the answer? E.g. if sticking foam is used in a conflict situation, people could suffocate or be left for dead.³⁷¹ The extent to which these new technologies can undermine international treaties and human rights law is a crucial issue. The manufacturers and proponents of these technologies are acutely aware of this dimension but the commercial pressure on them to ‘push the envelope’ are intense. ICRC with its SirUS project has adopted a new approach based on the actual weapons design which invites abusability. For example, all weapons which are currently banned by international law, such as poison gas, exploding bullets, blinding laser weapons and landmines, were designed to inflict a specific injury and to do so consistently. According to ICRC it is time to put a ban on any ‘non-lethal’ weapon that causes superficial injury or unnecessary suffering by specifically singling out anatomical, biochemical or physiological targets.³⁷² Australia is the first country to commit itself to taking SirUS criteria into account when reviewing its weapons policies.³⁷³

Other critics say that the notion of ‘soft-kill’ is a fallacy. The Nobel prize winning scientific organization Pugwash, has come to the conclusion that the term ‘non-lethal’ should be abandoned, not only because it covers a wide variety of different weapons but also because it can be dangerously misleading. “In combat situations, ‘sub-lethal’ weapons are likely to be used in co-ordination with other weapons and could increase overall lethality. Weapons purportedly developed for conventional military or peacekeeping use are also likely to be used in civil wars or for oppression by brutal governments. Weapons developed for police use may encourage the militarisation of police forces or be used for torture. If a generic term is needed, ‘less-lethal or pre-lethal might be preferable’.”³⁷⁴

The reality can indeed be far from non-lethal. A current and future domain of this weaponry is during internal security operations, where it provides authoritarian regimes with new tools for crushing dissent. Already variants of ‘less-lethal’ paralysing and incapacitating electroshock weapons have found a role in torture.³⁷⁵ The new weapons potentially offer the torturing states a spine chilling arsenal of repressive instruments. Whilst the genie of advanced crowd control weapons may not go back into

the bottle, there is still time for the European Union to develop consistent and appropriate structures of accountability. Pugwash considered that “each of the emerging less-lethal weapons technologies required urgent examination and that their development or adoption should be subject to public review”.³⁷⁶ The process should be transparent, adaptable and open to public and political scrutiny. Any class of technology shown to be excessively injurious, cruel, inhumane or indiscriminate, should be either prohibited or subject to stringent and democratic controls.

7. AN APPRAISAL OF LESS DAMAGING ALTERNATIVES.

7.1 Crowd Control Technologies and Social Contexts. From the arguments presented above, it is clear that the innovation, deployment and overall accountability regarding the use of crowd control weapons in Europe is inconsistent and subject to differing levels of both regulation and control. There are tremendous commercial pressures coming from crowd control weapon manufacturers urging government's to buy newer, more advanced forms of crowd control technology. Nowhere is this more apparent than in the United States, where the ‘wild west’ gun culture yields 30,000 murders each year and over 100,000 people injured by gunshot wounds.³⁷⁷ Much of this American crowd control technology overlaps with new US military ‘non lethal’ technologies and consequentially developments within NATO. Thus the new NATO doctrine about using so called ‘non-lethal’ warfare now means civilians and combatants are intentionally targeted with the same weaponry. Some of these are claimed to be less damaging but how can we know?

It is obvious that America has peculiar problems associated with the prevalence of firearms amongst the citizenry under rights guaranteed by their constitution. Although US police have been shown to be more than capable of misusing riot weapons when used against crowds such as the WTO demonstrations held in Seattle in November 1999, it is undeniable that US police officers do have to deal with armed hostage and barricade situations on a daily basis. In those situations, the use of ‘less-than lethal’ weapons may be an entirely appropriate alternative to the use of lethal firearms.³⁷⁸

However, it is questionable whether European police forces would, or should, want to import the “gangster cop” mentality that has accompanied some of the tactics evolved in the US to deal with this level of violent behaviour. What are the alternatives? In many respects, the United States is oddly insular and inward looking. It is hard to think of a European Member State where such a large proportion of the population does not possess a passport, which is reportedly the situation in America. Outside of the present Austrian government³⁷⁹ most Europeans would find it inconceivable that constitutional rights could protect racist and xenophobic propaganda as freedoms of speech, as they are in the US under the 1st Amendment. Racist policing can become systemic without appropriate accountability. A serious lack of police accountability has allowed certain officers from forces such as the Los Angeles Police Department to shoot innocent citizens, plant evidence, engage in bank robbery, rape, practice interrogation methods that have been categorised as torture and award each other celebratory plaques for certain kinds of killings.³⁸⁰

Thankfully, this is not civilisation as we know it - yet. There are good reasons for drawing back from the notion that Corporate America should programme European policing methods for crowd control, which it will if the status quo regarding the acquisition and deployment of crowd control weapons is allowed to continue in the current under-questioned, under-managed, under-licensed, under-regulated and under-accountable manner. This is not to suggest the issue of crowd control weapons is without complexity. What this study does assert is that the dangers of such weaponry being used to undermine “due process” are so high, given the second generation of products now entering service in the USA, that a certain degree of circumspections is required.

7.2 The Need for Social Impact Assessments. Before the advent of Rachel Carson’s classic book ‘Silent Spring’,³⁸¹ the tremendous impact that industrial and pesticide pollutants were having on the environment and our food chain were simply not realized. One early response of that awareness of the unforeseen social impacts of science and technology was the US Congress setting up the forerunner to

STOA, the Office of Technology Assessment (OTA) in Washington, to create an early warning system to alert decision makers about the potential hazards of technological innovation. Nowadays, the early warning system for such concerns about the environment has been institutionalised and we are all familiar with the process of Environmental Impact Assessments, which is now seen as a normal part of the planning landscape.

Could not something similar be set up to ensure that decisions regarding new police technologies including crowd control weapons are fully informed by the full range of likely social and political impacts? Such technologies can have profound implications for civil liberties and human rights. If they were subject to a compulsory 'Social Impact Assessment' or audit of the human and civil rights consequences, particularly problematic innovations would not proceed without the legal and regulatory framework being fully clarified. Experience has shown that vested interests soon surround the implementation of any new technology. Once introduced it is very difficult to reverse an implementation decision and its associated cultures.

Decisions about specific crowd control technologies are often viewed as operational matters and simply left to the police or the military. Questions about appropriateness are taken by user groups and often in secrecy without any public debate. A better policy route would be to thoroughly explore the impacts of all policing technologies before implementation. A testing set of criteria should be developed to objectively judge and assess the impact, ongoing requirement (including deployment and training procedures) and any potential need to withdraw or redesign the technology should untoward impacts emerge. Special consideration should be paid to the dangers of "technological creep" and "decision drift" whereby a system that would never have been given the go-ahead if introduced in one move, is deployed by a series of incremental technological changes and gradual reorientation of training and targeting procedures. Such social impact assessments would be able to objectively pronounce on the health, safety and legal liability issues associated with particular crowd control weapons before they were introduced and ensure a consistent approach. The most efficient alternative to the deployment of crowd control weapons are social and economic policies which effectively create areas of freedom, security and justice. The deployment of crowd control weapons is usually an admission that such policies have not been implemented or have failed. In such instances, purely technical means do not effect a long term solution and can prove dysfunctional.

7.3 Alternative Crowd Management Methodologies. Any alternatives to crowd control technologies must be discussed in the context of their role in creating areas of freedom, justice and security and must be democratically accountable. There may indeed be appropriate 'non lethal' alternatives to currently used crowd control weapons but any proposed pragmatic options should be independently tested against preset health and safety criteria for both the public and the officers charged with using them. There are many potential pitfalls of implementing "easy technical fixes" based upon centralised control systems, secrecy and a lack of accountability. It is easy to substitute more repressive technologies for social justice as events recorded in Indonesia, Kenya and most recently Zimbabwe testify. (See Section 8). It is also easy to reject counter-intuitive alternatives because they seem too radical. A good example is crowd control outside nightclubs which was always thought to require muscle bound 'bouncers' who could tackle any trouble that was presented at the doors by punters who might be less than sober. However, the macho culture of night club bouncers was based on the assumption that the threat of violence was the only way to maintain order and overly violent doormen caused many of the violent episodes they were there to prevent. Changing the image, training and including more women amongst night club door staff, has recently led to less violence, partially because the women appear to have more sophisticated verbal skills and can diffuse potential violence by negotiation rather than coercion. A prescient observation in this regard was given by Her Majesty's Inspectorate of Constabulary in the UK "Some officers forget that the best weapons they've got to deal with potential violence are their brains and the ability to talk".³⁸²

Could a similar approach be successfully adopted for public order policing? Again it seems counter-intuitive but we might be guided by the notion that if it has already happened then it is possible. South Korea, the most recent case, also seems the least likely. In the past, the South Korean Police have

used CS gas to literally fumigate anti-government demonstrations on a scale in a different league to even that used by the Police at the anti-WTO demonstrations in Seattle last year, but on a routine basis week in, week out. Yet according to the LA Times, last year the South Korean police substituted their Darth Vader body armour and chemical fogging tactics with a move towards putting unarmed policewomen to the front lines during demonstrations to calm protestors. The results were impressive and instead of the 220,000 canisters of teargas used in 1997, in 1999 none were used. The only casualty was the Seoul based tear gas company Dae-A Chemical Industry which closed down last April. It is perhaps significant that because women face much steeper odds getting accepted into the police force in Seoul (only 1 in 200 women are accepted onto the force, whereas 1 in 10 males applying are hired), police women tend to be much better educated than their male counterparts. All are graduates of 4-year colleges, whereas only 80% of the men hold Bachelors degrees.³⁸³ The lessons here are quite important, since the Korean Police Authorities have recognised that police-crowd confrontations are a process not a single event. More peaceful policing tactics can create more peaceful outcomes. The positive benefits are more than just less tear gas on the streets of Seoul. Now that fewer riot police are required, riot officers are being redeployed to traffic control and crime prevention. The European Parliament might like to learn more from the Seoul Police themselves by organising an official visit for relevant Members and Officers to meet with their European counterparts.

7.4 CCTV Surveillance and Algorithmic Systems. One apparently seductive alternative option is the notion of substituting CCTV systems for public order riot squads. However, once a public order incident develops, security force commanders prefer the deployment of a 'real-time' dispersal response. In that sense, any passive alternative is not useful in dealing with the immediate consequences, although CCTV networks could provide evidence after the event, of those involved in any incidents. What tends to happen in practice is that it is not a case of either crowd control weapons or CCTV but both and more. This is certainly the case in the UK where police and military officers have access to both alternatives. For example, "Heli Tele" helicopter mounted CCTV is frequently used to target "snatch squads" onto alleged 'ring-leaders'. In situations such as Indonesia (where European companies have sold both airborne surveillance systems, crowd marking & dispersal systems, as well as powerful command, control & information computer systems) such targeting may have fatal consequences.

Nevertheless, there are public order situations where CCTV might have both a deterrent effect and a positive role in identifying both hooligans and members of the police and security services who may have exceeded their remit. However even in the United Kingdom, which is the most heavily surveilled country in the EU, the ubiquitous presence of CCTV cameras does not dissuade football hooligans from threatening and anti-social behaviour. Indeed, the most comprehensive recent survey of the utility of CCTV surveillance systems in preventing crime (undertaken for the Scottish Office by Professor Jason Ditton of the Scottish Centre for Criminology) found that they did not. Ditton said that "the cameras had not lived up to their early promise". After four years of monitoring the monitors, the professor called for "an independent watchdog to oversee the use of the technology".³⁸⁴

Members of the Committee will recall that a previous STOA document (PE 166.499) noted the emergence of 'face-recognition' cameras but thought that deployment of such systems was five years away. Yet the 'Mandrake' face-recognition system has already been deployed since November 1998 in Newham, London and has created the basis of a universal identity recognition network. Such systems work by scanning the geometry of faces in a crowd and recognising if they are held in a database of individuals of interest. They are not totally reliable generating 'reliable hits' in a claimed 80% of cases which in the best case means a 1 in 5 chance of a false identification.³⁸⁵

The Newham system is being extended and if that process continues, the logic is a total surveillance society where everyone's movements are tracked and eventually their speech and friendship networks as well. Few political systems, even in Europe, have enjoyed absolute certainty of long term stability within a democratic framework and there is no guarantee that such stability will continue. Any mass surveillance system is potentially much more than an anti-riot network and it is on balance probably wise to resist a universal extension of such schemes and keep them limited and local.³⁸⁶

However, at enclosed public sports events, such as sports stadiums where public disorder by even a quite small minority can have significant public safety implications, there is a case to explore such systems. That case is particularly telling if a club has suffered crowd violence in the past and because identification and access are controlled at turnstiles, the system could have several payoffs including more rapid entry for season ticket holders, the automatic exclusion of banned individuals and the real time tracking of those caught up in disorder including the police. However, a current failure rate, of at least 20%, means that these are not fool proof systems and there should be appropriate procedures for dealing with misidentification and to ensure that any material gathered is subject to the terms of extant data protection legislation. If Members are minded to explore this option, it may be worth looking at piloting schemes in a few appropriate sports stadia first to gauge how well they actually perform compared to a similar set of sports stadia which could act as a control. Such an experiment should be independently audited taking into account the views of both the police and the fans, before any longer term deployment is approved.

8. EXPORT OF CROWD CONTROL WEAPONS & HUMAN RIGHTS.

For illustrative purposes we identified the role played by crowd control weapons in facilitating human rights violations in 33 countries (See Appendix 5). Whilst this figure is certainly an under-representation as hard data quantifying the overall situation is simply not available. It is, nevertheless absolutely clear that the export of crowd control technologies raises serious concerns when transferred to countries with poor human rights records. Substantial evidence also exists from the testimony of human rights victims compiled by NGO's such as Amnesty International, Human Rights Watch, the Medical Foundation for the Treatment and Rehabilitation of Victims of Torture and the international media, that crowd control technologies are used at the same time as more lethal weapons to create gross human rights violations. The Technical Annex to this report provides a comparative table (Appendix 6) indicating the countries which deploy crowd control weapons where there is documented evidence of injuries, fatalities and their role in effecting lethal force.

8.1 Transfers (Export) of Crowd Control Technologies. Research for this report found manufacturers or suppliers of crowd control weapons based in at least 10 of the 15 EU countries. These include: Austria, Belgium, France, Germany, Italy, Netherlands, Portugal, Spain, Sweden, United Kingdom. (See Appendix 1). Of these, at least 6 EU countries (Belgium, France, Germany, Italy, Spain and UK) have exported crowd control weapons to a number of countries where human rights violations have been committed with such technologies. (E.g. Bahrain, Egypt, Guatemala, Indonesia, Jordan, Kenya, Nigeria, Sri Lanka, Turkey, Zambia and Zimbabwe). However, effective parliamentary and public scrutiny of the trade and its impacts on human rights violations are made very difficult by the lack of comprehensive, timely, accurate and disaggregated data on transfers of such weapons at either the international, EU and national levels. For example, the voluntary UN Register of Conventional Arms transfers, introduced in 1992, does not require States to provide details for most categories of crowd control weapon transfers.³⁸⁷ The U.N Register provides no details of kinetic or chemical irritant weapon transfers. The Chemical Weapon Convention, (which allows the manufacture, transfer and deployment of chemical irritants for law enforcement purposes) has a requirement for States to report transfers of such chemical irritants to the CWC Inspectorate, based in the Hague, Netherlands. Currently such data is not publicly available. Given that all states are obliged not to proliferate chemical weapons under the terms of the treaty it is arguable that this data should now be in the public domain.

The introduction of the European Union Code of Conduct on Arms Exports, in June 1998, was welcomed as a first step by many human rights, arms control and development NGOs as well as by parliamentarians. The Code states that export licenses will not be issued if the exports may be used for internal repression, or if they may provoke or prolong armed conflicts. Given that crowd control weapons are primarily used for 'internal security' purposes there are major concerns that countries with

poor records of human rights violations will use such weapons for “internal repression”. However, a common criticism was the EU Code’s lack of transparency and the consequential lack of parliamentary and public scrutiny of arms transfers. The 15 EU countries have agreed to compile an annual report on defence exports and on the Code’s implementation, but not to make it public, or release it through their parliaments. The EU Code was also criticised for the lack of controls on the brokering and licenced production of weapons and munitions.

Unfortunately, another weakness of the EU Code of Conduct relates to the “common control lists”. This list identifies the types of weapons that EU States agree to control via the EU Code. It would appear that France does not classify certain crowd control weapons, namely tear gas, as “military equipment” but has a 7th Category weapon classification that is reported to be exempt from the requirements for either export licences or firearms ownership licences.³⁸⁸ Therefore if, as occurred in 1997/8, the United Kingdom rejected export licence applications for tear gas and other riot control equipment to Kenya because of human rights concerns, a French company, or UK citizen brokering a deal through a French company, could export the tear gas without breaching the EU Code of Conduct.³⁸⁹ Other omissions in export controls on crowd control technologies exist in other European Union countries. For example, the Irish Government informed Amnesty International that licences are not required for exports of Pepper Spray or CR from Eire. This loophole raises similar concerns regarding transshipment of such weapons to ‘repressive regimes’.³⁹⁰

Whilst many EU member states do provide, or have recently started to provide Annual Reports on arms transfers to their national parliaments, many of these reports actually provide little in the way of useful data.³⁹¹ For example, the recent report from the French Government simply provides data in three broad categories, namely: Land, Naval and Air based.³⁹² This contrasts with Annual Reports from Italy³⁹³ and the United Kingdom³⁹⁴ that provide more specific details. However, it has been argued by human rights organisations that even these more detailed reports prevent effective parliamentary and public scrutiny. For example, the UK Department of Trade & Industry indicated that tear gas transfers could be recorded on the Export Control Organisations computer databases under 12 different category codes, namely: ML7, ML2, ML3, ML4, ML6, ML9, ML10, PL5001, PL5018, PL5021, PL5030 or 1A905 and not only under ML7 as previously stated by the DTi.³⁹⁵ This type of aggregated data makes scrutiny very difficult.³⁹⁶

The detailed, dis-aggregated transfer data is available from some countries. For example, the table (see endnote ³⁹⁷) provides details of a transfer of tear gas via the USA to the Guatemala police from the Spanish firm, Falken SA. It should be achievable, within the EU wide Harmonized Customs system to provide data that allows effective parliamentary and public scrutiny of the trade in crowd control weapons.³⁹⁸ Steps now need to be taken to make this practical possibility a political reality. The transfer of crowd control weapons are often promoted by private companies who often also transfer militarised tactics overseas, without adequate regard for the human rights situation or accountability of military, security and police forces in the countries where these technologies will be deployed. The European Parliament is urged to consider options which might be adopted to ensure that such transfers do not facilitate human rights violations.

The following case studies provide further detail of the human rights problems associated with such transfers and the need for a common approach across all EU member states.

8.2 Kenya - tear gas, plastic bullets and water cannon. In the run up to Kenya’s elections on 29 December 1997, human rights NGOs raised concerns that the government’s intimidation of opponents and violent disruption of political rallies threatened to undermine the polls.³⁹⁹ At least nine people were killed and hundreds injured when pro-democracy rallies were violently disrupted by security forces. The Kenyan student leader, Janai Robert Orina described how “Tear gas is a day-to-day experience for us... There are times when the air around the city of Nairobi reeks of it”.⁴⁰⁰

On July 8th 1997, it was reported that Kenyan paramilitary police stormed the All Saints Anglican Cathedral, Nairobi, attacking pro-reform advocates who were sheltering inside. Reports state that

police threw tear gas canisters inside the cathedral and then moved in wielding truncheons and describe how “an elderly opposition MP and several dozen individuals bled profusely as other victims groaned with pain among the pews.”⁴⁰¹ The police use of tear gas in the All Saints Cathedral was confirmed by other sources.⁴⁰² Following this incident, Amnesty International received the physical remains of tear gas canisters and plastic baton round canisters that had been used in Kenya. These canisters were identified as having been manufactured in the United Kingdom.⁴⁰³ The use of tear gas within confined spaces or when people cannot physically leave an area could be seen as a form of punishment rather than dispersal. When tear gas has been used in these type of circumstances a number of severe injuries and death have been attributed to it.^{404 405} It also appears that when the Kenyan police and security units have deployed tear gas, it is not used instead of physical beatings with batons, sticks or canes or as an alternative to lethal force but rather as an additional form of punishment. Following campaigning by human rights organisations, the British government announced in March 1998 that since election on May 1st, 1997, it had rejected £1.5 million worth of applications to export certain types of riot control equipment, including batons and tear gas, to the Kenyan police.⁴⁰⁶

Unfortunately, during 1998 human rights organisations continued to receive reports of human rights violations by the Kenyan security forces and remained concerned over the abuse of security equipment such as tear gas and plastic bullets in Kenya. Reports emerged of the violent suppression of a nationwide teachers strike in October 1998. The 6th October 1998 edition of the *Daily Nation* reports how police and members of the GSU (General Security Unit) attacked teachers with tear gas, whips and rungs (clubs). According to the report at least ten teachers in Thika district were injured and required treatment by the Kenyan Red Cross Society after being tear gassed by police.⁴⁰⁷ It was reported in January 1999 that Kenyan riot police had used rubber bullets, teargas, baton charges and water cannon against students trying to plant trees in protest against deforestation. The report described the water cannon as spraying “acidic water” which probably denotes the use of chemical irritants in the water jet.⁴⁰⁸

On 10 June 1999, Amnesty International researchers witnessed around 2,000 peaceful protestors, led by human rights and church groups, demonstrate for peaceful democratic change in Kenya. One hundred yards from the Parliament building the head of the demonstration was stopped by a wall of police armed with riot shields and batons. The peaceful protestors sat on the ground and started to sing Christian songs. After less than 10 minutes police on horseback emerged and rode into the crowd of protestors, followed by police on foot who beat the peaceful crowd with sticks. The crowd reacted angrily, and some threw stones at the police. The police responded by firing tear gas into the crowd and the church grounds where some of the protestors had retreated to.⁴⁰⁹ Over 100 canisters were fired in one hour. The police later moved in with water-cannon which fired a mixture of water and tear gas, reportedly an irritant and a dye.

From the witness testimony and the physical remains of canisters, Amnesty International was able to identify that the manufacturer of the tear gas was a French-based company, Nobel Securite (formerly SNPE).⁴¹⁰ Further press reports suggested that the water cannon had been shipped to Kenya from either South Africa, Israel or France.⁴¹¹ So even though the United Kingdom had refused export licences for tear gas and other riot control equipment to Kenya at least one French company stepped in to fill the vacuum.

8.3 Indonesia. Over the last 20 years the international media and human rights organisations have documented numerous incidents where the Indonesian security forces have deployed both crowd control weapons and lethal force, often with severe consequences for peaceful protestors. However, with the exception of water cannon, what is striking is the lack of hard data on specific transfers of such crowd control weapons.

The Indonesian security forces have deployed chemical irritants (CS), plastic baton rounds and water cannon that spray a mixture of water, chemical irritant and marker dye.⁴¹² Both German and UK water cannon were identified as being deployed on the streets of Bandung in July 1996.⁴¹³ The German

water cannon were identified as Mercedes Benz vehicles but is unknown who actually constructed and supplied the vehicles. The UK water cannons were manufactured by Glover Webb (a subsidiary of GKN Defence) and supplied by Procurement Services International. Having permitted the export of 3 Tactica water cannon in 1994 and another 6 in 1995, the United Kingdom agreed an export licence in December 1996 for a further 7 water cannon and 303 Internal Security vehicles in complete disregard of numerous reports of the use of such vehicles in undermining human rights.⁴¹⁴

However, despite quite prolific use of crowd control weapons such as tear gas and plastic bullets there is little hard data on which countries are providing the transfers of such weapons and munitions. Past transfers of riot control weapons to Indonesia have included Mekar bullet-trap rifle grenades⁴¹⁵ and small amounts of tear gas from the UK.⁴¹⁶ One possibility is that indigenous companies have established local production of such weapons and munitions through licenced production agreements. For example PT Pindad manufactures a range of small arms and ammunition under licenced production agreements from European companies including FN Herstal, Browning (Belgium)⁴¹⁷ and Beretta (Italy).⁴¹⁸ It was reported in 1995 that PT Pindad could supply a range of pyrotechnics including "Grenades, anti-riot, tear gas CN, hand launched".⁴¹⁹ Such licenced production agreements (where a European based company permits a third-country manufacturer to produce products under 'licence') raise grave concerns that European Union embargoes and human rights based export criteria will be undermined.

8.4 Zambia. On 30 July 1997 events at Freedom House, the UNIP headquarters in Lusaka, indicated the political nature of policing opposition political parties in Zambia. A coalition of opposition political parties had planned a march through downtown Lusaka to protest a Supreme Court ruling against them in connection with a petition contesting President Chiluba's reelection victory in 1996. A heavy police presence broke up the march with tear gas, and a large number of demonstrators -- many women with small children -- came into the UNIP building to seek refuge.

An estimated 100 police officers gathered at the entrance of the building with riot batons, at about 9:45am that day. The police siege would last until 10:00 pm that night. To force people from the building into the street outside, where they would be beaten, police officers used teargas inside the building. Several witnesses confirm that police gave no warning before stepping inside and began shooting tear-gas from a gun launcher down the internal corridors of the building. Rabbison Chongo, a UNIP official, said: *"I've never seen so much tear gas. They broke doors of Freedom House and they fired tear gas into the building. So much tear gas, you couldn't see down the hall five feet in front of you. So much that you can't get air in the lungs, you can't breath"*.⁴²⁰ Another person in the building that day, Melania Chipungu, said she began to suffocate because of the tear gas.⁴²¹ Apparently the police prevented the Zambian Red Cross from providing medical assistance to those affected by police beatings and tear gas on this⁴²² and other occasions⁴²³.

SECTION C. TECHNICAL ANNEX

The technical and analytical material used to prepare this report has been collated into a series of 8 appendices to which this report refers. It is recommended that both documents are read together.

TABLE 1. THE MAIN CHEMICAL IRRITANT RIOT CONTROL GASES

Chemical Name and Formula	Short Name	Form	Melting Point / C	Stability / Solubility	Effects	Relative Power	IC ₅₀ (mg.min/m ³)
1-Chloroacetophenone	CN Mace	White Solid Odour of apple blossom	59	Powder. Insoluble but stable in water, ideal for use in water cannon. Soluble in organic solvent	Burning sensation in the eyes. Heavy flow of tears. Stinging of moist skin. Blisters at high concentrations. Salivation, nausea and headaches.	1	20
2-Chlorobenzylidene malonitrile	CS Tear Gas	White Solid Pungent odour of pepper	94	Powder. Insoluble and unstable in water, soluble in apolar and organic solvents. Used in water cannon	Strong lachrymation with involuntary closing of the eyes. Burning sensation on moist skin, 2 nd degree burns. Coughing and vomiting at higher concentrations.	5	3.6
Dibenz -1,4 -oxazepine	CR Fire gas	Pale Yellow Solid	72	Soluble in water.	Very intense skin pain particularly around moist areas. Involuntary closing of eyes resulting in temporary blindness which may cause panic or hysteria.	30	0.7
Oleoresin Capsicum	OC Pepper	Colourless	65	Stable in water, soluble in organic solvent.	Uncontrollable coughing and gasping for breath. Eyes close immediately. Loss of body motor control. Intense burning sensation. Leads to immediate incapacitation		
Nonivamid	PAVA		N/A	Stable in water, soluble in organic solvent.	Burning ache and stinging of skin, redness depending on concentration of PAVA, violent pain and blepharospasm in eye, uncontrollable coughing and gasping, no immunity with repeated doses.		
Diphenylaminearsine	DM Adamsite	Yellow-Green odourless	N/A	Partially soluble in water, relatively insoluble in organic solvents.	Burning in throat, pain in chest, uncontrollable coughing and sneezing, vomiting, more prolonged systemic effects		22-150 nausea 370 vomiting

TABLE 1. THE MAIN CHEMICAL IRRITANT RIOT CONTROL GASES

Chemical Name and Formula	Short Name	Form	Melting Point / C	Stability / Solubility	Effects	Relative Power	IC ₅₀ (mg.min/m ³)
					include headaches, mental depression, chills, abdominal cramps, vomiting, diarrhea lasting several hours		

TABLE 2: COMPARATIVE EFFECTS OF VARIOUS LESS LETHAL KINETIC IMPACT MUNITIONS

Munition	Manufacturer	Country	Projectile weight / g	Range / m	Impact Energy/ Joules
Plastic Bullet	Royal Ordnance	UK	135	25-60	150-210 ⁴²⁴
“Cross Cartridge”	Heckler and Koch	Germany	179	36462	above 200 at muzzle ⁴²⁵
Flash Ball	Verney Carron	France	28	12	200 at 7m ⁴²⁶
Jelly Baton	Crown Aircartridge	Netherlands	N/A	N/A	265 ⁴²⁷
Flexible Baton	MK Ballistic Systems	USA	40	N/A	163 ⁴²⁸
Bean Bag	MK Ballistics	USA	40	36462	120 ⁴²⁹
“Cease and Desist”	Milstor Corporation	USA	N/A	Less than 18	130 at 10m ⁴³⁰
Rubber baton slug	Fiocchi	USA	4.5	15-40	120 at muzzle, 77 at 10m ⁴³¹
Slingshot Bullet Machine	TFM	South Africa	107	175 max	205 at muzzle ⁴³²
MR 35 Punch	Manurhin	France	21	Up to 10	150-200 ⁴³³
Spherical Ball 55mm	SNPE	France	1355	more than 30	630 at muzzle, 150 at 30m ⁴³⁴
Rubber Bullet	SNPE	France	46	10 - 30	240 at muzzle, 45 at 30m ⁴³⁵
Kraken 59mm	Policske Strojirny	Poland	56	50	227 at 30m ⁴³⁶

TABLE 2: COMPARATIVE EFFECTS OF VARIOUS LESS LETHAL KINETIC IMPACT MUNITIONS

Munition	Manufacturer	Country	Projectile weight / g	Range / m	Impact Energy/ Joules
Arwen AR-1	Royal Ordnance	UK	79.4	20-100	220 at muzzle, 70 at 30m ⁴³⁷

Impact energy:

- below 20.3 Joules (15 foot lbs) is described as safe or low hazard, provided the projectile is large enough not to damage the eyes;
 - between 40.7 - 122 Joules (30 and 90 foot pounds) is described as a dangerous area for impact energy
 - above 122 Joules (90 foot pounds) is described as being in the severe damage region
- (From: Egner, D.O. et al (1973) 'A multi disciplinary technique for the evaluation of less lethal weapons Vol 1'. US Department of Justice.

Impact energies in the table are given at the range (in metres) for that projectile, unless otherwise stated.

NOTES & REFERENCES

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1. See 'Action plan of the Council and the Commission on how best to implement the provisions of the Treaty of Amsterdam on an area of freedom, security and justice' (text adopted by the Justice and Home Affairs Council on 3 December 1998) Official Journal of the European Communities C19, vol 42, 23 January 1999.
 2. A new beginning: Policing in Northern Ireland -The report of the Independent Commission on Policing for Northern Ireland. September 1999, <http://www.belfast.org.uk/report/>
 3. Statement by the UK Secretary of State for Foreign & Commonwealth Affairs (1997). "Action being taken to ban the export of electro-shock weapons". 28th July.
 4. European Parliament, Committee On Foreign Affairs, Security and Defence Policy, 14 January 1999 - PE227.710/fin.
 5. Given that the EU recently gave recognition that certain classes of crowd control equipment can be used for human rights violation (when setting export restrictions to the Federal Republic of Yugoslavia) it would be a useful starting point if this typology of weapons and ammunition were considered and agreed as a base line when excluding crowd control weapons from export to human rights violating regimes. (Council Regulation (EC) No 926/98 of 27 April 1998 concerning reduction of certain economic relations with the Federal Republic of Yugoslavia, Official Journal L130,01, 05/1998 (Doc. 398R0926) The community legislation in force is comprehensive and restricts exports of equipment which might be used for internal repression including anti-riot shields, water cannon, acoustic devices for riot control, electric-shock belts designed for restraining human beings, vehicles designed to be electrified to repel boarders, portable teargas and pepper-gas sprays, electric shock shields, batons, tasers etc).
 6. This report (PE 166.499) is available free from the European Parliament or via <http://jya.com/stoa-atpc.htm>
 7. See Ackroyd et. al (1980) for a historical discussion of the different types of riot weapons used in European foreign colonies and why.
 8. Lamb, Christopher (1995) 'Non-Lethal Weapons Policy: Department of Defence Directive' 1st January. p.1.
 9. A comprehensive bibliography is presented in Bunker, R.J. (ed.) (1998) 'Non-Lethal Weapons: Terms and References'. INSS Occasional paper 15. USAF

Institute For National Security Studies, USAF Academy, Colorado. (Available via http://www.infowar.com/resource/res_100997a.html-ssi).

10. See Wright, S (1999) 'The Hypocrisy of 'Non-Lethal' weapons'. *Le Monde Diplomatique*. December. Lewer, N. & Schofield, S. (1997) 'Non Lethal weapons - a Fatal Attraction'. Zed Press, London. Dando, M (1996) 'A new form of warfare: the rise of non-lethal weapons'. Brassey's, London.

11. Defense News October 1999

12. The Technical Annex contains 8 Appendices which provide a detailed technical treatment of the current state of the art. Appendix 1 has used open source literature derived from military, security and police exhibitions, to identify the key manufacturers, suppliers and distributors of crowd control weapons worldwide.

13. See 'Action Plan of the Council & Commission on how best to implement the provisions of the Treaty of Amsterdam on an area of freedom, security and justice'. (Text adopted by the Justice and Home Affairs Council, 3 December 1998) *Official Journal of the European Communities*, C19, Vol 42, Notice No. 1999/C19/0123. January 1999.

14. Archer, Denis, H.R. (Ed)(1978) 'Jane's Infantry Weapons 1978'. Jane's Publication Group, UK.

15. Dewar, Michael (1979) 'Internal Security Weapons and Equipment of The World'. Ian Allan Ltd, London, UK.

16. Manufactured or distributed by companies such as Armament Systems and Procedures, Inc (USA), Civil Defence Supply Ltd (UK), ICL Technical Plastics (UK), Le Protecteur (France) and Dipl Ing. Walfass (Germany).

17. Manufactured or distributed by companies such as Bonowi (Germany), ISPRA (Israel), DEFEX (Spain), Federal Laboratories & Mace Security International (USA),

18. Manufactured or distributed by companies such as Verney Carron (France), Flashball; SAE Alsetex (France); Pipenbrock Pyrotechnic (Germany); Heckler & Koch (Germany), Rubber Impact Cartridge; Simad Stacchini (Italy) Baton round; Crown Aircartridge (Netherlands), Jellybaton; Swartklip (South Africa), Pains Wessex and Haley & Weller (UK), and the US Army Ring Airfoil Civil Disturbance Control system.

19. Manufactured or distributed by companies such as Manhurin (France), MR35 Punch; Royal Ordnance (UK), Arwen which can fire a range of 37/38mm munitions including smoke, irritant CS gas and variable range plastic baton rounds and Mechem (South Africa) MGL 40mm Multiple Grenade Launcher.

20. Manufactured or distributed by companies such as GKN Defence (UK), Mercedes Benz (Germany), CSI Princhim, Lohr and Soframe (France),

Avnon and Beit Alfa (Israel), Custom Armoring Corp (USA).

21. Manufactured or distributed by companies such as Ruggierie (France) blinding grenade, Nico Pyrotechnik (Germany) Flash-Stun and Distraction Grenades, Royal Ordnance (UK) hand assault sound grenade.

22. Manufactured or distributed by companies such as SAE Alsetex (France); Piepenbrock Pyrotechnik (Germany); NORINCO, (China)

23. Manufactured or distributed by companies such as Haley & Weller (UK), Nobel Securite (France), ISPRA, (Israel) and Defense Technology Corp (USA).

24. Manufactured or distributed by companies such as Le Protecteur (France), SAE Alsetex (France), IDC Chemie (Germany), Piepenbrock Pyrotechnik (Germany), Falken SA (Spain), Mace Security International (USA), Zarc International (USA), Bsafe Industries' Devastator, (USA).

25. Manufactured or distributed by companies such as SAE Alsetex (France), ISPRA (Israel), Manroy (UK), Manpack Mist Sprayer and Defense Technology Corp (USA) .

26. Manufactured or distributed by companies such as AKAH (France), Eclats Antivol (France), SAE Alsetex (France), Dipl Ing H Wallfass (Germany), ISPRA (Israel), NitSpy (Spain), Teh Huang Plastic Co Ltd (Taiwan), Nova Products (USA), Tasertron (USA).

27. Non-lethal Weapons for Law Enforcement: Research Needs and Priorities. A Report to the National Science Foundation, Security Planning Corporation, First Printing, March 1972.

28. For a more technical explanation of such performance calculation see; US Department of Justice. 'Multi-disciplinary technique for the evaluation of less-lethal weapons, Volume 1'. July 1973.

29. Office of the Director of Defence Research and Engineering (1959) 'Report of the Task Group on Biological and Chemical Weapons Development of the Defense Science Board'. DSB 225/3. 18th Feb. vol.2, p26.

30. Ibid, Vol 1, pp 1-2. Such work was continued. (See section 6)

31. A provision made under the Verification Annexe V1.2. Organisation For the Prohibition Of Chemical Weapons, Convention on The Prohibition of the

Development, Production, Stockpiling and Use of Chemical Weapons and their Destruction. August 1994, p.122.

32. For a discussion of the background to this information which emerged from South Africa's Truth and Reconciliation Commission which revealed that a host of some 500 products was being produced as secret poisons against Anti-Apartheid activists, see Lovell, J. (1998) 'S.African Panel told of a secret murder factory'. Reuters. June 9.

33. Sanford, J.P. (1976) 'Medical Aspects of Riot Control (harrassing) agents'. Ann. Rev. Med. 27, pp. 412-419.

34. The most comprehensive record of this research is provided by Robinson, J.P. (1994) 'Disabling Chemical Weapons: some technical and historical aspects'. Working paper of the Pugwash Study Group on Implementation of CBW Conventions. Second Workshop. Den Haag/Noordwijk, Netherlands. 27-29th May.

35. Indian Border Security Force Tear Smoke Unit (TSU), Tekanpur, Gwalior, India.

36. Chemical Warfare laboratories researched the analogues of this irritant (such as VAN) for many years as an aid to understanding the neurophysiology of pain. Reviewed in 'Substances Producing Pain & Itch'. Arnold 1964. Letter to Steve Wright from R.M. Watson (the then Director of the UK Chemical Defence Establishment at Porton Down), dated 22nd. July 1975.

37. IDC of Switzerland packages CN and CS into special 18 litre canisters as well as special drums of 30 to 200 litres and with base solutions which can be individually dyed. IDC brochure 'Irritant agent base solutions CS and CN for spraying with water launcher cannons'. Displayed at Milipol Exhibition, France, 1993.

38. Police and Security News 5-6/99.

39. 'Less lethal munitions are they really safe and effective', <http://www.cactive.com/cato/NIJ.html>

40. Barzilay, D. (1973) 'The British Army in Ulster'. Vol 1. Century Books, Belfast.

41. See for example 'Jane's Security & Counter-Insurgency Equipment 1993/94'. Jane's Publication Group, UK.

42. See for example Technical specification for the 'Slingshot' rubber bullet weapon manufactured by TFM Olifantsfontein Pty (South Africa).

Company Brochure, April 1996.

43. Los Angeles Times 31/5/94 gives details that foam rubber rounds have also been developed.

44. The Kraken weapon which fires commercial ten manufactured by Policske strojirny a.s. Policka, Poland. Company brochure. 1998

45. For example Nobel Securite , France, large 55mm rubber balls.

46. See B'Tselem (1998) 'Death Foretold - the firing of rubber bullets to disperse demonstrators in the Occupied Territories'. P25.

47. See for example Applegate, R. (1969) 'Riot Control - Materiel and Techniques'. Stackpole Books, Harrisburg, USA. BSSRS (1985) 'TechnoCop - New Police technologies'. Free Association Books, London.

48. See for example Israel Security Catalogue, 1990, Sibat, Israel Ministry of Defence, Avnon Trade Ltd, Israel, company brochure.

49. International Defense Review (1994) 'Wanted: a watch on non-lethal weapons'. 1 April, vol 027, No. 004, p1.

50. Independent Evaluation Report of TASER and AIR TASER conducted energy weapons. 10th September 1999.
[Http://www.airtaser.com/Laur/Report.html](http://www.airtaser.com/Laur/Report.html)

51. This feature is widely being used by a large number of U.S. correctional agencies as a means of subject control and crowd control" (Independent Evaluation Report of TASER and AIR TASER conducted energy weapons. 10.9.99 [Http://www.airtaser.com/Laur/Report.html](http://www.airtaser.com/Laur/Report.html)

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54. Roy, O.Z; Podgorski, A.S (1989) 'Tests on a shocking device - the stun gun', Medical & Biological Engineering & Computing, Vol 27, p445-448.

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55. For example the Cochrane Steel Products (Pty) Ltd of South Africa, system as deployed in Taipei, Taiwan.
56. An effort has also been made to provide a comprehensive survey of such practices and legislation via the questionnaires circulated by Amnesty International as part of this study. An analysis of the responses is presented in Appendix 2.
57. Adopted and proclaimed by the UN. General Assembly, 10 December 1948.
58. Adopted by the UN General Assembly, 16 December 1966. Entered into force 3rd January 1976
59. Article 33 of the Vienna Declaration states that governments have a duty to train their law enforcement officers in human rights.
60. See 'A new beginning: Policing in Northern Ireland - The report of the Independent Commission on Policing for Northern Ireland'. September 1999. <http://www.belfast.org.uk/report>.
61. European Parliament, Committee On Foreign Affairs, Security and Defence Policy. 14th January 1999 - PE227.710/fin.
62. International Committee of the Red Cross 'The SIrUS Project and Reviewing the Legality of New Weapons' is available from <http://www.icrc.org>
63. For a useful discussion of this point see Jacobsson, Dr Marie (of the Swedish Ministry for Foreign Affairs) (1999) 'International law perspectives on non-lethal weapons'. A paper presented to 'Fielding non-lethal weapons in the new Millennium'. Jane's NLW '99 Conference. 1-2 November, London.
64. The proposed changes to the SIrUS project include (i) a provision that the primary effect should not be to target a specific part of the human anatomy, physiology or biochemistry and (ii) The injuries of the survivors should be treatable in a non-specialist facility. Coupland, R. (1996) *Medicine & Global Survival* 1996.3.A1,p.6.
65. A fuller discussion of this research is contained in Coupland, Robin. M. (ed) (1997) 'The SIRUS Project - Towards a determination of which weapons cause superfluous injury or unnecessary suffering'. International Committee of the Red Cross. Geneva.
66. Chemical Weapon Convention 1993. Article II, paras 2 & 7.

67. In the SIPRI Yearbook 1998, page 467 Jean Pascal Zanders has explained that ...'under the general purpose criterion of the CWC, certain purposes for which the objects for which objects may be employed are prohibited but not the objects themselves. Article II of the CWC thus defines CW as any toxic chemical or its precursors *intended for purposes other than those not prohibited by the CWC* as well as munitions, devices or equipment specially designed to be used with them.

68. Experts advise caution on this point, since whilst riot control agents are permitted under article 1, para5 and Article II, paras 1,2,7 and 9(d) of the CWC, there are still limits. SIPRI has provided an example of a 1997 NATO exercise undertaken near Riga in Latvia under the Partnership For Peace exercise where a World War I lacrimator and asphyxiating agent , chloropicrin was used to simulate chemical contamination. The exercise was halted when officials realized that this agent was listed in Schedule 3 of the CWC and according to Article II, para7, could not be considered as a riot control agent.

69. Dinmore, G. (1997) 'US unit repels Serb mob with tear gas'. Financial Times. 2nd September ,p1.

70. Thus there are several gray zones where the use of chemical weapons for controlling crowds falls between warfare and domestic riot control. The key question here is the extent to which the chemical agents used, the nature of the disseminating devices and the actual quantities used, are consistent with the legal purposes not prohibited by the convention. Artillery shells and other indiscriminate mass dissemination devices can not properly be considered instruments of domestic riot control. In those instances where the CWC prohibits chemical irritants and disseminating devices, possessor states must both declare and destroy them in order to meet their obligations under the convention.

71. According to SIPRI Chemical Weapons expert Jean Pascal Zanders, the matter is further complicated by positions taken by individual countries in terms of their reservations in ratifying the CWC. Zanders, J.P., Hart, J. (1998) 'Chemical and biological weapon developments and arms control'. SIPRI Yearbook 1998. p467.

For example the 'US senate ratified the CWC on the understanding that the convention would not restrict its use of riot control agents, including use against combatants in the following cases: (a) the conduct of peacetime military operations within an area of continuing armed conflict where the United States is not a party to the conflict (e.g. Bosnia, Rwanda and Somalia); (b) consensual peacekeeping operations when the use of force is authorized by the receiving state, including operations pursuant to Chapter VI of the UN Charter. The US Senate accepted the definition of a riot control agent in Article II of the CWC but stated explicitly that the 'President shall take no measure and prescribe no rule or regulation, which would alter or eliminate Executive Order 11850.' - as used by President Bush in the Gulf war to justify use of riot control agents in search and rescue operations.

72. A copy of the ethical policy on the Human Genome project and recent discussion is available in Rothman, H (2000) 'Disseminating the

principles of the Universal Declaration on the Human Genome and Human Rights'. In 'New Genetics and Society', v19, n1. Taylor & Francis.

73. Presented by the Omega Foundation to a STOA scoping meeting, held at the European Parliament, Brussels, 5 August 1999.

74. Coupland, Robin. (Ed) (1997) 'The SIrUS Project - towards a determinations of which weapons cause superfluous injury or unnecessary suffering'. ICRC, Geneva.

75. OPCW, Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and On their Destruction, (Corrected Version) 8 August 1994, the Hague, Netherlands.

76. *"As with other foreign chemicals which man(sic) may be exposed, no matter how detailed, extensive and carefully effected are the pre-clinical toxicity investigations and observations in controlled human exposures, there can be no complete guarantee from such studies that there is absolute safety in use for a given chemical."* Ballantyne, B. (1997) 'Riot Control Agents - Biomedical and Health Aspects of the Use of Chemicals in Civil Disturbances'. Medical Annual. pp.7-41.

77. "Politician and scientist alike must accept the inescapable conclusion that any substance capable of producing an intolerable irritation at low concentrations must also produce a concomitantly high toxicity. In other words, the existence of ideal riot agents of sufficient safety not to impair the health of rioters or accidentally exposed innocents is merely notional." Jones, R. (1973) 'Return To Riot Control'. New Scientist. May 31, pp.546-547.

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120. UK House of Commons Written Answer from Mr. Boateng to Mr. Flyn. Hansard. 9 June 1999, col. 335.

121. Police Review (1998) 'Contract Awarded to research water-based CS spray alternative'. 19th December.

122. SIPRI (1975) 'Delayed Toxic Effects of Chemical Warfare Agents'. Stockholm, Sweden, pp 15-17.

123. Physicians For Human Rights, (1987) 'The Use of Tear Gas in the Republic of Korea: A report by Health professionals'.
<http://www.phrusa.org/research/chemkorea.html>

124. Minkahyup Human Rights Group for prisoners of conscience (1996) 'Human Rights Situation in Korea:An Urgent Report'. September.

125. Ibid. In 1987, the US Physicians For Human Rights following their own field research asserted "There is considerable evidence that these essential studies cannot be undertaken in South Korea today. The government has not allowed research by responsible medical investigators of this problem and has refused to identify for health professionals the chemical compounds it is using, thereby blocking essential medical studies and proper treatment."

126. For a discussion, see Allen, T.J. (2000) 'Chemical Cops - Tear gas and pepper spray can be deadly'. In These Times. US. April 3.

127. From Zarc International (1993) 'Cap Stun Weapons - Aerosol product Line, Law Enforcement and Military, Technical Information'. p.44.

128. Liberty in conjunction with Channel 4 Dispatches (1996) 'The truth of CS'. November. ISBN 1 85144 182 4.

129. Evans, R., Wright, S. (1999) 'British police face a CS gas attack'. Guardian. July 8th.

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130. For example one study using a narcoleptic drug Diazem to decrease anxiety in less intelligent people showed it had a marked effect on increasing their tolerance. See Klapper, J.A., McColloch, M.A., Merkey, R.P. (1971) 'The Effect of Diazem on Tolerance of a Mucous Membrane Irritant'. Edgewood Arsenal Medical Research Laboratories, USA. Technical Report 4581.
131. Police Complaints Authority (UK) (2000) 'CS Spray: Increasing Public Safety'. March, p29.
132. Ibid.
133. Mueller, F. (1991) 'Chemical Aerosol Report'. Cincinnati Police Division, USA.
134. Police Review Commission (USA) Study (1997) 'The Effectiveness of OC. Pepper Spray - An Analysis of Berkeley Police Reports'.
135. San Francisco Chronicle (1997) 'ACLU Criticizes Novato Police Policy on Pepper Spray'. October 22nd.
136. For a useful discussion see Parneix-Spaake et al (1993) 'Severe cutaneous reactions to self-defence sprays'. Arch. Dermatol. Vol 129. p913.
137. Sidell, F.R. (1997) 'Riot Control Agents' in 'Medical Aspects of Chemical and Biological Warfare', Chapter 12. Borden Institute, Walter Reed Army Medical Center. pp 308-325.
138. Rice, P., Dyson, E.H. and Upshall, D.G. (1996) 'A review of the Toxicology of Methyl Isobutyl Ketone and Methylene Chloride'. Chemical and Biological Defence Establishment, Porton Down, UK. July. (Restricted).
139. For a discussion, see Wright, S., & Evans, R. (1999) 'British Police face a CS gas attack'. Guardian (S2 Science). July 8th.
140. Ironically, in the US, the Occupational Safety & Health Administration has called for a substantial reduction in the exposure to Methylene Chloride because of its risk to health including cancer, cardiovascular disease and material impairment of the central nervous system. OSHA (1997) 'Occupational Exposure to Methylene Chloride'. 62. 1494-1619. 1st October.
141. Rice, P., Jones, D.W., Stanton, D. (1997) 'A literature review of solvents suitable for the police CS spray device'. Defence Evaluation and Research Agency, UK. (DERA/CBD/HA/CR/1997/230). November. (Restricted).
142. 'There are no data available on the metabolism, kinetics, acute toxicity or skin irritancy of CS when administered in MIBK as solvent'. UK

Department of Health. Committee on Toxicity, Mutagenicity, Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (1999) 'Statement on 2-Chlorobenzylidene Malononitrile (CS) and CS Spray'. September.

143. Zekri, A.M.B., King, W.W.K., Yeung, R. and Taylor, W.R.J. (1995) 'Acute mass burns caused by o-chlorobenzylidene malononitrile (CS) tear gas'. Burns. Vol. 21. No.8. pp 586-589.

144. Sidell F. (1997) op.cit.

145. McGregor, Glen. (2000) 'Ottawa Cops Pepper Spray Lawsuit'. The Ottawa Citizen. 19th February.

146. Hansard, 21 January 1977, col 330.

147. For a more technical explanation of such performance calculation see US Department of Justice (1973) 'Multi-disciplinary technique for the evaluation of less-lethal weapons'. Volume 1. July. U.S. military weapons research laboratories have used this approach to produce the empirical data used in this current study as a benchmark. These researchers note that such performance characteristics generally fall into two categories namely:- (i) those that determine the effect on the target if the target is hit (muzzle velocity, projectile weight and drag), and (ii) those that determine if the target is hit (accuracy and reliability). Similarly with chemical devices where the performance characteristics fall into the same two categories. However, the distinction between a "hit" and a "no-hit" is not as precise for chemical devices as compared with kinetic energy devices.

148. Egner, D.O. et al (1973) 'A multi disciplinary technique for the evaluation of less lethal weapons Vol 1'. US Department of Justice.

149. Hansard 28 March 2000. "The government have accepted recommendation 69 of the report of the Independent Commission on Policing (in Northern Ireland), that a research programme to find a less potentially lethal alternative to plastic baton rounds should be established. The issue is at present being actively considered and a decision on the way forward is expected in the near future."

Examples of secrecy include suppression of reports from the UK's Ordnance Board - the body that certifies weapons that can be used by the UK security forces; the UK Police Scientific Development Branch who have produced several reports on "Police Baton Round Equipment for the Police" (Police Scientific Development Branch Annual Report 92/93) and the Association of Chief Police Officers (ACPO) who produce the "Public Order Tactical Options Manual" for UK Police forces and have a central role in decisions on what equipment is used, for example their "ACPO Replacement Baton Gun Project Team" which led to the decision to deploy the Heckler and Koch weapon in the UK (Police Scientific Development Branch Annual Report 92/3) and also the review of plastic baton rounds which led to new guidelines being introduced in 1999.

Although the UK government has published the name of the manufacturer of the weapon used in the UK (Her Majesty's Inspector of Constabulary Annual Report 1996/7, HMSO, UK.) it refuses, on national security grounds, to name the ammunition supplier or to publish tenders for training equipment (Minutes of the Select Committee on Administration <http://www.publications.parliament.uk/pa/cm199899/cmselect/cmpubadm/821/821mem17.htm>)

The Police Authority of Northern Ireland undertook a review on the “Control and Use of Plastic Baton Rounds” in 1998 which took place in private and was not published in full (Police Authority of Northern Ireland letter to the Committee on the Administration of Justice, Belfast dated 3 June 1998).

150. Rosenhead, J. (1976) ‘A new look at less lethal weapons’. New Scientist. 16th December.

151. Steadman, N. (1989) ‘Modern Riot Guns’ in ‘Internal Security and Counter Insurgency Supplement’ to Jane’s International Defence Review. October. “The safe envelope for baton firing may often be as narrow as 30m, which may explain the occasional miscalculation.”

152. Steadman, N. (1990) ‘Close range baton gun from Verney Carron’. National Security July/August. p35. “Despite the US safety figures it has been reported that the UK MoD has specified a level of 220 Joules for the baton gun and that the problem with the conventional riot gun however is that achieving the desired 220 joules at mid range (40-50m) means that it might easily kill within 20m. At this range for example, most standard 37/38mm ammunition will neatly punch a hole through plywood 11mm thick.”

153. Verney Carron, France. ‘Flashball’ company brochure.

154. MK Ballistics, USA ‘Flexible Baton’ company brochure.

155. For example the Royal Ordnance (UK) Arwen weapon. Company brochure. Or the Heckler and Koch (Germany/UK) riot gun. Police Authority of Northern Ireland Annual Report 1997-8

156. Steadman, N. (1989) ‘Modern Riot Guns’ in ‘Internal Security and Counter Insurgency Supplement’ to Jane’s International Defence Review. October.

157. National Security (1988) ‘Wallop improves riot control weapons’. September.

158. Police and Security Equipment 1998-99. Jane’s Publications Group, UK.

159. Manurhin Equipement, France, (1994) Company brochure for the MR 35 Punch rubber ballgun.

160. MK Ballistic Systems, USA (1999). Company information on RB-37-FS impact projectile gives an accuracy of 6-8 inches at 25 yards.

161. Venter, A. (1998) ‘Vital vehicle in times of unrest’. International Police Review November/December. Figure for the Slingshot rubber bullet machine at 70m.

162. Goodwin, B. (1991) ‘MoD admits dangerous defects in riot guns’. The Engineer 10th October. “It has been reported that the baton can land 3m either side of the target over a 60m range.”

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163. Jane's Infantry Weapons 87/88, p471. Jane's Publications group, UK. Detail of the Condor SA's AM-404 multiple baton cartridge states "this round (multi baton) is recommended only for use against groups, since the dispersion of the three projectiles inhibits accuracy.
164. B'Tselem (1998) 'Death Foretold - Firing of rubber bullets to disperse demonstrators in the Occupied Territories'. Israel
165. Jane's Police and Security Equipment 1998-99, p344. Jane's Publications Group, UK.
166. Goodwin, B. (1992) 'MoD orders emergency changes to plastic bullets'. The Engineer 16th July.
167. Schyma, C., Schyma, P. (1997) 'Possibilities for injuries caused by rubber bullets from the self defense weapon MR 35 Punch'. Arch. Krimipol. Sep-Oct. 200(3-4). 87-94. "The propellant used in the French MR 35 Punch, manufactured by Manurhin causes important variations in the projectiles velocity from 120 to 140m/s. The resulting energies were about 150 to 200 Joules. The report then discusses the wound ballistics and concludes that they contradict the 'non-lethal' character of the MR 35."
168. Hansard 19 June 1997. Dr Reid (Ministry of Defence) answer to Brian Sedgemoor. Bullets were found to be travelling at a significantly higher muzzle velocity than that in the specification and at least 45,000 were withdrawn from service.
169. Committee on the Administration of Justice (1998) ' Plastic bullets - A Briefing Paper'. 1998.
170. For details of the RPL Mk II riot projectile launcher see <http://ozarkmtns.com/less-lethal/riot.htm> 3/8/98.
171. Guidelines have been widely criticised as allowing and encouraging misuse of these weapons. See for example Committee on the Administration of Justice (1996) 'The Misrule of Law' and Bell, D. (1999) 'The use of rubber and plastic bullets in Northern Ireland'. M.A. Thesis. University of Ulster, Magee College. See also B'Tselem (1998) 'Death Foretold - Firing of rubber bullets to disperse demonstrators in the Occupied Territories'. Israel, p26. "The Israeli Defence Force is reportedly under orders to fire rubber bullets only from a distance of greater than 40m, and plastic bullets from a distance greater than 70m. However, the numerous deaths and injuries resulting during confrontations between the IDF and Palestinians is evidence of one or more of the following - failure to follow distance of fire orders in a stressful situation, the inadequacy of the reported "safe" distances of fire, or a willful decision to inflict extra-judicial punishment. Furthermore, it is obvious that instructions to aim only at the lower extremities, shoot only at rioters or stone throwers, and do not shoot at women or children are not adequate to prevent unnecessary injury or death."
172. Air Taser Inc, USA.(1997) Press Release from Modern Non-Lethal system introduced to the United Kingdom. May.

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173. Statewatch Bulletin (1996). Brian Douglas was the first person to die after being struck on the neck by a long handled baton. July/August, vol 6 no 4.
174. Police Complaints Authority (UK) (1998) 'Striking a balance: the police use of the new batons'. Crown. ISBN 0-9553157-1-1.
175. Robb, J.D.A. and Mathews, J.G.W. (1971) 'The injuries and management of riot casualties admitted to the Belfast hospital wards August to October 1969'. British Journal of Surgery. Vol 58. No.6. June.
176. Guardian 30/12/98 New Police batons may cause lasting injuries. The police have been told not to use their new, longer, US style batons to hit suspects on the kneecaps or shins because of the danger that the blows will result in long-term injuries, including fractures. The warning from the Police Complaints Authority follows an inquiry into more than 450 official complaints about the new batons that have replaced the traditional truncheon.
177. Statewatch Bulletin January 1999, vol 9 no 1.
178. Statewatch Bulletin, January 2000, Vol 10 No 1. 'UK: Northumbria police constabulary withdraws extendable batons', "because we did not see the operational necessity to use them outweighed the research which was available nationally saying such weapons were responsible for a higher proportion of injuries and damage to people than other kinds of batons."
179. Detroit Sunday Journal (1997) 'Vance video shows guards in assault drills'. "One technique, involving short wrist snaps that deliver powerful blows, is meant to deceive judges and others who must try to decide if a victim of such a clubbing was hit hard, according to drill leaders present. One said the technique must be used "if there's a video camera out there" ".July 27-August 2.
180. [Http://www.ebm-online.com/batton/spinex.htm](http://www.ebm-online.com/batton/spinex.htm) 20/3/2000. The SpineX - a new Dutch produced curved baton.
181. Home Office Police Research Group, UK. (1993) 'Assessing the Expandable Side Handled Baton'. Police Research Series Paper 11. "The Expandable Side Handled Baton (ESHB) was, however drawn much more frequently than the truncheon, reflecting officers' greater confidence in the ESHB than in the truncheon. This greater preparedness to draw the ESHB, together with a greater readiness to intervene in more violent incidents, meant more minor injuries to those members of the public involved in reported disturbances were caused by the ESHB than by the truncheon."
182. Guardian 1st October 1985.
183. Amnesty International (1999) 'Urgent Action Bulletin Malaysia'. September. Eight people are reported to have received hospital treatment, either as a result of injuries sustained, or for the after effects of chemicals used by water cannon to disperse demonstrators. Helmi bin Muhammed is reported to have received

serious injuries to his head, back, eyes and neck.

184. Lippelt, H. (1982) 'Auswirkungen des Wasserwerfer-Einsatzes, bei der Gorleben-Demonstration am 4./5 September 1982'. Dokumentation der Fraktion Die Grunen im niedersachsen Landtag.

185. Stern (Germany) 20/6/84 reported a case of severe rib cage bruising with lung embolism and thrombosis, temporary blindness in one eye leading to permanent eye damage and broken bones.

186. Northam, G. (1988) 'Shooting in the Dark'. Faber and Faber, p116.

187. Beit Alfa Trailer Co. Israel, company brochures.

188. BSSRS. (1985) 'TechnoCop, New Police Technologies'. Free Association Books. p70.

189. Duke-Elder, S., MacFaul, P. A. (1972) ' Mechanical Injuries'. System of Ophthamology. London. Kimpton. 14. Part 1.

190. Acheson, J. F., Chignell, A. H, and Wong, D. (1987) ' Eye injuries caused by directed jets of water from a fire hose'. British Medical Journal. Vol 294. 21st February. The report concluded that "the damage inflicted by a blow to the eye depends on the kinetic energy of the blow; ocular damage is due to the direct impact disrupting the anterior segment and the contra coup effect disrupting the retina. The energy on impact of solid objects such as a cricket ball or fist is dissipated over the cranial vault and facial skeleton as the blow strikes the orbital margin. This anatomical arrangement does not protect against atmospheric and immersion blast injuries or injuries due to high velocity jets of fluid; thus directed water jets can cause serious eye injuries.

191. Berson, D., Landau, D. (1985) 'High pressure water jets as a cause of severe bilateral intraocular injuries'. American Journal of Ophthalmology. 120 (4). p542-3.

192. Ranta, A. and Salminen, L. (1983) 'Orbital laceration caused by a blast of water: report of 2 cases'. British Journal of Ophthalmology. 67. 840-841.

193. Chemical Defence Establishment, Porton Down, United Kingdom. (1978) 'Assessment of damage to the anterior segment of the pig's eye due to the Special Water Dispenser (SWD)'. Technical Note No. 366. September.

194. Chemical Defence Establishment, Porton Down, United Kingdom. (1979) 'The Special Water Dispenser an assessment of the likelihood of damage to the fundus of the eye (R)'. Technical Note No. 378. February. This testing was targeted on pigs eyes with an impact energy of 120 joules and an impact time of 0.1 seconds.

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195. Eg the Armortek water cannon operates at 175 psi, <http://armortek.com/prod04.htm>, the riot control water cannon from Bulldog Direct Protective Systems Inc operates at 250 psi <http://www.bulldogdirect.com/armored-wc.html>, and the Ifex 3012 water gun operates at a pressure of 360 psi, IFEX 3000 brochure, PMC Supplies, UK.
196. BSSRS (1985) 'TechnoCop - New Police Technologies'. Free Association Books, UK.
197. Roche, L. (1983) 'Injuries caused by plastic bullets compared with those caused by rubber bullets'. The Lancet. 23rd April.
198. Police and Security News May 1998, p39.
199. Ibid. Historical data collected from the National Tactical Officers Association in the USA.
200. Reich, K. (1994) 'L.A police deploy "Less lethal" weapons'. Los Angeles Times 31st May.
201. Bell, D. (1999) 'The Use of rubber and plastic bullets in Northern Ireland'. M.A. Thesis. University of Ulster, Magee College, Ireland.
202. Bell, D. (1999) Ibid.
203. Shaw, J. (1972) 'Pulmonary contusion in children due to rubber bullet injuries'. British Medical Journal. 4. 764-766.
204. Millar, R., Rutherford, W. H., Johnstone, S. and Malhotra, V.J. (1975) 'Injuries caused by rubber bullets: a report on 90 patients'. British Journal of Surgery. Vol. 62. 480-486.
205. Ritchie, A. J., Gibbons, J.R.P. (1990) 'Life threatening injuries to the chest caused by plastic bullets'. British Medical Journal. Vol 301. 1027.
206. Roche, L. (1983) 'Injuries caused by plastic bullets compared with those caused by rubber bullets'. The Lancet. 23rd April.
207. Redgrave, P.(1982) 'Plastic Bullets: The medical facts'. World Medicine. 5th February, p52-54.
208. Irish News, 11 march 1998.
209. McMenamin, E. (1999) 'Submissions / general observations of Eamann McMenamin, Solicitor of Madden and Finucane, 88 Castle street, Belfast Re; the use of plastic bullets during the 'Drumcree' disturbances of July 1996 and July 1997, Submission to the Independent Commission on Policing in Northern Ireland'. July 1999. "No contemporaneous records are kept as and when the individual plastic bullet rounds are fired and it is respectfully believed these statements are just

a concoction for the purposes of giving lip service to the statutory obligations.

Her Majesty's Inspector of Constabulary inspected the RUC's use of plastic bullets and reported in his annual report in 1996 that record keeping was inadequate. In his report the following year he declares himself "quite at a loss to understand why (a better reporting system) was not actioned before this years marching season, when so much useful information could have been acquired". Her Majesty's Inspector of Constabulary, UK, Annual Reports 1996 and 1997

210. New Statesman (1984). "Many of the injured refused medical treatment for fear of being arrested". 17th August. p4.

211. Hiss, J., Hellman, F.N. and Kahana, T. (1997) 'Rubber and plastic ammunition lethal Injuries: the Israeli Experience'. Med.Sci.Law. Vol 37. No 2. p139.

212. Yellin, A., Golan, M., Klein, E., Avigad, I., Rosenman, J., Lieberman, Y. (1992) 'Penetrating thoracic wounds caused by plastic bullets'. Journal of Cardiovascular Surgery. 103. 381-385.

213. Jaouni, Z.M., O'Shea, J.G. (1997) 'Surgical management of ophthalmic trauma due to the Palestinian Intifada'. Eye. 11. 392-397.

214. Misliwetz, J., Wieser, I. and Denk, W. (1991) 'Medical and technical aspects of weapon effects'. Beitr. Gerichtl. Med. 49..361-6. The report compared the plastic ROTA training ammunition to standard 5.56mm ammunition. It stated that the ammunition has the advantage of being less dangerous over long distances (500m) but concluded that at short range the ammunition has a "reasonable capacity of incapacitation.

215. B'Tselem (1998) 'Death Foretold - Firing of "rubber" bullets to disperse demonstrations in the Occupied Territories'. Israel.

216. Cohen, M.A. (1985) 'Plastic Bullet Injuries to the Face and Jaws'. South African Medical Journal. 68. 849-852.

217. South (1988) 'The science of Suppression'. November, p71.

218. Misliwetz, J. and Lindermann, A. (1991) 'Gunshot Wounds Caused by Fiocchi Anticrime Cartridges (Plastic Bullets)'. American Journal of Forensic Medicine and Pathology. 12(3). 209-212.

219. Chute, D.J. and Smialek, J.E. (1998) 'Injury patterns in a plastic (AR-1) baton fatality'. American Journal of Forensic Medicine and Pathology. 19(3). 226-229.

220. Daily Telegraph 18th May 1997 'Police could test 'spiderman' gun'.

221. Law Enforcement News XXIII November 30th 1997, No.478.

222. http://www.zarc.com/english/news/bluelinedef_tecbeankill.html 8/3/2000

223. Sehgal, A., Challoner, K.R. (1997). Journal of Emergency Medicine. Nov-Dec. 15(6). 789-91.

224. Steele, J., McBride, S., Kelly, J., Dearden, C., Roche, L. (1999) 'Plastic bullet injuries in Northern Ireland: experiences during a week of civil disturbance'. Journal of Trauma, Injury, Infection and Critical Care. Vol 46. No 4. pp711-714.

225. Home Office News Release, UK, 27th July 1999.

226. This report called on governments to *"Establish a rigorous independent inquiry into the use of stun belts and all other types and variants of electro-shock weapons, to assess their medical and other effects in terms of international human rights standards regulating the treatment of prisoners and use of force; the inquiry should examine all cases of death or injury in custody resulting from the use of such instruments, and the results of the inquiry should be published without delay"*. Amnesty International (1997) 'Arming the Torturers - Electro-shock torture and the spread of Stun Technology'. ACT 40/01/97. March.

227. T'Prina Technology, USA (1994) 'Stun Guns - An independent report'. p17.

228. "The Air Taser functions by using electrical waves to disorient the human nervous system, it's like radar jamming. So rather than using blunt force like a gun we're hoping to cause enough injury to bring him down, or a pain like a pepper spray where you're hoping to cause enough pain that they get distracted. Here we're actually causing a temporary paralysis, .. so it's a very non-violent way in terms of stopping somebody we just want them to stop what they're doing, we don't want to hurt them in anyway...." Rick Smith Air Taser Inc. Equinox - Non-Lethal weapons. Channel Four. RDF Television. 22nd September 1996.

229. In 1996 the President of Stun Tech Inc, Dennis Kaufman stated that "Stun Tech products, such as stun guns and belts have been tested on pigs and humans since 1973. There has never been a single documented case of a hand-held stun gun causing death in the United States". Inter Press Service 18th June 1996.

230. Rick Smith from Air Taser stated in 1996 that "We've got over twenty thousand field firings that have, that where the Taser has been used and there's not one incidence where the Taser has played a marked role in the death of an individual." Equinox - Non-Lethal weapons. Channel Four. RDF Television. 22nd September 1996.

231. Air Taser also claim that a University of Southern California Medical Center showed that "the Taser leaves 0% long-term injuries". However, Air Taser recognise, in the warning notes that accompany their product, that the temporary paralysis could be fatal under specific circumstances. For example, if someone was tasered in a swimming pool. 'Warning. Read this before using'. Air Taser Inc, 1994.

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232. One Chinese manufacturer warns against the use of their devices for greater than three seconds to avoid the risk of injury or death. Their company brochure states "Precaution - Do not shock on the head or in the heart in performing their missions. In order to avoid injuries or deaths, do not act over three seconds on the recipients" State-Run No. 764 Factory - Public Security Business Division brochure July 1996.
233. Outdoor Life (1988) 'A shocking cure for Snakebites'. July, v182, n1, p45-47.
234. These studies evaluated dapsone and electric shock therapy found that *"Guardian stun gun treatment results did not differ significantly from those of the control group for any of the four wound areas."* Barrett, S.M., Romine-Jenkins, M., Fisher, D.E. (1994) 'Dapsone or Electric Shock Therapy of Brown Recluse Spider Envenomation?'. Annals of Emergency Medicine. July. v24. n1. p21-25.
235. Communication from Dr T. Bernstein, University of Wisconsin-Madison to Mr NP Zylich, Consumer Product Safety Commission, February 12, 1976.
236. He [Harry Landis] had a history of heart problems, and there does not appear to be conclusive evidence that stun belts are in fact safe for those with such medical histories. Although one health study has been undertaken on stun belts by Robert Stratbucker of the University of Nebraska that claimed the belts were safe, the study was only done on anesthetized pigs. Hinman, L.M. (2000) 'Stunning Morality: The moral dimensions of Stun Belts'. www.ethics.acusd.edu/stunning%20Morality%20Text.htm.
237. Texas state correction authorities stopped using stun guns reportedly on medical grounds, but continued to allow prison guards to use electro-shock riot shields when removing prisoners from cells. On 1 December 1995, Texas correctional worker Harry Landis was reported to have collapsed and died after enduring two 45,000 volt shocks while training with a riot shield. Amnesty International (1996) 'United States of America - Use of Electro-Shock Stun Belts'. AMR 51/45/96, 12 June .
238. The Texas Department of Criminal Justice, which had used the shields to subdue prisoners since September 1995, immediately suspended their use. Meanwhile, John McDermit, president of Nova Products, Inc., the maker of the shield, denied that it had killed Landis. "We're very sorry this happened," McDermit said. "But there certainly was no connection between his training and his death." Cusac, Anne-Marie. (1996) 'Stunning Technology'. The Progressive. July.
239. O'Brien, D. (1991) 'Electronic weaponry - a question of safety'. Annals of Emergency Medicine. May. v20. n5, p583-87.
240. Duff, L.T. (1976) 'TASER TF-1, CP-76-5 (Memo)'. Washington DC, US Consumer Product Safety Commission February 10. Cited in O'Brien, D (1991) op cit.

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241. O'Brien, D. (1991). Op. cit.
242. Nova Technologies Inc: The Nova XR-5000. Las Vegas, Nevada, NOVA, 1984. Cited in O'Brien, D (1991) *Annals of Emergency Medicine*, 20 May 1991, v5, p583-7
243. Unpublished communication from M Katz, General Counsel, US Consumer Product Safety Commission, January 24, 1984. Cited in O'Brien, D. (1991) *Annals of Emergency Medicine*. 20th May. v5. p583-7.
244. Stratbucker, Robert. A. (1985) 'Safety Technical Evaluation of Model XR-5000 electronic stun gun'. University of Nebraska Medical Center-Omaha. 15 January .
245. Stratbucker,R.A., Marsh,M.G. (1993) 'The relative immunity of the skin and cardiovascular system to the direct effects of high voltage - high frequency component electrical pulses'. IEEE BioMedical Engineering Conference.
246. Roy,O.Z., Podgorski,A.S. (1989) 'Tests on a shocking device - the stun gun'. *Med. & Bio. Eng. & Comp.* 27. 445-448.
247. Robinson,M.N., Brooks, C.G., Renshaw, G.D. (1990) 'Electric Shock devices and their Effects on the Human Body'. *Medical Science and Law*. v30. n4.
248. *Guardian* 10th July 1998, p3 'Judge shocks noisy prisoner into silence',. "Nine deaths in Los Angeles jails have been linked to taser gun use, and in 1986 the city paid a \$300,000 (£190,000) settlement to a youth burnt by stun guns to force him to confess to a robbery"
249. *Police Review* 16th September 1988, p1927. "Two Los Angeles men have died after being shot by police stun guns. They were overcome by the electric darts as police arrested them in separate incidents on suspicion of drug abuse. Police use Taser guns to disable violent suspects temporarily. An investigation has been ordered"
250. *Los Angeles Times*, March 12, 1993. 'Questions raised in death of man shot by Taser'. The death of Los Angeles barber Michael James Bryant, who died after being chased by police and, refusing to get out of a swimming pool, was shot with an electric stun gun, has raised serious questions about the incident. An autopsy on March 10, 1993 did not determine the cause of Bryant's death.
251. *Chicago Defender* July 1st 1995. Section PG, Col 6:1. 'Woman guilty in stun gun death'. On June 28, 1995, Francine Knox was convicted in the death of her nephew, Brandon Jordan, an infant who died after being shocked with a stun gun. The Peoria Illinois woman could face up to 20 years in prison when she is

sentenced for the death.

252. San Francisco Chronicle. June 19th 1992, Section A, 23:1. 'Lawsuit Seeks \$6 million in Deuel Prisoner's Death'. Guards trying to subdue a prisoner at Deuel Vocational Institution in Tracy CA in 1991 shocked the man to death with an electronic stun gun, according to a lawsuit filed in federal court Jun 18, 1992. The man, Donnie Ray Ward, was mentally ill.

253. Burdett-Smith, P. (1997) 'Stun Gun Injury'. Journal of Accident & Emergency Medicine. November. v14. n6. p402-4.

254. Other reports of injuries have emerged where illegal stun guns have been used by muggers to immobilise their targets enabling them to inflict physical injuries to the prone victim. See for example 'Hunt for brutal stun gun robbers', Manchester Evening News 13/5/2000, p1.

255. Mehl, L.E. (1992) 'Electrical Injury from Taser and Miscarriage'. Acta. Obstet. Gynaecol. Scand, Summer. February, v71, n2, p118-123. "A case report is presented of a woman who was "Tasered" by law enforcement personnel while 12 weeks pregnant. The Taser is an electronic immobilization and defense weapon that has been commercially available since 1974. The TASER was developed as an alternative to the .38 special handgun. The patient was hit with TASER probes in the abdomen and the leg. She began to spontaneously miscarry 7 days later and received a dilation and curettage procedure 14 days later for incomplete abortion...As use of the TASER becomes more common, obstetrical clinicians may encounter complications from the TASER more often."

256. New York Times, November 25th 1994. 'A Baby's Stun-gun death'.

257. Report of the Joint Committee of Inquiry into the Background, Circumstances and Actions resulting in the death and injury of Rail Commuters at Tembisa Station on 31 July 1996. August 1996.

258. Translation of letter to Dr Harold Hillman, May 10, 1995.

259. For example, a medical article in 1993 reported *"...Eleven cases of sudden death of men restrained in a prone position by police officers are reported. Nine of the men were hogtied, one was tied to a hospital gurney, and one was manually held prone. All subjects were in an excited delirious state when restrained. Three were psychotic, whereas the others were acutely delirious from drugs (six from cocaine, one from methamphetamine, and one from LSD). Two were shocked with stun guns shortly before death. The literature is reviewed and mechanisms of death are discussed"* O'halloran, R.L., Lewman, L.V. (1993) 'Restraint Asphyxiation in excited delirium'. American Journal of Forensic Medicine and Pathology. 14(4). 289-295.

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260. The isopropyl alcohol used in Cap-Stun is flammable. There is a court case pending concerning the use of Cap-Stun. Rick Wimberly, from Cap-Stun Weapon Systems, supplied the following information:"On August 10, 1990, NYPD officers responded to a call about an emotionally disturbed boy armed with a hammer and two knives who had locked himself in his bathroom. The officers opened the bathroom door and sprayed the subject with a crowd control unit sold by Luckey Police Products, the former owners of Cap-Stun. When the subject did not respond to a verbal command, the officers shot him with an electronic taser. A spark started a fire. The boy suffered first and second degree burns. There are two different accounts on how the fire started. Either the Taser ignited the boy after he was sprayed or the taser ignited the shower curtain and wallpaper, and burned the boy". Cincinnati Police Division Chemical Aerosol Report 1992.
261. Report of the Joint Committee of Inquiry into the Background, Circumstances and actions resulting in the death and injury of rail commuters at Tembisa Station on 31 July 1996.
262. Op. cit. p18
263. A 1997 study by Prof. Peter Kraska and Victor Kappeler at Eastern Kentucky University's School of Police Studies in the USA, reports that this process accelerated in the 1980's when 90 per cent of the police departments surveyed in cities over 50,000 had paramilitary units, as did 70 percent of departments surveyed in communities with populations under 50,000. See Kraska, P. and Kappeler, V. (1997) 'Militarizing American Police: The Rise and Normalization of Paramilitary Units'. Social Problems. 44. p.24.
264. Weber, D.C. (1999) 'Warrior Cops - The Ominous Growth of Paramilitarism in American Police Departments'. Briefing Report No.50, The Cato Institute, August 26th.
265. Hard evidence of such civilian casualties killed by police 'friendly fire', particularly in US black ghetto areas, is already documented. See for example Cassidy, P. (1997) 'Operation Ghetto Storm - The Rise in Paramilitary Policing'. Covert Action Quarterly. No. 62. Fall 1997. pp 20-25.
266. For an excellent discussion of this phenomena, see Kraska, P. and Kappeler, V. (1997) Op. cit.
267. See U.S. Department of Justice and U.S. Department of Defense (1997) 'Joint Technology Program: Second Anniversary Report'. Washington, US Department of Justice, February. pp.1-18.
268. Also of note are the changing contexts in which such weapons can be authorised - for example, controlling protestors hundreds of kilometres away from the site of any demonstration or static assembly. Thus, the recent EU proposals already agreed make the deployment of such public order

tactics weapons and options legal at the discretion of senior police officer, acting at the bequest of a fellow European colleague wishing to dissuade European nationals travelling outside their country of residence.

269. See for example, Hersh, S.M. (1969) 'Your friendly neighbourhood MACE'. New York Review of Books. 27th March. pp 41-44. Page, J.A. (1969) 'Mace for the masses', Commonweal. 90(5). 141-3. 18th April. 'Public Sale of protective Chemical Sprays', Hearings before the consumer subcommittee of the US Senate committee on Commerce, 21 May 1969.

270. Amnesty International, International Secretariat (2000) 'USA - Ruling limiting Police use of Pepper Spray – A Positive step'. AI Index AMR 51/72/2000. News Service 92. 17th May.

271. Amnesty International Press release (1997) 'AI-USA:Police Use of pepper Spray Is Tantamount To Torture'. Nov 7th.

272. Amnesty International News Service (2000). 'Austria - Incidents of police brutality continue'. "Supported by eyewitness reports and medical evidence, detainees have reported being repeatedly kicked, punched, kneed, beaten with truncheons and sprayed with pepper after restraint. The victims are mostly non-white foreign or Austrian nationals and in many cases police are alleged to have used racist language." AI Index: EUR 13/07/00. 24th March.

273. US GAC, (1989) 'Israel: Use of US Manufactured Tear Gas in the Occupied Territories. Report to the Honourable Ronald V. Dellums'. House of representatives. April.

274. A point recognised by NATO spokesman General Guiseppe Marani who announced reports of Yugoslav forces in Kosovo using tear gas to drive civilians from their homes in Pristina. He stated: "Tear gas shouldn't be used in combat. It can be used for police work. You can use it to pull someone out of a house and arrest him. It shouldn't be used to pull someone out of a house and shoot him." Reuters 20th Apr 1999, 'NATO says it hit Serb 'Frog' surface missile site'.

275. Examples of baton abuse are reported in virtually every country worldwide. Most of this abuse is unsystematic, but in some cases more systematic abuse has been reported, "among the more primitive weapons deployed are hard fibre glass batons and iron batons covered with plastic; these have replaced the wooden stick. They have been used to smash demonstrators cheekbones, forcing their eyes from their sockets. Dr John Hiddlestone, a UN health official, says he has seen so many of these wounds inflicted with 'such a degree of accuracy' that he believes troops must have had training for this particular blow." South (1988) 'The science of suppression'. November.

276. Numerous reports from Northern Ireland detail the doctoring of projectiles with such objects as razor blades, nails, torch batteries, glass slivers, bottle tops and coins. See Information on Ireland (1982) 'They Shoot Children - the use of rubber and plastic bullets in the North of Ireland'. Russell Press, UK. Also United Campaign Against Plastic Bullets (1996) 'A report on the misuse of the baton round in the North of Ireland, submission to the Mitchell Commission on Decommissioning'. January 18th 1996. "The death of 11 year old Francis Rowntree in 1972 was caused by a rubber bullet that had a battery inserted into it". Because plastic bullets are harder, they are more difficult, but not impossible, to tamper with. See also Rauch, J., Storey, D. (1998) 'The policing of public gatherings in South Africa 1960-1994'. The Truth Commission Research Unit, South Africa. May. "It is well known within police circles that SAP members would alter ammunition in order to inflict more damage on their victims. The best known example of this was the practice of placing batteries inside rubber stoppers, thus raising the likelihood of lethal consequences if they hit the victim on the head".

277. The RUC maintains that the bullets are only used against rioters in situations of serious public disorder, in accord with the rules of minimum use of force. However, many of those killed by plastic bullets have been proven not to have been rioting, according to the Committee on the Administration of Justice "in six cases a judge or inquest found that those killed were innocent victims. In two further cases involving children aged 10 and 11, no finding of rioting was made by the inquests. In one case two juries could not agree whether a victim had been petrol bombing troops from a kitchen window. In only four cases inquest juries judged those killed to have been rioting" see Committee on the Administration of Justice (1990) 'Plastic Bullets and the Law'. CAJ Pamphlet no.15. March. See also Committee on the Administration of Justice (1996) 'The Misrule of Law, A report on the policing of events during the summer of 1996 in Northern Ireland'. October which details numerous instances of plastic bullets fired when no rioting was taking place. Similarly in Israel there are numerous reports of rubber and plastic ammunition fired when no rioting is taking place, or fired into the backs of people fleeing the firing; see B'Tselem (1998) 'Death Foretold, Firing of rubber bullets to disperse demonstrators in the Occupied Territories'. December.

278. Millar et al report a series of 19 patients where impact was below 25m despite the guidelines stating 30m as minimum see Millar, R., Rutherford, W., Johnstone, S., Malhotra, V. (1975) 'Injuries caused by rubber bullets: a report on 90 patients'. British Journal of Surgery. Vol 62. 480-486. Metress and Metress report that "an examination of the three rubber bullet and 13 plastic bullet deaths in Northern Ireland indicates that most were fired at from a distance of less than 20 yards in contrast to the rules for firing, see Metress, E. and Metress, S. (1987) 'The Anatomy of plastic bullet damage and crowd control'. International Journal of Health Services. Vol 17. No2. Many examples of plastic bullets fired at short or even point blank range are detailed in Committee on the Administration of Justice (1996) 'The Misrule of Law, A report on the policing of events during the summer of 1996 in Northern Ireland'. October. Reports on demonstrations that took place in Seattle, USA in 1999 detail the firing of kinetic impact weapons at short range see for example Wilson, K. and Porterfield, E. (1999) 'Brutal police behaviour was recorded on video'. Seattle Post Intelligencer. 9th December.

279. Medical evidence suggests that vulnerable areas of the body are targeted. All the deaths that have occurred in Northern Ireland have been by shots to the chest or head - see United Campaign Against Plastic Bullets (1996) 'A report on the misuse of the baton round in the North of Ireland, submission to the Mitchell Commission on Decommissioning'. January 18th. Millar et al reported that over 70% of injuries were to the chest, neck or head area see Millar, R., Rutherford, W., Johnstone, S., Malhotra, V. (1975) 'Injuries caused by rubber bullets: a report on 90 patients'. British Journal of Surgery. Vol 62. 480-486. Rocke found that over 50% of the injuries examined were to the chest, neck or head area, see Rocke, L. (1983) 'Injuries caused by plastic bullet compare to those caused by rubber

bullets'. The Lancet. 23 April, p920. The Committee on the Administration of Justice detail scores of injuries to the upper body in contravention of the guidelines, see Committee on the Administration of Justice (1990) 'Plastic bullets and the law'. CAJ Pamphlet No 15.

Similar results have been reported from South Africa for example see Cohen, M. (1985) 'Plastic bullet injuries of the face and jaws'. South African Medical Journal. Vol 68.

In Israel Hiss et al reported deaths caused by impacts to 17 victims, 13 of whom suffered wounds to the head, neck or chest, see Hiss, Y., Hellman, F., Tzipi, K. (1997) 'Rubber and plastic ammunition lethal injuries: the Israeli experience'. Med Sci Law. Vol 37. No 2.

The most recent medical paper on plastic bullets highlights impacts on the vulnerable areas of the body in nearly 40% of cases and recommends that no shot should impact above waist level, see Steele, J., McBride, S., Kelly, J., Deraden, C., Roche, L. (1999) 'Plastic bullet injuries in Northern Ireland: experiences during a week of civil disturbances'. Journal of Trauma, Infection and Critical Care. vol 46. no 4. 711-714.

280. The deaths of at least two of the victims in Northern Ireland occurred when plastic bullets were fired from a moving vehicle; see United Campaign Against Plastic Bullets (1996) 'A report on the misuse of the baton round in the North of Ireland, submission to the Mitchell Commission on Decommissioning'. January 18th.

281. There are many reports of plastic bullets being fired at people coming out of pubs, clubs, restaurants, walking down the street, going shopping, shot through windows, into rooms, inside public halls etc, see Committee on the Administration of Justice (1990) 'Plastic bullets and the law'. CAJ Pamphlet No 15. Also Redgrave, P. (1982) 'Plastic bullets: the medical facts'. World Medicine. February. Also Committee on the Administration of Justice (1996), 'The misrule of law, a report on the policing of events during the summer of 1996 in Northern Ireland' October.

282. Many reports detail kinetic energy weapons pointed at children or innocent bystanders, or peaceful protestors sitting on the ground, see New Statesman 17th August 1984, p4 and Committee on the Administration of Justice (1996), 'The misrule of law, a report on the policing of events during the summer of 1996 in Northern Ireland'. October

283. Although justified as a crowd control weapon, their use has been reported against peaceful environmental protestors for example in Spain in 1996 against Greenpeace, see El Periodico, Barcelona, 2nd December 1996.

284. It has frequently been asserted by human rights groups in Northern Ireland that despite serious disorder from both protestant and catholic communities, rubber and plastic bullets have been disproportionately and indiscriminately against the catholic community. Of the 14 deaths from plastic bullets 13 have been catholic. During the summer of 1996 in Northern Ireland far more plastic bullets were fired in catholic areas than protestant areas despite a similar level of disturbances; see Human Rights Watch (1997), 'To serve without favor - policing, human rights and accountability in Northern Ireland' and Committee on the Administration of Justice (1996), 'The misrule of law, a report on the policing of events during the summer of 1996 in Northern Ireland'. October.

285. For example, “using tear gas, pepper spray and rubber bullets, the police forced the 200 ex-combatants out of the building. Sixty four bullets hit a single demonstrator, fifty year old army veteran Francisco Loza, who remains seriously injured”, El Salvador Watch, January 1996, No. 45.

286. Bullets fired from a normal gun have specific identifying marks cause by the internal imperfections of the barrel - hence bullets can be matched back to the gun that fired them and potentially the firer. Rubber and plastic ammunition used in Northern Ireland and the Occupied territories cannot be traced in this way.

287. In Northern Ireland despite 17 deaths and hundreds of injuries no single officer has ever been convicted of wrongdoing. In the only case that was heard under criminal law the officer was acquitted despite him breaking the guidelines on two counts, namely firing at the chest and below 20 yards range.

288. Details of investigation into 49 of the 58 Palestinians killed by “rubber” bullets found that action was only taken against 3 officers, 1 was acquitted, 1 had a “note on his file” and 1 was sentenced to twenty one months in prison for shooting and killing Ali Abu Awad from a distance of one metre whilst he lay on his back; see B’Tselem (1998) ‘Death Foretold, Firing of rubber bullets to disperse demonstrators in the Occupied Territories’. December.

289. The system of payments has been criticised because it prevents full examination and public disclosure of the facts of a case. Many cases are settled secretly out of court, with no admission of liability, see Bell, D. (1999) ‘The use of rubber and plastic bullets in Northern Ireland’. M.A. Thesis. University of Ulster, Magee College.

290. Helen Bamber, Director of the Medical Foundation for the Treatment & Rehabilitation of Torture Victims, London quoted in ‘The Torture Trail’, Channel 4 Dispatches programme, broadcast 11/1/1995.

291. He stated that “*electro-shock weapons are promoted as legitimate tools for law enforcement when in fact they are weapons of terror used to torture men, women and children. If companies knowingly trade electro-shock weapons with governments that torture, they are complicit in the abuse. Corporations cannot not disguise these weapons as reasonable police equipment for crime control when the design is intended to inflict severe pain suffering on human beings.*” William F. Schulz, Executive Director, Amnesty International USA. AIUSA Press Release. March 3, 1997. ‘Arming the Torturers: Electro-Shock Torture and the Spread of Stun Technology’.

292. For example, Armond Start, professor at the National Center for Correctional Health Care Studies has referred to stun weapons as “*one of those toys that enterprising manufacturers have developed that sound real good, but their potential for abuse is so great.*” Unfortunately, in the hands of a torturer, even a “toy” can produce cruel, even fatal, results. ‘Weapons of Torture’ - A Time investigation turns up evidence of loose controls and US companies’ shipping stun guns to countries that practice torture. Time Magazine, 6 April 1998, p52-53.

293. Time Magazine 6 April 1998, p52-53. 'Weapons of Torture' - A Time investigation turns up evidence of loose controls and US companies' shipping stun guns to countries that practice torture.

294. Amnesty International (1997) 'Arming the Torturers - Electro-shock torture and the spread of Stun Technology'. ACT 40/01/97. March. Appendix 1, p25.

295. The report included the following findings *"From various sources the delegation received allegations according to which people detained by the Bureau of Security in Vienna during February and March 1994 had received electric shocks inflicted with batons equipped to administer an electric discharge. The delegation of the CPT did not meet any detainees who claimed to have personally received electric shocks. However, several detainees met separately by different members of the delegation alleged having been threatened with electric shocks during interrogation at the Bureau of Security in Vienna. These detainees all described a similar instrument which was a portable device the size of an electric razor one extremity of which had two electrodes, a device which reportedly a police official carried in a personal bag."* ECPT. Council of Europe's Committee for the Prevention of Torture, October, 1996.

296. Agence France-Presse. March 14th, 1996 'About 70 injured in clashes over priest accused of homosexuality'. "The government called for calm on Thursday after about 70 people were injured in clashes with riot police who used tear gas to disperse supporters of a Greek Orthodox priest accused of homosexuality. Police also used electric batons to fight back 3,000 supporters of the cleric, as they tried to break down police barriers around the Archbishopric in Nicosia. Students of a nearby secondary school also threw bottles and stones into the building's courtyard. A police spokesman told AFP that 58 demonstrators and 10 police officers were taken to hospital, mostly suffering from breathing difficulties caused by the tear gas, which hung over the capital much of the day. Three demonstrators and two police officers were hospitalized for further treatment. One demonstrator was in serious condition after being struck by a electric baton, according to state radio."

297. United Nations Commission on Human Rights. Report of the Special Rapporteur. 24 December 1997. E/CN.4/1998/38.

298. Reuter-News-Service 6th September 1990. 'Bulgarian Police to get Anti-Riot Equipment'. Bulgaria's police, criticised for not preventing the recent storming and arson of Socialist Party headquarters, are being completely refitted as a riot force, the official BTA news agency reported on Thursday. New equipment will include water and air cannon, electric shock batons, blank cartridges, rubber, plastic and stun bullets, dogs, horses, armoured personnel carriers and "non-lethal chemical weapons", a decree by the council of ministers said. The decree said the new weapons could be used only when physical force failed to quell public disorder endangering property and civil rights and freedoms. (It is not known which country supplied the electro-shock batons).

299. Amnesty International (1998) News Release 'Standing up for the Victims? 1998 United Nations Commission on Human Rights'. AI News release IOR 41/04/98. 12th March.

300. Human Rights Watch (1997) 'Turkey: Torture and Mistreatment in Pre-Trial detention by Anti-Terror police' 19th March. "Torture, especially by anti-terror police units, continues to be practiced widely in police detention in Turkey. Torture by the anti-terror unit is neither spontaneous nor rogue. This unit has methodically incorporated torture and abuse into its daily operations, utilizing special equipment, including special straps to bind detainees, high pressure hoses, racks for suspending suspects by their arms, and instruments to apply electric shock".

301. Amnesty International (1999) 'Urgent Action (UA 287/99) Fear of torture/ill-treatment' AI Index: AMR 51/179/99. 3 November. Other New Mexico inmates transferred to Wallens Ridge in September have made similar allegations of torture or ill-treatment. For example, Perry Connor has alleged that he was subjected to electro-shocks on his testicles from a stun gun, and Joseph Saavedra, Raymond Tahod and Julian Fuentes have alleged that they were beaten and/or shocked with stun guns. At least one of them has said that the electro-shocks caused him uncontrollable defecation. The New Mexico Corrections Department has conducted a initial investigation into the allegations, but has not made its findings public".

302. St Louis Post-Dispatch (1997) 'Graphic Tape Shows Attacks on Inmates Scenes Depict Kicking, Stun Gun Prods and Dog Bites'. August 17th. A 1:1. "In a dramatic show of force, Texas deputies curse, kick, drag and zap with an electronic stun gun Missouri prisoners who had been calmly relaxing in their bunks minutes before. Missouri prisoners housed in rented cells as part of a lease agreement with Texas have made claims of abuse for months. But their stories were routinely rejected as overblown by the Texas Jail Standards Commission and the Missouri Department of Corrections. Now the FBI is investigating for possible assault charges and civil rights violations. The Missouri Corrections Department is yanking its 415 male prisoners out of the jail in Brazoria County, Texas, beginning this week. And on Friday, Missouri abruptly cancelled its \$6 million annual contract with that rural county, south of Houston".

303. Boston Globe. August 19th 1997. 'Advocate wants inmates returned NBC report prompts worry about Texas jails'. A videotape that shows Texas prison guards beating and kicking inmates from Missouri at a county jail where they are housed has prompted one former lawmaker to question the safety of Massachusetts prisoners sent to Texas. The tape, made by prison officials as a training tool and aired on NBC last night, shows the guards conducting a raid after one of them smelled marijuana. Dressed in riot gear, the guards are shown forcing inmates to crawl as they are prodded by stun guns, chased and bitten by attack dogs, and sprayed with tear gas. Missouri officials were so upset by the incident that they pulled their 415 prisoners out of the Texas jail and brought them back to Missouri. They also cancelled their \$6 million contract with the private company that manages the jail where the episode happened, in Brazoria County, just south of Houston.

304. In affidavits taken by FIAC lawyers in Miami, some detainees said they were shackled and three said they were jolted with a device that gives electric shocks. Cuban detainee Rolando Alberto Vera Leon said guards shackled him spread-eagled to a concrete bed, face down; zapped him with a 50,000-volt riot shield; and left him there for 17 hours. At least eight detainees saw other INS detainees jolted with the "shock shield" or stun guns. Others said they were beaten; cursed with anti-immigrant comments and racial epithets; and arbitrarily placed in solitary confinement for

weeks at a time. Jackson County Jail administrator John Sullivan said he was investigating the complaints, but insisted there was no pattern of racism or abuse in the 300-bed jail, which has housed thousands of INS detainees since 1992. Reuters 7/31/98; Boston Globe 8/2/98

305. For example, that of Scott Norberg, an inmate at Madison Street Jail in Arizona, USA who reportedly died in prison on 1 June 1996 as a result of asphyxia, when detention officers who had intervened because of his alleged disruptive behaviour tried to overcome his resistance. The autopsy report was said to indicate that he had numerous contusions and lacerations to his head, face, neck and limbs as well as burn marks resulting from the use of a stun gun on various parts of his body. From 'Question of the Human Rights of all persons subjected to any form of detention or imprisonment, in particular: torture and other cruel, inhuman or degrading treatment or punishment'. Report of the Special Rapporteur, Mr. Nigel S. Rodley, submitted pursuant to Commission on Human Rights resolution 1997/38. Addendum. 24 December 1997. E/CN.4/1998/38/Add.1

306. Amnesty International (1997) 'Arming the Torturers - Electro-shock torture and the spread of Stun Technology'. ACT 40/01/97. March.

307. Frechette, A., Rimsza, M.E. (1992) 'Stun Gun Injury: A new presentation of the Battered Child Syndrome'. Pediatrics. May. Vol 89. No 5. p898-901. Which identified how medical and social workers were under-recognising the effects of child abuse using stun guns. The authors highlighted that *"the signs of such abuse are often subtle, and that they may currently be under-recognized. The skin lesions that are often seen are hypopigmented circular macules, measuring approx 0.5cm in diameter. They may be raised slightly and erythematous if inflicted recently. Most characteristic of stun gun assault is pairing of lesions approx 5cm apart"*. The authors were of the opinion that *"...Unfortunately, as well suited as they may be for self-protection, they are also very well suited for a form of assault on children which may be difficult to detect. Abusers have ready access to these devices and, because they are extolled as safe, may appear to provide an attractive method of gaining control over children or inflicting severe punishment. There have been some highly publicised cases involving interrogation and torture of adults with stun guns, but we can find no reports of stun gun abuse in children. Given the subtlety of physical findings resulting from a stun gun assault, these cases may be under-recognized currently."* and the authors concluded that: *"It is our hope that a better understanding of stun guns and the patterns of injury they may produce will result in an increased awareness of this type of abuse"*.

308. For an extended discussion of the background see for example Toffler A., & Toffler H., (1994) 'War and Anti-War: Survival at the Dawn of the 21st. Century,' Little Brown & Co., London.

309. Morris J., And Morris C., (1990) 'Non-Lethality: A global strategy,' Morris & Morris, West Hyannisport, MA.

310. Ibid.

311. Alexander J.B., Groller, R., & Morris, J., (1990), 'The Warriors Edge', USA.

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312. Aftergood, S. (1994) 'The Soft-kill fallacy', Bulletin of the Atomic Scientists, September-October pp.40-45
313. Lovelace D.C & Metz S., (1998) 'Non-lethality and American Landpower: Strategic context and operational concepts, Strategic Studies Institute, US Army War College, June 15th.
314. Ballantyne R., (1998) 'The Technology of Political Control', Covert Action Quarterly, Spring, pp.17-23
315. Paradoxically in 1999 allegations emerged that contrary to earlier denials, the FBI had used incendiary 'non-lethal' CS grenades at Waco, which are now believed to have started the fire. Although the FBI have now admitted to lying about the use of incendiary CS cartridges they deny a causal link to the fire. A further investigation was launched in 1999. See Guardian, Aug 27th. 1999 p.13
316. Hough W., (1995) 'High Tech Civilian Control Studied, Secret Pentagon-DoJ 'Memo of Understanding', The Spotlight, July 31.
317. See Lewer, N. & Schofield, S. (1997) 'Non-Lethal Weapons - A Fatal Attraction', Zed Books.
318. Aftergood S., (1994) op. cit.
319. William D Hartung, (1999) 'Stuffing the Pentagon with \$\$ is Wrong', Newsday, January 11.
320. For a detailed discussion of the U.S. NLW Management structure, see Col. Mazarra, (1998) 'Non-Lethal Weapons development & Doctrine - A View To The Future', presented to Janes NLW '98, Conference, London 1-2 December.
321. Hill L., (1999) 'NATO to adopt policy on non-lethal weapons', Defence News, Oct 18.
322. NATO (1999) NATO Press Statement, 'NATO Policy on non-lethal weapons', dated 13 October (See URL: <http://www.nato.int/docu/pr/1999/p991013e.htm>).
323. Ibid.
324. Thornton C., (1996) U.S. 'Army Non-Lethal Warfare Requirements' Proceedings, Non-lethal Defense II, The American Defense Preparedness Association, March 6-7.

325. Alexander JB., (1999) 'Future War - Non-lethal Weapons in Twenty First Century Warfare,' St Martin's Press, New York.p224.

326.New Scientist, 18 October 1997, p27.

327. See for example, Bunker, R.J. (ed.) (1998) 'Non-Lethal Weapons:Terms and References'. INSS Occasional paper 15. USAF Institute For National Security Studies, USAF Academy, Colorado. Available via http://www.infowar.com/resource/res_100997a.html-ssi

328. Mathew Meselson (1992) 'Banning Non-Lethal Chemical Incapacitants in the Chemical Weapons Convention', Committee For National Security, Washington, February 20

329.Meselson, 1992, op. cit.

330.Much of the scientific background to the chemicals described in this section is derived from Robinson, JPR, (1994) 'Disabling chemicals: some technical and historical aspects', a paper presented to the second workshop of the Pugwash study group on Implementation of the CBW conventions, Den Haag, 27-29 May.

331. Witten B., (1968) 'Non-lethal agents in crime and riot control' Edgewood Arsenal Technical memorandum, EATM 133-1, July, AD392476 (via FOIA)

332.Dept of the Army (1991) 'Supporting data FY 1992/1993 biennial budget estimate, Descriptive Summaries of the Research Development Test and Evaluation Army Appropriation', submitted to Congress February, AD A234275.

333.US Executive Order 11850 of April 1974 quoted in Meselson (1992) op.cit note 21.

334.This Acquisition Strategy (AS) was approved in February 1991, the Acquisition Plan was approved in May 1991. (USA Department of the Army(1992), 'NBC Modernization Plan' January).

335. Evidence for this conclusion comes from US Defense department FY 93 Small Business Innovation Research program for proposals including 'less-than-lethal' Immobilizing Chemicals'. The objective is given as "To suggest acquire, evaluate and develop chemical immobilizing materials for applications to various missions such as rescue, embassy protection, anti-terrorism, barricade situations, domestic disturbances and other law enforcement scenarios." The programme suggested that the fentanyl were candidates but that the duration of action too long and safety ratios too

low.” New “candidate immobilizers” should have “ improved safety ratios and shorter duration of action.” ASA Newsletter(1993) No.38, 14 October, page 14.

336.President Clinton (1994) Letter to the Senate transmitting the Chemical Weapons Convention for ratification, June 23rd

337. See presentation of J Basic (1998) ‘Technology Investment:exploring New Non Lethal Weapons concepts’, to Janes Non-Lethal Weapons - Development & Doctrine conference, 1-2 December.

338. See Presentation of Colonel Mazarra, United States Marine Co., ‘A View To the Future’,Janes Non-Lethal Weapons - Development & Doctrine conference, 1-2 December 1998.

339.Thornton C., (1996) ‘US Army Non-Lethal Warfare Requirements’, Non-Lethal Defence II Conference Proceedings, ADPA, March 6-7.

340.Janes International Defense Review (1996) ‘ Modified M16 for lethal/non-lethal attack’, No.9, September, p 20.

341.Mahon J., (1996) ‘Correctional Applications of less-lethal Force, Office of Security Technology, Federal Bureau of Prisons, presentation to Non-Lethal defence II Conference Proceedings, ADPA, March 6-7.

342.Flint J., (2000) ‘It worked for Spiderman, now WA police seek a net result’, The Age, Australia 17th. February’.

343.Alliant Technical Systems (1997) ‘An Industry perspective on Non-Lethal Weapons’ Presentation to Janes Conference NLW, 1997, 20-21 November, London

344. According to David Boyd at the National Institute of Justice research programme on Non-Lethal Weapons.

345. Gourley, S., (1996) ‘Soft Options’ Janes defence Weekly, London 17th. July.

346. For a discussion, see Doswald-Beck, L.. (1996) ‘New Protocol on Blinding Laser Weapons’. International Review of the Red Cross, M-J 96 36(312)pp.272-299.

347. See for example Alexander J.B et. Al.(Eds.) (1997): SPIE Proceedings, ‘Security Systems And Non-Lethal technologies For Law Enforcement, Boston, MA (<http://www.spie.org/web/abstracts/2900/2934.html>)

348. See Patent No 5675103, Non-lethal tetanizing laser, filed 17 July 1997.. The UK Defence Ministry's Defence Evaluation Research Agency as looked at this 'freezer ray already. See ' Raygun freezes Victims Without causing Injuries', Sunday Times 9 May 1999

349. See Technology News (1999) UV Lasers Stop people in Their Tracks, January. Also Max Glaskin (1999) 'Ray gun freezes victims without causing injury', Sunday Times May 9

350. Scannel EP, (1997), ' - ARL Non-lethal Weapon Concepts', Janes Conference, 'The Future of Non-Lethal Weapons', 20-21 Nov.

351. Bill Arkin quoted in the Guardian 9 December 1997.

352. For a discussion, see Alexander JB., (1999) op.cit

353. See Altman J., (1999) 'Acoustic Weapons - A Prospective Assessment: Sources, Propagation, and Effects of Strong Sound, Cornell University Peace Studies program, Occasional papers, May.

354. E.g. a provocative study on alleged psychotronics has emerged from the Czech republic. See Babacek, M., (1998) 'Psychoelectronic Threat to democracy - the Secret Arms Race (Russian federation and the USA Built Radar Systems that Could Enable Them to Control Minds of Whole Populations. ([Http://www.mk.net/~mcf/babdoc.htm](http://www.mk.net/~mcf/babdoc.htm))

355. For an interesting discussion, see Victorian A., (1998) 'The military use of electromagnetic microwave and mind control technology, Lobster No, 34 Hull, Winter edition, pp 2-7 (See also back issues of this exceptional publication: <http://www.knowledge.co.uk/xxx/lobster/>)

356. See Begich N., & Roderick J., (2000) 'Earth Rising? The Revolution: Toward a Thousad Years Of Peace, Earthpulse Institute, USA.

357. See reports from US military laboratories presented to Janes Non-Lethal Weapons conferences in 1997, 1998 and 1999.

358. See Outlines: <http://www.dtic.mil/ndia/NLD3/libb.pdf>

359. Not surprisingly, some of these are made by manufactures of the now outlawed anti-personnel land mines such as Alliant Tech, who developed a fishhook mine in 1996 as part of such a cannister launched area denial system which shoots out a thin wire with fishhooks. Marketing manager Tom Bierman says that 'Its intended to snag, its not going to kill you'. Not unless that is those who share your predicament panic.

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360. See Business Wire (1999) 'Battlefields of the future - Tasertron's Mine and Munition patents Issued Now,' Oct. 14, p.196.
361. Malodourous substances were chosen for US funding under the FY 1997 selection round - 'Investigating effect of odourous compounds on people of various cultures and geographical locations. See presentation of J Basic 'Technology Investment:exploring New Non Lethal Weapons concepts, Janes Non-Lethal Weapons - Development & Doctrine conference, December 1998.
362. For a presentation of these weapons and their tactical utility see RDF(1996), 'Non-Lethal Weapon broadcast by CH. 4's Equinox series, 22nd. September and subsequently repeated on the US Discovery Channel.
363. By academics and former military scientists writing for SIPRI. For a clear discussion of these developments see, Barfal, T., Lundin S.J., and Rybeck B., (1993) 'Benefits and threats of developments in biotechnology and genetic engineering,' Appendix 7A., SIPRI Year Book, World Armament and Disarmament, Stockholm, Sweden.
364. See for example, Larson CA., (1970) 'Ethnic Weapons,' Military Review, Nov. 3-11.
365. For an extended scientific discussion of the basis of such genetic breakthroughs and their feasibility, see the BMA's (1999) 'Biotechnology, Weapons and Humanity', Harwood Academic Publishers, Ch.4, pp53-68
366. Enriques J., (1998) 'Genomics and the world's economy.' Science, vol 28, 14 August, pp.925-26.
367. For a recent comprehensive and clear discussion of the prospects of genetic warfare and the breakthroughs in bio-technology upon which it can be based, see Dando M., (1998) 'Benefits and Threats of developments in biotechnology and genetic engineering,' Appendix 13A, SIPRI Year Book, World Armament and Disarmament, Stockholm, Sweden.
368. The 5th. Review conference of the BTWC will take place in 2001. Detailed accounts and summaries of the negotiations are available at the joint SIPRI/Bradford Department of Peace Studies Internet site at URL <http://www.brad.ac.uk/acad/sbtwc>
369. However some of these concerns have been addressed by the Principles of the Universal Declaration of the Human Genome and Human Rights. They have been more specifically covered by the resolution on legal aspects of military activities passed at the meeting of the EP's Foreign Affairs, Security and defence Policy which called for an international convention and global ban on all research and development , whether civilian or military , which seeks to apply knowledge of the chemical, electrical, sound vibration or other functioning of the human brain to the development

of weapons which might enable any form of manipulation of human beings, including a ban on any actual or possible deployment of such systems.

370. Non-Lethal Weapons and International Humanitarian Law, Proceedings of Jane's Non-Lethal Weapons Conference 1-2 December 1998.

371. Edwards, R.(1999) Humane Killing, New Scientist, 4 December, pp. 14-15

372. ICRC(1997) The SIrUSProject, Geneva. Also <http://www.icrc.org> (English)

373. For a discussion see Edwards. R.,(1999) 'Humane Killing', New Scientist, 4 December, pp.14-15.

374. Pugwash Newsletter (1997) November, p.276

375.Amnesty International (1997) 'Arming the Torturers: Electroshock Torture and the Spread of Stun Technology, London: International Secretariat.

376. Pugwash(1997) see note 38.

377. Reuters 20th March 2000 'Glock Mulls Joining US Handgun Settlement'. In the US,12 children under the age of 19 are killed by guns every day - by adults, each other or by accident which is more than all the other industrialised countries combined. Every two years, more Americans are killed by guns than died in the entire Vietnam War see, MacIntyre, B.(2000) 'Shooting From the Lip Over Right To Bear Arms'. Times, London 25th March.

378. For a useful discussion of such dilemmas for US police officers see, Major Steve James' collection of articles on less-lethal force options and impact projectiles. Available from City of Springfield Police Department, 321 E. Chestnut Expressway, Springfield, Missouri 655802, USA Fax (417) 864 1827 (HRT4ME@dialnet.net)

379. Amnesty International (2000) 'Austria before the UN Committee against Torture: allegations of police ill-treatment'. AI Index: EUR 13/001/00. 24th. March. The report accused the Austrian police of seriously flouting human rights and abusing their powers in their treatment of black detainees. Based on the findings of the UN Committee Against Torture, the report provides detailed eyewitness accounts and medical reports of detainees being kicked, punched beaten with truncheons and sprayed with pepper. See also Guardian 25th March 2000.

380. These crimes have emerged during an ongoing investigation into police practices in Los Angeles. See for example Reuters 6th May 2000 'U.S. Reportedly May Sue to Force LAPD Reforms'.

381. Carson, R. (1963) 'Silent Spring'. Hamish Hamilton.

382. Hansard, 12th May 2000 c1186.

383. Reitman, V. (2000) 'Seoul Adopts Chemical-Free Policy on Protests'. Los Angeles Times. Sunday March 5th. Section A page A-4.

384. BBC Wednesday, August 11, 1999. 'UK. Government maintains CCTV vision'. Published at 06:06 GMT 07:06.

385. PA News. 6th October 1998 'Spy on the Street can identify criminals in seconds'. Liberty questioned claims that the system had an 80% success rate. Its campaigns manager Liz Parratt warned: "The accuracy of facial mapping is very limited. You only need to look at a handful of photos of celebrities to see how very different the same people can look in different photos. "The claim that those who have nothing to hide have nothing to fear is rubbish. What the police call an 80% success rate is what we would call a one in five chance of a mistake. Even if it worked, it would need to be very carefully regulated to protect people's privacy."

386. For a detailed discussion of the longer term social implications of the development of 'intelligent' or algorithmic surveillance see Norris, C. and Armstrong, G. (1999) 'The maximum surveillance society - the rise of CCTV'. Berg. Sussex.

387. The exception would be water cannon, if States decided to categorise them within the Armoured Vehicle category.

388. See for example. Manurhin MR35 Punch company brochure that states: In France the MR35 Punch is a weapon classified in the 7th Category: free purchase, possession and transport in the conditions accepted by law. (Company Brochure, June 1994).

389. In France an export licence is not required to export tear gas as this material is not included in the French governments arms control list. In other words, it is not military equipment and so it is not subject to arms export controls. Foreign buyers simply need to contact the French manufacturer, agree a price and that's it. Personal communication with the authors from Saferworld 3rd April 2000.

390. Irish Government response to Amnesty International 'Less-than-lethal' survey questionnaire. 9th February 2000.

391. See for example, Eire, Finland, France, Italy, Netherlands, Spain, UK.

392. Given that chemical irritants can be deployed by individual personnel, from vehicles, helicopters and by Naval launched munitions it is difficult to identify where any such transfers would be recorded.

393. See for example the details provided for a transfer by Simad SpA of 12 Cartuccia Lacrimogena cal 40mm M40STA/SR at a value of 300 Dm. Sulle Operazioni Autorizzate E Svolte Per Il Controllo Dell'Esportazione, Importazione E Transito Dei Materiali di Armamento Nonche Dell'Eportazione E Del Transito Del Prodotti ad Alta Tecnologia. Comunicata alla Presidenza il 31 Marzo 1999.

394. See for example listing for of export licence granted for CS Grenades to Tanzania [No further details] Strategic Export Controls Annual Report, October 1999. [1998 data], p89.

395. Export Controls.

Mr. Letwin: To ask the Secretary of State for Trade and Industry if (a) tear gas and (b) plastic bullets are covered by the export control regime.

Dr. Howells: These goods, and others, are controlled under entries in Part III of Schedule I of the Export of Goods (Control) Order 1994 as amended: tear gas under entry ML7; and plastic bullets under entries ML3 or PL5021. However, a variety of devices may contain tear gas. Such devices are controlled under several other entries: for instance, portable anti-riot devices for administering an incapacitating substance under PL5001; grenades under ML4 or PL5030; ammunition under ML3 or PL5021; gas projectors or generators under ML2 or PL5018; under entries ML6, ML9, or ML10, gas projecting equipment for controlled ground vehicles, combatant vessels or aircraft, respectively, that are specially designed or modified for military use; and portable devices designed for self-protection by the administration of an incapacitating substance under entry 1A905 of the Dual-Use and Related Goods (Export Control) Regulation 1996, as amended. It should be noted that other goods are also controlled under each of these entries. (Hansard. 19 April 1999 : Column: 456)

396. See for example, Amnesty International (1999) 'Submission to the Joint Inquiry into the Annual Report on Strategic Export Controls'. May. London.

397. Trade Intelligence CDROM 1997. Typical record from Trade Intelligence information source

TRADE Intelligence Bill of Lading Number:SEAU9687966807 Port of Embarkation:
Port of Arrival:

US Clearing Dest:
Foreign Port Dest:
Carrier:
Country of Origin:
Algeciras, Spain (ES) (EURO)
Miami, Florida
Miami, Florida
Santo Tomas, Guatemala (GT) (SAMR)
SEAU - Sea-Land Service Inc. (Maersk California: 718W (EURO)
Shipment
Arrival Date: 12-Oct-97
Container?: Y
TEU Count: 1

Weight: 5790 KG	Consignee
Measure: 15CM	Ministerio de la Gobernacion
Shipper	7A, Calle 10-54, Zona 1,
Falken Sociedad Anomina	Guatemala, Guatemala, CA
c/ Juan Jose Martinez Seco 12	Notify Parties
28021 Madrid, Espana	Ministerio de la Gobernacion
Tel: 91-7981418	7A, Calle 10-54, Zona 1,
	Guatemala, Guatemala, CA

Commodity Information
Cntr: GSTU333765
Cellulosic Chemical Pulps
HS Code: 470692
Cntr: GSTU333765
Pieces: 14
Chemical pulps equipo especial para control de masas para la direction general de la policia nacional civil L/C No.
Puerto Nacional Santo Tomas de Castillo, Izabal, Guatemala CA. Marks and Numbers Cntr:
No marks

398. The 9 digit EU Harmonized Custom codes would allow data to be provided for all EU member states. Whilst some codes cover a broad category of products in some cases it appears that manufacturers have extended the 9 digit code to produce more accurate data. For example, SNPE

provides the following code for its E2 Irritant grenade. 9306 90 10 2001B. It would be useful if this level of data was made publicly available.

399. See for example photograph of Kenyan police using teargas on pro-democracy demonstrators at Uhuru park, Nairobi in May 1997. In Amnesty International (1997) 'Kenya - The quest for Justice'. AI index: AFR 32/25/97. First published September 1997.

400. Amnesty International (1998) 'Equipping Kenyan Repression'. AI UK Journal. January/February. p14-15.

401. Anglican Communion News Service (1997) 'Kenya: Police storm cathedral'. 11th July.

402. Independent, 8th July 1997 'Kenyan protestors die in clashes'. and Times, 8th July 1997, p14. 'Seven die as Police smash Kenyan protests'.

403. The tear gas canister was manufactured by Pains Wessex, Salisbury, UK. Designated Standard Hand CS Irritants Mk IV. The plastic baton round was identified as being manufactured by Haley & Weller, Draycott, Derbyshire, UK. Designated 38mm Baton Round H371 long range version, which has a propellant giving a range of 90 to 130 metres. Both companies are subsidiaries of Chemring Plc, Portsmouth, UK.

404. Lockman, Zachary. And Bein, J. (Eds) (1989) 'Intifada - The Palestinian Uprising against Israeli Occupation'. MERIP Publication. p324. Lists 66 Palestinians killed by tear gas.

405. Nairn, A. (1998) 'Tear of Rage'. Multinational Monitor. April. p15-17.

"..Tear gas is often described as relatively harmless. In a March [1988] interview with New York radio station WBAI-Pacifica, Federal Laboratories President Dr Dennis Constantine said the gas "is not lethal. It is considered as being an irritant and there are no permanent serious effects because of its use. Anything can be lethal if used improperly..."

The Federal Laboratories "Riot Control" manual describes the dangers differently... The manual includes formulas for calculating the 'median lethal dosage' of CS and CN, expressed as the number of minutes it would take to 'kill 50 percent of an exposed group of persons.' In the example quoted at the beginning of the article, a Federal Laboratories No.230 Flite-Rite projectile containing 25 grams of CN gas can be expected to kill half the inhabitants of an eight-foot by eight-foot by seven-foot room in seven minutes. They would be expected to live 18 minutes if the CS gas were used instead."

406. Hansard 25th March 1998, Col 160.

Mr. Kidney: To ask the Secretary of State for Foreign and Commonwealth Affairs what assessment he has made of the compliance with his Department's ethical foreign policy of the sale of military, security and police equipment to Kenya. [35969]

Mr. Fatchett: In accordance with the revised criteria for licensing arms exports, we do not issue arms export licences for Kenya where there is a clearly identifiable risk that the proposed export might be used for internal repression.

During 1997 we rejected licence applications (together worth over £1.5 million) to export certain types of riot control equipment, including baton rounds and tear gas, to the Kenyan police. Furthermore, we removed Kenya from the coverage of several Open Individual Export Licences for the supply of body armour, firearms and ammunition.

407. The Nation 6th October 1998.

408. Agence France Presse 30th January 1999 'Kenya. Dozens injured as Kenyan police tackle eco-protestors'.

409. Agence France Presse 10th June 1999 'Kenyan police and demonstrators clash over constitution'.

410. Amnesty International, International Secretariat (1999) 'Tear Tracks: The trail from Europe to Kenya' in 'The Terror Trade Times'. October. p10.

411. The East African. 2nd October, 1997 'Kenya makes \$4.4m Order for Anti-Riot Vehicles'.

412. This combination of chemical irritant and marker dye has often led to observers and victims mis-reporting the weapons deployed. For example, "This time the paramilitary police drove British-made armoured water cannon onto the campus and sprayed the students with an ammonia solution. The water cannon were part of batch of nine exported to Indonesia in 1995. Dozens of students suffered skin burns. Independent, 27 March 1997 'British arms help Jakarta's war against its own citizens'.

413. TAPOL (1997) 'Statement on the Judicial Review Initiative'. 25th March 1997. "There was also overwhelming evidence that British and German water cannon had been out on the streets on 27 July 1996 and that water cannon were used to spray demonstrators with coloured liquid, possibly CS gas".

414. Amnesty International News Release (1997) 'Indonesia and East Timor. Arms and security transfers undermine human rights'. AI Index ASA 21/39/97. 3rd June. Riot control vehicles supplied from the UK to Indonesia during 1994-5 were fitted with powerful water cannons designed to use both tear gas as well as pink dye. Both types of chemicals have been reportedly used by Indonesian security forces on street protestors.

It is known that such dye has been used to mark street protestors in Jakarta. On 23 May 1997, a photograph and report of a riot control vehicle using pink dye was published by a UK newspaper. The UK Government has stated that it is opposed to the use of such dye by the Indonesia authorities and agreed on 12 February

1997 to investigate reports of the misuse of the water cannon. Nevertheless, it has been reported to Amnesty International that further transfers of such water cannon to Indonesia from the UK are being considered.

Amnesty International believes that as long as arbitrary arrests and ill-treatment by the security forces are common in Indonesia, and until the UK Government has reported the results of its investigation into the misuse of water cannon to Parliament and can offer reasonable assurances that such transfers will not be misused again, such transfers should be stopped.

415. Ezell, E. (1988) 'Small Arms Today'. Boston, Stackpole Books. p205.

416. A report dating from 1990 that Schermuly had supplied a small amount of CS gas. Defence Manufacturers Association (1990) 'Police & Security Requirements for Equipment and Services in the ASEAN region'. August. p238.

417. SS1-V1, SS1-V2 and SS1-V3 assault rifles. Jane's Infantry Weapons 1997/98, p153.

418. Defence Manufacturers Association (1990) 'Police & Security Requirements for Equipment and Services in the ASEAN Region'. August. p238.

419. Jane's International Defence Directory 1995. Jane's Publications Group, UK. PT Pindad was listed as supplying: small arms ammunition, spares for licenced weapons, mortar bombs, hand grenades, explosive devices, pyrotechnics, and Grenades, anti-riot, tear gas CN, hand launched.

420. Interview on 7 November 1997 with Rabbison Chongo, of Zambia's United National Independence Party (UNIP) in London

421. After being beaten by police, then detained in a police van, she said she watched the police officers going inside the building to shoot tear gas rounds, then closing the main glass door of the lobby to contain it *"The smoke in this office was terrible. I tried to wash my face. I wanted to go upstairs to the first floor. I couldn't see in front of me, about five feet in front, I couldn't see because it was like chili in my eyes. I was following the wall to go out and up the stairs. Then someone was pulling me out. A hand was pulling me out. It was the police. They started beating me. Three police men, they hit me with batons. Wooden batons, a club with a handle on the side. They tore my skirt and threw me in a van. What I saw when I looked out: guns., The police were going in with guns. They opened the door [to Freedom House] and would shoot teargas, then they closed the door again.* (Interview with Mrs Melania Chipungu, 8 April 1998).

422. UNIP official Basil Kabwe recalled *"We sent out telephone messages to red cross. Mrs Melian Sebente Akuffo managed to get through to the Red Cross. But the police shot tear gas canisters at the ambulance, it was clearly marked with a red cross, and it turned around and drove away again."* (Interview with Basil Kabwe in Lusaka, 8 April 1998)

423. For example, on 27 July 1998, Melian Sebente Akuffo was at another UNIP office elsewhere in Lusaka. After phoning Freedom House, she was asked

telephone the police. She remembered her conversation with the police officers: "The policeman who I spoke with said: 'We'll tear gas them until they die and those who come out of the building we will break their necks.' I asked: '*Are you a policeman for the [ruling party] MMD or for the republic?*' and he *banged down the receiver.*" Melian Sebente Akuffo then called the Zambia Red Cross, and agreed to meet them outside Freedom House, and accompany them into the building. "I went with the Red Cross to give water to people suffocating. Police said we couldn't give water to people. The policeman in charge said if the Red Cross didn't move, he would shoot out their tyres. He shot tear gas into the vehicle."

424. Hansard 21st January 1977

425. Jane's Police and Security Equipment 1998-99, p345. Jane's Publications Group, UK.

426. Verney Carron (France) company brochure.

427. Jane's Police and Security equipment 1998-99, p148. Jane's Publications Group, UK.

428. MK Ballistic Systems (USA) company brochure.

429. MK Ballistic Systems (USA) company brochure.

430. Milstor Corporation (USA) company brochure.

431. Fiocchi (Italy) company brochure.

432. TFM Pty, South Africa, company brochure.

433. MR 35 Punch - see Arch. Kriminol. 1997 Sep-Oct. 200(3-4):87-94. Variation in energy due to variation in propellant charge.

434. Nobel Securite (formerly SNPE) France company brochure.

435. Nobel Securite (formerly SNPE) France, company brochure. For the 46g rubber bullet the energy level given is for the upper range limit, at 10m impact energy would be higher.

436. Poliske Strojirny, Poland company brochure.

437.. Chute, Dennis. J. and Smialek, John. E. (1998) ' Arwen: Injury Patterns in a Plastic (AR-1) Baton Fatality'. The American Journal of Forensic Medicine and Pathology. 19(3). 226-229.