ORIGINAL

SUPREME COURT, STATE OF COLORADO Court Address: 2 East 14th Avenue Denver, Colorado 80203	FILED IN THE SUPREME COURT MAY 10 2006 OF THE STATE OF COLORADO SUSAN J. FESTAG, CLERK
ORIGINAL PROEEDINGS PURSUANT TO § 1-40-107(2), C.R.S. (2005) Appeal from Ballot Title Setting Board **CHILDREN EX REL.** **Petitioners:** Boy Ho and Page Penk v. **Respondents:** **Title Board:** WILLIAM A. HOOBS, JASON DUNN AND DAN CARTIN.	**▲ COURT USE ONLY ▲**
Page Penk *pro se* for myself and the boy. 1304 S. Parker, PH 17 Denver, Colorado 80231 Phone Number: 303.283.7913	Case No: 06SA144 06SA144

EMERGENCY PETITION FOR REVIEW OF FINAL ACTION OF BALLOT TITLE SETTING BOARD CONCERNING AMENDMENT OF ARTICLE XXVI, "NUCLEAR DETONATIONS", OF THE COLORADO CONSTITUTION THROUGH PROPOSED INITIATIVE 2005-2006 #82

("PEACE IS POSSIBLE")

AND 71 PAGE APPENDIX OF NON-LETHAL WEAPONS

05-10-2006 01:01:0048 CHECK 75.00

"Government will be imperilled if it fails to observe the law scrupulously. Our Government is the potent, the omnipresent teacher. For good or for ill, it teaches the whole people by its example."

Olmstead v. United States. 275 U.S. 570 (1927) Mr. Justice Brandeis, dissenting.

QUESTIONS PRESENTED

I. Because the Title Board is not restricted by statute to putting the text of the proposed initiative at the end of the Ballot Title sentence, as they did with Proposition #82, would this honorable Court agree with the proponents to place the text at the beginning of the Ballot Title, such as: "Should 'PEACE IS POSSIBLE' be amended to Article XXVI of the Colorado Constitution.?"

II. What's the difference between a nuclear weapon and the ovens at Auschwitz?

III. Would this Court accept as evidence of an alternative to nuclear weapons for the defense of the great and good nation called "Non-Lethal Technology", which the Air Force produced an unclassified 64 page catalog of back in 1996 documenting the extent of our vast and growing arsenal of tools that won't kill but still protect us, before deciding this case? (See Appendix)

FINDING OF FACT

I. "The Triad of the bombers, the missiles, and the missiles in the submarines has grown to such proportions that it has become the Holy Trinity."[1]

II. "Rand [Corporation, an Air Force think tank] repeatedly urged increases in the U.S. [nuclear] arsenal. Eisenhower fought these 'theologians of nuclear war' ".[2]

III. "The Coming of the Second Nuclear Age, How the Pentagon is going to build a new generation of nuclear weapons"[3]

IV. "The explosive 'family' for which Rocky Flats manufactured about 70,000 plutonium bomb cores over the course of four decades was at the heart of nuclear warheads that still comprise the U.S. Cold War 'triad' of air, land and sea forces...The [March 16th, 2002 Nuclear Posture Review and September 2002 National Security Strategy] also defined a new, post-Cold War triad composed of an offensive combination of nuclear and precision guided weapons...and what it calls a 'responsive infrastructure ' enabling the United States to rapidly expand its nuclear arsenal...The administrations aggressive stance including plans to build a new earth-penetrating warhead...It's time for the public to challenge such 'realists' regarding nuclear weapons of mass destruction, something that didn't happen 55 years ago when rocky Flats was built."[4]

V. Estimated number of nuclear warhead on missiles locked on permanent hair-trigger alert in Colorado: About 150. Estimated date these missiles will be taken off 24/7 alert: Never.

---

[1] Dyer, Gwen. War New York, Crown 1985: 215

[2] Kuklick, Bruce. "Academics and generals do not direct how America wages war." Financial Times of London, 18 April, 2006: 13

[3] Keller, Bill. New York Times Magazine, 4 May, 2003: cover.

[4] Ackland, Len. Nukes of the future." Denver Post, 26 March, 2006: E1.

FINDING OF FACT (continued)

VI. "Two-thirds of Americans say no nation should have nuclear weapons, including the U.S."[5]

[5] Lester, Will. No one should possess nukes, most in poll say." Denver Post, 31 March. 2005: 13A.

I come before this esteemed tribunal as a common citizen in my own representation to humbly ask for respect for myself and my client, Boy Ho. Although my hope is to tell the story of how I came to represent my client in my formal brief to the Court, I want to begin by simply stating that my goal in this matter is to start a discussion about the future defense methods of the United States of America.

Unfortunately, that is not going to happen concerning the U.S. nuclear arsenal that I as a tax-payer, pay for. While the government will be happy to politely listen to my concerns and objections to their plans to continue to build and deploy atomic bombs into the far distant future, unfortunately, the Pentagon has no intention of accepting a different number of nuclear weapons than they have already concluded they need. That's because my number of future U.S. nuclear bombs is: Zero. In fact, most people already agree with me. The Denver Post said so in March of 2005.

That, of course, is irrelevant to the "nuclear theologians", as Ike called them. They have come to both love and worship their atom bombs and don't care that I don't

want my government to own any number above zero. That's because the difference between a nuclear weapons and the ovens at Auschwitz is that one's portable.

Guess which one?

In truth, nuclear weapons are city-sized ovens that when activated, reach close to the heat of the sun and burn every living thing inside that zone to death. Instantly.

Now because the citizens went to all that trouble to create Article XXVI of the Colorado Constitution prohibiting the explosion of nukes inside the state without a vote of the people *and* a massive insurance policy to boot, maybe after 9/11 we don't want anymore big bombs going off anywhere, now that we know how much pain and hurt and suffering they cause. I think because we are a kind and wise and generous people at heart, we should talk about future U.S. nuclear policy.

Of course the position of the text of Proposition #82 is the excuse to begin this discussion with some very important people, the justices of the Colorado Supreme Court. Not so much to change policy immediately, but more to let me know that others want this discussion to begin as well.

That's the story I want to tell and of course, it is a love story with a happy ending.

Everyone likes love stories with happy endings. Correct?

Unlike the state, I have no formal legal training and do *not* have unlimited tax-payer resources to defeat the will of my opponent. Therefore, I and I alone am responsible for all the shortcomings of this filing. And because there is no page limit on this document, I including the Non-Lethal weapons catalog from the U.S.A.F., just to let everyone know we can move away from flying deaths camps in the form of nuclear weapons to a kinder and gentler way of defense, non-lethal. Ronald Reagan called for the elimination of all nuclear weapons and twice asked the Gorbachev to help him.[6] That's a start to ending the Age of Gunpowder and beginning the Age of non-Lethal Weapons.

I ask this court to help me carry out Reagan's will by reading this petition and my following brief before agreeing to move the text of Proposition #82, "PEACE IS POSSIBLE" from the end of the Ballot Title to the front.

---

[6] Kempelman, Max M. "Bombs Away." New York Times, 24 April ,2006: A23.

I. Action of the Ballot title Setting Board

The Title Board conducted its initial public meeting on Proposition #82 and set a title for it on April 19th, 2006. I filed a Motion for rehearing pursuant to § 1-40-107(1), C.R.S. 2005 on April 25th, 2006. On May 3rd, 2006, the Title Board denied my motion for a rehearing. I seek review of that final action of the title board with regards to proposed Initiative 2005-2006 #82 pursuant to § 1-40-107(2), C.R.S. 2005.

II. Issues Presented

Because there is not statutory requirement to put the initiative text at the end of the Ballot Title, can it instead be placed at the front?

III. Supporting Documentation

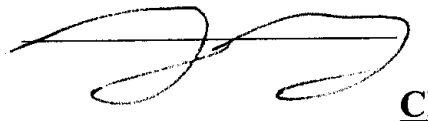
As required by § 1-40-107(2), C.R.S. 2005, a certified copy of the Petition, with the titles and submission clause of the proposed constitutional amendment, together with a certified copy of the motion for Rehearing and the rulings thereon. are submitted.

IV. Relief Requested

I respectfully request that this entire document be read along with my formal brief before this Court agrees to place the text of Proposition #82 at the beginning of the Ballot Title and not the end. I'm sorry I couldn't think of a better way to start this discussion.

Respectfully submitted on May 10th, 2006.

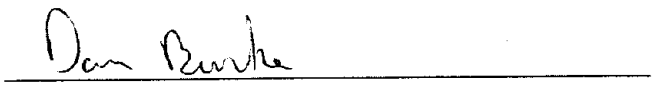
Page Penk, *pro se*



CERTIFICATE OF SERVICE

I hereby certify that on May 10th, 2006. a true and correct copy of the forgoing **EMERGENCY PETITION FOR REVIEW OF FINAL ACTION OF BALLOT TITLE SETTING BOARD CONCERNING AMENDMENT OF ARTICLE XXVI, "NUCLEAR DETONATIONS", OF THE COLORADO CONSTITUTION THROUGH PROPOSED INITIATIVE 2005-2006 #82 ("PEACE IS POSSIBLE") AND 71 PAGE APPENDIX OF NON-LETHAL WEAPONS** was placed in the United States mail, postage prepaid, to:

Maurice G. Knaizer, Esq.
Deputy Attorney General
Coloraod Department of Law
1525 sherman Street, 5th Floot
Denver, Colorado 80203



STATE OF COLORADO

DEPARTMENT OF STATE

CERTIFICATE

I, GINETTE DENNIS, Secretary of State of the State of Colorado, do hereby certify that:

the attached are true and exact copies of the text, motion for rehearing, titles, and the rulings thereon of the Title Board on Proposed Initiative "2005-2006 #82"...

.....**IN TESTIMONY WHEREOF** I have unto set my hand and affixed the Great Seal of the State of Colorado, at the City of Denver this 9th day of May, 2006.

Ginette Dennis

SECRETARY OF STATE

Original NO changes #82

Be it Enacted by the People of the State of Colorado:

Article XXVI of the Colorado Constitution is amended as follows:

Section 6 – PEACE IS POSSIBLE.

SUBMITTED BY:

PAGE PENK
1304 S. PARKER RD. PH 17
ARAPAHOE COUNTY, COLORADO
80231
303-283-7913

CHESTER PENK
1304 S. PARKER RD. PH 17
ARAPAHOE COUNTY, COLORADO
80231
303-283-7913

RECEIVED
MAR 3 0 2006
ELECTIONS / LICENSING
SECRETARY OF STATE

RECEIVED
JAN 3 1 2006
#82 COLORADO
LEGISLATIVE COUNCIL

April 25, 2006

RECEIVED
APR 25 2006
ELECTIONS / LICENSING
SECRETARY OF STATE

Greetings,

The proponents of Proposition #82 request and require a title board rehearing. The title set by the board is inadequate. (spelling?)

Page Penk
1304 S Parker PH17
~~Denver, CO~~ Arapahoe County CO
80231
303.283.7913

Chester Penk
1304 S Parker PH17
Arapahoe County CO
80231
303.283.7913

Ballot Title Setting Board

Proposed Initiative 2005-2006 #82[1]

The title as designated and fixed by the Board is as follows:

An amendment to article XXVI of the Colorado constitution concerning a declaration that peace is possible.

The ballot title and submission clause as designated and fixed by the Board is as follows:

Shall there be an amendment to article XXVI of the Colorado constitution concerning a declaration that peace is possible?

Hearing April 19, 2006:
Single subject approved; staff draft adopted; titles set.
Hearing adjourned 1:47 p.m.

Hearing May 3, 2006:
Motion for Rehearing denied.
Hearing adjourned 2:32 p.m.

[1] Unofficially captioned "**Peace**" by legislative staff for tracking purposes. Such caption is not part of the titles set by the Board.

APPENDIX

http://www.angelfire.com/or/mctrl/nonlethal.html

NONLETHAL WEAPONS: TERMS AND REFERENCES

Robert J. Bunker, Editor

INSS Occasional Paper 15

USAF Institute for National Security Studies

USAF Academy, Colorado

The views expressed in this paper are those of the authors and do not necessarily reflect the official policy or position of the Department of the Air Force, the Department of Defense, or the US Government. This paper is approved for public release by OASD/PA and SAF/PAS (with the following disclaimer). Distribution is unlimited.

"Many of the weapon concepts described in this paper are merely proposals. Except where specifically identified in official Department of Defense documents, none of the concepts in this paper should be interpreted to be funded R&D programs or operational weapon systems possessed by the Department of Defense."

* * * * * * *

Comments pertaining to this paper are invited and should be forwarded to:

Director, USAF Institute for National Security Studies

HQ USAFA/DFES

2354 Fairchild Drive, Suite 5L27

USAF Academy, CO 80840

phone: 719-333-2717

fax: 719-333-2716

email: hayspl.dfe@usafa.af.mil

Visit the Institute for National Security Studies home page at http://www.usafa.af.mil/inss

* * * * * * *

ABOUT THE EDITOR:

Dr Robert J. Bunker is an adjunct professor, National Security Studies program, California State University, San Bernardino, and professor, Unconventional Warfare, American Military University, Manassas Park, Virginia. His research focus is on the influence of technology on warfare and political organization and on the national security implications of emerging modes of warfare. He served as a concept assessor to the US Air Force *Project 2025* study.

The editor would like to thank the following individuals in addition to those listed on the next page for their contributions to this work: Dr Glenn W. Goodman, Jr., Dr Mark T. Clark, Amy Wittman, and Scott Boris, as well as the institutional support of *Armed Forces Journal International* and *Defense News*.

ABOUT THE CONTRIBUTORS:

Dr John B. Alexander is a retired Army Colonel with assignments ranging from command of Special Forces A-Teams in Thailand and Vietnam to Directorship of the Advanced Systems Concepts Office, U.S. Army Laboratory Command. From 1992-1995 he was the Program Manager for Nonlethal Defense, Special Technologies Group, Nonproliferation and International Security Division, Los Alamos National Laboratory. He currently holds many positions including that of US Delegate to a NATO Advisory Group.

Col Rex Applegate is a retired Army officer whose career in unconventional warfare included assignments with the Office of Strategic Services (OSS), Military Police and Counterintelligence. He is a recognized international authority on nonlethal weapons having been involved in projects relating to their development during the period 1960-75. His book on riot control is considered the principle work in this subject area by many police forces.

Mr Jon B. Becker is the CEO & President of Aardvark Tactical, Inc., a California based provider of less-lethal munitions and training. His business was the primary contractor for less-lethal munitions and training for Operation United Shield in Somalia.

Lt Col Matt Begert, USMC, is the Military Assistant to the Director, Precision Guided Weapons Countermeasures Test and Evaluation Directorate, an OSD field activity. His operational experience includes instructor duty for the A-6 Intruder, extensive deployment to the Pacific and operations as a small team leader attached to US Army and allied special operations units for interoperable fire support. Expeditionary experience includes aircraft carrier deployment in the Indian Ocean and air operations in the Persian Gulf War.

Mr Jaime H. Cuadros is the founder of Arts and Engineering, a firm dedicated to the study and development of less-lethal kinetic energy projectiles and weapons; together with the art of watercolor painting. Arts and Engineering has designed improved shotbags (for the 12 gauge shotgun) and a 19 mm close-range rubber bullet system for police use.

Mr Abraham Flatau, formerly Chief of Weapons Systems Concepts Team, US Army Armament Research and Development Command. Conceived and directed research and development projects in unconventional weaponry, including Ring Airfoil Grenade (RAG) and tubular projectiles. From 1984 to 1988 served as technical advisor to Director, Advanced Systems and Technology Division, Aerojet Ordnance Company.

CWO-5 Charles "Sid" Heal, USMCR, saw service in the Vietnam and Persian Gulf Wars and was the Mobile Training Team leader for nonlethal options in Operation United Shield in Somalia. He has over 22 years of law enforcement experience and is a national authority on diversionary devices and a court recognized expert in law enforcement special operations and emergency management.

FOREWORD

We believe you will find this reference book to be a useful addition to the current literature on nonlethal weapons. Its target audience is individuals who deal with special operations, weapons procurement and sales, and military operations other than war. It also complements other handbook literature of this type, such as *Weapons of Mass Destruction Terms Handbook* (Alexandria, VA: Defense Special Weapons Agency, May 1997), and *Nuclear Terms Handbook 1996* (Washington, D.C.: U.S. Department of Energy, 1996). The need for such a handbook on nonlethal weapons and associated technology has grown along with the perception that U.S. forces will increasingly use such systems in the post-Cold War global security environment. We hope that this comprehensive handbook will help to contribute a sense of the technological limitations of nonlethal weapons, as well as provide clarity and consistency in discussions on the future of U.S. national security policy.

About the Institute

INSS is primarily sponsored by the National Security Policy Division, Nuclear and Counterproliferation Directorate, Headquarters US Air Force (USAF/XONP) and the Dean of the Faculty, US Air Force Academy. Our other current sponsors include: the Air Staff's Directorate for Intelligence, Surveillance, and Reconnaissance (USAF/XOI); OSD Net Assessment; the Defense Special Weapons Agency; the Army Environmental Policy Institute; Army Space Command; and the On-Site Inspection Agency. The mission of the Institute is to promote national security research for the Department of Defense within the military academic community, and to support the Air Force national security education program. Its primary purpose is to promote research in fields of interest to INSS' sponsors: international security policy (especially arms control and counterproliferation), Air Force planning issues, regional security policy, conflict in the information age (including the revolution in military affairs and information warfare), environmental security, and space policy.

INSS coordinates and focuses outside thinking in various disciplines and across services to develop new ideas for USAF policy making. The Institute develops topics, selects researchers from within the military academic community, and administers sponsored research. It also edits books and hosts conferences and workshops that facilitate the dissemination of information to a wide range of private and government organizations. INSS is in its fifth year of providing valuable, cost- effective research to meet the needs of the Air Staff and our other sponsors. We appreciate your continued interest in INSS and its research products.

PETER L. HAYS, Lt Colonel,USAF

Director, Institute for NationalSecurity Studies

TABLE OF CONTENTS

About the Editor iii

About the Contributors iv

Foreword v

Executive Summary ix

Term Listing 1

I. Nonlethal Weapons 2

Acoustics 2

Acoustics & Opticals 3

Antilethals 4

Antiplant Agents 6

Barriers 7

Batons 9

Biotechnicals 10

Electricals 11

Electromagnetics 13

Entanglers 13

Holograms 15

Markers 15

Obscurants 15

Opticals 16

Projectiles 19

Reactants 22

Riot Control Agents 23

II. Nonlethal Weapons Concepts 27

Ethical 27

Functional 28

Operational 29

Physiological 31

Theoretical 32

Reference Listing 34

I. Books 34

II. Chapters 35

III. Documents 36

IV. Addendum 79

EXECUTIVE SUMMARY

The purpose of this paper is to promote an understanding of and research into a new category of weapons, designated "nonlethal" by the military services. These weapons are also classified as "less-than-lethal" or "less-lethal" by law enforcement agencies. National security experts consider these weapons increasingly important in the post-Cold War era. This type of weapon has been used throughout history, but was given new emphasis during the Vietnam War era. Law enforcement agencies and Army national guard units relying upon traditional forms of politico-military force were ineffective in countering US domestic civil unrest. As similar types of conflict, now many magnitudes greater, seem to dominate international politics since the end of the Cold War, this type of weapon takes on increasing importance.

The Department of Defense defines these weapons as follows:

Weapons that are explicitly designed and primarily employed so as to incapacitate personnel or materiel, while minimizing fatalities, permanent injury to personnel, and undesired damage to property and the environment. Unlike conventional lethal weapons that destroy their targets principally through blast, penetration and fragmentation, non- lethal weapons employ means other than gross physical destruction to prevent the target from functioning. Non-lethal weapons are intended to have one, or both, of the following

characteristics: a. they have relatively reversible effects on personnel or materiel, b. they affect objects differently within their area of influence [229:1-2].

We have followed this Western definition of nonlethal weapons in this paper, but have also included what would be considered non- Western forms of weaponry. The reason for the inclusion of these weapons, which specifically are designed to result in permanent injury to personnel, is because of the great likelihood that they will be used against US forces in future conflicts.

Our intent is to create an initial term and reference listing that will help support joint-force and dual-use initiatives focused on identifying the potential drawbacks of integrating nonlethal weapons into our military services and law enforcement agencies. Because of the limited objective of this paper, it consists solely of two sections: a list of terms that describes nonlethal weapons along with the concepts both surrounding and inhibiting their use and a comprehensive listing of references to facilitate further research. The category of nonlethal weapons that offers the capability for information warfare has not been included in this paper because of its association with that distinct form of conflict.

The terms and descriptions provided within this paper should not be considered authoritative, static, or comprehensive. Rather, they represent a point of departure from which further research can be conducted and eventual definitions created as these weapons begin the slow and tedious process of being adapted for operational use. This paper offers a candid assessment of our current understanding of nonlethal weapons that undoubtedly contains inaccuracies, either directly or by omission.

Bearing these caveats in mind, we have attempted to create a fairly comprehensive overview of the terms and concepts relating to nonlethals and the works available for reference on this topic. The contributors to this paper represent some of our country's "best and brightest" in the field of nonlethal weapons research, development, training and operational employment. Their combined expertise spans the early years of the development of nonlethal weapons from the Vietnam War era, including their employment in the Somali operation and in recent domestic law enforcement disturbances, to newer systems still in the process of being developed and field tested.

Nonlethal weapons cannot be thought of in a "business as usual" sense or, for that matter, solely as a new type of force multiplier. It is the opinion of the editor (and most of the contributors to this paper) that when nonlethal weapons are ready for wide- scale application, this will signal a development as significant in magnitude as the emergence of gunpowder based firearms during the European Renaissance. Just as the firearm gave the ability for distance-killing that destroyed a Western ban existing since the time of the *Iliad*, the introduction of nonlethals may allow for tailored employment of politico-military force and challenge the accepted definition of warfare.

The US military will need to undertake significant organizational and doctrinal restructuring in order to exploit the potential of these new weapons. The most important near-term application of nonlethal technology appears to be in areas such as: operations in "failed states," as a counter to the non-Western form of warfare that is emerging globally, as a defense against the specter of further terrorist assaults upon our homeland, and as a means of responding to civil unrest in many of our inner cities. Over the longer term, it is their fit with other nascent warfighting trends embodied in the revolution in political and military affairs (RPMA) that is of paramount significance. For example, nonlethal weapons could present new and potentially highly effective mechanisms for dealing with an advanced form of battlespace (i.e. cyberspace) and the criminally-based non-state soldier (i.e. terrorist, mercenary or "new-warrior class") as a challenger to the Western nation-state's domination of political violence.

In order to respond to these and other challenges, we must insure that our armed services retain the capability to dominate the battlefields of the 21st century. Our ability to use nonlethal weapons effectively

will be a critical component of our future capabilities. It is toward improving our knowledge in that endeavor that this paper has been written.

Robert J. Bunker

December 1996

Nonlethal Weapons: Terms and References

TERM LISTING

As listed in the table of contents, the entries in this paper are organized into seventeen categories for nonlethal weapons technology and five areas for concepts associated with the use of nonlethal technology. The citation protocol for entries list the reference material number and the page number as follows: [Reference Number: Page Number]. If an entire document is cited, no page numbers are given. For the purpose of accuracy, many terms have been directly quoted from a single referenced source, while others combined reference sources.

I. Nonlethal Weapons

A. Acoustics

Acoustic Beam . High power, very low frequency beam emitted from weaponry under development. Envisioned to be a piston-driven or detonation-driven pulser which forces compressed air into tubes to generate a low frequency wave [543,546].

Acoustic, Blast Wave, Projector. Energy generation from a pulsed laser that will project a hot, high pressure plasma in the air in front of a target. It creates a blast wave with variable but controlled effects on hardware and troops [543].

Acoustic Bullets . High power, very low frequency waves emitted from one to two meter antenna dishes. Results in blunt object trauma from waves generated in front of the target. Effects range from discomfort to death. A Russian device that can propel a 10-hertz sonic bullet the size of a baseball hundreds of yards is thought to exist. Proposed fixed site defense [16,113,212,543]. Also known as sonic bullets.

Acoustic, Curdler Unit . A device which is plugged into an HPS-1 sound system to produce a shrill shrieking, blatting noise. It is used to irritate and disperse rioters and had a decibel range just below that of the danger level to the human ear. It is used in night operations to produce a "voodoo" effect and effectively breaks up chanting, singing and clapping [2:279- 280,82:184,84,529].

Acoustic, Deference Tones . Devices which can project a voice or other sound to a particular location. The resulting sound can only be heard at that location [176:86].

Acoustic, Doppler Effect Alarm . Any movement in the area between a transmitter and a receiver causes a slight variation in the sound pattern received. By measuring this variation an alarm system can be made to be activated [23:204].

Acoustic, High Intensity Sound . Loud music was used by American forces to drive Manual Norriega from the Vatican Embassy in Panama in 1990. Also known as polysound [354:45].

Acoustic, HPS-1 Sound System . A 350 watt sound system with an audible voice range of 2 1/2 miles. Used by the military in Indo-China and then supplied to law enforcement. First used by police forces at San Francisco State College and at Berkeley in the 1960s [2:277-279,82,84]. See also *Acoustic, Curdler Unit.*

Acoustic, Infrasound . Very low- frequency sound which can travel long distances and easily penetrate most buildings and vehicles. Transmission of long wavelength sound creates biophysical effects; nausea, loss of bowels, disorientation, vomiting, potential internal organ damage or death may occur. Superior to ultrasound because it is "in band" meaning that its does not lose its properties when it changes mediums such as from air to tissue. By 1972 an infrasound generator had been built in France which generated waves at 7 hertz. When activated it made the people in range sick for hours [23,302,546].

Acoustic, Squawk Box . Crowd dispersal weapon field tested by the British Army in Ireland in 1973. This directional device emits two ultrasonic frequencies which when mixed in the human ear become intolerable. It produces giddiness, nausea or fainting. The beam is so small that is can be directed at specific individuals in a riot situation [451,452,504].

Acoustic, Teleshot . Cartridge projecting a powerful sonic device delivered by a 12-gauge shotgun. Experimental use in 1972 [529].

Acoustic, Ultrasound. A very high frequency sound whose wavelength is "out of band" making it less effective than infrasound because it losses its properties when it changes mediums. Example, from air to human tissue. Like infrasound a lot of power is required to generate these waves which create biophysical effects. See also *Acoustic, Infrasound.*

B. Acoustics & Opticals

Acoustic & Optical, Air Burst Simulator . A diversionary device normally used to simulate the air burst of artillery rounds during infantry training. The device is fired via a 37- 40mm launching device and has an 8 second fuze prior to ignition.

Acoustic & Optical, Cod-Weight . A heavy, (2 pounds or greater) weight to which a diversionary device is attached to allow it to be thrown through window screens, window glass, bushes and similar materials. The name is derived from the original weights used for deep-sea fishing for Cod.

Acoustic & Optical, Diversionary Device . A hand thrown pyrotechnic device which emits a loud bang and dazzling light when ignited. The device is designed to create a sensory overload which temporarily causes confusion and an inability to effectively respond to a tactical team's actions. Sometimes called a flash-bang grenade.

Acoustic & Optical, Diversionary Device, Launched. A diversionary device which can be launched from a 12 gauge shot gun [373].

Acoustic & Optical, Flash Stick . A stick or pole to which a diversionary device is affixed, allowing it to be precisely placed and held during ignition. Often used for exact insertion through chain link fences, windows, heavy brush and so forth.

Acoustic & Optical, Painter's Pole . An extendible pole to which a diversionary device is affixed allowing it to be precisely placed and held during ignition. Often used for supporting second story entries from beneath. The name is derived from the pole used by painters to hold paint rollers when painting overhead.

Acoustic & Optical, Photic Driver . A crowd control device developed by a British company prior to 1973 which uses ultrasound and flashing infrared lights which penetrate closed human eyelids. Potential for epileptic fits because of the stroboscopic flashing effect. May have been employed by South African Police during interrogations [23,450].

Acoustic & Optical, Psycho-Correction . A technology invented by a Russian scientist that involves influencing subjects visually or aurally with imbedded subliminal messages [318].

Acoustic & Optical, Stun Grenade. A non-lethal grenade, XM84, in development to be used by Army military police [338].

C. Antilethals

Antilethal . Technologies which provide counter-sniper, counter-mortar, antimissile and high-precision weapons capabilities. Advanced forms of camouflage and sensors which defeat lethal weapons are additional forms of this technology [418:24].

Antilethal, Camouflage-Active . Created by dynamically matching the object to be camouflaged to its background colors and light levels rendering it virtually invisible to the eye. This is conceptually the same camouflage process as that used by a chameleon. This is accomplished through a sophisticated color and light sensor array which detects an object's background color and brightness. This data is then computer matched and reproduced on a pixel array covering the viewing service of the object to be camouflaged. Also known as chameleon camouflage [245,302].

Antilethal, Camouflage-Metamorphic . Uniforms or paint which change color due to either light or heat sensitivity. Extremely useful for night and day operations and those taking place in urban environments [245,302].

Antilethal , Counter- Sniper. Electronic sniper-locating systems based on acoustic, shock wave or infrared measuring technologies. Provides the location of a hostile sniper to a sniper team or to an automated counter-sniper system which can fire either a kinetic round or a low-energy laser at the hostile sniper [2:300-301,505].

Antilethal, Electronic-False Target Generation . An electronic device that creates and presents an image of a target to a precision laser-guided weapon that causes that weapon to aim at the false target. Used as a countermeasure to those precision guided weapons [468:14].

Antilethal, Electronic-Shell Detonator . A system fielded by U.S. troops in Bosnia which creates an electronic field that causes mortar and artillery shells to explode prematurely by signaling to them that they have reached their target [183].

Antilethal, Electromagnetic Shielding . A form of defense against microwave attack. A metal box, known as a "Faraday Cage," can sometimes function as one by excluding electromagnetic fields [356:39].

Antilethal, Food Bomb. Humanitarian use of nonlethal weapons. Place concentrated food pellets rather than anti-personnel bomblets in a cluster bomb unit. For use in cities under siege on the verge of starvation [609].

Antilethal, Laser Protection . Protection is achieved in three ways: absorption using dyes, reflected using optical coatings and the blocking of specific wavelengths [287].

Antilethal, Laser Protection-BLPS.

Ballistic and Laser Protective Spectacles. Since 1988, these devices have been issued to high priority Army and Marine Corps units. The BLPS are dye-filled polycarbonate plastic filters which will protect eyesight against the low-energy lasers most likely encountered on today's battlefield, specifically the two or three wave lengths used by common range finders and target designators based on Nd:YAG and ruby lasers. They will not give protection against frequency- agile low energy laser weapons [1:185].

Antilethal, Laser Protection-Smoke . Smoke's attenuative properties allow it to serve as a passive defense against blinding laser weaponry. Large-area smoke generation may provide a means to offer continuous protection for forward elements of U.S. combat forces [115:38].

Antilethal, Low Energy Laser. An Air Force project, known as Have Glance, in which a pod-mounted, low energy laser would be mounted on an aircraft to confuse the heat-seeking function of infrared missiles [1:161].

Antilethal, RPG Barrier . See *Barrier, Fence-RPG.*

Antilethal, Sensor-Acoustic. Remote acoustic sensors placed in an area overwatch position in urban zones to detect and locate gunfire within that area [429].

Antilethal, Sensor-Facial Recognition Technology . Experimental information systems which recognize human facial features and compare them to databases of wanted suspects. Great potential for apprehending terrorists in airport terminals and criminals in large crowds. More advanced subdermal systems will be required as a follow-on to these systems as a counter to criminals/non- state soldiers who surgically alter their facial features [642].

Antilethal, Sensor-Ground Penetrating Radar . Sensor that can detect nongeologic objects and human engineered structures beneath the ground by analyzing the return of electromagnetic waves traveling through geologic structures. Detection of buried mines and discovery/mapping of underground bunkers represent practical, nonlethal applications [215:10].

Antilethal, Sensor-Nonimaging Portable Radar . A radar unit which weighs less than 10 pounds, uses rechargeable batteries, is small enough to fit into a briefcase and will detect motion through nonmetallic walls and floors. Using sounds instead of images, it detects motion and can transmit to a receiver up to a distance of 200 feet [302].

Antilethal, Sensor-Retroreflectivity . A theory based on the reflection of light. Common example is seeing an animal's eyes at night in your headlights. Allows for an electro- optical sensing mode that can be used to find opposing electroptics looking into the night for location and targeting purposes.

Antilethal, Smart Gun . A gun which can only be used by the proper user or users. Identification is automatic and would be carried out by radio frequency signals or other technologies [620].

Antilethal, Smart Metals. See *Markers, Smart Metals.*

Antilethal, White Light Goggles . Experimental goggles which "gate out" bright white light so that the user will not be affected by them along with the targets [330:6].

D. Antiplant Agents

Antiplant Agent . Compounds used to destroy plants or crops function in one of two general ways. Growth regulators and desiccants kill or defoliate by stimulating the leaf fall process (growth regulator) or by drying the leaf blade (desiccant). The other category, soil sterilizers, contaminate the soil, preventing or retarding growth. Uses of antiplant agents include destruction of crops and foliant removal to deny/degrade camouflage [13:77-78].

Antiplant Agent Blue . Fast acting antiplant desiccant containing sodium dimethyl. The desiccant, unlike anti- plant growth regulators, works by drying the leaf blade of the plant rather than simulating the plant's leaf fall process [13:77-78].

Antiplant Agent, Defoliants . Any of a variety of chemical compounds that either stimulate the leaf fall process, dry the leaf blade or sterilize the soil [13:77-78].

Antiplant Agent, Operation Ranch Hand . A defoliation program conducted during the Vietnam War from 1962 to 1970. The primary purpose of the operation was to deny cover to enemy forces, thereby making ambushes more difficult. Crop destruction missions were also conducted in northern and eastern central areas of South Vietnam [22:66-67].

Antiplant Agent Orange . Antiplant growth regulator containing n-butyl esters of dichlorophenoxyacetic acid and trichlorophenoyacetic acid. Publicized for its use in Operation Ranch Hand in the Vietnam War from 1962-1970 [13:77-78].

Antiplant Agent Purple . Growth regulator similar to Agent Orange but contains, in addition, the isobutyl ester of trichlorophenoxyacetic acid [13:77-78].

Antiplant Agent White . Antiplant growth regulator composed of a mixture of tri-iso-propanolanime salt of dichlorophenoxyacetic acid and picloram in water [13:77-78].

E. Barriers

Barrier , Air Bag, Backseat. An automobile airbag designed to hold in place a suspect placed in a police car. Designed because of the frequency of violent behavior once suspects have been handcuffed and placed in a police car for transport.

Barrier, Air Bag Mine . A nonlethal vehicular mine based on a type of air bag [339].

Barrier, Caltrops . A personnel and vehicular barrier device with four projecting spikes so arranged that when three of the spikes are on the ground, the fourth points upward. The term caltrop is derived from an English water chestnut which was used to impede the mobility of heavy cavalry during the Middle Ages. Caltrops were used in Somalia by the Marines during United Shield to supplement key barrier systems at night during the final hours of the withdrawal [378].

Barrier, Coating-Slick . Teflon- type lubricants which create a slippery surface because of their chemical properties. These

chemical agents reduce friction with the intent to inhibit the free movement of the target. In the 1960s the term "Instant Banana Peel" was coined to describe the capability provided by Riotril. When applied to a hard surface and wetted down, this dry, relatively-inexpensive, non-toxic, non-corrosive white powder becomes ice slick. It becomes virtually impossible for an individual to move or stand up on a hard surface

so treated. Tire-type vehicles are also unable to get traction. Riotril, if allowed to dry, can easily be peeled away or, because of its water-soluble nature, can also be hosed away with high-pressure streams [2:302-303,16,91, 356,565]. Also known as low- friction polymers, slick'ems,' and superlubricants.

Barrier, Coating-Sticky . Polymer adhesives used to bond down equipment and human targets. Also known as stick'ems' and superadhesives [16].

Barrier , Electronic. See *Antilethal, Electronic-Shell Detonator.*

Barrier, Emulsifier . Agents, contained in a mixture of mutually insoluble liquids, which were dispersed over the Ho Chi Minh trail to degrade the logistical lifeline of Viet Cong forces during the Vietnam War. Used in tandem with clouding seeding. Also known as soil destabilizers [434].

Barrier, Fence-Electrical . See *Electrical, Fence.*

Barrier, Fence-RPG. Conventional fencing, usually 6 ft high, with barbed wire on top. While the anti-mobility utility of such fencing is apparent it also had an anti-lethal capability. In Vietnam this fencing was erected as a rocket propelled grenade (RPG) screen in front of armored fighting positions and around command vehicles. RPGs which hit this screen either had their fusing systems disabled (RPG7's) or prematurely detonated (RPG2's). Also known as cyclone fencing [635,637:109].

Barrier, Foam-Aqueous . Originally derived from a fire fighting compound used to put out airplane fires. Barrier foam is a derivative which is thicker in consistency. This technology employs a safe, biodegradable form of suds which can be piled up to as high as four feet. Barrier foam can be applied over fences, concertina wire, ditches to be seeded with caltrops (a four pointed device designed to puncture tires) to prevent vehicular passage. By applying the foam over obstacles, it impedes the ability to defeat them. Barrier foam, as its name implies, is used to deny entry or passage. The conceptual origins of this foam date back to 1965 [2:300,82,302,378].

Barrier, Foam-Aqueous, Generator . Concept involves blowing air through nylon net kept wet with mixture which creates aqueous foam [529].

Barrier, Foam-Aqueous Riot Control Agent . The ordinary suds of barrier foam can be enhanced with the addition of substances such as oleoresin capsicum, the primary ingredient in "pepper spray," or CS [165].

Barrier, Foam-Sticky . A name given to a polymer-based superadhesive agent. The technology first began appearing in commercial applications such as "super glue" and quick setting foam insulation. It is extremely persistent and is virtually impossible to remove without a liquid solvent which has a pleasant citrus odor. The solvent can be applied as a spray or poured on. The foam then appears to dissipate, releasing its hold and allowing suspects to be arrested and safely transported. Sticky foam came to public attention on February 28, 1995 when U.S. Marines used it in Mogadishu, Somalia, to prevent armed intruders from impeding efforts to extricate United Nation forces from that county [302,378].

Barrier, Foam-Sticky , Dispenser. An interior barrier system, operated by either intruder penetration or command, which administers a sticky-foam barrier in a passageway from floor to ceiling [506].

Barrier, Rope, Launcher . Nylon rope dispersed by a compressed air launcher using mounted on a truck. Thirty cubic feet per minute [529].

Barrier, Smoke-Antilaser . *See Antilethal, Laser Protection-Smoke.*

Barrier, Smoke-Cold. A thick, disorienting "cold smoke" which

can be generated in areas from 2,000 to 50,000 cubic feet. It restricts an intruders eye-hand coordination and interactions among members of an intruding group [506].

Barrier, Spike. An angle-cut metal rod driven into an unsurfaced road's wheel pit. A 1/2 inch diameter rod, protruding only about 3 inches, is blunt enough so as to not penetrate a shoe sole under a person's weight, yet a heavy vehicle will drive it through a tire [15:92].

Barrier, Spiked Strip . Flat strip resembling a fire hose with retractable hollow spikes designed to flatten the tires of a target automobile. When the strip is activated, hollow spikes extend vertically and puncture the tires as the vehicle rolls over the strip.Also known as road spikes [566:2].

Barrier, Stakes . A sharp stake, often of wood or bamboo, that is concealed in high grass, deep mud or pits. It is often coated with excrement, and intended to wound and infect the feet of enemy soldiers. Can be utilized both as a booby trap and as a barrier. Commonly known as punji stick or punji stakes.

Barrier, Wire/Tape-Barbed, Launcher . Dispensing systems for flat barbed tape and barbed wire which could be quickly deployed into concertina form [82,529].

F. Batons

Baton, Biotechnical-Injector. A baton with an automatic self-injecting syringe for administering the antidote to nerve gas built into it's tip and filled with calmatives or other biotechnical agents [165].

Baton, Breakaway . A baton made of a substance that will break if used incorrectly [529].

Baton, Electrical . Standard dimension baton which delivers an electric charge of low voltage, powered by standard flash-light cells [2:240,23,529]. Also known as stun baton or shok baton.

Baton, Expandable . Measures 6" to 7" in closed position. The three telescopic sections rapidly flick open to an extended 16" to 18". Also known as extensible billyclub [529].

Baton, Riot Control Agent . 12- 26" plastic baton which is able to project riot control agents [2:211- 212].

Baton, Side-Handle . A baton with a side-handle attachment which allows it to be twirled for greater impact and used more effectively to block an opponent's blows.

Baton, Straight . Wooden, plastic, metallic rod from 12" to 36" used as a swung impact weapon. Can either hang from a leather throng or be held in a holster. Smaller version, 6" to 8." Also known as nightstick or billyclub.

Baton, Straight, Flashlight . Heavy shock resistant flash light which can be swung like a baton.

Baton, Straight, Flashlight-Riot Control Agent. Shock resistance polyethylene flash light. Besides providing a light source, this flashlight can be used as a baton and to project a riot control agent [2:216].

Baton, Two-Handed Riot . The 36 in. long riot baton is employed like a rifle and bayonet--overhead blows could be fatal. Short, one-handed batons are not appropriate for close- quarter riot actions [74,95].

G. Biotechnicals

Biotechnical, Behavior-Altering Drugs . See *Biotechnical, Calmatives.* Suggested delivery in a gaseous form for terrorist and hostage situations in 1987 [556].

Biotechnical, Biodegrading Microbes. Microbes which turn storage tanks full of aviation fuel into useless jelly. Such microbes may produce acids or enzymes which can be tailored to degrade almost anything, even concrete and metal, so their potential use as nonlethal weapons could be extensive [171:2,356:38].

Biotechnical, Calmatives . Biotechnical agents which are sedatives or sleep-inducing drugs; includes alfentinil, fentanyls, ketamine and BZ. Several of them make ideal choices for this application when mixed with dimethyl sulfoxide (DMSO), which promotes absorption through skin to quickly sedate persons contacted. DMSO introduces the calmative agent into the bloodstream by increasing the epidermal absorption rate by about 1,000 percent. The explosion of a flash bang (sometimes called a diversionary device) represents one method of dispersing DMSO and a calmative agent. Calmatives were reportedly used by the Soviets against the Mujahideen in Afghanistan [16,176:83,302,431,556].Also known as sleep agents.

Biotechnical, Disease Organisms . Nonfatal diseases targeted toward troops and civilians. Such viral agents were developed by Iraq to be used against Western forces during the Gulf War so as to create long term disabling injuries. Agents being considered for use were those that cause hemorrhagic conjunctivitis, chronic diarrhea, yellow fever and Crimean Congo hemorrhagic fever [627].

Biotechnical, DM. Diphenylaminechloroarsine. A sickening agent no longer in use by the military because of health risks. Probably ruled out of use in Vietnam by October, 1965. Effects include sneezing, shortness of breath, retching and vomiting, hemorrhaging, and possible death. Mixed with CN for immediate effect [13:19,529].

Biotechnical, Genetic Alteration . The act of changing genetic code to create a desired less-than-lethal but longterm disablement effect, perhaps for generations, thereby creating a societal burden.

Biotechnical, Hypodermic Syringe-Dart . Modified shotgun or handgun in which the projectile is a drug-filled syringe activated by a small charge on impact. Wide variety of drugs available including emetic (vomiting) agents [2:293,165,529].

Biotechnical, Injector-Baton . See *Baton, Biotechnology- Injector.*

Biotechnical, Malodorous Agents. Foul-smelling gases and sprays such as hydrogen sulphide (H_2S) or a compound known as NaS_8 which is used in making plastics. Could be delivered by a grenade. Past work on "cultural specific" agents has also been undertaken [356,529]. See also *Biotechnical, Project Agile.*

Biotechnical, Neuro-Implant . Computer implants into the brain which allow for behavioral modification and control. Current research is experimental in nature and focuses on lab animals such as mice [636].

Biotechnical, Pheromones. The chemical substances released by animals to influence physiology or behavior of other members of the same species. One use of pheromones, at the most elemental level, could be to mark target individuals and then release bees to attack them. This would result in forcing them to exit an area or abandon resistance [195].

Biotechnical, Project Agile. Series of military science studies in Asia conducted by Battele Memorial Institute in May 1966 for Advanced Research Projects Agency (ARPA). One such study centered on developing 'stink' bombs which were race specific [320].

Biotechnical, Wetware. Advanced technology devices which are surgically implanted into the body rather than worn. These devices can be used to enhance memory and the human senses, modify behavior or to locate allied troops. Pacemakers represent an early form of wetware. New concept developed in this document.

H. Electricals

Electrical , Armored Personnel Carrier. Standard armored personnel carrier fitted with a gate-like apparatus in the front and charged to a high voltage. Used by West German police to clear streets or round up small groups of people [165].

Electrical, Baton . See *Baton, Electrical.*

Electrical, Fence .A fence which delivers a nonlethal electrical shock. It can be employed as an effective barrier against intruders [74:66].

Electrical, Flashlight . A type of flashlight designed with electrodes on the base. Effective range is minimal [556].

Electrical, Glove . A glove with an electric impulse generator in the palm and the bottom sides of the glove fingers. A close-in device similar to the electric stun gun and the electric flashlight [556].

Electrical, High-Voltage Telsa Coil. Passed from public scene because of their indiscriminate use against blacks in several Southern states in the mid-1960s. Example, electric baton or electric cattle prod [165].

Electrical, Homemade Body Armor . Newspapers and magazines stuffed down inmates' clothing and/or the use of mattresses as shields to counter the effects of stun guns [385].

Electrical, Police Jacket . Police jacket which jolts anyone who touches it [165].

Electrical, Projector . An advanced version of the standoff stun gun, where no wires are required. The charges are delivered through the air through pre-ionized air channels or by charging a low energy projectile which releases the charge at impact. Another approach is to launch a low energy projectile that releases the electrical charge at impact by compressing a piezo-electric element [195:8].

Electrical, Stun Belt . A command activated belt worn by prisoners which delivers a mild electric shock when they become combative [385].

Electrical, Stun Gun -Close In. A small, two-pronged, hand held electrical discharge weapon. Effective range is less than an arm length. It works by affecting the muscle signal paths, disturbing the nerve system [556].

Electrical, Stun Gun-Standoff . A form of stun gun with a range of 20 feet. It fires small, barbed electrical contactors, via a fine trailing wire, which snare a victim's clothing. A 3- 4 second lapse takes place before the target is subdued. The development of this device was inspired by the Watts Riots in 1965 [408,529].

Electrical, Water Stream . A mobile unit projects a water stream charged with high voltage, low amperage. Another method cites 2 water jets, 1 negatively charged and 1 positively charged, which meet to close the circuit [529].

I. Electromagnetics

Electromagnetic, Engine Kill . The use of high-powered microwaves to kill the electrical system of an engine.

Electromagnetic, High Power Microwave [HPM] , Weapons. Energy generated by a conventional electromagnetic apparatus, such as a radar transmitter, or released from a conventional explosion converted into a radio-frequency weapon which causes the disruption of electronic systems. Usually an ultra-wide ban source focus due to target vulnerability considerations. HPMs can also cause human unconsciousness without permanent maiming by upsetting the neural pathways in the brain and/or death [256,278].

Electromagnetic, Interference (EMI) . Flight control systems of military aircraft are sensitive to electromagnetic interference (EMI). It is suspected that several crashes of Army UH-60 Black Hawk helicopters may have resulted when they flew too near large microwave transmitters [278].

Electromagnetic, Maser . Microwave Amplification by Stimulated Emission of Radiation. A microwave generation device.

Electromagnetic Pulse, Non-Nuclear [NNEMP], Weapons . Non-nuclear EMP generating weapons mounted on cruise missiles or unmanned aerial vehicles (UAVs) which would disable enemy tanks and early warning radars would be invaluable. Such weapons when they explode would produce a momentary burst of microwaves powerful enough to disable all but special, radiation-hardened electronic devices [205,261,262].

Electromagnetic, Radio Frequency [RF], Weapons . A class of weapons which transmit short, high-powered pulses of electromagnetic radiation over significant ranges [278].

Electromagnetic, Rocket-Powered Unit. Unmanned miniature-wheeled vehicle launched by a police cruiser which delivers an electromagnetic energy pulse to the underside of a fleeing car's engine controls and associated sensors to disable it [644:4].

Electromagnetic, Static Unit. See *Electromagnetic, Rocket-Powered Unit.* Static version resembling a pancake shaped bump in the road. Remote control or unmanned automatic control [644:4].

Electromagnetic, Thermal Gun . A device that directs energy to produce heat, in concept similar to a microwave oven [565].

J. Entanglers

Entangler, Animal "Come-Along." A pole with a looped wire attached to one end. When the wire is placed around the neck of a subject and then tightened it produces a choking effect much in the same manner as that of a choking collar used for dogs.

Entangler, Bola . Device consisting of two or three heavy balls attached by one or two ropes/cords and used for entanglement purposes. It is twirled overhead in one hand and hurled or cast at the intended target. Designed to entangle legs to retard/stop movement. Probably an ancient weapon, but made famous by the gauchos of South America, who used them to catch cattle and ostrich.

Entangler, Cloggers . Polymer agents, sticky-soft plastics, used in burst munitions to clog up jet and tank engine intakes [144].

Entangler, Cloggers-Colored . Clogging agents when mixed with dyes result in "tinted clouds" whose presence let friendly forces know not to enter them [353].

Entangler, Cloggers-Colored, Mine-Air . Cloggers mixed with colored gas which designate an air mine to allied pilots or drones. These air mines can be intermixed with "decoy mines" consisting solely of colored gas and laid in air mine fields to restrict aerial mobility [54].

Entangler, Monofilament Fishing Line . When spread out on snow, monofilament fishing line may be sucked into a snowmobile's track mechanism and cause it to jam. Effectiveness unconfirmed [15:108].

Entangler, Net-Electrified. A net shot from a gun at a targeted individual. Will release an electric shock if the target tries to struggle [361:69].

Entangler, Net, Gun . Fires a net which entangles a human or vehicular target. One such net is 18 feet wide and employs glue-coated strands. Another is 28-foot-wide, fired from a cannon and can envelope a car or armored vehicle [121:24,165].

Entangler, Net, Mine-Human . Mine detonation fires a net into the air which lands upon a soldier target.

Entangler, Net, Mine-Vehicular . A device laid across a road which shoots a fabric barrier up about to 2 meters to ensnare an oncoming vehicle [216].

Entangler, Net - Poles. A capture device based on a pair of 6 foot nylon poles that have a strong chain interlaced between them. It is employed by two people who capture the target in the chain mesh between the poles [2:295,569:21].

Entangler, Riot Gloves . Heavy protective gloves used by prison guards and riot police which protect the hands and forearms from cuts and blunt trauma. These gloves allow for the grappling of prisoners and rioters.

K. Holograms

Hologram, Death . Hologram used to scare a target individual to death. Example, a drug lord with a weak heart sees the ghost of his dead rival appearing at his bedside and dies of fright [149:4].

Hologram, Prophet . The projection of the image of an ancient god over an enemy capitol whose public communications have been seized and used against it in a massive psychological operation [609].

Hologram, Soldiers-Forces . The projection of soldier-force images which make an opponent think more allied forces exist than actually do, make an opponent believe that allied forces are located in a region where none actually exist, and/or provide false targets for his weapons to fire upon. New concept developed in this document.

L. Markers

Marker, Foam Dye . Hand held device which is used to spray green foaming dye into the face of an opponent. Obscures vision and marks the target for one week for future identification.

Marker, Invisible. One concept envisions a fluorescent powder sprayed into crowds from pressurized container. Particles adhere to clothing and are only visible under ultraviolet light. Another concept envisions sponge grenades impregnated with infrared dye so that rioters can be later identified [529].

Marker, Laser Paint . A laser dye and scatterer suspended in a host medium. When irradiated with a laser beam, this "laser paint" exhibits laser-like properties, becoming a brilliant light source, without being a collimated beam [355].

Marker, Paint Gun . Gelatin capsule containing a marking agent which splatters on impact leaving a 3" circle and streamers from 12" to 18" [2:294,529].

Marker, Smart Metals . Metals formed with chemical additives or blended in a particular form so that they would function only when used for legitimate purposes or give off telltales signs to inspectors when used improperly [176:84].

Marker, Smoke Dyes . Marking dye added to smoke during crowd control situations [529].

M. Obscurants

Obscurant, Agents . Rapid- hardening agents used to obscure the vision ports/optics of an armored fighting vehicle [144].

Obscurant, Crazing . Higher powered low energy laser weapons have the capability of heating and distorting or cracking the glass lenses of optical systems. This effect is called crazing and is caused when the heat buildup and subsequent cooling in the glass surface creates uneven stresses in the glass surface to crack it. The result is a frosted effect, making it impossible to see through the glass lenses or vision blocks (glass windows) in tanks. Such targets may be effected at long ranges, and the optics can be crazed in less time than is needed to blink an eye [1:148].

Obscurant, Laser-Argon Beam . An Argon laser aimed at windows, automobile windshields or airplane canopies for vision denial purposes. Microabrasions in the glass scatter this particular wavelength of light turning the entire sheet a glaring, opaque green. As a result, a sniper could not see through a window or a suicide driver would not be able to look out through the windshield of the truck laden with explosives that he was driving [253].

Obscurant, Myopia . The inability of the human eye to focus light from infinity accurately, which, in practical terms, means beyond approximately 20 feet. If induced through nerve/chemical agents, performance degradation could be dramatic, especially in aviation operations, because studies indicate that as much as 85% of pilot sensory perception/performance is through sight. Nerve gas can induce myopia [14:42].

Obscurant, Smoke-Colored . Colored smoke concentrations produce greater initial psychological and panic effect than white smoke. Caucasians are said to have a greater repugnance to brilliant green smoke, which is associated with disagreeable personal experiences such as seasickness, bile and vomit. Negroids and Latins are declared to be most adversely affected by brilliant red. Rioters confronted with a strong concentration of colored smoke feel, instinctively, that they are being marked, or stained, and thus they lose anonymity [2:198-199].

Obscurant, Smoke-White. White obscuring smoke delivered by grenades or smoke pots. Relatively inexpensive, non-toxic, noncontaminating and tactically ideal for police use. Obscuring smokes are

temporarily irritating to the nose and throat, and cause those affected to lose visibility, sense of purpose and direction [2:198,529].

N. Opticals

Optical, Add-On Combat Assault Weapon . The use of a low energy laser weapon as a compliment to the main armament of a tank or infantry fighting vehicle or as a compliment to a antitank missile system [1:172].

Optical, Bucha Effect . High intensity strobe lights which flash at near human brain wave frequency causing vertigo, disorientation, and vomiting [245]. See also *Optical, Stroboscopic Device.*

Optical, Cameo Bluejay. A 75 pound version of the AN/VLO-7 Stingray designed for use by the Apache attack helicopter [1:161].

Optical, C-CLAW . The Close-Combat Laser Assault Weapon, code named "Roadrunner," was an early 1980s Army tactical laser proto-type which was designed to attack the optics of opposing armored fighting vehicles. The program was canceled in 1984 as a result of adverse publicity over human blinding issues and cost/weight requirements [435].

Optical, Cobra . Prototype of the AN/PLQ-5 Laser Countermeasures System. A 30-pound hand-held laser weapon used to damage enemy sensors and human eyes. Because this device may operate on three-different wave lengths it may be impossible to be currently defended against [1:161-164].

Optical, Cornet Prince . Air Force version of the AN/VLO-7 Stingray. It is a pod mounted system which is intended to protect an aircraft from enemy air defense weapons which are dependent on optics and electro-optics for their effect. Cornet Prince has a detection system which notifies an air crew if it is under attack or if attack is imminent so that it can take the proper counter-measures [1:160].

Optical, Crazing . See *Obscurant, Crazing.*

Optical, Dazer . Battery-operated 20,000 candlepower "flashlight." It uses an alexandrite laser and is meant to provide infantry with a nonlethal capability against armored targets by attacking sensors, night vision devices and personnel. The shoulder-fired Dazer weighs about 20 pounds and is submachine gun size [1:161-163,16].

Optical, Dazzle . A class of optical weapons that emit extremely bright light causing temporary blindness.

Optical, Dazzle Rifle . A rifle which emits an eye-safe argon-ion laser beam designed to disorient the target [352].

Optical, Demons . Term for directed-energy munitions [16].

Optical, Electro-Optical Countermeasures System . AN/VLO-7, Stingray. A laser designed to blind the optics and electro-optics of enemy tanks and armored fighting vehicles. Two test versions were deployed in the Gulf War by the Army but not used. This device weighs about 160 kilograms. It can be mounted on both the M1 Abrams tank and the Bradley infantry fighting vehicle [16,546]. See also *Antilethal, Sensor-Retroreflectivity.*

Optical, Flares . Both directional and omnidirectional flares can be used against personnel and materiel to obscure vision.

Optical Flash . A 40-mm artillery shell filled with plastic dye laser rods. Used to blind electro-optic sensors and enemy personnel [114].

Optical, High Intensity Lights . High intensity hydrogen-chloride light on a reflector equipped hand-held candle holder [529].

Optical, Illuminating-Grenade . In night ambushes in Vietnam the MK1 Illuminating Grenade, which produced 55,000 candlepower for 25 seconds, effectively blinded Viet Cong caught in the center of its illumination zone for short periods of time.

Optical, Isotropic Radiators . Special munitions that illuminate or bloom with laser-bright intensity causing the same retinal or optical damage as LEL (low energy laser) weapons. Isotropic radiation is generated by an explosive burst that superheats a gaseous plasma surrounding it, causing a laser-bright flash [246].

Optical, Laser . Light Amplification by Stimulated Emission of Radiation.

Optical, Laser-Argon Beam . See *Obscurant, Laser-Argon Beam.*

Optical, Laser-Anti-Oil Storage Tank . Man-portable laser system with a back-pack power supply designed for use against storage tanks in the Gulf War. Use debated [16,577].

Optical, Laser Countermeasures System [LCMS] . AN/PLQ-5. M-16 rifle-mounted and backpack- powered 42 pound system. Can detect and disrupt optical and electro-optical targeting systems at "stand-off ranges." While not specifically intended to harm human eyes, the system was canceled so U.S. troops would not be subjected to war crimes concerns [277,520].

Optical, Laser Dazzle System [LDS] . U.K. Royal Navy's low energy laser system deployed during the 1982 Falklands war by two of its frigates [475,476].

Optical, Laser-Infrared CO_2 . Laser which can heat the skin of a target to cause pain but will not burn the skin. Application against the hand of a suspect holding a knife or gun to a hostage [253].

Optical, Light Flashing Devices . Devices which are much like a photographer's flash bulb but at a greatly increased power. They are used to disorient target individuals by causing temporary flash blindness [23:206].

Optical, Low Energy Laser-Antilethal . See *Antilethal, Low Energy Laser.*

Optical, Low Energy Laser-Eye Safe . A continuous wave laser, mounted on a M-16/M-203 rifle, that produces a high-intensity glare strong enough to temporarily delay and disorient an adversary so that he can't complete a mental task, like cutting a fence or walking on rough terrain. Effective range of several hundred meters. Laser powered by 6 rechargeable AA size batteries [310:19].

Optical, Mobile Test Unit . Mid- 1970s Army tactical laser concept utilizing a medium powdered laser mounted on a Marine Corps armored personnel carrier called the Mobile Test Unit. Used to shoot down some helicopter drones [435].

Optical Munitions . A class of non-lethal weapons which rely upon either a multi-directional or uni-directional intense burst of light [isotropic radiator (laser)] generated by the high-explosive shock heating of an inert gas [543].

Optical, Stroboscopic Device . Devices employed against demonstrators which cause stroboscopic flashing. Same principle as a discotheque "strobe." In the 5-15 hertz range these devices can cause various physical symptoms and in a small portion of the population may trigger epileptic seizures [23:206].

O. Projectiles

Projectile, Bag-Bean . Fabric sacks filled with lead shot (usually No. 9) weighing from 40 to 150 grams, designed to be fired from 12 gauge shotguns and 37mm (40mm) launchers. The bags conform to the shape of the target on impact, producing less damage than a solid hard projectile. The bags are rolled in the cartridge and unroll after exiting the launch barrel. These projectiles are designed for direct impact on the target, therefore accuracy is important to ensure effective impacts. The level of energy delivered ranges from 40 to 100-foot pounds, depending on the distance the projectile has to travel. Also known as Flying Bean Bag or Shot Bag.

Projectile, Bag-Bean-Rubberized, Gun . A prison gun which utilizes rubberized bean bag projectiles. Used for movement of cell blocks and surprise advances [385].

Projectile, Bag-Stun . Early form of nonlethal projectile composed of a 5 1/4 ounce canvas pouch filled with metal buckshot which spread into a 3-inch diameter pancake in flight. Known to cause serious injury [511:672].

Projectile, Bag-Stun, Launcher . An obsolete gun which delivered a cartridge containing a 4" diameter stun-bag loaded with 1/5 to 1/2 lb. of shot. It could be used as handgun or with an extension as a shotgun. It has been replaced by the 12 gauge shotgun and the 37 (and 40) mm launchers [529]. Also known as the stun gun.

Projectile, Ball-Rubber, Grenade . An explosive anti-riot device which hurtles a large number of small "stinging" rubber balls at rioters when ignited. May or may not contain riot control agents [373].Also known as stingball or stinger grenade.

Projectile, Ball-Rubber, Round . The common usage of this term now refers to a number of 5/8 in. rubber balls fired from a 12 ga. shotgun. The 3/8 in. ball is also common. Both have a hardness of about 50 shore. These rounds have maximum effect when fired in confined spaces, where multiple bounces augment the number of impacts on the target with sufficient force to sting rather than hurt. The eyes are the most at risk of damage, due to the small size and velocity of the balls. The older use of this term refers to a rubber ball fitted with a "Blake" attachment to a shotgun. The ball can be solid or filled with liquid or gas. Various designs existed for point or area targets [529].

Projectile, Barricade Penetrating. Any projectile which delivers a riot control agent into a barricade situation via a window or plate-glass. One such projectile is a fin stabilized injection-molded plastic device which disperses a highly- volatile liquid CS agent [2:150,82].

Projectile, Baton-Plastic . A PVC cylinder 1/2 inches in diameter and 4 inches long. Instead of being bounced off of the ground these rounds are directly fired at the intended target. Causes a bruising impact blow with a claimed effective range of 30 to 65 yards. At point blank range this round can be fatal. First used by the British Army in Northern Ireland in February of 1973 as a replacement for rubber bullets [2:159,511:672]. Also known as riot baton round, plastic bullets or PVC bullets.

Projectile, Baton-Rubber . Pliable rubber cylindrical projectiles delivered from the riot gun or British Army signal gun. Aimed at crowd's legs or at the ground for ricochet effect into a crowd [165,529]. Also known as rubber baton or rubber bullet 6- inch.

Projectile, Baton-Wooden . Wooden cylinder delivered by a riot gun or by a British Army signal gun [529]. Also known as broomstick round.

Projectile, Baton-Wooden Multiple . A 37-38mm round which disperses 5 wooden pellets which can be fired from a distance or ricocheted into the mob. Direct fire at close or point blank range can cause serious or fatal injuries [2:158].

Projectile, Baton-Wooden Whistling . A short fluted cylinder made of wood and fired at low-velocity for crowd dispersal. This round makes a whistling sound when fired. Whistling sound and visibility of round valued over kinetic impact. Fired by a Hong Kong Pellet Gun [165].

Projectile, Chaff-Ceramic . Dropped or fired in front of an aircraft which when ingested by a jet engine will destroy its turbine blades and other mechanisms [356:35].

Projectile, Gas Vortex . If a gas vortex, a highly stable phenomenon, was projected at some velocity, the difference in pressure on the leading and trailing edges would produce an impact. Potential use in crowd and riot control situations [556:19].

Projectile, Launcher-ARWEN . Anti- Riot Weapon Enfield. A hand-held, cylinder fed, shoulder-launched 37mm anti-riot weapon which is used to launch a variety of impact devices such as bean bags, pellets, rubber and wooden baton rounds, etc.

Projectile, Launcher-Blake Impact Gun . Aluminum alloy-type, golf ball sized projectile fitted to a bolt-action shotgun [529].

Projectile, Launcher-Velocity Adjusting . Small arms weapon with an adjustable muzzle velocity intended for delivery of less-than-lethal munitions such as rubber or PVC bullets. The purpose of the adjustment is to tailor the velocity to the range [35].

Projectile, Launcher-Very Pistol . A 37mm pistol used to fire tear gas and other nonlethal projectiles.

Projectile, Liquid Filled . Several types of hollow rubber projectiles have been manufactured. The most recent, in a 12 ga. shotgun size, is filled with a liquid dye to mark the target for subsequent identification, in addition to the impact effect. The working range is from 5 to 75 feet. Older types included a 3 inch diameter, .5 lb. rubber ball filled with water, to be used as an impact projectile. The range was 75 ft. The launcher was large and heavy [529].

Projectile, Mine-Claymore . Modular Crowd Control Munition. A nonlethal claymore-type mine which disperses blunt impact ordnance for crowd control purposes [373].

Projectile, Muzzle Launch Ordnance [MLO] . MLO MA/RA 88 less-than-lethal shot for the M16A2 Rifle. Must disorient targets at effective ranges of 30-70 meters, not create shrapnel, and be of minimal hazard [338,373].

Projectile, Ricochet-Soft Plastic . Polyethylene pellets 1/16" in diameter delivered from a standard 12-gauge shotgun aimed to ricochet. Available in larger sizes [529].

Projectile, Ring Airfoil Grenade, Launcher . Launcher Adapter, M234 Designed for attachment to M16A1 rifle. Uses blank cartridge (M755) to propel either Soft Ring Airfoil Grenade (M742) or Sting Ring Airfoil Grenade (M743).

Projectile, Ring Airfoil Grenade-Soft. Soft RAG, M742. A rubberized donut shape with airfoil cross- section that is launched spinning from M234 adapter attached to M16A1 rifle. A series of cavities in the projectile body contain packets of CS powder. Target impact opens the CS packets and disseminates the chemical (powder). This system has been replaced by the Non-Lethal 40mm Sponge Grenade.

Projectile, Ring Airfoil Grenade-Sting . Sting RAG, M742. A rubberized donut shape with airfoil cross section that is launched spinning from the M234 adapter attached to M16A1 rifle. Intended as an initial deterrent via kinetic energy impact. Can also be used as a training round. This system has been replaced by the Non-Lethal 40mm Sponge Grenade.

Projectile, Rock Salt . Large salt crystals fired from shot guns. Crowd dispersal method.

Projectile, Rubber . These projectiles can be solid (homogeneous) or clad (composite). Solid rubber projectiles can be further classified by density, ranging from high density (hard), to soft (foam). The shape of the homogeneous projectiles varies from a right cylinder (35mm diameter by 3 inches long) to a cylinder with a hemispherical nose, to short cylinders (35mm diameter by 1 1/2 inches long- multi-projectiles, soft foam) to hard, finned shape projectiles (12 gauge), and balls about 5/8 inch. The large cylinders fired to strike the ground in front of the target individuals, bouncing up to hit them. Depending on the distance from the ground impact to the target, the impact point can range from the knees to the head, producing different results. Past experience with this method of firing has shown that.

Projectile, Shards-Ceramic . Fired against aircraft to disable their engines or to degrade their stealth capabilities [16].

Projectile, Splatt-Thixotropic . Special Purpose Low Lethality Anti-Terrorist. Any projectile that deforms at impact, without penetrating the body. One materiel preparation designed to accomplish this action is described in the patent. The whole projectile is made of this substance, not just the tip. The older usage of this term referred to any caliber shotgun shell with grease or soft putty on the tip which would deform at impact [529].

Projectile, Sponge Grenade . 40mm nonlethal projectile developed for the M203 grenade launcher made out of spongy material. Can either be used as a kinetic weapon or with the inclusion of a CS or marking dye wafer. Potentially fatal within 25 meters or if an eye shot occurs. Successor to the discontinued Soft/Sting Airfoil Grenade System.

Projectile, Water Stream . Mobile unit which projects a continuing stream of water for riot control purposes [529].

Projectile, Water Stream-Electrical . See *Electrical, Water Stream.*

P. Reactants

Reactant, Acetylene, Grenade . One pound bomb containing calcium carbide and water. Upon detonation, forms a bubble of acetylene gas seven feet in diameter. When sucked into the air intake of a diesel at concentrations as little as one percent, the gas would cause the fuel in each cylinder to ignite prematurely, with enough force to break piston rods [144,387].

Reactant, Chemical Compounds . Chemical compounds which are magnitudes more powerful than hydrofluoric acid. A mixture of hydrochloric acid (HCl) and nitric acid (H_2NO_3) will dissolve most noble metals, such as gold and platinum, and organic compounds. Could be delivered by binary weapons to attack

structures, armored fighting vehicles, roads, roof tops and optical systems [16,246,356].Also known as supercaustics, superacids, supercorrisive bases, C+, and tire eaters.

Reactant , Cloud Seeding. Silver iodide dropped into clouds over the Ho Chi Minh trail during the Vietnam War in order to promote additional rainfall which would degrade Viet Cong logistics [434]. See also *Reactant, Operation Popeye.*

Reactant, Combustion Alteration . This technology consists of chemical additives that either contaminate or change the viscosity characteristics of fuel to degrade standard engine performance. The additives may be ingested as a vapor through air intakes, mixed with fuel during the intake cycle or applied directly to a fuel source causing almost instant engine failure [302:13,16].

Reactant, Liquid Metal Embrittlement [LME] . Agents operate by altering the molecular structure of base metals or alloys and could significantly interfere with the operation of the aircraft, vehicles, metal treads and bridge supports to which they were applied. LMEs are clear and have little or no perceptible residue, whether sprayed on or applied with felt-tip markers. Some ambiguity exists because LMEs may refer to both liquids and liquid metals [16,302,356].

Reactant, LME Graffiti . Graffiti used to mask an LME strike against a bridge or other target. Great potential for terrorist use. Example, phone call to law enforcement stating that an LME strike has been conducted against one of a number of bridges in a city using red LME graffiti.

Reactant , Operation Popeye. The cloud-seeding campaign conducted by the U.S. military during the Vietnam War. 2,602 Popeye flights were flown through 1972 in hopes of interdicting the flow of Communists troops and supplies along the Ho Chi Minh Trail [434].

Reactant, Pyrophoric Particles . Particles which when ingested in a combustion chamber give off heat and thus overheat the chamber which causes thermal failure. Caesium would be one likely candidate [144,356]. Also known as polystyrene peanuts.

Q. Riot Control Agents

Riot Control Agent, Area Dispensers . RCA dispensers mounted in the walls and ceilings of prison facilities. They provide law enforcement personnel the ability to move groups out of or from one area to another through CS and OC dispersement [385].

Riot Control Agent, CA . 4- Bromobenzylcyanide. CA was one of the first tear agents used. It is not as effective as CN or CS and is obsolete. CA produces a burning sensation of the mucous membranes and severe irritation and tearing of the eyes with acute pain in the forehead [584:52]. Also known as BBC, larmine, and camite.

Riot Control Agent, Chemical Mace . Small spray can containing a 0.9 per cent solution of agent CN in a variety of petroleum based carriers including a mixed freon/hydrocarbon solvent. First introduced in 1966. CS-Mace then developed in 1968 by suggestion of the U.S. Army [2:213-214,165].

Riot Control Agent, CN . Chloroacetophenone. A lacrimator that causes irritation to the upper respiratory passages and may cause irritations to the skin. On average, it incapacitates for approximately 3 minutes. Discovered by the German chemist Graeber in 1869. Replaced for most purposes by CS [13:19,529].

Riot Control Agent, CR . Dibenz- (b,f)-1,4-oxazepine. Newer riot control irritant developed in England in 1962 by the British chemists Higginbottom and Suchitzsky. About 5 times more effective than CS. In

addition, CR is much less toxic than CS. CR is not used in its pure form (a yellow powder) but dissolved in a solution of 80 parts of propylene glycol and 20 parts of water to form a 0.1-percent CR solution. It is used in solution as a riot control agent. Eye pain, discomfort and excessive tearing occur with sometimes painful sensitivity to strong light or temporary blindness. Symptoms can persist for 15 to 30 minutes. Dubbed "fire gas" by the media because of the burning sensation it caused to the skin of rioters when used in Northern Ireland from 1973-1974. Authorized U.S. Army use in 1974 [2:180,67,584:59].

Riot Control Agent, CS . Ortho- chlorobenzalmalononitrile was made the standard riot control agent by the Army in 1959. The term "CS" is derived from the two scientists, B.B. Carson and R.W. Sloughton, who first prepared it in 1928.First used by U.S. civilian law enforcement in 1968 during the riots in Washington D.C. While an effective riot control agent, which incapacitates on average from 5 to 10 minutes, decontamination and cross-contamination is a considerable problem in urban environments [13:19,82,337].

Riot Control Agent, CS1 . Specially formulated to prolong persistency and increase the effectiveness of CS. Unlike CS, CS1 is a free-flowing (micropulverized) agent powder consisting of 95-percent crystalline CS blended with 5-percent silica aerogel. This formulation reduces agglomeration and achieves the desired respiratory effects when dispersed as a solid aerosol [584:59].

Riot Control Agent, CS2 . CS blended with silicone-treated silica aerogel, which causes it to repel water. This treatment improves the physical characteristics of CS by reducing agglomeration and hydrolysis. This form of CS prolongs the effectiveness for both immediate and surface contamination effects. When disturbed, CS2 reaerosolizes to cause respiratory and eye effects. A cloud of waterproofed CS can be kicked up by people walking in the street or grass two months after it has settled [13:50,584:59].

Riot Control Agent, CSX . A form of CS developed for dissemination as a liquid rather than as a powder. One gram of powdered CS is dissolved in 99 grams of trioctylphosphite (TOF). As with CS, CSX stings and irritates the eyes, skin, nose, throat, and lungs of exposed personnel [584:59].

Riot Control Agent, Disperser-Fogger . Conventional insecticide blower adopted for CS and CN dispensing in Vietnam. Produces a fog-type emission for up to a 15 minute period. Conceptual basis was to fill Viet Cong tunnel complexes with large amounts of the CS agent. Another fogger was a handheld gasoline-operated device which dispenses either CS, CN or inert fog at 0.7 gallon/hour [2:178,165]. Also known as mighty mite (M-106) and pepper fogger.

Riot Control Agent, Disperser-Liquid . An Army riot-control agent disperser visually resembling a man-carried flamethrower. Fully loaded weight is approx. 55 pounds. Disperses CS mixed with a trioctylphosphate solvent. [2:178,165]. Also known as liquid stream projector.

Riot Control Agent, Disperser-Powder . Modified Dry-Powder Fire Extinguisher. Powdered CS and CN dispersal [165].

Riot Control Agent, Grenade Electrically Activated . A riot control grenade with a male, electrically activated screw-in socket connection in place of a standard fuse. This enables the grenades to be incorporated into electrical systems, in fixed installations, where they can be activated by a trip device or switch, at will. This is of special importance in security of buildings, and vital installations, providing a dependable, economical protective system that can be locally installed. This system, with variations, is now in use in commercial security systems, as well as in U.S. government and embassy installations [2:133].

Riot Control Agent, Grenade-M73A . Army riot control grenade in use prior to the M47-Type CS Grenade. As of 1992, the M7A3 was still in use because of technical problems with the M47 [67].

Riot Control Agent, Grenade-M47 CS . Basic riot control grenade employed by the Army. Its contents are expelled as a vapor from a taped-over port in the grenade body, causing the grenade to "skitter" around on the ground, making it difficult for rioters to throw back. As of 1992, it has not seen tactical action [67].

Riot Control Agent, Homemade Face Filters . Wet rags and other devices made by prison inmates to counter the effects of riot control agents [385].

Riot Control Agent, Lacrimator . A riot control irritant that will cause blinding tears upon contact with the eyes [444]. Also see *Riot Control Agent, CN.*

Riot Control Agent, Launcher - Handy Andy. U.S. Army hand-hold type throwaway munition consisting of an aluminum tube with a hand-activated striker in the base. On ignition, the E24 propels a cylindrical rubber projectile containing 50 grams of CS burning formulation to distances of 70-100 yards [2:179].

Riot Control Agent, Launcher-Riot Gun . A weapon designed specifically to fire tear gas munitions of 37-mm diam. [444:2]. Also known as 1 1/2-in gun, 38-mm gun, gas gun, and tear gas launcher.

Riot Control Agent, Mine . An anti-personnel mine filled with a riot control agent. For perimeter use around detention camps or secured facilities.

Riot Control Agent, OC . Oleoresin Capsicum. A food product obtained from chili peppers which are dried and ground into a fine powder. When mixed with an emulsifier such as mineral, vegetable, soy oil or water, it may be sprayed from a variety of dispensers and used as an irritant for safely controlling violent persons or vicious animals and/or restoration and maintenance of order.

Riot Control Agent, Ring Airfoil Grenade- Soft . See *Projectile, Ring Airfoil Grenade- Soft.*

Riot Control Agent, Sponge Grenade . See *Projectile, Sponge Grenade.*

Riot Control Agent, Tear Gas-Invisible . Invisible tear-gas clouds are produced by blast munitions loaded with dust or liquid agents. Invisible tear gas cannot be seen by rioters once it first emerges from a grenade or mechanical dispenser and therefore produces a greater psychological panic-producing effect than tear smoke [2:161-162].

Riot Control Agent, Tear Gas-Visible . Visible tear-gas clouds (tear smoke) emanate from burning grenades and projectiles. Tear smoke is highly visible and plainly indicates the area covered to police and rioter alike [2:161-162].

II. Nonlethal Weapons Concepts

A. Ethical

Ethical, Biological Weapons Convention [BWC], 1972 . This convention prohibits the development, production, stockpiling or retention of microbial or biological agents for use as weapons. Would likely preclude the use of biodegrading microbes [16,508].

Ethical, Blinding Laser Ban, 1995 . The Department of Defense prohibits the use of lasers specifically designed to cause permanent blindness of unenhanced vision and supports negotiations prohibiting the use of such weapons. However, laser systems are absolutely vital to our modern military. Among other things, they are currently used for detection, targeting, range-finding, communications and target destruction...accidental or incidental eye injuries may occur on the battlefield as the result of the use of

legitimate laser systems. This prohibition was initiated by the United States in concurrence with other, mostly Western, nations [457].

Ethical, Certain Conventional Weapons Convention, 1980 . Prohibits or restricts weapons which are deemed to be excessively injurious or to have indiscriminate effects. Microwave, radio-frequency radiation, and visible light pulsing at brain-wave frequency may violate this convention [20:49-54,508:45]. Also known as Inhumane Weapons Convention.

Ethical, Chemical Weapons Convention [CWC], 1993 . This convention, while not in force, precludes the use of toxic chemicals as a method of warfare. A toxic chemical is one which 'though its chemical action on life processes can cause death, temporary incapacitation or permanent harm to humans or animals.' How supercaustics would be interpreted within this convention is unknown [16,508].

Ethical, Environmental Modification Techniques Ban, 1977. Found in Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD). Bans any technique for changing- through deliberate manipulation of natural processes- the dynamics, composition or structure of the Earth, including its biota, lithosphere, hydrosphere and atmosphere, or of outer space which will have widespread, long-lasting or severe effects as the means of destruction, damage or injury to any other State Party [20:68-69].

Ethical, Geneva Protocol, 1925 . Whereas the use in war of asphyxiating, poisonous or other gases, and of analogous liquids, materials or devices, has been justly condemned by the general opinion of the civilized world; and Whereas the prohibition of such use has been declared in Treaties to which the majority of Powers of the world are Parties; and To the end that this prohibition shall be universally accepted as part of International Law, binding alike the conscience and the practice of nations. Extended to bacteriological methods of warfare. The United States has interpreted the Protocol of 1925 as not prohibiting the use of riot control agents [20:57-58].

Ethical, New Martyrdom . A potential form of martyrdom arising from the long-term incapacitation capacity that some nonlethal weapons provide. Examples are permanently blinding or disrupting the nervous systems of opposing soldiers. Those living, rather than dead, would represent a new form of

martyr. References to the horrors of the gassings of the First World War would undoubtedly be made [149:10-11].

Ethical, Tennessee vs. Garner . A 1985 court case (475 U.S. 1) which held that the use of deadly force to apprehend an apparently unarmed, nonviolent fleeing felon is unreasonable seizure under the Fourth Amendment. Stimulated law enforcement interest in less-than-lethal weapons.

B. Functional

Functional, Bouchon . The complete metal fuze assembly of a diversionary device or similar grenade, usually consisting of a safety pin, safety "spoon," and a percussion type ignition device.

Functional, Deflagrate . To burn; consume; to burn rapidly with intense heat and dazzling light.

Functional, Deflagrating Canister . A canister which is designed to burst or burn. When used with a diversionary device, this type of canister is designed to burst or burn at a low enough pressure to prevent the bouchon from being thrown.

Functional, Deflagrating Explosive . Any explosive which deflagrates rather than detonates. Also called a "low" explosive, it is characterized by relatively slow burning processes with progressive reaction rates and buildup of pressure which creates a heaving action.

Functional, Deployment Sequence . The first of three functions when a diversionary device is deployed. It refers to the manner and place in which a diversionary device is deployed. See also *Functional, Ignition Sequence* and *Functional, Firing Sequence.*

Functional, Detonate . To explode violently and noisily; also called a "high" explosive it is characterized by very rapid chemical reactions, thus causing tremendously high pressure and brisance (shattering action).

Functional, Detonating Explosive . Any explosive which detonates rather than deflagrates. Also called a "high" explosive, it is characterized by very rapid chemical reactions, thus causing tremendously high pressure and brisance (shattering action).

Functional, Firing Sequence . The second of three functions when a diversionary device is deployed. It refers to the mechanical action of the bouchon, (fuze assembly). See also *Functional, Deployment Sequence* and *Functional, Ignition Sequence.*

Functional, Fuse . A narrow tube filled with combustible material, or a wick saturated with such material, for setting off an explosive charge. A pyrotechnic device which serves as the initiator to an explosive charge (e.g. M-3A1, friction type fuse).

Functional, Fuze . Any of various devices for detonating bombs, projectiles, or explosive charges. A mechanical device used as the initiator to an explosive charge (e.g. M- 201A1, percussion type fuze).

Functional, Hybrids . Weapons that can be switched from "lethal" to "nonlethal" by a simple mechanism, having multiple barrels, or using ammunition which can be switched at launch (single barrel, lightened logistic chain) [529].

Functional, Ignition . Setting a thing on fire, to cause something to burn.

Functional, Ignition Sequence . The third of three functions when a diversionary device is deployed. It refers to the events which take place during the burning of the charge. See also *Functional, Deployment Sequence* and *Functional, Firing Sequence.*

C. Operational

Operational, Brevity Code . A one or two word phrase which, when transmitted on a radio, carries a much larger meaning. Used to keep transmission time to a minimum without unduly tying up valuable "air time." Usually repeated twice to ensure understanding.

Operational, Denial System . Components of a security system that prevent an intruder or adversary from completing an intrusive hostile act on a fixed sight [359].

Operational, Dirty Battlefield . A battlefield operational environment in which civilians and other noncombatants are mixed in with combatants [56].

Operational, Environmental Warfare . A form of attack based on purposeful environmental degradation by a state or non-state group against an opponent. An early example would be the salting of the fields of

Carthage by the Romans. The most recent example would be the blowing up of 732 oil wells in Kuwait and the releasing of oil into the Persian Gulf by Iraq in 1991.

Operational, Immediate Action Drill . Any action, technique or procedure which is initiated by an event rather than a signal [5].

Operational, Lethal-Nonlethal Coordination . A process by which hardkill and softkill weapons are made to enhance the effects of one another rather than degrade each others' performance. Applied to the defensive systems of a warship [570].

Operational, Long Term Disablement . The outcome of the application of nonlethal force that affects the opponent beyond duration of the confrontation or conflict. Blinding, maiming or psychologically deranging the opponent represent forms of long term disablement. This form of disablement burdens a society and is anathema to the Western definition of nonlethality.

Operational, Mobile Security System . Area/fixed site denial or delay systems that are portable, leveraging on nonlethal technology and minimal installation costs [402].

Operational, Mobile Tactics . A procedure used against rioters in which an anti-riot team is embarked on vehicles, rapidly driven near rioters, whereupon they quickly disembark and rush toward the crowd, followed by another team which repeats the procedure and exploits the momentum gained by the original team.

Operational, Nonlethal-Lethal Effect . A nonlethal attack which purposefully sets up an opposing soldier or vehicle for a fatal attack. Example, a soldier struck to the ground by a stick'em' and then shot by a conventional round or killed by an artillery barrage.

Operational, Nonlethal Weapons, Non-Western . Weapons which are designed to cause long-term disablement to military personnel and civilians. These weapons may be employed by either non-state forces or non-Western nation-states. Forms of nonlethal non- Western weapons include blinding lasers, disease organisms, and genetic alteration [149:3].

Operational, Nonlethal Weapons, Western . Weapons that are explicitly designed and primarily employed so as to incapacitate personnel or materiel, while minimizing fatalities, permanent injury to personnel, and undesired damage to property and the environment. Unlike conventional lethal weapons that destroy their targets principally through blast, penetration and fragmentation, non-lethal weapons employ means other than gross physical destruction to prevent the target from functioning. Non-lethal weapons are intended to have one, or both, of the following characteristics: a. they have relatively reversible effects on personnel or materiel, b. they affect objects differently within their area of influence [229:1-2].

Operational, Passive Deterrents . A genre of nonlethal weapons that does not affect the physiology of the target individual. Includes dyes, personal alarms, and scent sprays.

Operational, Rules of Engagement [ROEs] . Generally, rules that provide implementation guidance on actions to exercise 1. the inherent right and obligation of self-defense and 2. the application of force for mission accomplishment by national/multinational military forces in international not domestic situations. The many boundaries to ROE's include international laws and treaties, national policy and custom. Standing Rules of Engagement refer to those generally intended for all situations, but tailored ROE's for specific situations may augment those standing rules. This is a general, not legal, description.

Operational, Second Order Effect . A nonlethal attack ultimately resulting in an unintentional death. For example, a pilot, blinded by a laser unable to safely land his or her aircraft or a patient dies because the power to an incubator or iron long in a hospital is cut off due to the destruction of a power plant.

Operational, Short Term Disablement . A form of disablement which has relatively reversible effects on personnel or materiel [230:1].

Operational, Tailored Weaponry . Alternative, and likely more accurate, term for nonlethal weaponry. Such weaponry is qualitatively advanced over traditional firearms and munitions because it allows for precision control over the application of politico- military force. Rather than killing (100% force) or not-killing (0% force) an opponent these weapons offer new capabilities in the 1-99% range between no action and lethal force.

D. Physiological

Physiological, Acetylcholine Effect. The temporary effect an organism experiences after long periods of high stress, characterized by a total emotional surrender. Derived from an overabundance of the compound acetylcholine which is active in the transmission of nerve impulses.

Physiological, Diversion . A diversion which acts directly on a person by affecting one or more of the five senses.

Physiological, Impulse Noise . Noise which lasts less than one second.

Physiological, Lag Time . The physiological time lag which occurs between the time a stimulus is perceived until the body responds. In a healthy, well-rested human, this takes about three-quarters of a second.

Physiological, Rhodopsin. A purplish protein pigment, contained in the rods of the retina, that is transformed by the action of light and is necessary for vision in dim light.

Physiological, Sensory Overload. A temporary inability of an organism to correctly interpret and appropriately respond to life's stimuli because of the volume of input.

Physiological, Ulster Techniques. Psychophysiological techniques employed by the British in Northern Ireland based on sensory deprivation which can lead to long- lasting post-traumatic neurosis. Methods used included hooding, masking noise, wall standing, inadequate diet, sleep deprivation and some physical brutality [532].

E. Theoretical

Theoretical, Environmental Security . The recognition that the natural environment in which humans exist must be protected for their continued benefit. Because of the magnitude of many environmental problems, they require regional not national level solutions.

Theoretical, Fourth Epoch War . Strategic level theory of war utilizing an energy paradigm of Western civilization. The magnitude of change forecast is equivalent in scale to the Dark Ages, 378-732, and the European Renaissance, 1346-1648. During these transformations a new energy source is demonstrated on the battlefield, the dominant polity form "fails," the non-state soldier achieves dominance on the battlefield, crime and war blur, a new economy emerges, social classes shift, and advanced forms of battlespace and weaponry develop [633:23-25].

Theoretical, Fourth Generation Warfare . Operational level theory of warfare which views military change based upon advances in either technology or ideas. The emerging "idea based" fourth generation is thought to be based on terrorism and low intensity conflict [633:19-21].

Theoretical, MTR . A military technical revolution was declared by the Soviets to be taking place back in the 1980s. This revolution is based on emerging technologies, electronic and information systems and non-nuclear deep strike munitions, and will qualitatively alter the conduct of future war. The MTR is the conceptual forerunner to the revolution in military affairs (RMA) [640:2]. See also *Theoretical, RMA.*

Theoretical, New Gunpowder Revolution . The perception that the wide scale application of nonlethal technology on the battlefield will be as significant as the fielding of gunpowder based firearms during the European Renaissance [149:9].

Theoretical, Nonlethality . The theory that overwhelming nonlethal force could be used to defeat lethal force [418:24].

Theoretical, Post-Engine, Mechanical, Energy . For more advanced forms of nonlethal weaponry such as lasers and acoustics to properly function post-engine (mechanical) forms of energy will be required [149:7]. See also *Theoretical, Fourth Epoch War.*

Theoretical, RMA . Revolution in Military Affairs. Operational level theory which views military technical, doctrinal, and force structure changes now taking place equivalent in magnitude to the 1920's and 1930's when armored warfare, strategic bombing, and amphibious and carrier operations developed. The RMA is generally accepted by the U.S. Armed Forces and Office of Net Assessment [640].

Theoretical, RPMA . Fourth Epoch War theory perception that a revolution in political and military affairs (RPMA) is taking place. Far larger than a revolution in military affairs (RMA), this historical transition will result in the eventual demise of the nation-state, the blurring of crime and war, and the rise of new competing polity forms [633]. See also *Theoretical, Fourth Epoch War.*

Theoretical, Sixth Generation Warfare . Soviet (Russian) view of future warfare based upon faulty historical modeling which does not differentiate between strategic and operational level change. The current military revolution is said to be equivalent in magnitude to the 1920s & 1930s or the 1950s & 1960s. Attributes of the new form of warfare developing will include the ascendancy of aerospace operations, the growing importance of electronic warfare and the computerization of armed combat [634]. See also *Theoretical, MTR.*

Theoretical, Third Wave War . Theory of future war modeled on "waves" of economic based civilizations. First wave civilizations are agricultural, second wave civilizations are industrial and emerging third wave civilizations are informational. Future warfare will be informational based with the Gulf War representing the first of these conflicts. Magnitude of current change now taking place viewed as equivalent to that of the Industrial Revolution [633:21-23].

Theoretical, Twenty-First Century Politico-Military Force Matrix . Nonlethal technology, when coupled with traditional forms of lethal weaponry, allow for the application of short- term incapacitation, long-term incapacitation, and deadly force against the physical and mental/perceptual attributes of human targets and the hardware and software attributes of machine targets. This advanced form of politico- military force application can be expressed in a matrix [149:4].

Theoretical, War, Clausewitzian. A struggle between nation-states or their coalitions over the preservation and extension of national sovereignty.

Theoretical, War, Post-Clausewitzian . A struggle between competing forms of social and political organization over which the eventual successor to the nation-state will be built [633:27].

Theoretical, Weapons of Mass Protection . Nonlethal, antilethal, and information warfare weapons [418:16].

REFERENCE LISTING

I. Books

[1] Anderberg, MajGen. Bengt & Wolbarsht, Dr. Myron L. (1992). *Laser Weapons: The Dawn of a New Military Age*. New York, New York: Plenum Press.

[2] Applegate, Col. Rex. (1981). *Riot Control: Materiel and Techniques*. 2nd Edition. Boulder, Colorado: Paladin Press. (1st Edition. Harrisburg, Pennsylvania: Stackpole Books, 1969).

[3] Clede, Bill. (1987). *Police Nonlethal Force Manual: Your Choices This Side of Deadly Force.* Harrisburg, Pennsylvania: Stackpole Books.

[4] Doswald-Beck, Louise., ed. (1993). *Blinding Weapons: Reports of the Meetings of Experts Convened by the International Committee of the Red Cross on Battlefield Laser Weapons 1989-1991*. Geneva, Switzerland: International Committee of the Red Cross.

[5] Heal, Charles "Sid." (1991). *The Diversionary Device Reference Manual*. Doylestown, Pennsylvania: National Tactical Officer's Association.

[6] *Manual of Tear Gas Information.*(1967). Alternative title

Training Officer's Tear Gas Blue Book

. Saltsburg, Pennsylvania: Federal Laboratories.

[7] McLaughlin, Vance. (1992). *Police and the Use of Force: The Savannah Study*. Westport, Connecticut: Praeger.

[8] Momboisse, Ramond M. (1970). *Riots, Revolutions and Insurrections*. Springfield, Illinois: Charles C. Thomas Publisher.

[9] Momboisse, Ramond M. (1969). *Confrontations, Riots, Urban Warfare*. MSM Enterprises.

[10] Jones, Eugene S. (1970). *Law Enforcement Chemical Agents and Related Equipment*. Santa Cruz, California: Davis Publishing, Co.

[11] Swearengen, Thomas F. (1966). *Tear Gas Munitions: An Analysis of Commercial Riot Gas Guns, Tear Gas Projectors, Grenades, Small Arms Ammunition, and Related Tear Gas Devices*. Springfield, Illinois: C.C. Thomas.

[12] United States Marine Corps. (1940). *Small Wars*. 1st Printing. Manhattan, Kansas: Sunflower Press. (2nd Printing, 1996).

[13] Verwey, Wil D. (1977). *Riot Control Agents and Herbicides in War: Their Humanitarian, Toxicological, Ecological, Military, Polemological, and Legal Aspects*. Leyden: A.W. Sijthoff.

II. Chapters

[14] Cook, Dr. David L. (1992). Refractive Error. *Vision, What Every Pilot Needs to Know*. Atlanta, Georgia: Invision Press, 42.

[15] Foreman, Dave & Haywood, Bill., eds. (1987). Roads and Tires, Vehicles and Heavy Equipment. *EcoDefense: A Field Guide to Monkeywrenching*. Tucson, Arizona: Ned Ludd Books, 89-156.

[16] Kokoski, Richard. (1994). Non-lethal weapons: a case study of new technology developments. Stockholm International Peace Research Institute (SIPRI). *SIPRI Yearbook 1994*. Oxford, England: Oxford University Press, 367-386.

[17] O'Connor, Paul G. (1994, Aug.). Waging Wars with Nonlethal Weapons. Magyar, Dr. Karl P., ed. *Challenge and Response: Anticipating US Military Security Concerns*. Maxwell Air Force Base, Alabama: Air University Press., 333-344.

[18] Powell, William. (1971). Natural, Nonlethal, and Lethal Weapons. *The Anarchist Cookbook*. Secaucus, New Jersey: Barricade Books, Inc., 77-110.

[19] Reaves, Brian A. & Smith, Pheny Z. (1993). Table 15a. Types of nonlethal weapons authorized for use by officers in local law enforcement agencies, 1993. *Law Enforcement Management and Administrative Statistics, 1993: Data for Individual State and Local Agencies with 100 or More Officers*. Washington, District of Columbia: U.S. Department of Justice, 169-180.

[20] Reisman, W. Michael & Antoniou, Chris T., eds. (1994). Using Force (selected protocols and conventions). *The Laws of War: A Comprehensive Collection of Primary Documents on International Laws Governing Armed Conflict*. New York, New York: Random House.

[21] Sapolsky, Harvey M. (1994). War without Killing. Sarkesian, S. & Flanagin, J., eds. *U.S. Domestic and National Security Agendas*. Contributions in Military Studies, Vol. 152. Westport, Connecticut: Greenwood Press., 27-40.

[22] Summers, Harry G. (1985). Operation Ranch Hand. *Vietnam War Almanac*. New York, New York; Facts on File Publications, 66-67.

[23] Stockholm International Peace Research Institute (SIPRI). (1978). Non-penetrating kinetic energy projectiles & Electric, acoustic and electromagnetic-wave weapons. *Anti-personnel Weapons*. London, England: Taylor & Francis Ltd., 108-110, 202-210.

[24] Toffler, Alvin & Heidi. (1993). War Without Blood? *War and Anti-War: Survival at the Dawn of the 21st Century*. Boston, Massachusetts: Little, Brown and Company, 125-136.

III. Documents

[25] AAI Corp. (1979). *Incapacitating Agent Weapons Technology*. Baltimore, Maryland.

[26] Adams, J.P. (1966, Apr.). Teargas injuries; a clinical study of hand injuries and an experimental study on its effects on peripheral nerves and skeletal muscles in rabbits. *The Journal of Bone Surgery, 48.*

[27] Adams Schmidt, Dana. (1971, 11 Jan.). Pentagon says defoliation may help South Vietnamese economy. *The New York Times.*

[28] *Aerospace Daily.* (1995, 28 Jul.). Lack of DOD requirements prevents non-lethal technology growth, 141.

[29] *Aerospace Daily.* (1995, 28 Jul.). SASC provides $37.2 million for new non-lethal weapons office, 141.

[30] *Aerospace Daily.* (1993, 12 Aug.). Regarding Non-Lethal Weapons, 245.

[31] *Aerospace Daily.* (1992, 6 Mar.). Pentagon Eyes Minimum-Lethality Weapons, 377.

[32] Aftergood, Steven. (1994, Sep.-Oct.). The Soft-Kill Fallacy: The Idea of Non-Lethal Weapons is Politically Attractive and Purposefully Misleading. *The Bulletin of the Atomic Scientists, 50,* (5) 40-45

[33] *Agence France-Presse.* (1995, 24 Feb.). Goo, suds and bean bags: new additions to US arsenal in Somalia, Internet.

[34] *Air Force Times.* (1995, 17 Jul.). Waves of Goo, *55,* (50) 32.

[35] *Air Force Times* (1994, 11 Apr.). Crimebusters!

[36] Alexander, John B. (1996, Jun.). Shoot, But Not to Kill. *International Defense Review, 29,* (6) 77-78.

[37] Alexander, Dr. John B. (1996, Mar.). Non-Lethal Weapons Demand Expands as Missions Change. *National Defense, 80,* (516) 34-35.

[38] Alexander, John B. (1995, 9 Mar.). *Non-lethal Weapons and the Future of War.* LA-UR 95-699. Invited presentation to the Harvard-MIT Seminar on the Future of War. John M. Olin Institute for Strategic Studies, Harvard University Center for International Affairs.

[39] Alexander, John B. (1994, 2 Nov.). *Nonlethal Weapons: Concepts, Applications, & Issues.* LA-UR 94-3580. Presented to the Bourn's College of Engineering, University of California, Riverside.

[40] Alexander, John B. (1994, 27 Sep.). *Nonlethal Antimateriel Application of Superacids and Other Very Aggressive Chemical Agents.* LA-CP 94-203. Presented to NATO Advisory Group on Aerospace Research and Development, Rome, Italy.

[41] Alexander, John B. (1994, 23 Aug.). *A Proposal for Non-Lethal Force Development.* LA-CP 94-190. Presented to Defense Science Board, University of California, Irvine.

[42] Alexander, John B. (1994, Jul.). *Deeskalation und der Bedarf von Schonenden Waffen* (Deescalation and the Need for Nonlethal Weapons) with Dipl Ing Ulrich Rieger. LA-UR 94-2205. Published in German by Deutsche Aerospace.

[43] Alexander, John B. (1994, May.). *Nonlethal Weapons: A Need for New Options*. LA-UR 94-1497. Presented at the International Symposium for Common Defense 1994 "Keeping the Peace," Arlington, Virginia.

[44] Alexander, John B. (1994, 28 Mar.). *Nonlethal Weapons as Force Options for the Army*. LA-UR 94-861. Presented to the National Research Council, Board on Army Science and Technology, National Academy of Science.

[45] Alexander, John B. (1994, 24 Jan.). *Nonlethal Defense Briefing*. LA-UR 94-72. Presented to NATO AGARD, Paris, France.

[46] Alexander, John B. (1993, 27 Oct.). *Nonlethal Weapons and Limited Force Options*. LA-UR 93-3747. Presented to the Council on Foreign Relations, New York, New York.

[47] Alexander, John B. (1993, 2 Jun.). Nonlethal Weapons Technology. *Proceedings of the MIT Conference on the Political Implications of Non-Lethal Warfare Technologies*. Lexington, Massachusetts.

[48] Alexander, John B. (1993, 7 Mar.). New Weapons for a New World Order: The Pentagon looks to nonlethal technology. *The Boston Globe*, 70.

[49] Alexander, John B. (1992, 13 Nov.). *Rethinking National Security Requirements & the Need for Nonlethal Weapons Options*. LA-UR 92-3773. Submitted to President-Elect Clinton's Transition Team.

[50] Alexander, John B. (1992, 29 Sep.). *Potential Non-Lethal Policy Issues*. LA-UR 92-3206. Submitted to the Wall Street Journal.

[51] Alexander, John B. et al. (1992, May). *Antimateriel Technology*. LA-12319-PR Laboratory-Directed Research and Development.

[52] Alexander, John B. & Gates, Robert. (1991, Sep.). *Contingency Mission Technology*. LA-UR 91-3161.

[53] Alexander, John B. (1990, Sep.). *Future Applications of Directed Energy Weapons in Non-Lethal Defense*. LA-CP 90-393.

[54] Alexander, US Army Ret. Col. John B. (1989, Oct.). Antimateriel Technology. *Military Review, 69*, (10) 29-41.

[55] Alexander, Lexi & Klare, Julia L. (1995-1996, Win.). Nonlethal Weapons: New Tools for Peace. *Issues in Science and*

Technology, 12

, (2) 67-74.

[56] American Defense Preparedness Association. (1996, 6- 7 Mar.). *Non-Lethal Defense II Conference: Proceedings & Updated Attendee Roster*. Alexander, John B., chair. The Ritz-Carlton Hotel, Tysons Corner, McLean, Virginia.

[57] Americans for Effective Law Enforcement. (1988). Use-of Force Tactics and Non-Lethal Weaponry. *Alert Issue*, (3) 2- 6.

[58] Amnesty International, National Office. (1988). *Israel and the Occupied Territories: the misuse of tear gas by Israeli army personnel in the Israeli Occupied Territories*. New York, New York.

[59] Amouyal, Barbara. (1990, 19 Nov.). Use of Nonlethal Weapons May Alter Military Strategy. *Defense News*, *5*, 7.

[60] Amouyal, Barbara & Munro, Neil. (1990, 5 Nov.). Labs Rush Nonlethal Arms for Mideast Deployment. *Defense News*, *10*, 1.

[61] Anderberg, Bengt, Bring, Ove E. & Wolbarsht, Myron L. (1992, Aug.). Blinding Laser Weapons and International Humanitarian Law. *Journal of Peace Research*, *29*, (3) 287- 297.

[62] Anderberg, Bengt & Wolbarsht, Myron L. (1992, May). Hand-Held Laser Weapons are Waiting in the Wings. *Armed Forces Journal International*, *129*, (10) 60.

[63] Anderson, Col. Gary W. (1996, Jul.). There's A Better Way: Tomorrow's Missions Cry Out For A Mix of Lethal and Non-Lethal Weapons. *Armed Forces Journal International*, *133*, (12) 15.

[64] Anderson, S.E. (1971, Jan.). CS and its use. *The Military Review*.

[65] Anderson, Jon R. (1995, 8 May.). Fighting with new purpose: Marines' new 'experimental' unit looks at future wars. *Navy Times*, 30. Marine Corps Edition.

[66] Andrews, Andy E. & Alexander, John B. (1993, Oct.). Softer Response Required as Global Threats Change. *National Defense*, *78*, (491) 23-24.

[67] Applegate, Rex. (1992, Dec.). Riot Control: Army and National Guard Unprepared to Rule the Mob. *Soldier of Fortune*, 43- 47, 71.

[68] Applegate, Col. Rex. (1978, Feb.). New U.S. Army Riot Control Developments. *Law & Order*, 56-57, 62.

[69] Applegate, Col. Rex. (1974, Jul.). Guns & the Law: Multipurpose Police Handgun Developments, Non-Lethal Police Weaponry May be the Most Significant Development in the History of Law Enforcement. *Guns*, 28.

[70] Applegate, Col. Rex. (1973, Jun.). Guns & the Law: New Ideas for Law Enforcement Part 2. *Guns*, 24.

[71] Applegate, Col. Rex. (1972, Sep.). Guns & the Law: Non-Lethal Weapons and the Law. *Guns*, 30.

[72] Applegate, Col. Rex. (1971, Dec.). Guns & the Law: Non-Lethal Weapons, Part IV. *Guns*, 34.

[73] Applegate, Col. Rex. (1971, Aug.). Guns & the Law: Non-Lethal Weapons, Part III. *Guns*, 26.

[74] Applegate, Col. Rex. (1971, Jul.-Aug.). Nonlethal Police Weapons. *Ordnance*, *56*, (307) 62-66.

[75] Applegate, Col. Rex. (1971, Jul.). Guns & the Law: Non-Lethal Weapons, Part II. *Guns*, 28.

[76] Applegate, Col. Rex. (1971, Jun.). Guns & the Law: Non-Lethal Weaponry. *Guns*, 32.

[77] Applegate, Col. Rex. (1970, Sep.). Guns & the Law: Pepper Fogger. *Guns*, 30.

[78] Applegate, Col. Rex. (1970, Aug.). The Ferret Barricade Round, A 12 Gauge Riot Shotgun Projectile that Requires No Attachment. *Law & Order*, 112.

[79] Applegate, Col. Rex. (1970, Apr.). Guns & the Law: Tear Gas Grenades. *Guns*, 26.

[80] Applegate, Col. Rex. (1970, Feb.). Guns & the Law: Ferret Barricade Round. *Guns*, 28.

[81] Applegate, Col. Rex. (1969, Nov.). New Weaponry for Riot Control. *The National Guardsman*, 10.

[82] Applegate, Col. Rex. (1969, Sep.-Oct.). Riot Control 1969. *Ordnance*, *54*, 180-184.

[83] Applegate, Col. Rex. (1968, Oct.). Mace Revisited. *Law & Order*, 50.

[84] Applegate, Col. Rex. (1968, May.). Super Sonic Sound- A New Police Weapon. *Law & Order*, 28.

[85] Applegate, Col. Rex. (1967, Aug.). Guns & the Law: The Long Riot Baton. *Guns*, 28.

[86] Applegate, Col. Rex. (1967, Jun.). Guns & the Law: New Weapon Against Crime. *Guns*, 28.

[87] Applegate, Col. Rex. (1967, May.-Jun.). Weapons for Riot Control. *Ordnance*, *51*, 604.

[88] Applegate, Col. Rex. (1966, Jun.). The Chemical Mace, Evaluation of a New Police Weapon for Mob Control or Individual Defense. *Law & Order*.

[89] Applegate, Col. Rex. (1966, May.-Jun.). The Chemical Mace. *The National Sheriff*, 8.

[90] Applegate, Col. Rex. (1965, Sep.-Oct.). "Soft Soaping" The Rioters. *The National Sheriff*, 4.

[91] Applegate, Col. Rex. (1965, Sep.). Bubbles & Banana Peels, A New "Soft" Weapon for Destroying Dignity. *Law & Order*, 22.

[92] Applegate, Col. Rex. (1965, Mar.). The New Multi- Purpose Riot Control Grenade. *Law & Order*, 53.

[93] Applegate, Col. Rex. (1964, Jul.-Aug.). New Riot Control Weapons. *Ordnance*, 67.

[94] Applegate, Col. Rex. (1964, Jul.). A Commentary on Riot Control Chemical Tear Gas....CN and CS. *Law & Order*, 41.

[95] Applegate, Col. Rex. (1964, Mar.) The Long Riot Baton. *Law & Order*, 36.

[96] Applegate, Col. Rex. (1963, Oct.). Smoke vs. the Mob Cancer. *The Police Chief*.

[97] Applegate, Col. Rex. (1963, Oct.). A New Police Shock-Baton. *Law & Order*, 16.

[98] Applegate, Col. Rex. (1963, Mar.). The Organization and Tactics of Professional Riot Control Forces. *Army*, 53.

[99] Arbetter, Lisa. (1994, Jun.). A Pepper Pinch. *Security Management, 38*, 14-15.

[100] Arbrogast, Walter W. (1976, Jan.). *Soft/Sting Ring Airfoil Grenade Civil Disturbance Control System*. Edgewood Arsenal, Maryland: Weapons Systems Concept Office.

[101] Arkin, William. (1995, Dec.). Vienna Meeting Sets Ban on Blinding Laser Weapons. *Laser Focus World, 31*, (12), 62.

[102] Arkin, William. (1995, 17 Jul.). Ban Tactical Laser Weapons: DoD Maintains Blinding is Not Violation of War. *Defense News*, 20.

[103] Arkin, William. (1995, 10 May.). The Pentagon's Blind Ambition (Blinding Laser Weapons). Opinion-Editorial. *New York Times* (Late New York Edition), A23.

[104] *Army Times*. (1994, 10 Oct.). Perry seeks directive on nonlethal warfare feat, 34.

[105] Arquilla, John & Ronfeldt, David. (1992). *Cyberwar is Coming!* RAND Pamphlet P-7791. Santa Monica, California: The RAND Corporation.

[106] Ary, USMC. Maj. Vaughn A. (1996, Aug.). *New Rules of Engagement for Today's Missions*. Unpublished paper.

[107] Atkinson, Rick.(1995, 26 Feb.). Bullets to beanbags: A military evolution. *The Kansas City Star*, A-1.

[108] Atkinson, Rick. (1995, 25 Feb.). Marines test new arsenal for Somalia. *Washington Post*, Internet.

[109] Atwal, Kay & Tapscott, Mark. (1993, Apr.). Non- lethal Laser Rifle Testing at Fort Bragg, Naval Anti-Missile Laser is Readied for Sea. *Defense Electronics, 25*, 18-19.

[110] Audsley, David (1989, Fal.) Flash/Sound Diversionary Device Evaluation. *The Tactical Edge*, 6.

[111] *Aviation Week & Space Technology*. (1995). Panel's Report Backs Nonlethal Weapons-High-Priiority Emerging Missions May Bring Development Push, *143*, (16) 50.

[112] *Aviation Week & Space Technology*. (1994, 24 Jan.) Government/Military: John B. Alexander, program manager for Nonlethal Defense, Los Alamos (NM) National Laboratory (Aerospace Laureate), *140*, (4) 19-20.

[113] *Aviation Week & Space Technology*. (1993, 24 May.). Army Prepares for Non-Lethal Combat (Low Collateral Damage Munitions program). *138*, (21) 62.

[114] *Aviation Week & Space Technology*. (1992, 7 Dec.). Nonlethal Weapons Give Peacekeepers Flexibility. *137*, (23) 50-51.

[115] Bacon, LtCol. Douglas C. (1980, Oct.). Battlefield Lasers: A New Problem With an Old Cure. *Military Review, 60* (10) 33-39.

[116] Baker, David. (1994, Oct.). Wizard Wars & Air Power in the 21st Century-- Part 2. *Air International, 47*, 214-217.

[117] Balzar, John. (1995, 25 Feb.). Marines take a Tip from L.A. Riots Somalia: Southland crowd control failures lead to non- lethal devices that may cut casualties as troops shield U.N. pullout. *Los Angeles Times*, Internet.

[118] Bandman, A.L. & Savateyev, Med Col. N.V. (1977). Toxicology of CR. *Voyenno-Meditsinskiy Zhurnal, 3*, 84-86. UDC 615.9:623. 459.43., 126-130.

[119] Barrie, Darwin N. (1988, Jun.). Maricopa County's evaluation of less-than-lethal electronic devices. *The Police Chief, 55*, (6) 17.

[120] Barry, Col. John L., Everett, LtCol. Michael W. & Peck, LtCol. Allen G.(1994). *Nonlethal Military Means: New Leverage for a New Era.* Policy Analysis Paper 94-01, National Security Program. Cambridge, Massachusetts: Harvard University, John F. Kennedy School of Government.

[121] Barry, J. & Morganthau, T. (1994, 7 Feb.). Soon, 'Phasers on Stun.' *Newsweek, 123*, (6) 24-26.

[122] Baugham, T. Frank. (1942). *The ABC of Practical Riot Gun Instruction.* Washington, District of Columbia: National Rifle Association.

[123] Beal, Cliff. (1995, Dec.). Bang! Bang! You're Not Dead. *Focus*, 63.

[124] Becker, Jon B. (1996, Spr.). The Legal Aspects of Diversionary Devices. *The Tactical Edge*, 53.

[125] Becker, Jon B. & Heal, Charles. (1996, Feb.) Less-Than-Lethal Force: Doctrine must lead the technology rush. *International Defense Review, 29*, (2) 62-64.

[126] Beecher, W. (1966, Feb.). Chemical versus Viet Cong: right or wrong? *The National Guardsman, 20.*

[127] Begert, USMC. LtCol. Matthew. (1996, 5 Jun.). *Non-Lethal Applications: A USMC View.* Slide Series. U.S. Army Test and Evaluation Command, "Visions of Future Conflict- Test Technology Drivers," Symposium, Johns Hopkins University, Laurel, Maryland.

[128] Begley, Sharon. (1994, 7 Feb.). One Pill Makes You Larger, One Pill Makes You Small... *Newsweek*, 123, (6) 37.

[129] Bender, Frank. (1974, Nov.-Dec.). Ring Airfoil Grenades. *National Defense.*

[130] Bernstein, Theodore. (1985, 22 Jan.). *Evaluation of the Electric Shock Hazard for the Nova XR 5000 Stun Gun.* Unpublished. Madison Wisconsin: University of Wisconsin.

[131] Betts, R. & Denton, F. (1967, Oct.). *An evaluation of chemical crop destruction in Vietnam.* RAND Corporation Memo. RM-5446 ISA/ARPA. Santa Monica, California.

[132] Biggs, M. (1990). *Non-Lethal Weapons: A tool for law enforcement, 6* (1) 37-43.

[133] Blumenfeld, Stewart N. (1968). *Employment of the Riot Control Agent CS in Vietnam.* Office of the Science Advisor, Military Assistance Command, Vietnam.

[134] Blumenthal, R. (1970, 15 Mar.). US shows signs of concern over effect in Vietnam of 9-year defoliation program. *The New York Times.*

[135] Blundy, David & Pringle, Peter. (1974, 27 Oct.). New Ulster riot control gas worries experts. *London Times*.

[136] Bodenheimer, T.S. & Rose, L. (1968, Aug.). Mace. *Survival, 10*.

[137] Boffey, P. M. (1971, Jan.). Herbicides in Vietnam, AAAS study finds widespread devastation. *Science, 171*.

[138] Bowers, M.B. et al. (1960, Jun.). Interim report of CS exposures in plant workers. *U.S. Chemical Warfare Laboratories Technical Memo.* CWL-TM-24-50.

[139] Brady, LtCol. Robert. (1995, July.). Tofflers missed importance of nonlethal weapons. Letters to the Editor. *Special Warfare, 8*, (3) 45.

[140] Bramwell, E.C.B. (1961, Feb.). Skin reaction and sensitivity to CS. *Porton Tech Paper 757*.

[141] Breit, J.M. (1965, Mar.). *Nonlethal Incapacitating-Weapon: Liquid Stream Projector Feasibility Study*. Technical Paper No. RAC-TP-168 submitted to Advanced Projects Agency, Washington, D.C. under contract No. SD-212). McLean, Virginia: Research Analysis Corporation.

[142] Brennan, Dennis T. (1976, Apr.). *Riot Control Without Bloodshed: The Soft/Sting Ring Airfoil Grenade*. A Feasibility Review of the U.S. Army's Experimental Civil Disturbance Control System. Cleveland, Ohio: City of Cleveland, Office of the Mayor.

[143] Bruel, P.V. & Olesen, H.P. (1973). Infrasonic Measurements. *B.K. Technical Review, 3*, 14-25.

[144] Budiansky, Stephen. (1987, 20 Jul.). All stuck up, no way to go. *U.S. News & World Report*, 62.

[145] Bunker, Robert J. (1996, Aut.). Advanced Battlespace and Cybermaneuver Concepts: Implications for Force XXI. *Parameters, 26* (3) 108-120.

[146] Bunker, Robert J. (1996, May.-Jun.). Nonlethal Defense II Conference. *Military Review, 76*, (3) 90.

[147] Bunker, Dr. Robert J. (1996, Feb.). *Fourth Epoch War: Strategic Considerations and Responses*. Prepared for Command's Warfighting Lab, Marine Corps Combat Development Command (MCCDC). NSSP Report 96-1. San Bernardino, California: National Security Studies Program, California State University, San Bernardino.

[148] Bunker, Robert J. (1995, 28 Aug.). U.S. Must Seize the Future With Tactical Laser Development. *Defense News*, 15, 19.

[149] Bunker, Robert J. & Moore, T. Lindsay. (1996, Feb). *Nonlethal Technology and Fourth Epoch War: A New Paradigm of Politico-Military Force*. Land Warfare Paper No. 23. Arlington, Virginia: Institute of Land Warfare, Association United States Army.

[150] Bureau of Prisons, U.S. Department of Justice. (1949, Nov.). *Use of Tear Gas and Smoke*.

[151] Burnett, Richard. (1993, 24 Oct.). Contractors Hatch New Weapons. *The Orlando Sentinel*.

[152] Burnett, W.A. et al. (1961, May). The influence of particle size on the subjective effects of CS. *Porton Tech. Paper* 776.

[153] *Business Week.* (1972, 29 Jul.). The hunt for nonlethal guns, (2239) 34-36.

[154] California Legislature & Assembly, Committee on Criminal Justice. (1977). *Less-Than Lethal Weapons: Hearing, Los Angeles, California Oct 22, 1976.* Sacramento, California: Assembly Publications Office.

[155] Campbell, C. (1992, 27 Sep.). The lethal bomb that does not kill. *Sunday Telegraph*, 6.

[156] Campbell, Donald & Egner, Donald O. (1976, Jan.). *Modeling for Less-Lethal Chemical Devices.* Technical Memorandum 2-76. Aberdeen Proving Ground, Maryland: U.S. Army Human Engineering Laboratory.

[157] Cantrow, Ellen. (1988, Oct.). *Not Tears Alone* (Israeli use of tear gas in West Bank and Gaza). *Technology Review, 91*, 16-17.

[158] Capaccio, Tony. (1995, 23 Jan.). U.S. Commanders State Uses for Non-Lethal Technology. *Defense Week*, 16, 3.

[159] Casey, Joe D. (1988, Feb.). Research and Development Needed for Less-Than-Lethal Weapons. *The Police Chief, 55*, (2) 7.

[160] The Center for Advanced Command Concepts and Technology (ACT). (1995, Nov.). *Operations Other Than War (OOTW): The Technological Dimension.* Washington, DC: National Defense University.

[161] *Chemical Weapons Convention Bulletin.* (1994, Mar.), *23.*

[162] Chief of the Defence Staff, Canada. (1976, 1 Sep.). Riot Control Agent Dibenz (b,f) -1, 4 - Oxazepine (CR). *Canadian Force Technical Order.* NSN 1365-21-873-1605. C-77-206-000/AF-000.

[163] Chicago Police Department, Training Division. (1961). *Tear Gas Manual.* Chicago, Illinois.

[164] Cline, Ray S. (1991, 27 Feb.). Warfare's New Era. *Washington Times*, 58.

[165] Coates, Joseph F. (1972, Jun.). Non-Lethal Police Weapons. *Technology Review*, 49-56.

[166] Coates, Joseph F. (1972). *Nonlethal, Nondestructive Warfare.* P-569. Arlington, Virginia: Institute for Defense Analyses.

[167] Coates, Joseph F. (1970). *Nonlethal and Nondestructive Combat in Cities Overseas.* Washington, District of Columbia: Institute for Defense Analyses, Science and Technology Division.

[168] Coates, Joseph F. (1969). *Nonlethal Chemical Agents.* Washington, District of Columbia: International Association of Chiefs of Police.

[169] Coates, Joseph F. (1968, May.). Safe Police Weapons. *Science and Technology*, (77).

[170] Coates, Joseph F. (1967, Nov.). *Nonlethal Weapons for Use by Law Enforcement Officers*. Study No. S-271. Arlington, Virginia: Institute for Defense Analysis, Science and Technology Division.

[171] Collins, John M. (1995, 14 Sep.). *Nonlethal Weapons and Operations: Potential Applications and Practical Limitations*. CRS Report for Congress 95-974 S. Washington, District of Columbia: Congressional Research Service.

[172] Commandant's Warfighting Lab (CWL). (1995, Dec.). *Draft Non-Lethal Technology Functional Concept*. Quantico, Virginia: United States Marine Corps. Under Redraft.

[173] Commodity Management Office, Department of the Army. (1969, Jul.). *Riot-Control-Agent CS, Munitions and Dispersers*. Edgewood Arsenal, Maryland.

[174] *Computerworld*. (1990-1991, 24 Dec.-1 Jan.). Joy to the World, *24*, 72. Computer viruses as nonlethal weapons.

[175] Conine, Ernest. (1975, 26 Sep.). A Nonlethal Substitute for the Handgun? *Los Angeles Times*.

[176] Cook III, USAF. Maj. Joseph W, Fiely, USAF. Maj. David P. & McGowan, USAF. Maj. Maura T. (1995, Special Edition.). Nonlethal Weapons: Technologies, Legalities, and Potential Policies. *Airpower Journal*, *9*, (SE) 77-91.

[177] Cook, III. Maj. Joseph W. et al. (1994, 27 Jun.). *Non-Lethal Weapons and Special Operations*. For HQ USAF/XOXI. Air Force Academy, Colorado Springs, Colorado: USAF Institute for National Security Studies.

[178] Cook, Nick. (1992, 10 Oct.). Russia leads in "pulse" weapons. *Jane's Defence Weekly*, *18*, (15) 5.

[179] Cooper, Pat & Holzer, Robert. (1996, 29 Apr.). Loophole Allows Officials to Deny Technology Funds (non-lethals). *Defense News*, *11*, (17) 12.

[180] Cooper, Pat. (1996, 22-28 Jul.). DOD Guides Nonlethal Weapon Use. *Defense News*, 11, (29) 8.

[181] Cooper, Pat. (1995, 24 Jul.). Nonlethals Get Funding Plan: Senators Urge U.S. Military to Explore Technology. *Defense News*, *10*, 18.

[182] Cooper, Pat. (1995, 27 Feb.-5 Mar.). U.S. Tests Nonlethal Weapon Policy in Somalia. *Defense News*, *10*, 28.

[183] Cooper, Pat & Erlich, Jeff. (1996, 5-11 Feb.). U.S. Troops to Field Shortstop Against Shells in Bosnia. *Defense News*, *11*, 22.

[184] Cooper, Pat & Opall, Barbara. (1994, 19-25 Sep.). Perry Plans to Launch Nonlethal Warfare Effort. *Defense News*, *9*, 6.

[185] Cooper, Pat & Opall, Barbara. (1994, 10 Oct.). Perry seeks directive on nonlethal warfare feat. *Army Times*, 34.

[186] Council for Science and Society. (1978). *Harmless Weapons*. Chichester, Great Britain.

[187] County of San Diego Office of The Medical Examiner.(1994, 1 Jul.). Autopsy Report on Daniel Lee Price ME#94-1204.

[188] Craig, F.N. et al. (1960, Jun.). Breathing patterns during exposure to CS. *U.S. Army Chemical Warfare Laboratories Rep.* CW2-2399.

[189] Creasy, W.M. (1958, May.-Jun.). Toxicological Warfare. *Ordnance, 42.*

[190] Crichton, D. (1959). A study of the toxicity of CS. *Porton Tech. Paper 672.*

[191] Crichton, D. et al. (1959, declassified 1968, Jun.). Agents for riot control: the selection of T. 792 (o-chlorobenzal malonoitrile) as a candidate agent to replace CN. *Porton Tech. Paper 651.*

[192] *Crime Control Digest.* (1992, 30 Nov.). Detroit, LAPD, *26,* (48). Studying Use of Non-Lethal Weapons.

[193] Criminal Justice Newsletter. (1994, 1 Aug.). California Agencies Search for Less-Lethal Weapons, *25,* (15) 2.

[194] Crockett, Thompson S.(1969). *Police Chemical Agents Manual.* Washington. District of Columbia: International Association of Chiefs of Police.

[195] Cuadros, Jaime H. (1995, 24 May.). *Non-Lethal and Less-Than-Lethal Weapons.* Advanced Weapon Systems AWJC-8.

[196] Cuadros, Jaime H. (1994, Jan.). *Non-Lethal Weapons: Course Outline.* Presented at the 7th ASLET International Training Seminar, Washington, District of Columbia. Hacienda Heights, California: Arts and Engineering.

[197] Cuadros, Jaime H. (1993, Nov.). *Kinetic Energy Less-Lethal Projectile Technology.* Presented at the Non-Lethal Defense Conference, Johns Hopkins University, Laurel, Maryland. Hacienda Heights, California: Arts and Engineering.

[198] Cuadros, Jaime H. (1993, Sep.). *Terminal Ballistics of Non-Lethal Projectiles.* Presented at 14th Annual Symposium on Ballistics, Quebec, Canada. Hacienda Heights, California: Arts and Engineering.

[199] Cuadros, Jaime H. (1993, 1 Jun.). *A Training Manual for Flexible Baton Selection and Use.* Hollister, California: MK Ballistic Systems.

[200] Cuadros, Jaime H. (1993, Apr.). *A Comparison Between Rubber Bullets and Shot Bags.* Hollister, California: MK Ballistic Systems.

[201] Cuadros, Jaime H. (1992, 30 Nov.-3 Dec.). *A Non- Lethal Projectile Concept for Military, Law Enforcement and Civilian Use.* Presented at the Small Arms Division Meeting, American Defense Preparedness Association, San Antonio, Texas. Hacienda Heights, California: Arts and Engineering.

[202] Curtis, Liz. (1982). *They Shoot Children: The Use of Rubber and Plastic Bullets in the North of Ireland.* London, England: Information on Ireland.

[203] Daley, Dorthy E., Hayes, Roger M. & Swint, Lloyd, E. (1995, Jul.). Oleoresin capsicum: don't let the fancy name fool you (pepper spray). *Corrections Today, 57*, 24.

[204] Davidson, Keay. (1992, 2 Feb.). War without Death may be on its Way. *San Francisco Examiner*, 1.

[205] Davis, Malcolm. (1994, Apr.-May.). How to win wars without actually killing. *Asia-Pacific Defense Reporter, 20*, 36-37.

[206] Davis, Sherman L. (1970, Jun.). *Riot Control Weapons for the Vietnam War*. Historical Monograph AMC 56M. Edgewood Arsenal, Maryland: Edgewood Arsenal, U.S. Army Munitions Command.

[207] de Bakker, et al. (1990, Aug.). Laser Weapons at Sea. *International Defense Review, 23*, (8) 853-856.

[208] Debban, LtCol. Alan W. (1993, Spring). Disabling Systems: War-Fighting Option for the Future. *Airpower Journal, 7*, (1) 44-50.

[209] Debban, Alan W. (1993, 22 Feb.). *Disabling Technologies and Applications*. HQ USAF/XOXT Background Paper.

[210] De Caro, Chuck. (1994). *Sats, Lies, and Video- Rape: The Soft War Handbook*. McLean, Virginia: Aerobureau Corporation.

[211] *Defense Daily*. (1994, 25 May.). DOD to Adopt Policy on Non-Lethal Weapons by Late 1994, *183*, 301-302.

[212] *Defense Electronics*. (1995, March). Russians Continue Work on Sophisticated Acoustic Weaponry, *26*, 12.

[213] *Defense Electronics*. (1992, Mar.). DOD Urged to Adopt Nonlethal Warfare Strategy, *24*, 22.

[214] *Defense Electronics*. (1992, Mar.). Examples of Nonlethal Weapons, *24*, 22.

[215] *Defense News*. (1996, 8-14 Jul.). Countermine Technologies Flow From Increased Threat, 10.

[216] *Defense News*. (1996, 10-16 Jun.). Olin Ordnance to Test Nonlethal Vehicle Trap, *11*, (23) 27.

[217] *Defense News*. (1996, 6-12 May.). Open Door for Nonlethals, *11*, (18) 18.

[218] *Defense News*. (1996, 11-17 Mar.). Nonlethal Technology Wins Commander Nod, *11*, (10) 2.

[219] *Defense News*. (1995, 25 Sep.-1 Oct.). Laser Stance Is on Target, 26.

[220] *Defense News*. (1994, 19-25 Oct.). Military Studies Unusual Arsenal.

[221] *Defense News*. (1994, 19-25 Sep.). Perry Plans to Launch Nonlethal Warfare Effort, 6.

[222] *Defense News*. (1994, 28 Mar.-3 Apr.). DoD to Boost Nonlethal Options, 46.

[223] *Defense News*. (1994, 7-13 Feb.). Lasers, Viruses, May Rule No-Fly Sky Zone, 1, 45.

[224] *Defense News*. (1993, 22-28 Nov.). Non-Lethal Weapons Group Set to Form in March, 1, 14.

[225] *Defense News*. (1993, 11-17 Jan.). U.S. Explores Mind-Control Technology, 4, 29.

[226] *Defense Week*. (1994, 18 Jan.). CIA Asked to Review "Buck Rogers" Weapon, 6.

[227] *Defense Week*. (1992, 19 Oct.). Army Gives a Boost to Exotic Non-Lethal Weapons.

[228] de la Taille, Renaud. (1980). *Brief Survey of Non-Wounding Anti-Riot Weapons*. FSTC-HT-1092-79. Charlottesville, Maryland: U.S. Army Foreign Science and Technology Center.

[229] Department of Defense Directive. (1996, 9 Jul.). *Policy for Non-Lethal Weapons*. No. 3000.3.

[230] Department of Defense. (1994, 14 Oct.). *DOD Activities in Non-Lethal Weapons*. 94-S-4521.

[231] Dettling, J.R. & Mawhinney, R.C. (1972, 2 Oct.). *Stun-Gun Preliminary Terminal Effects Study*. MB-R-72/77. San Ramon, California: MBA Associates.

[232] Dobbs, Herbert H. et al. (1990, Sep.). *Assessment of Mission Kill Concept, Requirements, and Technologies*. Prepared by System Planning Corporation, Arlington, Virginia. Washington, District of Columbia: Defense Advanced Research Projects Agency.

[233] Dworetzky, Tom. (1987, Nov.). Bag-em with the Un- Gun (Less-Lethal Bean Bag Weapons). *Discover*, *8*, 26- 27.

[234] *The Economist*. (1994, 15 Oct.). Thou Shall Not Blind (inhumane laser guns). *333*, (7885) 54.

[235] Edgewood Arsenal, MD, Directorate of Medical Research. (1983). *Special Summary Report of Toxicology of CN, CS, and DM*. Washington, District of Columbia: International Association of Chiefs of Police. First published in 1965, Sep.

[236] Edgewood Arsenal, MD. (1967, Oct.). *Characteristics of Riot Control Agent CS*. EASP 600-1/AD 661 319. Edgewood Arsenal, Maryland: Department of the Army.

[237] Egner, D.O. & Williams, L.W. (1975). *Standard Scenarios for the Less Lethal Weapons Evaluation Model*. Technical Memorandum 20-75. Aberdeen Proving Grounds, Maryland: U.S. Army Human Engineering Laboratory.

[238] Egner, D.O. & Campbell, D.(1975, Aug.). *Testing and Evaluation of Chemical Weapons*. Aberdeen Proving Grounds, Maryland: U.S. Army Land Warfare Laboratory.

[239] Egner, D.O. et al. (1974, May.). *The Effectiveness of Less Lethal Weapons Utilizing Chemical Agents*. Aberdeen Proving Grounds, Maryland: U.S. Army Human Engineering Laboratory.

[240] Egner, D.O. et al. (1973). *A Multidisciplinary Technique for the Evaluation of Less Lethal Weapons*. Aberdeen Proving Grounds, Maryland: U.S. Army Land Warfare Laboratory.

[241] Ellis, R.H. & Kellog, J.C. (1966, Sep.). *Implications of the Use of Incapacitating Agents in Warfare*. Report No. 7675-2225 submitted to Headquarters, U.S. Air Force, Washington D.C., under contract No. AF 49 (638)-1584. Hartford, Connecticut: Travelers Research Center.

[242] Ehmke, Charles. (1966). *The Use of Non-Lethal Chemical Agents in Limited Warfare*. Thesis. Maxwell Air Force Base, Alabama: Air Command and Staff College.

[243] Epstein, J.S. & Kelso, M.A. (1995, 14 Mar.). *Non-Lethal Weapons, An Overview of Policy and Technology*. Slide Series. Center for International Security and Arms Control, Stanford University.

[244] Evancoe, Paul. (1994, Jun.). Tomorrow's Weapons of Choice? *Military Technology, 18*, 68-71.

[245] Evancoe, Paul. (1994, May.-Jun.). Non-lethal Alternatives Weighed by Law Officers. *National Defense, 73*, (498) 28-30.

[246] Evancoe, Paul. (1993, Dec.). Non-Lethal Technologies Enhance Warrior's Punch. *National Defense, 73*, (493) 26-29.

[247] Evancoe, Paul & Bentley, Mark. (1994, May). CVW: Computer Virus as a Technology Weapon. *Military Technology, 18*, 38-40.

[248] Evers, Stacey. (1993, 19 Nov.). Police, Prisons Want Cheap Non-lethal Technologies. *Aerospace Daily*, 299.

[249] *Facts on File*. (1995, 19 Oct.). Blinding Laser Weapon Ban Implemented. *55*, (2864) 781.

[250] Faul, Denis. (1982, Oct.). *Plastic Bullets- Plastic Government: Deaths and Injuries by Plastic Bullets, August 1981- October 1982*.

[251] Ferretti, F. (1976, 4 Jan.). Zap! *New York Times Magazine*, 13-16.

[252] Fetter, Gregory. (1992, 22 Apr.). The Ring Airfoil Grenade- A Weapon Whose Time Has Come. *World Weapons Review*, (134), 5-8.

[253] Fischetti, Mark. (1995, Jan.). Less-Than-Lethal Weapons. *Technology Review, 98*, (1) 14-15.

[254] Flatau, Abraham et al. (1974). *Summary of Technical Presentations for the STING RAG Validation In-Process Review and Soft RAG-Concept Feasibility In-Process Review*. Aberdeen Proving Ground, Maryland: U.S. Army Armament Command.

[255] Flatau, Abraham. (1976, 15-16 Sep.). *The XM234 Launcher Adapter for M16 Rifle*. Unedited Preliminary Summary Report. Presented at the 1976 Annual Meeting, Small Arms Systems Division, American Defense Preparedness Association, Picatinny Arsenal, Dover, New Jersey.

[256] Florig, H. Keith. (1988, Mar.). The future battlefield: a blast of gigawatts? *IEEE Spectrum, 25*, (3) 50- 54.

[257] *Fortune*. (1994, 11 Jul.). How Cops will Rearm, Tom Clancy Style, 16.

[258] Foster-Miller, Inc. A. Mangolds. (1990). *Soft Kill of Fielded Weapons Systems*. Weston, Massachusetts.

[259] Frost, Dr. Gerald & Shipbaugh, Dr. Calvin. (1994, 1 Feb.). *GPS Targeting for Non-Lethal Systems*. RAND Publication RP-262, Santa Monica, California: The RAND Corporation.

[260] Fulghum, David A. (1994, 19 Sep.). Air Force May Delay JPATS, TSSAM (Carbon-Fiber Weapon). *Aviation Week & Space Technology, 141*, (12) 26-27.

[261] Fulghum, David A. (1993, 24 May.). EMP Weapons Lead Race for Non-Lethal Technology. *Aviation Week & Space Technology, 138*, (21) 61.

[262] Fulghum, David A. (1993, 22 Feb.). ALCMS Given Nonlethal Role (air-launched cruise missiles fitted with electromagnetic pulse generators). *Aviation Week & Space Technology, 138*, (8) 20-22.

[263] Fulghum, David A. (1992, 17 Aug.). US Weighs Use of Nonlethal Weapons in Serbia If U.N. Decides to Fight. *Aviation Week & Space Technology, 137*, (7) 62-63.

[264] Fulghum, David A. (1992, 27 Apr.). Secret Carbon- Fiber Warheads Blinded Iraqi Air Defenses. *Aviation Week & Space Technology, 136*, (17) 18-20.

[265] Fulton, Roger. (1995, Sep.). The Law Enforcement Technology Network. *Law Enforcement Technology*, 26.

[266] Fulton, Roger. (1995, Sep.). When Law Enforcement Met Industry...Transferring Military Technology. *Law Enforcement Technology*, 56.

[267] Futrell, A. (1988). *History and development of the side-handle baton power strike and the PPCT side-handle baton system.* Millstadt, Illinios: PPCT Research Publications.

[268] Gallego, F. & Daly, M. (1990, 13 Jan.). Laser weapon in Royal Navy service. *Jane's Defence Weekly.*

[269] Galston, A.W. (1968, Jun.). Military uses of herbicides in Vietnam. *The New Scientist.*

[270] Galston, A.W. (1967, Aug.-Sep.). Changing the environment: herbicides in Vietnam. *Scientist and Citizen, 2.*

[271] Garwin, Richard L. (1994, Oct.). Secret Weapons for the CNN Era. *Harper's, 289*, (1773) 17-18.

[272] Gee, USA. Maj. Robert W. (1994, Dec.). *Military Police Nonlethal Technology Program.* Briefing Slides. Battle Lab Support Division. Fort McClellan, Alabama: U.S. Military Police School.

[273] General Ordnance Equipment Corporation. (1968). *A Series of Reports on Chemical Mace Non-Lethal Weapons.*

[274] Gips, Michael. (1995, Apr.). One-stop shop. *Security Management, 39* (4) 11. Law enforcement database (less-than lethal).

[275] Goldblat, J. (1970, Apr.). Are tear gas weapons and herbicides permitted weapons? *Bulletin of the Atomic Scientists, 26.*

[276] Gongwer, L.E. et al. (1958, Nov.). The comparative effectiveness of four riot control agents. *U.S. Army Chemical Warfare Laboratories Tech. Memo.* CWL-TM-24-18.

[277] Goodman, Jr. Glenn W. (1994, Jul.). Upping the Nonlethal Ante: Pentagon Funds A New Weapons Initiative. *Armed Forces Journal International, 131*, (12) 13.

[278] Goodman, Jr. Glenn W. (1988, May.). US Electronic Systems Highly Vulnerable to Radio-Frequency Beam Weapons. *Armed Forces Journal International, 87,* (10) 20.

[279] Gourley, Scott R. (1995, Apr.). The Sniper's Latest Nightmare. *International Defense Review,* 66.

[280] Gray, Jan M. (1995, 17 Jul.). *Uses of Nonlethal Force in Army Operations.* White paper, draft. Fort Monroe, Virginia: US Army Training and Doctrine Command.

[281] Grossman, Elaine M. (1994, 15 Apr.). Pentagon to Set Priorities in Non-lethal Technologies, Weapons. *Inside the Air Force,* 1.

[282] Grossman, Jon. (1991, Jul.). Military Lasers: A Costly Search for Ultimate Weapons. *Photonics Spectra, 25,* (7) 84-92.

[283] Grudowski, Mike. (1995, 13 Apr.). Not-so-lethal weapons (police weapons). *New York Times Magazine,* 40-41.

[284] Gunther, Judith, Suzanne, Kantra & Langreth, Robert N. (1994, Sep.). The Digital Warrior. *Popular Science, 245,* 60-64.

[285] Gurganious, Joseph T. (1974). *Riot Control Barrier: Concept Development and Feasibility Test.* Aberdeen Proving Ground, Maryland: U.S. Army Land Warfare Laboratory.

[286] Gutentag, P.J. & Hart, J. (1960, Apr.). The evaluation of CS aerosols as a riot control agent in man. *U.S. Army Chemical Warfare Laboratories Rep.* CWL-2365.

[287] Hammick, Murray. (1991, Aug.). Laser protection for AFV's: the eyes have it. *International Defense Review,* 818-821.

[288] Hanley, William C. (1968). *Berkeley Police Department Use of Chemical Mace.* City Manager Report No. 68-37. Berkeley, California.

[289] Hannant, Philip. (1977). *Nonlethal Weapons for Law Enforcement.* Thesis. Central Missouri State University.

[290] Hansen, George. (1966). *Non-Lethal Gases for Guerrilla Warfare.* Professional Study. Maxwell Air Force Base, Alabama:

Air War College.

[291] Harris, Bill. (1993, May.). Less-than-lethal munitions to give Army greater flexibility. *Ordnance,* 22-23.

[292] *Hartford Democrat/AP News.* (1978, 20 Dec.). At CSL 1978 Was A Year of Advances: Riot Control Device & New Army Weapon (Sting RAG).

[293] Hayeslip, Ph.D. David W. & Preszler, Ph.D. Alan. (1993, Mar.). *NIJ Initiative on Less-Than-Lethal Weapons.* NCJ 133523. Research in Brief.

[294] Headquarters, Department of the Army. (1993). *Grenade, Hand: Riot Control, CS, ABC-M7A3, (1330-6963), Ammunition Surveillance Procedures.* Supply Bulletin; SB 742-1330-94-322. Washington, District of Columbia.

[295] Headquarters, Department of the Army. (1989). *Operator's Manual: Cartridge, 40-Millimeter, Riot Control CS, XM674 and Cartridge, 40-Millimeter, Red Smoke RS, XM675.* Tecnical Manual; TM 3- 1310-244-10. Washington, District of Columbia.

[296] Headquarters United States Air Force, Special Technical Plans Division. (1991, 13 Sep.). *Position Paper on the Air Force Role in Development of Disabling Systems/Strategy.*

[297] Heal, Sid. (1994, Win.). Diversionary Devices: "Down and Dirty." *The Tactical Edge*, 26-30.

[298] Heal, Sid. (1990, Spr.). Flashbangs: Why and How, Part III. *The Tactical Edge*, 7-11.

[299] Heal, Sid.(1990, Win.). Flashbangs: Why and How, Part II. *The Tactical Edge,* 20-22.

[300] Heal, Sid. (1990, Jul.). Flashbangs: Effective Use of Diversionary Devices. *The Police Chief,* 18-24.

[301] Heal, Sid. (1989, Fal.). Flashbangs: Why and How. *The Tactical Edge*, 9-11.

[302] Heal, Sid & Evancoe, Paul. (1996, Sep.-Oct.). Nonlethal Disabling Technology: A Future Reality. *Police and Security News*, 3-16.

[303] Heal, Charles S. & Kolman, John. (1989). Flash/Sound Diversionary Devices. *Training Key #391, 17.* Alexandria, Virginia: International Association of Chiefs of Police

[304] *Hearing on Public Sale of Protective Sprays.* (1969). Consumer Subcommittee on Commerce, 91st Congress, First Session.

[305] Hecht, Jeff. (1992, Aug.). Lasers Designed to Blind. *New Scientist, 135,* (1833) 27-31.

[306] Hellreich, A. et al. (1967, Jan.). The effects of thermally-generated CS aerosols on human skin. *Edgewood Arsenal Technical Report.* 4075, AD809485.

[307] Hemenway, David & Weil, Douglas. (1990, Win.). Phasers on Stun: The Case for Less Lethal Weapons. *Journal of Policy Analysis and Management, 9,* (1) 94-98.

[308] Herby, Peter. (1995, Mar.-Apr.). Outlaw blinding: Weapons intended to blind soldiers on the battlefield must, like chemical and biological weapons, be banned. *The Bulletin of the Atomic Scientists, 51,* (2) 4.

[309] Herskovitz, Don. (1993, Aug.). Killing Them Softly. *Journal of Defense Electronics, 16,* 41-42.

[310] Heun, Christopher T. (1996, Sep.). Holograms Halt Contraband; New Sensor Detects Bombs (Saber 203 Info). *National Defense, 81,* (520), 19.

[311] Higgins, John. (1967). *Non-Lethal Chemical Weapons in Counterinsurgency.* Thesis. Maxwell Air Force Base, Alabama: Air Command and Staff College.

[312] Hiltermann, Joost & Arkin, William. (1995, 23 Oct.). No Blinding Lasers. *Defense News*, 29. Letters to the Editor.

[313] Himmelspach, Darlene. (1995, 18 Oct.). Leathernecks' new devices are not deadly, but they're effective. *San Diego Union-Tribune*, Internet.

[314] Himsworth, Sir H. et al. (1971). *Report of the enquiry into the medical and toxicological aspects of CS.* Part II. London, England: Her Majesty's Stationary Office.

[315] Hoffman, Lisa. (1996, 10 Aug.). Pentagon backs use of nonlethal weapons. *The San-Diego Union Tribune*, A-25.

[316] Holland, P. (1974). Cutaneous Reactions Produced by Dibenz-(b,f)-1,4-oxazepine (CR). *British Journal of Dermatology.*

[317] Holzer, R. & Munro, N. (1992, 13-19 Apr.). Microwave weapon stuns Iraqis. *Defense News*, 1.

[318] Horgan, John. (1994, Apr.). Bang! You're Alive: An unusual trio wins support for "nonlethal" weapons. *Scientific American, 270*, (4) 22-24.

[319] House, W.B. et al. (1967, Dec.). Assessment of the ecological effects of extensive or repeated use of herbicides. *Midwest Research Institute Report.* AD 824314.

[320] Howard, Stuart & Hitt, William D. (1966, 2 May.). *Intercultural differences in olfaction.* ARPA-Project AGILE Report. Columbus, Ohio: Battelle Memorial Institute.

[321] Hu, Howard, et al. (1989, 4 Aug.). Tear Gas: Harassing Agent or Toxic Chemical Weapon. *Journal of the American Medical Association, 262*, 660.

[322] Huddle, F.P. (1969). *Technology-assessment of the Vietnam defoliant matter; a case history.* U.S. Congress, House of Representatives, 91st. Congress., Cie. on Science and Astronautics.

[323] Hunter, John C. (1994, May.). Pepper Spray. Focus on Use of Force. *FBI Law Enforcement Bulletin, 63*, 24-26.

[324] Hunter, USAF. Maj. Roger C. (1994, Fal.). Disabling Systems and the Air Force. *Airpower Journal, 7*, (3) 43-47.

[325] Hurlburt, T.D. Beaulieu, M., & Pickman, S. (1985, Jul.). *An evaluation of use force--Part II: Non-deadly force.* The Program Evaluation Section, Orlando Police Department.

[326] Hust, Gerald. (1994). *Taking Down Communications.* Thesis. Maxwell Air Force Base, Alabama: School of Advanced Airpower Studies.

[327] Ingram, J.T. (1942, Dec.). Dermatitis from exposure to tear gas. *The British Journal of Dermatology, 54.*

[328] *Inside the Army.* (1995, 31 Jul.). Draft Concept for Non-Lethal Capabilities in Army Operations, 18-19.

[329] Institute for Foreign Policy Analysis. (1996, May.). *Nonlethal Weapons: Emerging Requirements for Security Strategy*. Cambridge, Massachusetts.

[330] Institute for Law and Justice. (1995, Jan.). Law Enforcement Options. *Newsletter on Less-Than-Lethal Technology Development, 1*, (1) 1-8.

[331] International Association of Chiefs of Police. (1970-1971). *Police Center Weapons Report Series*. Washington, District of Columbia.

[332] International Association of Chiefs of Police. (1970). *Police Chemical Munitions Handbook*. Riot Control Agent Information Series No. 03-1. Washington, District of Columbia.

[333] International Association of Chiefs of Police. (1970). *Tactical Use of Riot Agents*. Riot Control Agent Information Series No. 04-1. Washington, District of Columbia.

[334] International Association of Chiefs of Police. (1970). *Aerosol Irritant Projectors: A National Survey*. Gaithersburg, Maryland. See also *The Police Chief*. (1970, Jan.).

[335] International Association of Chiefs of Police, Professional Standards Division. (1969). *The Evaluation of CS Aerosols as a Riot-Control Agent in Man*. Washington, District of Columbia. Originally Issued in April 1960 by U.S. Army Chemical Corps Research and Development Command, Chemical Warfare Laboratories.

[336] International Association of Chiefs of Police, Police Weapons Center. (1968). *Selected Military Reports on CS Riot Control Agents*. Gaithersburg, Maryland.

[337] International Association of Chiefs of Police, Professional Standards Division. (1967). *Characteristics of Riot Control Agent CS*. Washington, District of Columbia.

[338] *International Defense Review*. (1995, Nov.). More Less-Than Lethal Weaponry for US, *28*, 14.

[339] *International Defense Review*. (1994, Jul.). Less Than Lethal, *27*, (7) 29.

[340] Isenberg, David. (1996, Spr.). Forum: Nonlethal Weapons. *Issues in Science and Technology, 12*, (3) 15-16.

[341] Jackson, L. (1989). *The effect of Tennessee vs. Garner on the use of deadly force by non-sworn private security personnel.* Millstadt, Illinois: PPCT Research Publications.

[342] Jamieson, J.P., Hull, R. & Battershill, P. (1990, Jul.). *Recommendations of the Committee on the Use of Less Than Lethal Force by Police Officers in British Columbia.* British Columbia Police Commission.

[343] *Janes Infantry Weapons*. (1989). Ring Airfoil Civil Disturbance Control System, 495.

[344] JAYCOR. (1994, 19 Sep.). *Policy Study: Non- Lethal Technologies*. Washington, District of Columbia.

[345] Jolley, H.W. & Carpenter, W.L. (1968, Feb.). Tear gas dermatitis. *The Journal of the American Medical Association, 203*.

[346] Jones, Anita. (1995, 4 Dec.). ARPA Has Mission. *Defense News*, 26. Letters to the Editor.

[347] Jones, G.R.N. (1971, Jun.). CS in the balance. *New Scientist and Science Journal, 203.*

[348] *Journal of Electronic Defense.* (1993, Aug.). The Sound of Waco, *16*, 42. Using sound as a nonlethal weapon.

[349] Kalman, S.M. (1970, 28 May.). *Drugs as Weapons.* Seminar paper, Department of Bio-chemistry, U.C. Berkeley.

[350] Kerby, M. (1988). *Analysis of impact weapon power and energy duration of batons.* Millstadt, Illinois: PPCT Research Publications.

[351] Kiernan, Vincent. (1994, 19 Nov.). 'Ban Cruel Laser Weapons' Says Red Cross. *New Scientist, 144,* 11.

[352] Kiernan, Vincent. (1994, Sep.). Lasers seen as an aid to law enforcement. *Laser Focus World, 30,* (9) 49-50.

[353] Kiernan, Vincent. (1993, 11 Dec.). War over weapons that can't kill. *New Scientist, 140,* (1903) 14-16.

[354] Klaaren, USAF. Maj. Jonathan W. & Mitchell, USAF. Maj. Ronald S. (1995, Spe.). Nonlethal Technology and Airpower: A Winning Combination for Strategic Paralysis. *Airpower Journal, 9,* (SE) 42-51. Excerpt from a 1993 Air Command and Staff College research project authored by Chingono, Maj. Biltim, et al.

[355] Knoth, Arthur. (1995, Oct.). Laserpainting the battlefield. *International Defense Review,* 79.

[356] Knoth, Arthur. (1994, Jul.). Disabling Technologies: A Critical Assessment. *International Defense Review,* 33-39.

[357] Kornblum, Ronald N. & Reddy, Sara K. (1991). Effects of the Taser in Fatalities Involving Police Confrontation. *Journal of Forensic Sciences, 36,* (2) 434.

[358] Koscove, Eric M. (1985, Dec.). The Taser Weapon: A New Emergency Medical Problem. *Annals of Emergency Medicine,* 14, 112.

[359] Kunze, Douglas R. (1995, May.-Jun.). Denial Systems Deflect Terrorists from Mischief. *National Defense,* 55-56.

[360] *Lancet* (North American Edition). (1994, 17 Dec.). Weapons Intended to Blind, *344,* 1649-1650.

[361] Langreth, Robert. (1994, Oct.). Soft Kill. *Popular Science, 245,* (4) 66-69.

[362] *Laser Focus World.* (1996, Jun.). Laser Industry Report: Blinding Laser Weapons Ban in Question?, *32,* (6) 67.

[363] *Laser Focus World.* (1993, Sep.). Washington Report: Lets Debate Laser Weapons, *29,* (9) 65.

[364] *Law Enforcement News*. (1996, 31 Mar.). Civil liberties group wants FDA-style regulations-and more- for OC spray, *22*, (442) 1, 6.

[365] *Law Enforcement News*. (1996, 31 Mar.). Philly reports no problem with OC, *22*, (442) 6.

[366] *Law Enforcement News*. (1996, 31 Jan.). The eyes have it...OC spray is NYC cops' weapon of choice, *22*, (438).

[367] *Law Enforcement Technology* (1995, Nov.). Surveillance and Weapons Detection, 5.

[368] *Law Enforcement Technology* (1995, Nov.). Weapons and Protective Systems, 10.

[369] Lawson, Chris. (1995, 17 Apr.). Words from a rising star. *Navy Times*, 16. Marine Corps Edition.

[370] Leakey, Robert J. (1968). *Utilization of Chemical Agents and Their Application to Civil Disturbances*. Thesis. Washington State University.

[371] Levine, Robert A. & Stahl, Charles J. (1968, Apr.). Eye Injury Caused by Tear-Gas Weapons. *American Journal of Ophthalamology*, *65*, 497.

[372] Lewer, Nick. (1995). Non-Lethal Weapons. *Medicine and War*, *11*, (2) 78.

[373] Libby, Hildi S. (1996, 6-7 Mar.). Coordinated Army Non Lethal Program Overview. In American Defense Preparedness Association. *Non-Lethal Defense II Conference: Proceedings & Updated Attendee Roster*. Alexander, Chair. John B. The Ritz-Carlton Hotel, Tysons Corner, McLean, Virginia.

[374] Linder, USA. Maj. Jim. (1995). *Nonlethal Weapons: Direct Employment Against Non-Combatants in MOOTW*. Unpublished Research Paper. Newport, Rhode Island: US Naval War College.

[375] Livingston, Neil C. (1995, 1 Sep.). Dazzling Achievements. *Sea Power*, *38*, (9) 43.

[376] Lorenz, F.M. (1996, Aut.). Non-Lethal Force: The Slippery Slope to War? *Parameters*, *26*, (3) 52-62.

[377] Lorenz, Col. F.M. (1995, Nov.-Dec.). Forging Rules of Engagement: Lessons Learned in Operation United Shield. *Military Review*, *75*, (6) 17-25.

[378] Lorenz, Col. Frederick M. (1995, Sep.). "Less- Lethal" Force in Operation United Shield. *Marine Corps Gazette*, *79*, (9) 68-76.

[379] *Los Angeles Times*. (1994, 20 Dec.). Not So Deadly Weapons, A4.

[380] *Los Angeles Times*. (1995, 13 Oct.). Pentagon Cancels Controversial Laser, A16.

[381] Lynch, Gregory R. (1995). *The Role of Non-Lethal Weapons in "Special Wars."* Thesis. Monterey, California: Naval Post Graduate School.

[382] *Maclean's*. (1995, 6 Mar.). Sticky 'Em Up, *108*, 11. Marines use sticky foam in Somalia

[383] Macleod, Ian F., Villarreal, J.E. & Seevers, M.H. (1968, Jun.). *Report on Mark IV Chemical Mace.* Ann Arbor, Michigan: University of Michigan Medical School.

[384] Madden, J.F. (1951, Jan.). Cutaneous hypersensitivity to tear gas (CN), a case report. *The American Medical Association Archives of Dermatology and Syhpilology, 63.*

[385] Mahan, Jim. (1996, 6-7 Mar.). Prison Requirements. In American Defense Preparedness Association. *Non-Lethal Defense II Conference: Proceedings & Updated Attendee Roster.* Alexander, Chair. John B. The Ritz-Carlton Hotel, Tysons Corner, McLean, Virginia.

[386] Manley, Harriot. (1993, Mar.). Guide to Self- Defense Devices. *Good Housekeeping, 27,* 28-30.

[387] Mar, Roland K. (1986, Sep.). Bang-Less Tank Killer. *U.S. Naval Institute Proceedings, 112,* (19) 112-113.

[388] Marconi, Andrew. (1974, Dec.). What's New on the Beat. *Mechanix Illustrated.*

[389] Marine Corps Combat Development Command (MCCDC). (1996, Nov.). *Joint Concept for Nonlethal Weapons.* Draft. Quantico, Virginia.

[390] *Marine Corps Gazette.* (1996, Jun.). Lab to Hold Nonlethals Experiment, *80,* (6) 6.

[391] *Marine Corps Gazette.* (1996, May.). Corps Leads Nonlethal Weapons Program, *80,* (5) 6.

[392] Marine Corps Systems Command (1996). *NonLethal Weapons Program.* Briefing Slides & Draft Memorandum. Quantico, Virginia.

[393] Margolis, R.J. (1974, 8 Dec.). Stun guns, bean bags and dumdums. *Washington Post.*

[394] Martin, USN. Capt. M.D. (1991, 29 May). *Non- Lethal Weapons.* Policy Planning Paper. Office of the Under-Secretary of Defense (Policy).

[395] Matthews, William. (1994, 11 Apr.). Crimebusters! Cops put defense technology to work. *Air Force Times,* 31.

[396] Mayer, J. (1966). Crop destruction in Vietnam. *Science, 152.*

[397] MBA Associates. (1970, 24 Jul.). *Technical Memorandum: Non-Lethal Projectile.* MB-TM-70 12-2. San Ramon, California.

[398] MCCDC, Concepts Division, Nonlethal Coordination Cell. (1996). *Marine Corps Systems Command: Nonlethal Weapons Program.* Brief. Quantico, Virginia.

[399] McConnell, A.F. (1970). Mission: Ranch Hand. *Air University Review, 21.*

[400] McGrew, Dan. (1996, 22 Apr.). The Name of the Game is Killing. *Navy Times, 46,* (29) 54. Marine Corps Edition.

[401] Meadows, Sandra I. (1996, Jul.-Aug.). Warfighters Want Weapons That Disable But Don't Kill. *National Defense, 81,* (519) 24.

[402] Meadows, Sandra I. & Williams, Robert H. (1995, May.-Jun.). Movable Systems Shepherded Course of Defense Security. *National Defense*, 52.

[403] *Mechanical Engineering*. (1994, Apr.). Lawbreakers Beware the Web of Justice, *116*, (4) 86.

[404] *Memorandum of Agreement between the United States Army and United States Marine Corps for Non-Lethal Weapons Development, Test & Evaluation and Fielding*. (1996).

[405] Merchant, Julie. (1994, Jul.). Threat Weapons and Weapons Technologies: Implications for Army SOF. *Special Warfare*, *7*, 32-39.

[406] Meselson, M. (1971, Mar.). Tear gas in Vietnam and the return of poison gas. *The Bulletin of the Atomic Scientists, 27*.

[407] Meyer-Arendt, Jurgen R. (1968, Mar.). Efficiency and Limitations of Lasers as Weapons. *American Journal of Optometry and Archives of American Academy of Optometry*, 188-191.

[408] Meyer, Sgt. Greg. (1992, Aug.). Nonlethal Weapons vs. Conventional Police Tactics: Assessing Injuries and Liabilities. *The Police Chief, 59*, (8) 10-17.

[409] Meyer, Greg. (1991). *Nonlethal Weapons versus Conventional Police Tactics*. Thesis. Los Angeles, California: California State University, Los Angeles.

[410] Michigan State University, Vietnam Advisory Group (Saigon, Vietnam). (1959). *Tear Gas Training Manual*. Reports and Documents, Ser. 2, No. 39. Saigon, East Lansing: Michigan State University.

[411] Miller, Craig. (1994, 1 Jul.). Poway Man Dies After Hit With Spray. *San Diego Times Advocate*, B1.

[412] Miller, W.L. (1964, Nov.-Dec.). Smoke'em out! *Ordnance, 64*.

[413] Miller, W.L. (1964, Jul.). Chemicals vs. guerrillas. *Marine Corps Gazette, 48*.

[414] Mohr, USAF. Capt. George C., et al. (1965, Sep.). Effects of Low Frequency and Infrasonic Noise on Man. *Aerospace Medicine*, *36*, (9) 817-824.

[415] Morehouse, Maj. David A. (1992). *A New Strategic Era: A Case for Nonlethal Weapons*. Thesis. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College.

[416] Morgan, J.P. (1992, Aug.). Oleoresin Capsicum. *The Police Chief, 59*, 22-23.

[417] Morris, Chris & Janet. (1995, 13 Nov.). End Battle Over Nonlethals: Congress Must Heed Call for Needed Weapons. *Defense News*, 40.

[418] Morris, Chris & Janet, & Baines, Thomas. (1995, Spring). Weapons of Mass Protection: Nonlethality, Information Warfare, and Airpower in the Age of Chaos. *Airpower Journal*, *9*, (1) 15-29.

[419] Morris, Janet & Morris, Chris. (1990, 1994). *Nonlethality: A Global Strategy*. West Hyannis Port, Massachusetts: Morris & Morris.

[420] Morris, Chris & Morris, Janet. (1994). *Nonlethality: An*

Overview

. West Hyannis Port, Massachusetts: Morris & Morris.

[421] Morris, Chris & Morris, Janet. (1993). *Nonlethality and Psyops*. West Hyannis Port, Massachusetts: Morris & Morris.

[422] Morris, Janet & Morris, Chris. (1992). *Creating an Office of Nonlethality: A New Paradigm for a New Era*. Washington, District of Columbia: US Global Strategy Council.

[423] Morris, Janet., Krivorotov, Victor & Morris, Chris. (1992). *The Age of Chaos*. West Hyannis Port, Massachusetts: Morris & Morris.

[424] Morris, Janet & Morris, Chris. (1991). *Nonlethality: Development of a National Policy and Employing Nonlethal Means in a New Strategic Era*. Washington, District of Columbia: US Global Strategy Council.

[425] Morris, Janet. (1991, Sep.). Enter Nonlethal Weaponry. *IEEE Spectrum, 28*, (9) 58.

[426] Morris, Janet & Morris, Chris. (1990). *Toward a Nonlethal Strategy*. West Hyannis Port, Massachusetts: Morris & Morris.

[427] Morrison, David C. (1995). More-Than-Lethal Weapons. *National Journal, 27*, (29) 1919.

[428] Morrison, David C. (1994, Oct.). Crime-Fighting 2001. *Government Executive*, 26, 42-44.

[429] Morrison, David C. (1994, 16 Apr.). Robocops. *National Journal, 26*, (16) 889-893.

[430] Morrison, David. (1992, 7 Nov.). War Without Death? *National Journal, 24*, (45) 2589.

[431] Morrison, David C. (1992, 6 Jun.). Alternatives to Bashing. *National Journal, 24*, (23) 1358-1360.

[432] Morrison, David C. (1992, 28 Mar.). Bang! Bang! You've been inhibited. *National Journal, 24*, (13) 758-759.

[433] Morrison, David. (1989, May.). Tactical Laser Weapons. *Lasers and Optics*.

[434] Morrison, David C. (1987, 14 Mar.). Snow Jobs (emulsifying agents). *National Journal, 19*, (11) 651.

[435] Morrison, David C. (1987, 4 Mar.). When Eyes Become the Targets. *National Journal, 19*, (14) 822-823.

[436] Morrison, David C. (1985, May.). Laser Weapons Come Down to Earth; Their Targets Electronic and Human Eyes. *High Technology, 5*, 69-70.

[437] Munro, N. & Opall, B. (1992, 19-25 Oct.). Military studies unusual arsenal. *Defense News*, 3.

[438] Munro, N. (1990, 5 Mar.). Army tests hand-held laser rifles. *Defense News*.

[439] National Institute of Justice. (1995, Sep.). New Technologies Demonstrated for Law Enforcement. *Technology Beat*, 1-5.

[440] National Institute of Justice, Office of Science and Technology. (1995, 18 Sep.). *Matrix of Law Enforcement Technology Requirements, Studies, Evaluations & Standards (Draft)*.

[441] National Institute of Justice. (1995, 14 Jun.). *CJ Management & Training Digest, 1* (11) 1-4. Focuses on Nonlethal Weapons.

[442] National Institute of Justice. (1995, Jan.). NIJ Awards in Fiscal Year 1994. NCJ 152109. *Research in Brief.* Washington, District of Columbia: U.S. Government Printing Office, 9, 11- 13.

[443] National Institute of Justice. (1985, Sep.). *Hand-Held Aerosol Tear Gas Weapons*. Technology Assessment Program, NIJ

Standard 0110.00. Washington, District of Columbia: U.S. Government Printing Office.

[444] National Institute of Justice. (1985, Sep.). *Barrier-Penetrating Tear Gas Munitions*. Technology Assessment Program, NIJ Standard 0111.00. Washington, District of Columbia: U.S. Government Printing Office.

[445] *Navy Times* (1996, 5 Aug.). Nonlethals get official DoD nod. Marine Corps Edition., 24.

[446] *Navy Times*. (1995, 9 Oct.). Special Ops pulls blind laser. Marine Corps Edition., 32.

[447] *Navy Times*. (1995, 27 Feb.). Corps hopes a little goo goes a long way there. Marine Corps Edition., 3.

[448] Neild, R. & Robison, Perry J. (1970, 15 Feb.). Tear gas: a blunder. *The Sunday Times*.

[449] Neven, Thomas E. (1993, Dec.). Nonlethal Weapons: Expanding Our Options. *Marine Corps Gazette, 77*, (12) 61-62.

[450] *New Scientist*. (1973, 29 Mar.). Anti-crowd weapons work by causing fits *57*, (839) 726.

[451] *New Scientist*. (1973, 20 Sep). 'Squawk box' technology. *59*, (864) 667.

[452] *New Scientist*. (1973, 20 Sep). Army tests new riot weapon. *59*, (864) 684.

[453] Nicholson, Thomas Gerald. (1969). *The Use of Chemical Mace by Army Military Policemen*. Staff Study ASDIRS, 3079. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College.

[454] Nollinger, Mark. (1995, Feb.). Surrender or We'll Slime You. *Wired, 3*, 90.

[455] Noorani, A.G. (1995). Landmines and Blinding Laser Weapons. *Economic and Political Weekly, 30*, (48).

[456] O'Connell, USAF. Capt. Edward P. & Dillaplain, USAF. 1stLt. John. (1994, Win.). Nonlethal Concepts: Implications for Air Force Intelligence. *Airpower Journal, 7*, (4) 26-33.

[457] Office of Assistant Secretary of Defense (Public Affairs). (1995, 1 Sep.). *DOD Announces Policy on Blinding Lasers*. Washington, District of Columbia.

[458] *Official Journal of the European Communities: Information and Notices*. (1995). Blinding Laser Weapons, *38*, (340) 39.

[459] Olmstead, Bob. (1975, 14 Sep.). For Crowd Control: A Stunning New Weapon. *Chicago Sunday Sun-Times*.

[460] Olson, Donald N. (1972, Aug.). *A Kinetically Non-Hazardous Ring Airfoil Projectile for Delivering Riot Control Agent*. EATM 2200-6. Edgewood Arsenal, Maryland: U.S. Army Munitions Command.

[461] O'Malley, MPC. Maj. Dennis J. (1974, Win.). 'Less-Than-Lethal Firepower: A Possible Solution. *MPLEJ*, 16-17.

[462] Opall, Barbara. (1990, 5 Nov.). Labs Rush Nonlethal Arms for Mideast Deployment. *Defense News*, 1.

[463] Opall, Barbara. (1992, 17 Feb.). Pentagon Forges Strategy on Non-Lethal Warfare. *Defense News*, 1, 50.

[464] Opall, Barbara. (1992, 2 Mar.). Pentagon Units Jostle Over Non-Lethal Initiative. *Defense News*, 6.

[465] Opall, Barbara. (1994, 28 Mar.-3 Apr.). DoD to boost nonlethal options. *Defense News*, 46.

[466] *Optics and Photonics News*. (1995). Scatterings: Ethics of Laser Weapons Questioned, *6*, (8), 6.

[467] Ordog, Gary J., Wasserberger, Jonathan & Schater, Theodore., et al. (1987). Electronic Gun (Taser©) Injuries. *Annals of Emergency Medicine*, *16*, 73-78.

[468] Orion International Technologies, Inc. (1989). *Precision Guided Weapons Countermeasures Test and Evaluation Directorate (OTD) Pamphlet 1-89*.

[469] Page, J.A. (1969). Of 'Mace' and men: tort law as a means of controlling domestic chemical warfare. *The Georgetown Law Review*.

[470] Panique, Jr. Chester H. (1995, May.). *What Methods will California Use to Identify and Inform Technology Developers of Their Needs by the Year 2004?* Command College Graduate Project, Class 20, Center for Leadership Institute.

[471] Parks, W. Hays. (1988, Nov.). Memorandum of Law: The Use of Lasers as Antipersonnel Weapons, *The Army Lawyer*, 3.

[472] Parlor, USMCR. Michael B. (1991, 29 May.). *Non- Lethal Weapons: A Policy Planning Paper*.

[473] Patel, Tara. (1995, 23 Sep.). US Fights Ban on Laser Warfare. *New Scientist*, *147*, 6.

[474] Peak, Ken. (1990, Feb.). The Quest for Alternatives to Lethal Force: A Heuristic View. *Journal of Contemporary Criminal Justice*, *6*, (1) 8-22.

[475] Pengelley, Rupert. (1995, Jul.). Eyewash No Defense: Lasers Still Cause Concern. *International Defense Review, 28*, (7) 1.

[476] Pengelley, Rupert. (1994, Apr.). Wanted: a watch on non-lethal weapons. *International Defense Review, 27*, (4) 1.

[477] Penneys, N.S. (1971, Jan.-Feb.). Contact dermatitis due to chloroacetophenone. *Federation Proceedings, 30.*

[478] Penneys, N.S. et al. (1969, Aug.). Contact dermatitis due to o-chloroacetophenone and chemical mace. *The New England Journal of Medicine, 281.*

[479] Peters, D.W.A. (1969, Oct.). *Delivery of Anti- Riot Agents, Final Report No. 69-17.* Aberdeen Proving Ground, Maryland: U.S. Army Limited War Laboratory.

[480] Pexton, Patrick. (1995, 17 Jul.). Shoot-- but not to kill: Major U.S. study pushes use of nonlethal weapons. *Navy Times*, 32. Marine Corps Edition.

[481] Pilant, Lois. (1996, Mar.). Innovative Weaponry. *The Police Chief, 63*, (3) 36-42.

[482] Pilant, Lois. (1993, May.). Spotlight on... Selecting Nonlethal Weapons. *The Police Chief, 60*, (5) 45-55.

[483] Pine, A. (1993, 19 Dec.). Pentagon pushing nonlethal weapons. *The Virginian-Pilot and the Ledger-Star*, A1. First published in *Los Angeles Times* on 18 Dec.

[484] *The Police Chief.* (1988, Aug.). Models for Management: Non-Lethal Electronic Restraint Weapons, *55*, 79- 80.

[485] *The Police Chief.* (1987, Sep.). A Less-Than- Lethal Alternative (Handler 12 Grip Action Baton). *54*, 79.

[486] Pope, Canadian Forces. Maj. Stephen R. (1995, Jun.). *Nonlethality and Peace Operations.* Thesis. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College.

[487] Porton. (1959, declassified 1968, Jun.). Agents for riot control: the selection of T. 792 (o-chlorobenzal malononitrile) as a candidate agent to replace CN. *Porton Tech. Paper 651.*

[488] Porton. (1959, declassified 1968, Jun.). A study of the toxicity of CS. *Porton Tech. Paper 672.*

[489] Potok, Mark. (1996, 20 May.). Wanted: Weapons that don't kill. *USA Today*, p. A3.

[490] *Proceedings.* (1966). Navy defends non-lethal war gas, *92.*

[491] Punte, C.L. & Owens, E.J. 1960, Feb.). The physiological effectiveness of CS in man with reference to aerosol particle size. *U.S. Army Chemical Warfare Laboratories Tech. Memo.* CWL-TM-24- 28.

[492] Purser, B.J. (n.d.). *CR Decontamination Trial.* Program No. 23/71. Field Trial Report No. 27. Porton Down, Salsbury Wilts, England: Chemical Defense Establishment.

[493] Queen and Stander. (1941, Nov.). Allergic dermatitis following exposure to tear gas (chloracetophenone, CN). *The Journal of the American Medical Association, 117.*

[494] Quimby, Freeman H. (1968, Jan.). *The State of Technology in Nonlethal Guns.* Washington, District of Columbia: Legislative Reference Service.

[495] Rapaport, Gary S. (1994, Feb.). Use of Deadly Force Against Suspects with Aerosol Weapons: Some Preliminary Guidelines. Chief's Council. *The Police Chief,* 10.

[496] Reinnagel, Richard E. (1968). *Considerations in the Use of Irritants in Law Enforcement.* Buffalo, New York: Weapons Research Department, Cornell Aeronautical Laboratory, Inc.

[497] Rengstorff, R.H. (1969, Mar.). The effects of the riot control agent CS on visual activity. *Military Medicine, 134.*

[498] Richardson, Odie B. (1969). *CS Munitions: Dispenser and Bagged Riot Control Agent, Helicopter, CS2, XM28: Final Report.* San Francisco, California: Department of the Army,

Army Concept Team in Vietnam. Project Number: ACG-83- 86.7/61.

[499] Ricks, T.E. (1993, 5 Jan.). A kinder, gentler war may be in order. *Globe and Mail,* 1. Toronto, Canada.

[500] Ricks, T.E. (1993, 4 Jan.). Nonlethal arms: new class of weapons could incapacitate foe yet limit casualties. *Wall Street Journal,* 1.

[501] Ritsche, Daniel F. (1993). *"Mace" and Tear Gas Weapons.* Wisconsin Briefs from the Legislative Reference Bureau, Brief

93-3. Madison, Wisconsin: Legislative Reference Bureau.

[502] Rivetti, Dominick J. (1987). *What is the Future of Less Than Lethal Weapons in Law Enforcement?* Sacramento, California: State of California, Peace Officer Standards and Training.

[503] Roberts, Clifford. (1966). *Nonlethal Agents in Limited War.* Thesis. Maxwell Air Force Base, Alabama: Air Command and

Staff College.

[504] Rodwin, Robert. (1973, 27 Sep.). How dangerous is the Army's squawk box? *New Scientist, 59,* (865) 730.

[505] Roos, John G. (1996, Jul.). Nowhere to Hide: High- Tech Counter-Sniper Systems Unmask Urban Terrorists. *Armed Forces Journal International, 123,* (12) 18.

[506] Roos, John G. (1987, Dec.). Protecting Our Vitals: A Sticky Response to Terrorists. *Armed Forces Journal International, 124* (5) 32.

[507] Rose, S. & Smith, R. (1969. Sep.). CS- a case for concern. *The New Scientist.*

[508] Rosenberg, Barbara Hatch. (1994, Sep.-Oct.). "Non-lethal" weapons may violate treaties. *The Bulletin of the Atomic Scientists, 50,* (5) 44-45.

[509] Rosenberg, Eric. (1995, 6 Mar.). Pentagon Memo Seeks To Better Explain Non-Lethal Weaponry. *Defense Week, 16,* 5.

[510] Rosenhead, J. & Smith, P.J. (1971, 12 Aug.). Ulster Riot Control: A Warning. *New Scientist,* 374.

[511] Rosenhead, Jonathan. (1976, 16 Dec.). A new look at less 'less lethal' weapons. *New Scientist,* 672-674.

[512] Rothberg, S. (1970, Jul.). Skin sensitization potential of the riot control agents BBC, DM, CN and CS on guinea pigs. *Military Medicine.* Also published as *Edgewood Arsenal Technical Report* 4219.

[513] Rothstein, Linda. (1994, Mar.-Apr.). The "soft-kill" solution. *Bulletin of Atomic Scientists, 50,* (2) 4-6.

[514] Rothstein, Linda. (1992, Jun.). More road blocks to chemical treaty? *Bulletin of Atomic Scientists, 48,* 7.

[515] Runions, Bradley. (1996, Jan.-Feb.). Less-Lethal Weapons in Peace Operations: Broadening the Spectrum of Response. *Peacekeeping and International Relations, 25,* (1) 8-10.

[516] Sagalyn, Arnold & Coates, Joseph F. (1967, 17 Sep.). Wanted: Weapons That Do Not Kill. *New York Times Magazine.*

[517] Samuels, D.W., Egner, D.O. & Campbell, D. (1969). *Riot Control: Analysis and Catalog, Final Report, Report No. 69- 14.* Aberdeen Proving Ground: U.S. Army Land Warfare Laboratory, Research Analysis Branch.

[518] Sapolsky, Harvey M. (1995, Mar.). *Non-Lethal Warfare Technologies: Opportunities and Problems.* Defense and Arms Control Studies Program Working Paper. Cambridge, Massachusetts: Center for International Studies, Massachusetts Institute of Technology.

[519] *The San Diego Union-Tribune.* (1995, 13 Oct.). Army told to scrap laser that can blind.

[520] *The San Diego Union-Tribune.* (1995, 21 Sep.). Blinding laser shelved by U.S. Special Operations, A-12.

[521] Sapolsky, Harvey M. & Weiner, Sharon K. (1994, Oct.). War Without Casualties. *Across the Board, 31,* (9) 39- 42.

[522] Saunders, Carol Silverman. (1995, Feb.). Future Firearms. *OMNI, 17,* (5) 31.

[523] Savitz, D. (1966, Mar.). Gas and guerrillas-- A word of caution. *The New Republic.*

[524] Scannell, Dr. Edward P. (1994, Dec.). *Nonlethal Technologies Overview.* Presentation Slides for Sixth Annual SO/LIC Symposium and Exhibition, Washington, DC. Dec. 14-16, 1994. US Army Research Laboratory, Weapons Technology Directorate. Adelphi, Maryland.

[525] Schmidt, Donald et al. (1994, 3 Mar.). Water-based Non-stick Hydrophobic Coatings. *Nature, 368,* (6466), 39.

[526] Schmitt, Eric. (1995, 15 Feb.). Now, to the Shores of Somalia With Beanbag Guns and Goo. *The New York Times International,* A10.

[527] Scott, R. (1994). Offboard Countermeasures Technology Part 1: Soft Kill Payloads Get Smarter. *Naval Forces, 15,* (4) 16.

[528] Scott, William B. (1995, 16 Oct.). Panel's report backs nonlethal weapons. *Aviation Week & Space Technology, 143,* (16) 50-51.

[529] Security Planning Corporation. (1972, Mar.). *Non-Lethal Weapons for Law Enforcement: Research Needs and Priorities.* A Report to National Science Foundation, PB 209 635. Washington, District of Columbia.

[530] *Senior Advisory Group for Low-Collateral, Less- Than-Lethal Weapons.* (1994, May.). Columbus, Ohio: RACIC Battelle Memorial Institute.

[531] Serwer, Andrew E. (1994, 4 Apr.). Crime Stoppers Make a Killing. *Fortune, 129,* (7) 109-111.

[532] Shallice, T. (1973). The Ulster depth interrogation techniques and their relation to sensory deprivation research. *Cognition, 1,* 385-405.

[533] Shank, Ellsworth B. et al. (1974, Jun.). *A Comparison of Various Less Lethal Projectiles.* Technical Report No. 74- 79. Aberdeen Proving Ground, Maryland: US Army Land Warfare Laboratory.

[534] Shannon, James O. (1996, 10 May.). *A Report of the Nonlethal (NLW) Coordination Project.* Conducted by Los Alamos National Laboratory at the United States Atlantic Command under the auspices of the Joint Program Office for Special Technology Countermeasures.

[535] Shorto, Russel. (1995, Mar.). Armageddon: killing them softly. *Gentlemen's Quarterly, 65,* 152.

[536] Silverstone, A. (1970, Dec.). *Lethal use of non- lethal weapons.* Paper submitted at the International Meeting of Scientists on Chemical Warfare in Vietnam, Orsay.

[537] Smith, Senator Bob. (1996, Jun.). Appropriate Response: Nontraditional Missions Demand Less-Than-Lethal Weapons. *Armed Forces Journal International, 133,* (11), 55.

[538] Smith & Wesson Chemical Company. (1965). *Police Riot Control Training Manual.* Rock Creek, Ohio.

[539] Sprang, W.O. (1965, Nov.). *Nonlethal Incapacitating Weapon: Extensible Billy Club.* Technical Paper No. RAC- TP-194 submitted to Advanced Research Projects Agency, Washington D.C. McLean Virginia: Research Analysis Report.

[540] Stanton, USA. LtCol. Martin N. (1996, Nov.). Nonlethal Weapons: Can of Worms. *U.S. Naval Institute Proceedings, 122,* (11) 58-60.

[541] Stanton, USA. LtCol. Martin N. (1996, Jan.). What Price Sticky Foam? *U.S. Naval Institute Proceedings, 122*, (1) 58-60. Reprinted in (1996, Aut.) *Parameters, 26*, (3) 63-68.

[542] Starr, Barbara. (1996, 6 Mar.). USA defines policy on non-lethal weapons. *Jane's Defence Weekly.*

[543] Starr, Barbara. (1994, 31 Oct.). USA tries to make war less lethal. *Jane's Defence Weekly*, 10.

[544] Starr, Barbara. (1994, Jul.). Pentagon Maps Non- Lethal Options. *International Defense Review, 27*, (7) 30, 32.

[545] Starr, Barbara. (1994, 30 Apr.). USA studies non- lethal weapon priorities. *Jane's Defence Weekly*, 14.

[546] Starr, Barbara. (1993, Apr.). Non-lethal weapon puzzle for US Army. *International Defense Review, 26*, (4) 319-320.

[547] Steadman, Nick. (1996, May.). Nonlethal Weaponry. *S.W.A.T.*, 60.

[548] Steele, David. (1995, Mar.). Guns for Raids and Riot Control. *Gun World, 35*, (8).

[549] Stefanye, David. (1971, 2 Nov.). *Less Lethal Weapons for the Civil Disturbance Control Mission.* Washington, District of Columbia: U.S. Army Materiel Command.

[550] Stiner, Carl et al. (1994, May.). *Report of the Senior Working Group on Military Operations Other Than War (OOTW).*

Contract No. MDA972-93-C-0016. Advanced Research Projects Agency.

[551] Stolfi, R.H. et al. (1973, Mar.). *Gradient and Less Lethal Devices in Control of Urban Violence.* Report No. 1635. Aberdeen Proving Ground, Maryland: U.S. Ballistic Research Laboratories.

[552] Stratbucker, Robert A. (1989, 4 Aug.). *Evaluation of the Ultron II Electronic Stun Device.* Unpublished. University of Nebraska Medical Center.

[553] Striker, G.E. et al. (1967, Jan.). *A clinico- pathologic study of the effects of riot control agents on monkeys: IV CS grenade.* Edgewood Arsenal, MD: Edgewood Arsenal Technical Report. 4071 AD 808732.

[554] Stuck, Monte. (1972). *Future U.S. Use of Non- Lethal Chemical Agents in Warfare.* Staff Study. Norfolk, Virginia: Armed Forces Staff College.

[555] *Sunday Telegraph Reporter.* (1973, 6 Oct.). New riot gas condemned (CR).

[556] Sweetman, Sherri. (1987, Mar.). *Report on the Attorney General's Conference on Less Than Lethal Weapons.* National Institute of Justice. Washington, District of Columbia: U.S. Government Printing Office.

[557] Swett, Charles. (1995, Jan.). Nonlethal weapons section. Review Essay: War and Anti-War. *Special Warfare, 8*, (1) 29.

[558] Swett, Charles F. (1994, 28 Nov.). *Draft Non- Lethal Weapons Policy*. Briefing Slides. Office of the Assistant Secretary of Defense, Special Operations/Low Intensity Conflict, Policy Planning. Washington, District of Columbia.

[559] Swett, Charles F. (1994, 21 Jul.). *Draft Policy for Non-Lethal Weapons*. Office of the Assistant Secretary of Defense, Special Operations/Low Intensity Conflict, Policy Planning. Washington, District of Columbia.

[560] Swett, Charles F. (1993, 9 Nov.). *Strategic Assessment: Non-Lethal Weapons*. Office of the Assistant Secretary of Defense, Special Operations and Low-Intensity Conflict, Policy Planning. Washington, District of Columbia. Draft report.

[561] *Tactical Technologies*. (1995, 3 Feb.). Non- Lethal Weapons Offer New SO/LIC Capabilities, 5.

[562] Tapscott, Mark & Atwal, Kay. (1993, Feb.). New weapons that win without killing on DOD's horizon; policy strife in Pentagon may slow work on devices that could give the president more options in a crisis. *Defense Electronics*, *25*, (2) 41-46.

[563] Tapscott, M. (1993, Apr.). The non-lethal weapons battle. *Defence*, 37.

[564] Tapscott, Mark. (1993, Dec.). Reno Asks Aspin for Non-Lethal, Other DOD Weapons to Fight Crime. *Defense Electronics*, *25*, 8.

[565] Tatum, Chris. (1995, Mar.). Defensive Weapons Do's and Don'ts. *Security Management*, 26-31.

[566] *Technology Beat*. (1995, Sep.). New Technologies Demonstrated for Law Enforcement, 2-4.

[567] *Technology Review*. (1995, Jan.). Trends, *98*, (1) 14.

[568] Tengroth, Bjorn M. (1993, Sep.). Laser Weapons Designed to Produce Blindness. Editorial. *American Journal of Ophthalmology*, *116*, (3) 370.

[569] Tennenbaum, Abraham N. & Moore, Angela M. (1993, Sep.-Oct.). Non-Lethal Weapons: Alternatives to Deadly Force. *The Futurist*, *27*, (5) 20-23.

[570] The, Liang. (1995, Aug.). Getting the Act Together: Hardkill-Softkill Co-Ordination for Littoral Waters. *International Defense Review*, *28*, (8) 54-56.

[571] Thein, B.K. et al. (1976, Jan.). *Weapon Performance Testing and Analysis: The Modi-Pac Round, the No. 4 Lead-Shot Round, and the Flying Baton*. Technical Memorandum 4-76. Aberdeen Proving Ground, Maryland: U.S. Army Human Engineering Laboratory.

[572] Thein, B.K., Shank, E.B. & Wargovich, M.J. (1974, May). *Analysis of a Bean-Bag-Type Projectile as a Less Lethal Weapon*. Draft Report. Aberdeen Proving Grounds, Maryland: U.S. Army Land Warfare Laboratory.

[573] Thomas, Bob & Means, Randy. (1990, Jul.). Objective Reasonableness Standard for Use of Non Deadly Force Established. *The Police Chief*, 45.

[574] Thorpe, Terry. (1990, Mar.). Clearing the Way to Distraction Devices. *Law Enforcement Technology*, 16.

[575] Tigner, Brooks. (1996, 29 Apr.). Alliance Study Urges Nations to Collaborate on Weapons (non-lethals), *11*, (17) 12.

[576] Tigner, Brooks. (1994, 11-17 Jul.). NATO Eyes Peacekeeping Tools. *Defense News*, *9*, 4.

[577] Tillman, A.C. (1994, Jan.). Weapons for the 21st century soldier. *International Defense Review*, *27*, (1) 37-38.

[578] *Time*. (1989, Jan.). Nonlethal bullets that kill (rubber-clad metal balls used by Israelis to quell Palestinian uprising), *133*, 33.

[579] Trebor Corporation International. (n.d.) *Stun- Gun Preliminary Terminal Effects Study*. Dublin, California.

[580] Trostle, L.C. (1990). The force continuum: From lethal to less-than-lethal force. *Journal of Contemporary Criminal Justice, 6,* (1) 23-36.

[581] Truong, Khong Q. (1985, Sep.). *Evaluation of the MS Disperser as a Dissemination Device for Thickened Liquid Chemical Agent Stimulant*. CRDC-TC 84076. Aberdeen Proving Ground, Maryland: U.S. Army Armament, Munitions and Chemical Command, Chemical Research and Development Center.

[582] *USA Today*. (1995, Apr.). New High-Tech Tools Aid Police, *123*, 14-15.

[583] United States Army. (1996, Aug.). *FM 311, Riot Control Agents, Herbicide Operations*. Washington, District of Columbia: U.S. Government Printing Office.

[584] United States Army. (1990, 12 Dec). *FM 3-9, Military Chemical Compounds and Their Properties*. Washington, District of Columbia: U.S. Government Printing Office.

[585] United States Army. (1985, Nov.). *FM 19-15, Civil Disturbance*. Washington, District of Columbia: U.S. Government Printing Office.

[586] US Army ARDEC. (1995, 2 Jun.). Grenade Stun Nonlethal Weapon XM84. Issue No. PSA-1359. *Commerce Business Daily*, 3.

[587] U.S. Army Corps of Engineers. (1982). *Army Equipment Data Sheets: Chemical Weapons and Munitions*. Technical Manual; TM 43-0001-26-2. Washington, District of Columbia: Headquarters, Department of the Army.

[588] U.S. Air Force Armament Laboratory. (1967). *CBU- 30/A Incapacitating Munitions Systems*. AFATL-TR-67-178.

[589] U.S. Air Force Armament Laboratory. (1966). *Design and Development of an Incapacitating Disseminator*. ATL-TR-66- 40.

[590] U.S. Air Force Tactical Air Command. (1969). *ROC for Non-Lethal Area Denial System*. TAC-ROC-45-69. Langley Air Force Base, Virginia.

[591] U.S. Army Engineering Laboratory (HEL). (1981, 7-9 Dec. & 1982, 12-15 Jan.). *An Acoustical Assessment of the Impulse Noise of Grenade Simulators Exploding in Enclosures*. Aberdeen, Maryland: Aberdeen Proving Grounds.

[592] U.S. Army Foreign Science and Technology Center. (1990). *Incapacitating Agents, European Communist Countries*. AST- 162OR-100-90. Charlottesville, Maryland.

[593] U.S. Army Laboratory Command. (1988, Mar.). *Warfighting with Emerging Technologies: Report on the Tech Base War Games*. Waterways Experiment Station.

[594] U.S. Army Research, Development, and Engineering Center. (1992, 23 Sep.). *Low Collateral Damage Munitions (LCDM) Programs*. Picatinny Arsenal, New Jersey.

[595] U.S. Army Research Laboratory. (1993). *Less- than-Lethal Weapons Development for Law Enforcement*. ARL-TR-51. Aberdeen Proving Ground, Maryland.

[596] U.S. Army Training and Doctrine Command (TRADOC). (1992, 4 Sep.). *Operations Concept for Disabling Measures*. Pamphlet 525-XX, Draft.

[597] U.S. Congress. House. Committee on Foreign Affairs. Subcommittee on National Security Policy and Scientific Developments. (1970). *Chemical-biological warfare: U.S. policies and international effects report with an appended study on the use of tear gas in war:...pursuant to House Resolution 143*. Washington: U.S. Government Printing Office.

[598] U.S. Congress. Senate. Committee on Foreign Relations. Subcommittee on Oceans and International Environment. (1972, 26- 27 Jul.). *Prohibiting military weather modification*. 92nd. Cong., 2nd Sess.

[599] U.S. Department of the Army. (1969, 9 Apr.). *Employment of riot control agents, flame, smoke, antiplant agents, and personnel detectors in counterguerrilla operations*. Training Circular 3-16.

[600] U.S. Government Printing Office. *An Act to Authorize the Export-Import Bank of the United States to Provide Financing for the Export of Nonlethal Defense Articles and Defense Services the Primary End Use of Which Will Be for Civilian Purposes*. (1995). Washington, District of Columbia.

[601] U.S. Special Operations Command & Advanced Research Projects Agency. (1995, 29 Dec.). *Survey of Limited Effects Weapons, Munitions, and Devices*. 2nd Edition. MacDill Air Force Base, Florida.

[602] *U.S. News & World Report*. (1992, 28 Sep.). A guide to self-defense devices, 88.

[603] Vasishtha, Ph.D., Niraj & Bera, Cristin S. (1995, 10 Jul.). *Marking and Incapacitating a Fleeing Target (MIFT) using Non-Lethal Encapsulated Compounds, Volume I: Technical Proposal*. Prepared for ARPA/ASTO, Southwest Research Institute.

[604] Wade, Nicholas. (1972, 9 Jun.). Technology in Ulster: Rubber Bullets Hit Home, Brainwashing Backfires. *Science, 176*, 1102-1106.

[605] Walker, Sam. (1994, 6 Sep.). 'Nonlethal' Weapons, James Bond Style. *The Christian Science Monitor*, 12.

[606] *Wall Street Journal*. (1994, 2 Aug.). Nonlethal Weapons: Freeze., or I'll Fire My Sticky-Goo Gun, 1.

[607] *Wall Street Journal*. (1993, 4 Jan.). New Class of Weapons Could Incapacitate Foe Yet Limit Casualties, 1.

[608] Walsh, Don. (1985). The Ring Airfoil Grenade: A Miracle Munition The Army Ignores. *Gung-Ho/Special Weapons*, 20-25.

[609] Warden III, USAF. Col. John. (1994, Dec.). *Non Lethal Concepts of Operation*. Presented at Sixth Annual SO/LIC-CD Symposium and Exhibition, Washington, District of Columbia. Draft.

[610] Wargovich et al. (1975, Sep.). *Evaluation of the Physiological Effects of a Rubber Bullet, a Baseball, and a Flying Baton*. Technical Memorandum 24-75. Aberdeen Proving Ground, Maryland: U.S. Army Human Engineering Laboratory.

[611] *Washington Post*. (1994, 23 Mar.). Pentagon, Justice Dept. Set Plans for Sharing of Nonlethal Technology, A3.

[612] Weapons Systems Concept Office, Development and Engineering Directorate. (1975, Oct.). *Soft/Sting Ring Airfoil Grenade Civil Disturbance Control System; Concise Summary Description*. Aberdeen Proving Ground, Maryland.

[613] Weapons Systems Concept Office, Development and Engineering Directorate. (1975, Apr.). *Development Plan for Soft Ring Airfoil Munitions System--Revision C*. Aberdeen Proving Ground, Maryland.

[614] Weigand, D.A. (1969). Cutaneous reaction to the riot control agent CS. *Military Medicine, 134*.

[615] Weiner, J.T. et al. (1960). *A study of the acute and subacute toxicity of aerosols of CS in small laboratory animals*. Edgewood Arsenal, MD: Edgewood Arsenal Chemical Warfare Laboratory. 2360.

[616] Weiner, Malcolm H. and Boyd, David. (1996, Sum.). Forum: Nonlethal Weapons. *Issues in Science and Technology, 12*, (4) 12-13.

[617] Weiner, Malcolm H., chairman. (1995). *Nonlethal Technologies: Military Options and Implications*. Report of an Independent Task Force. New York, New York: Council on Foreign Relations.

[618] Weinschenk, A. (1993, 24 Nov.). Non-lethal weapons group set to form in March. *Defense Weekly, 14*, (46) 1.

[619] Weinschenk, A. (1993, 16 Feb.). Boosters again are pushing for "Office of Non-Lethality." *Defense Weekly*, 2.

[620] Weiss, D.R., Brandt, D.J. & Tweet, K.D. (n.d.). *Smart Gun Technology Requirements Preliminary Report*. Contract IAA- 94-IJ-R-021. Albuquerque, New Mexico: Sandia National Laboratories.

[621] Westbrook, E.E. & Williams, L.W. (1971, 30 Apr.). *A Brief Survey of Nonlethal Weapons*. Report No. RACIC-TR-66, sponsored by ARPA Order No. 1509. Columbus, Ohio: RACIC Battelle Memorial Institute.

[622] Westing, Arthur W. (1990, Feb.). Use of Chemical Weapons Illegal? Letter to the Editor. *Military Review, 70*, (2) 82-83.

[623] Williams, Robert H. (1993, Oct.). Non-Lethal Devices Slice Across Science Spectrum. *National Defense, 78,* (491) 25.

[624] Wilsnack, Richard W. et al. (1971, Mar.) *Comprehensive Law and Order Assistance Research and Development (CLOARAD) Program, Technical Report No. 71-04.* Aberdeen Proving Ground, Maryland: U.S. Army Land Warfare Laboratory.

[625] Witten, Benjamin. (1965). *Non-Lethal Agents for Denial of Terrain in Limited Warfare Situations.* Edgewood Arsenal, Maryland: U.S. Army Edgewood Arsenal, Chemical Research and Development Laboratories.

[626] Wolfowitz, Paul. (1991, 10 Mar.). Do We Need a Non Lethal Defense Initiative? *Memorandum to the Secretary of Defense.* USD(P).

[627] Wright, Robin. (1995, 6 Sep.). Iraqis Admit to Broad, Virulent Germ War Plan. *Los Angeles Times,* A1, A11.

[628] York, Ken C, Gourley, Scott, & Arsentein, Seth. (1993, 3 Feb.). Non-Lethal Weapons Offer New SO/LIC Capabilities. *Tactical Technology,* 1-5.

[629] Yost, James Michael. (1993). *Non-Lethal Weapons: A Study of Effectiveness in Reducing Injuries and Brutality Complaints.* Thesis. Virginia Commonwealth University.

[630] Zaloga, S. (1990, May.). Soviets close to deploying battlefield beam weapons. *Armed Forces Journal International.*

[631] Zekri, A.M.B. et al. (1995, Dec.). Acute Mass Burns Caused By O-Chlorobenzylidene Malononitrile (CS) Tear Gas. *Burns, 21,* (8) 586-589.

IV. Addendum

[632] *Aviation Week & Space Technology.* (1994, 24 Jan.). NATO's Peek: Nonlethal Weapons. *140,* (4) 33.

[633] Bunker, Robert J. (1996, Spr.). Generations, Waves and Epochs: Modes of Warfare and the RPMA. *Airpower Journal, 10* 23-25.

[634] Bunker, Robert J. (1996, Sum.). Ricochets and Replies: RPMA Update. *Airpower Journal, 10* 3, 117.

[635] Bunker, Robert J. (1997). Grenades, launched, Allied and DRV, Spencer C. Tucker, ed. *The Vietnam War: An Encyclopedia.* New York, New York: Garland Publishing.

[636] Cooper, Pat. (1995, 20-26 Mar.). Naval Research Lab Attempts to Meld Neurons and Chips: Studies May Produce Army of 'Zombies.' *Defense News, 10,* 1, 50.

[637] Hay, Jr. John H. (1974). *Tactical and Materiel Innovations.* Washington, District of Columbia: U.S. Government Printing Office.

[638] Linder, US Army. Maj. James B. (1996, Sept.-Oct.). A Case for Employing Nonlethal Weapons. *Military Review, 76,* (5) 25-29.

[639] Marine Corps Combat Development Command. (1996, 20- 21 Aug.). *Proceedings of the Non-Lethal Modeling and Simulation Workshop.* Hosted by Non Lethal Weapons Program & Non Lethal Coordination Cell. Quantico, Virginia.

[640] Metz, Steven & Kievit, James. (1995, 27 Jun.). *Strategy and the Revolution in Military Affairs.* Carlisle Barracks, Pennsylvania: U.S. Army War College, Strategic Studies Institute.

[641] Office of the Judge Advocate General. (1995, 6 Feb.). *Legal Review of Barrier Foam.* Alexandria, Virginia: Department of the Navy.

[642] Rauss, Patrick J. et al. (1996, 23-25 Jul.). FERET (Face-Recognition Technology) Recognition Algorithms in *Proceedings of the Fifth Automatic Target Recognizer System and Technology Symposium.* Sponsored by the Automatic Target Recognizer Working Group.

[643] Under Secretary of Defense for Acquisition and Technology. (1996, 22 Mar.). *Nonlethal Weapons (NLW) Program Implementation.* Memo.

[644] U.S. Department of Justice. (1996, Oct.). High- Speed Pursuit: New Technologies Around the Corner. *National Law Enforcement and Corrections Technology Center Bulletin*, 1-6.

UNITED STATES AIR FORCE ACADEMY

Lieutenant General Tad J. Oelstrom

Superintendent

Brigadier General Ruben A. Cubero

Dean of the Faculty

HEADQUARTERS, US AIR FORCE

DIRECTORATE OF NUCLEAR AND COUNTERPROLIFERATION

Major General Thomas H. Neary

Director

Colonel Thomas D. Miller

Chief, Policy Division

USAF INSTITUTE FOR NATIONAL SECURITY STUDIES

Lieutenant Colonel Peter L. Hays

Director

Lieutenant Colonel Jeffrey A. Larsen

Editor

Major Vincent J. Jodoin

Editor

Ms Marsha Taylor

Cover Design

INSS OCCASIONAL PAPERS

1. Explaining Weapons Proliferation: Going Beyond the Security Dilemma. Gregory J. Rattray, July 1994

2. The Ukrainian Military: Instrument for Defense or Domestic Challenge? Oleg Strekal, November 1994

3. North Korea's Nuclear Program: The Clinton Administration's Response. William E. Berry, Jr., March 1995

4. Environmental Assistance as National Security Policy: Helping the Former Soviet Union Find Solutions to its Environmental Problems. Robert L. Dunaway, November 1995

5. Economic Power in the Sino-U.S. Relationship. Kevin F. Donovan, December 1995

6. Nuclear Proliferation: Diminishing Threat? William H. Kincade, December 1995

7. Nuclear Proliferation: The Diplomatic Role of Non- Weaponized Programs. Rosalind R. Reynolds, January 1996

8. Five Minutes Past Midnight: The Clear and Present Danger of Nuclear Weapons Grade Fissile Materials. Guy B. Roberts, February 1996

9. The International Legal Implications of Information Warfare. Richard W. Aldrich, April 1996

10. Weapons Proliferation and Organized Crime: The Russian Military and Security Force Dimension. Graham H. Turbiville, Jr., June 1996

11. Melancholy Reunion: A Report from the Future on the Collapse of Civil-Military Relations in the United States. Charles J. Dunlap, Jr., October 1996

12. Russia's Crumbling Tactical Nuclear Weapons Complex: An Opportunity for Arms Control. Stephen P. Lambert and David A. Miller, April 1997

13. Political-Military Affairs Officers and the Air Force: Continued Turbulence in a Vital Career Specialty. James E. Kinzer and Marybeth Peterson Ulrich, April 1997

14. Environmental Federalism and U.S. Military Installations: A Framework for Compliance. James M. Smith, June 1997