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On the Need for New Criteria of Diagnosis of Psychosis in the Light of Mind Invasive Technology

By Carole Smith

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"We have failed to comprehend that the result of the technology that originated in the years of the arms race between the Soviet Union and the West, has resulted in using satellite technology not only for surveillance and communication systems but also to lock on to human beings, manipulating brain frequencies by directing laser beams, neural-particle beams, electro-magnetic radiation, sonar waves, radiofrequency radiation (RFR), soliton waves, torsion fields and by use of these or other energy fields which form the areas of study for astro-physics. Since the operations are characterised by secrecy, it seems inevitable that the methods that we do know about, that is, the exploitation of the ionosphere, our natural shield, are already outdated as we begin to grasp the implications of their use." [Excerpt]

For those of us who were trained in a psychoanalytical approach to the patient which was characterised as patient centred, and which acknowledged that the effort to understand the world of the other person entailed an awareness that the treatment was essentially one of mutuality and trust, the American Psychiatry Association's Diagnostic Criteria for Schizotypal personality was always a cause for alarm. The Third Edition (1987) of *Diagnostic and Statistical Manual of Mental Disorders* (DSM) required that there be at least four of the characteristics set out for a diagnosis of schizophrenia, and an approved selection of four could be: magical thinking, telepathy or sixth sense; limited social contact; odd speech; and over-sensitivity to criticism. By 1994, the required number of qualifying characteristics were reduced to two or more, including, say, hallucinations and 'negative ' symptoms such as affective flattening, or disorganised or incoherent speech – or only one if the delusions were bizarre or the hallucination consisted of a voice keeping up a running commentary on the person's behaviour or thoughts. The next edition of the DSM is not due until the year 2010.

In place of a process of a labelling which brought alienation and often detention, sectioning, and mind altering anti-psychotic medication, many psychoanalysts and psychotherapists felt that even in severe cases of schizoid withdrawal we were not necessarily wasting our time in attempting to restore health by the difficult work of unravelling experiences in order to make sense of an illness. In this way, psychoanalysis has been, in its most radical form, a critic of a society, which failed to exercise imaginative empathy when passing judgement on people. The work of Harry Stack Sullivan, Frieda Fromm-Reichmann, Harold Searles or R.D. Laing – all trained as psychiatrists and all of them rebels against the standard procedures – provided a way of working with people very different from the psychiatric model, which seemed to encourage a society to repress its sickness by making a clearly split off group the carriers of it. A psychiatrist in a mental hospital once joked to me, with some truth, when I commented on the number of carrier bags carried by many of the medicated patients around the hospital grounds, that they assessed the progress of the patient in terms of the reduction of the number of carrier bags. It is too often difficult to believe, however, when hearing the history of a life, that the "schizophrenic" was not suffering the effects of having been made, consciously and unconsciously, the carefully concealed carrier of the ills of the family.

For someone who felt his mind was going to pieces, to be put into the stressful situation of the psychiatric examination, even when the psychiatrist acquitted himself with kindness, the situation of the assessment procedure itself, can be 'an effective way to drive someone crazy, or more crazy.' (Laing, 1985, p 17). But if the accounting of bizarre experiences more or less guaranteed you a new label or a trip to the psychiatric ward, there is even more reason for a new group of people to be outraged about how their symptoms are being diagnosed. A doubly cruel sentence is being imposed on people who are the victims of the most appalling abuse by scientific-military experiments, and a totally uncomprehending society is indifferent to their evidence. For the development of a new class of weaponry now has the capability of entering the brain and mind and body of another person by technological means.

Harnessing neuroscience to military capability, this technology is the result of decades of research and experimentation, most particularly in the Soviet Union and the United States. (Welsh, 1997, 2000) We have failed to comprehend that the result of the technology that originated in the years of the arms race between the Soviet Union and the West, has resulted in using satellite technology not only for surveillance and communication systems but also to lock on to human beings, manipulating brain frequencies by directing laser beams, neural-particle beams, electro-magnetic radiation, sonar waves, radiofrequency radiation (RFR), soliton waves, torsion fields and by use of these or other energy fields which form the areas of study for astro-physics. Since the operations are characterised by secrecy, it seems inevitable that the methods that we do know about, that is, the exploitation of the ionosphere, our natural shield, are already outdated as we begin to grasp the implications of their use. The patents deriving from Bernard J. Eastlund's work provide the ability to put unprecedented amounts of power in the Earth's atmosphere at strategic locations and to maintain the power injection level, particularly if random pulsing is employed, in a manner far more precise and better controlled than accomplished by the prior art, the detonation of nuclear devices at various yields and various altitudes. (ref High Frequency Active Auroral Research Project, HAARP).

Some patents, now owned by Raytheon, describe how to make "nuclear sized explosions without radiation" and describe power beam systems, electromagnetic pulses and over-the-horizon detection systems. A more disturbing use is the system developed for manipulating and disturbing the human mental process using pulsed radio frequency radiation (RFR), and their use as a device for causing negative effects on human health and thinking. The victim, the innocent civilian target is locked on to, and unable to evade the menace by moving around. The beam is administered from space. The Haarp facility as military technology could be used to broadcast global mind-control, as a system for manipulating and disturbing the human mental process using pulsed radio frequency (RFR). The super-powerful radio waves are beamed to the ionosphere, heating those areas, thereby lifting them. The electromagnetic waves bounce back to the earth and penetrate human tissue.

Dr Igor Smirnov, of the Institute of Psycho-Correction in Moscow, says: "It is easily conceivable that some Russian 'Satan', or let's say Iranian – or any other 'Satan', as long as he owns the appropriate means and finances, can inject himself into every conceivable computer network, into every conceivable radio or television broadcast, with relative technological ease, even without disconnecting cables…and intercept the radio waves in the ether and modulate every conceivable suggestion into it. This is why such technology is rightfully feared." (German TV documentary, 1998).

If we were concerned before about diagnostic criteria being imposed according to the classification of *recognizable symptoms*, we have reason now to submit them to even harsher scrutiny. The development over the last decades since the Cold War arms race has included as a major strategic category, psycho-electronic weaponry, the ultimate aim of which is to enter the brain and mind. Unannounced, undebated and largely unacknowledged by scientists or by the governments who employ them – technology to *enter and control minds from a distance* has been unleashed upon us. The only witnesses who are speaking about this terrible technology with its appalling

implications for the future, are the victims themselves and those who are given the task of diagnosing mental illness are attempting to silence them by classifying their evidence and accounts as the symptoms of schizophrenia, while the dispensers of psychic mutilation and programmed pain continue with their work, aided and unopposed.

If it was always crucial, under the threat of psychiatric sectioning, to carefully screen out any sign of confused speech, negativity, coldness, suspicion, bizarre thoughts, sixth sense, telepathy, premonitions, but above all the sense that "others can feel my feelings, and that *someone seemed to be keeping up a running commentary on your thoughts and behaviour*," then reporting these to a psychiatrist, or anyone else for that matter who was not of a mind to believe that such things as mind-control could exist, would be the end of your claim to sanity and probably your freedom. For one of the salient characteristics of mind-control is the running commentary, which replicates so exactly, and surely not without design, the symptoms of schizophrenia. Part of the effort is to remind the victim that they are constantly under control or surveillance. Programmes vary, but common forms of reminders are electronic prods and nudges, body noises, twinges and cramps to all parts of the body, increasing heart beats, applying pressures to internal organs – all with a personally codified system of comments on thoughts and events, designed to create stress, panic and desperation. This is mind control at its most benign. There is reason to fear the use of beamed energy to deliver lethal assaults on humans, including cardiac arrest, and bleeding in the brain.

It is the government system of secrecy, which has facilitated this appalling prospect. There have been warning voices. "…the government secrecy system as a whole is among the most poisonous legacies of the Cold War …the Cold War secrecy (which) also mandate(s) Active Deception…a security manual for special access programs authorizing contractors to employ 'cover stories to disguise their activities. The only condition is that cover stories must be believable." (Aftergood & Rosenberg, 1994; Bulletin of Atomic Scientist). Paranoia has been aided and abetted by government intelligence agencies.

In the United Kingdom the fortifications against any disturbing glimmer of awareness of such actual or potential outrages against human rights and social and political abuses seem to be cast in concrete. Complete with crenellations, ramparts and parapets, the stronghold of nescience reigns supreme. To borrow Her Majesty the Queen's recent observation: "There are forces at work of which we are not aware." One cannot say that there is no British Intelligence on the matter, as it is quite unfeasible that the existence of the technology is not classified information. Indeed it is a widely held belief that the women protesting against the presence of cruise missiles at Greenham Common were victims of electro-magnetic radiation at gigahertz frequency by directed energy weapons, and that their symptoms, including cancer, were consistent with such radiation effects as reported by Dr Robert Becker who has been a constantly warning voice against the perils of electro-magnetic radiation. The work of Allen Frey suggests that we should consider radiation effects as a grave hazard producing increased permeability of the blood-brain barrier, and weakening crucial defenses of the central nervous system against toxins. (Becker, 1985, p. 286). Dr Becker has written about nuclear magnetic resonance as a familiar tool in medecine known as magnetic resonance imaging or MRI. Calcium efflux is the result of cyclotronic resonance which latter can be explained thus: If a charged particle or ion is exposed to a steady magnetic field in space, it will begin to go into a circular or orbital, motion at right angles to the applied magnetic field.The speed with which it orbits will be determined by the ratio between the charge and the mass of the particle and by the strength of the magnetic field. (Becker, 1990,p.235) The implications of this for wide scale aggression by using a combination of radar based energy and the use of nuclear resonating are beyond the scope of the writer, but appear to be worth the very serious consideration of physicists in assessing how they might be used against human beings.

Amongst medical circles, however, it has so far not been possible for the writer to find a neuroscientist, neurologist or a psychiatrist, nor for that matter, a general medical practitioner, who acknowledges *even the potential* for technological manipulation of the nervous system as a problem requiring their professional interest. There has been exactly this response from some of England's most eminent practitioners of the legal profession, not surprisingly, because the information about such technology is not made available to them. They would refer anyone attempting to communicate mind- harassment as a psychiatric problem, ignoring the crime that is being committed.

The aim here is not to attempt a comprehensive history and development of the technology of mind control. These very considerable tasks – which have to be done under circumstances of the most extreme difficulty – have been addressed with clarity and courage by others, who live with constant harm and threats, not least of all contemptuous labelling. Their work can be readily accessed on the internet references given at the end of this paper. For a well-researched outline of the historical development of electro-magnetic technology the reader should refer to the timeline of dates and electromagnetic weapon development by Cheryl Welsh, president of Citizens against Human Rights Abuse. (Welsh 1997; 2001). There are at least one and a half thousand people worldwide who state they are being targeted. Mojmir Babacek, now domiciled in his native Czech Republic, after eight years of residence in the United States in the eighties, has made a painstakingly meticulous review of the technology, and continues his research. (Babacek 1998, 2002)

We are concerned here with reinforcing in the strongest possible terms:

i) The need for such abuses to human rights and the threats to democracy to be called to consciousness, and without further delay.

ii) To analyse the reasons why people might defend themselves from becoming conscious of the existence of such threats.

iii) To address the urgent need for intelligence, imagination, and information – not to mention compassion – in dealing with the victims of persecution from this technology, and

iv) To alert a sleeping society, to the imminent threats to their freedom from the threat from fascist and covert operations who have in all probability gained control of potentially lethal weaponry of the type we are describing.

It is necessary to emphasise that at present there is not even the means for victims to gain medical attention for the effects of radiation from this targeting. Denied the respect of credulity of being used as human guinea pigs, driven to suicide by the breakdown of their lives, they are treated as insane – at best regarded as 'sad cases'. Since the presence of a permanent 'other' in one's mind and body is by definition an act of the most intolerable cruelty, people who are forced to bear it but who refuse to be broken by it, have no other option than to turn themselves into activists, their lives consumed by the battle against such atrocities, their energies directed to alerting and informing the public of things they don't want to hear or understand about evil forces at work in their society.
It is necessary, at this point, to briefly outline a few – one might say the precious few – attempts by public servants to verify the existence and dangers inherent in this field:

- In January 1998, an annual public meeting of the French National Bioethics Committee was held in Paris. Its chairman, Jean-Pierre Changeux, a neuroscientist at the Institut Pasteur in Paris, told the meeting that "advances in cerebral imaging make the scope for invasion of privacy immense. Although the equipment needed is still highly specialized, it will become commonplace and capable of being used at a distance. That will open the way for abuses such as invasion of personal liberty, control of behaviour and

brainwashing. These are far from being science-fiction concerns…and constitute “a serious risk to society.” (“Nature.” Vol 391, 1998.

- In January 1999, the European Parliament passed a resolution where it calls “ for an international convention introducing a global ban on all development and deployment of weapons which might enable any form of manipulation of human beings. It is our conviction that this ban can not be implemented without the global pressure of the informed general public on the governments. Our major objective is to get across to the general public the *real threat which these weapons represent for human rights and democracy and to apply pressure on the governments and parliaments around the world to enact legislature which would prohibit the use of these devices to both government and private organisations as well as individuals*.” (Plenary sessions/Europarliament, 1999)

- In October 2001, Congressman Dennis J. Kucinich introduced a bill to the House of Representatives which, it was hoped would be extremely important in the fight to expose and stop psycho-electronic mind control experimentation on involuntary, non-consensual citizens. The Bill was referred to the Committee on Science, and in addition to the Committee on Armed Services and International Relations. In the original bill a ban was sought on ‘exotic weapons’ including electronic, psychotronic or information weapons, chemtrails, particle beams, plasmas, electromagnetic radiation, extremely low frequency (ELF) or ultra low frequency (ULF) energy radiation, or mind control technologies. Despite the inclusion of a prohibition of the basing of weapons in space, and the use of weapons to destroy objects or damage objects in space, there is no mention in the revised bill of any of the aforementioned mind-invasive weaponry, nor of the use of satellite or radar or other energy based technology for deploying or developing technology designed for deployment against the minds of human beings. (Space Preservation Act, 2002)

In reviewing the development of the art of mind-invasive technology– there are a few outstanding achievements to note:

In 1969 Dr Jose Delgado, a Yale psychologist, published a book: “Physical Control of the Mind: Towards a Psychocivilized Society”. In essence, he displayed in practical demonstrations how, by means of electrical stimulation of the brain which had been mapped out in its relations between different points and activities, functions and sensations, – by means of electrical stimulation, how **the rhythm of breathing and heartbeat could be changed,** as well as the function of most of the viscera, and gall bladder secretion. Frowning, opening and closing of eyes and mouth, chewing, yawning, sleep, dizziness, epileptic seizures in healthy persons were induced. The intensity of feelings could be controlled by turning the knob, which controlled the intensity of the electric current. He states at the end of his book the hope that the new power will remain limited to scientists or some charitable elite for the benefit of a “psychocivilized society.”

In the 1980’s the **neuromagnetometer** was developed which functions as an antenna and could monitor the patterns emerging from the brain. (In the seventies the scientists had discovered that electromagnetic pulses enabled the brain to be stimulated through the skull and other tissues, so there was no more need to implant electrodes in the brain). The antenna, combined with the computer, could localize the points in the brain where the brain events occur. The whole product is called the **magnetoencephalograph**.

In January 2000 the Lockheed Martin neuroengineer Dr John D. Norseen, was quoted (US News and World Report, 2000) as hoping to turn the **electrohypnomentalaphone**, a mind reading machine, into science fact. Dr Norseen, a former Navy pilot, claims his interest in the brain stemmed from reading a Soviet book in the 1980’s claiming that research on the mind would revolutionize the military and society at large. By a process of deciphering the brain’s electrical activity, electromagnetic pulsations would trigger the release of the brain’s own transmitters to fight off disease, enhance learning, or alter the mind’s visual images, creating a ‘synthetic reality’. By this process of **BioFusion**, (Lockheed Martin, 2000) information is placed in a database, and a **composite model of the brain** is created. By viewing a brain scan recorded by (functional) magnetic resonance imaging (fMRI) machine, scientists can tell what the person was doing at the time of recording – say reading or writing, or recognise emotions from love to hate. “If this research pans out”, says Norseen, “you can begin to manipulate what someone is thinking even before they know it.” But Norseen says he is ‘agnostic’ on the moral ramifications, that he’s not a mad scientist – just a dedicated one. “The ethics don’t concern me,” he says, “but they should concern someone else.”

The next big thing looks like being something which we might refer to as a **neurocomputer** but it need not resemble a laptop – it may be reducible to whatever size is convenient for use, such as a small mobile phone. Arising from a break-through and exploitation of PSI-phenomena, it may be modelled on the nervous-psychic activity of the brain – that is, as an unbalanced, unstable system of neurotransmitters and interacting neurones, the work having been derived from the creation of a copy of a living brain – accessed by chance, and ESP and worked on by design.

On receiving a communication from the writer on the feasibility of a machine being on the horizon which, based on the project of collecting electromagnetic waves emanating from the brain and transmitting them into another brain that would read a person’s thoughts, or using the same procedure in order to impose somebody else’s thoughts on another brain and in this way direct his actions – there was an unequivocal answer from IBM at executive level that there was no existing technology to create such a computer in the foreseeable future. This is at some variance with the locating of a patent numbered 03951134 on the Internet pages of IBM Intellectual Property Network for a device, described in the patent, as capable of picking up at a distance the brain waves of a person, process them by computer and emit correcting waves which will change the original brain waves. Similar letters addressed to each of the four top executives of Apple Inc., in four individual letters marked for their personal attention, produced absolutely no response. This included the ex- Vice President of the United States, Mr Al Gore, newly elected to the Board of Directors of Apple.

Enough people have been sufficiently concerned by the reports of victims of mind control abuse to organise The Geneva Forum, in 2002, held as a joint initiative of the Quaker United Nations Office, Geneva; the United Nations Institute for Disarmament Research; the International Committee of the Red cross, and the Human Rights Watch (USA), and Citizens against Human Rights Abuses (CAHRA); and the Programme for Strategic and International Security Studies, which was represented by the Professor and Senior Lecturer from the Department of Peace Studies at the University of Bradford.

In England, on May 25, 1995, the Guardian newspaper in the U.K. carried an article based on a report by Nic Lewer, the peace researcher from Bradford University, which listed “more than 30 different lines of research into ‘new age weapons’…”some of the research sounds even less rational. There are, according to Lewer, plans for ‘pulsed microwave beams’ to destroy enemy electronics, and separate plans for very-low-frequency sound beams to induce vomiting, bowel spasm, epileptic seizures and also crumble masonry.” Further, the article states, “There are plans for ‘mind control’ with the use of ‘psycho-correction messages’ transmitted by subliminal audio and visual stimuli. There is also a plan for ‘psychotronic weapons’ – apparently the projection of consciousness to other locations – and another to use holographic projection to disseminate propaganda and misinformation.” (Welsh, *Timeline*). Apart from this notable exception it is difficult to locate any public statement of the problem in the United Kingdom.

Unfortunately, the problem of credulity does not necessarily cease with frequent mention, as in the United States, in spite of the number of reported cases, there is still not sufficient public will to make strenuous protest against what is not only already happening, but against what will develop if left unchecked. It appears that the administration believes that it is necessary and justifiable, in the interests of national

security, to make experimental human sacrifices, to have regrettable casualties, for there to be collateral damage, to suffer losses in place of strife or war. This is, of course, totally incompatible with any claims to be a democratic nation which respects the values of human life and democracy, and such an administration which tutors its servants in the ways of such barbaric tortures must be completely condemned as uncivilised and hypocritical.

Disbelief as a Defence Mechanism

In the face of widespread disbelief about mind-control, it seems worth analysing the basis of the mechanisms employed to maintain disbelief:

i) In the sixties, Soviet dissidents received a significant measure of sympathy and indignant protest from western democracies on account of their treatment, most notedly the abuse of psychiatric methods of torture to which they were subjected. It is noteworthy that we seem to be able to access credulity, express feelings of indignant support when we can identify with victims, who share and support our own value system, and who, in this particular historical case, reinforced our own values, since they were protesting against a political system which also threatened us at that time. Psychologically, it is equally important to observe that support from a safe distance, and the benefits to the psyche of attacking a split-off 'bad father', the soviet authorities in this case, presents no threat to one's internal system; indeed it relieves internal pressures. On the other hand, recognizing and denouncing a similar offence makes very much greater psychic demands of us when it brings us into conflict with our own environment, our own security, our own reality. The defence against disillusion serves to suppress paranoia that our father figure, the president, the prime minister, our governments – might not be what they would like to be seen to be.

ii) The need to deposit destructive envy and bad feelings *elsewhere*, on account of the inability of the ego to acknowledge ownership of them – reinforces the usefulness of persons or groups, which will serve to contain those, disowned, projected feelings which arouse paranoid anxieties. The concepts of mind-invasion strike at the very heart of paranoid anxiety, causing considerable efforts to dislodge them from the psyche. The unconscious identification of madness with dirt or excrement is an important aspect of anal aggression, triggering projective identification as a defence.

iii) To lay oneself open to believing that a person is undergoing the experience of being invaded mentally and physically by an unseen manipulator requires very great efforts in the self to manage dread.

iv) The defence against the unknown finds expression in the split between theory and practice; between the scientist as innovator and the society who can make the moral decisions about his inventions; between fact and science fiction, the latter of which can present preposterous challenges to the imagination without undue threat, because it serves to reinforce a separation from the real.

v) Identification with the aggressor. Sadistic fantasies, unconscious and conscious, being transferred on to the aggressor and identified with, aid the repression of fear of passivity, or a dread of punishment. This mechanism acts to deny credulity to the victim who represents weakness. This is a common feature of satanic sects.

vi) The liberal humanist tradition which denies the worst destructive capacities of man in the effort to sustain the belief in the great continuity of cultural and scientific tradition; the fear, in one's own past development, of not being 'ongoing', can produce the psychic effect of reversal into the opposite to shield against aggressive feelings. This becomes then the exaggerated celebration of the 'new' as the affirmation of human genius which will ultimately be for the good of mankind, and which opposes warning voices about scientific advances as being pessimistic, unenlightened, unprogressive and Luddite. Strict adherence to this liberal position can act as overcompensation for a fear of envious spoiling of good possessions, i.e. cultural and intellectual goods.

vii) Denial by displacement is also employed to ignore the harmful aspects of technology. What may be harmful for the freedom and good of society can be masked and concealed by the distribution of new and entertaining novelties. The technology, which puts a camera down your gut for medical purposes, is also used to limit your freedom by surveillance. The purveyors of innovative technology come up with all sorts of new gadgets, which divert, entertain and feed the acquisitive needs of insatiable shoppers, and bolster the economy. The theme of "Everything's up to date in Kansas City" only takes on a downside when individual experience – exploding breast implants, say – takes the gilt off the gingerbread. Out of every innovation for evil (i.e. designed for harming and destroying) some 'good' (i.e. public diversion or entertainment) can be promoted for profit or crowd-pleasing.

viii) Nasa is sending a spacecraft to Mars, or so we are told. They plan to trundle across the Martian surface searching for signs of water and life. We do not hear dissenting voices about its feasibility.

Why is it that, when a person accounts that their mind is being disrupted and they are being persecuted by an unseen method of invasive technology, that we cannot bring ourselves to believe them? Could it be that the horror involved in the empathic identification required brings the shutters down? Conversely, the shared experience of the blasting of objects into space brings with it the possibilities of shared potency or the relief that resonates in the unconscious of a massive projection or evacuation – a shared experience which is blessed in the name of man's scientific genius.

ix) The desire 'not to be taken in', not to be taken for a fool, provides one of the most powerful and common defence mechanism against credulity.

Power, Paranoia and Unhealthy Governments

The ability to be the bearer and container of great power without succumbing to the pressures of latent narcissistic psychoses is an important matter too little considered. The effect of holding power and the expectation and the need to be seen as capable of sustaining it, if not exercising it, encourages omnipotence of thought. In the wake of this, a narcissistic overevaluation of the subject's own mental processes may set in. In the effort to hold himself together as the possessor, container and executor of power, he (or indeed, she) may also, undergo a process of splitting which allows him, along with others, to bear enthralled witness of himself in this illustrious role. This may mean that the seat of authority is vacated, at least at times. The splitting process between the experiencing ego and the perceiving ego allows the powerful leader to alternate his perception of himself inside and outside, sometimes beside, himself. With the reinforcement of himself from others as his own narcissistic object, reality testing is constrained. In this last respect, he has much in common with the other powerful figure of the age, the movie star. or by those, in Freud's words, who are "ruined by success."

In a world, which is facing increasing disillusion about the gulf between the public platforms on which governments are elected, and the contingencies and pragmatics of retaining defence strategies and economic investments, the role of military and intelligence departments, with their respective tools of domination and covert infiltration, is increasingly alarming. Unaccountable to the public, protected from exposure and prosecution by their immunity, licensed to lie as well as to kill, it is in the hands of these agents that very grave threats to human rights and freedom lies. Empowered to carry out aggression through classified weapon experimentation which is undetectable, these men and women are also open to corruption from lucrative offers of financial reward from powerful and sinister groups who can utilize their skills, privileged knowledge and expertise for frankly criminal and fascist purposes.

Our information about the psychological profiles of those who are employed to practice surveillance on others is limited, but it is not difficult to imagine the effects on the personality that would ensue with the persistent practice of such an occupation, so constantly exposed to the perversions. One gains little snatches of insight here and there. In his book on CIA mind control research (Marks, 1988), John Marks quotes a CIA colleague's joke (always revealing for personality characteristics): "If you could find the natural radio frequency of a person's sphincter, you could make him run out of the room real fast." (One wonders if the same amusement is derived from the ability to apply, say infra-sound above 130 decibels, which is said to cause stoppage of the heart, according to one victim/activist from his readings of a report for the Russian Parliament.)

Left to themselves, these servants of the state may well feel exempt from the process of moral self-scrutiny, but the work must be dehumanising for the predator as well as the prey. It is probably true that the need to control their agents in the field was an incentive to develop the methods in use today. It is also an effectively brutalising training for persecuting others. Meanwhile the object, the prey, in a bid for not only for survival but also in a desperate effort to warn his or her fellows about what is going on, attempts to turn himself into a quantum physicist, a political researcher, a legal sleuth, an activist, a neurologist, a psychologist, a physiologist – his own doctor, since he cannot know what effects this freakish treatment might have on his body, let alone his mind. There are always new methods to try out which might prove useful in the search to find ways of disabling and destroying opponents – air injected into brains and lungs, lasers to strike down or blind, particle beams, sonar waves, or whatever combination of energies to direct, or destabilise or control.

Science and Scepticism

Scientists can be bought, not just by governments, but also by sinister and secret societies. Universities can be funded by governments to develop technology for unacceptably inhumane uses. The same people who deliver the weapons – perhaps respected scientists and academics – may cite the acceptable side of scientific discoveries, which have been developed by experimenting on unacknowledged, unfortunate people. In a cleaned up form, they are then possibly celebrated as a break-through in the understanding of the natural laws of the universe. It is not implausible that having delivered the technical means for destruction, the innovator and thinker goes on, wearing a different hat, to receive his (or her) Nobel Prize. There are scientists who have refused to continue to do work when they were approached by CIA and Soviet representatives. These are the real heroes of science.

In the power struggle, much lies at stake in being the first to gain control of ultimate mind-reading and mind-controlling technology. Like the nuclear bomb, common ownership would seem by any sane calculations to cancel out the advantage of possession, but there is always a race to be the first to possess the latest ultimate means of mass destruction. The most desirable form is one that can be directed at others without contaminating oneself in the process – one that can be undetected and neatly, economically and strategically delivered. We should be foolish to rule out secret organisations, seeing threat only from undemocratic countries and known terrorist groups.

As consumers in a world which is increasingly one in which shopping is the main leisure activity, we should concern ourselves to becoming alert to the ways in which human welfare may have been sacrificed to produce an awesome new gadget. It may be the cause for celebration for the 'innovator', but brought about as the result of plugging in or dialling up the living neuronal processes of an enforced experimentee. If we are concerned not to eat boiled eggs laid by battery hens, we might not regard it morally irrelevant to scrutinise the large corporations producing electronically innovative 'software.' We might also be wary about the origins of the sort of bland enticements of dating agencies who propose finding your ideal partner by matching up brain frequencies and 'bio-rhythms'.

We do not know enough about the background of such technology, nor how to evaluate it ethically. We do not know about its effects on the future, because we are not properly informed. If governments persist in concealing the extent of their weapon capability in the interests of defence, they are also leaving their citizens disempowered of the right to protest against their deployment. *More alarmingly, they are leaving their citizens exposed to their deployment by ruthless organisations whose concerns are exactly the opposite of democracy and human rights.*

Back in the United Kingdom

Meanwhile, back in England, the Director of the Oxford Centre for Cognitive Neuroscience, Professor Colin Blakemore, also the elective Chief Executive of the Medical Research Council writes to the author that he "… knows of no technology (not even in the wildest speculations of neuroscientists) for scanning and collecting 'neuronal data' at a distance." (Blakemore, 2003,) This certitude is at distinct variance with the fears of other scientists in Russia and the United States, and not least of all with the fears of the French neuroscientist, Jean-Pierre Changeux of the French National Bioethics Committee already quoted (see page 5). It is also very much at odds with the writing of Dr Michael Persinger from the Behavioural Neuroscience Laboratory at Laurentian University in Sudbury, Ontario, Canada. His article "On the Possibility of Directly Accessing Every Human Brain by Electromagnetic Induction of Algorithms" (1995), he describes the ways that individual differences among human brains can be overcome and comes to a conclusion about the technological possibilities of influencing a major part of the approximately six billion people on this planet without mediation through classical sensory modalities but by generating electromagnetic induction of fundamental algorithms in the atmosphere. Dr Persinger's work is referred to by Captain John Tyler whose work for the American Air Force and Aerospace programmes likens the human nervous system to a radio receiver. (1990)

Very recently the leading weekly cultural BBC radio review had as one of its guests, the eminent astro-physicist and astronomer royal, Sir Martin Rees, who has recently published a book, "Our Final Century", in which he makes a sober and reasoned case for the fifty-fifty chance that millions of people, probably in a 'third-world country' could be wiped out in the near future through biotechnology and bio-terrorism – "by error or malign release." He spoke of this devastation as possibly coming from small groups or cults, based in the United States. "…few individuals with the right technology to cause absolute mayhem." He also said that in this century, human nature is no longer a fixed commodity, that perhaps we should contemplate the possibility that humans would even have implants in the brain.

The other guests on this programme were both concerned with Shakespeare, one a theatre producer and the other a writer on Shakespeare, while his remaining guest was a young woman who had a website called "Spiked", the current theme of which was Panic Attack, that is to say, Attack on Panic. This guest vigorously opposed what she felt was the pessimism of Sir Martin, regarding his ideas as essentially eroding trust, and inducing panic. This reaction seems to typify one way of dealing with threat and anxiety, and demonstrates

the difficulty that a warning voice, even from a man of the academic distinction of Martin Rees, has in alerting people to that which they do not want to hear. This flight reaction was reinforced by the presenter who summed up the morning's discussion at the end of the programme with the words: "We have a moral! Less panic, more Shakespeare!"

The New Barbarism

Since access to a mind-reading machine will enable the operator to access the ideas of another person, we should prepare ourselves for a new world order in which ideas will be, as it were, up for grabs. We need not doubt that the contents of another's mind will be scooped up, scooped out, sorted through as if the event was a jumble sale. The legal profession would therefore be well advised to consider the laws on Intellectual Property very judiciously in order to acquit themselves with any degree of authenticity. We should accustom ourselves to the prospect of recognizing our work coming out of the mouth of another. The prospect of wide-scale fraud, and someone posturing in your stolen clothes will not be a pretty sight. The term "personal mind enhancement" is slipping in through the back door, to borrow a term used by the Co-Director of the Center for Cognitive Liberty and Ethics, and it is being done through technologically-induced mental co-ercion – mind raping and looting. In place of, or in addition to, cocaine, we may expect to see 'mind-enhanced' performances on "live" television.

The brave new science of neuropsychiatry and brain mapping hopes to find very soon, with the fMRI scanner – this "brand new toy that scientists have got their hands on" – "the blob for love" and "the blob for guilt", (BBC Radio 4: All in the Mind, 5 March, 2003). Soon we will be able to order a brain scan for anyone whose behaviour strikes us as odd or bizarre, and the vicissitudes of a life need no longer trouble us in our diagnostic assessments. In his recent Reith Lectures for the BBC (2003), Professor Ramachandran, the celebrated neuroscientist from the La Hoya Institute in San Diego, California, has demonstrated for us many fascinating things that the brain can do. He has talked to us about personality disorders and shown that some patients, who have suffered brain damage from head injury, do not have the capacity to recognise their mothers. Others feel that they are dead. And indeed he has found brain lesions in these people. In what seems to be an enormous but effortless leap, the self-styled "kid in a candy store" is now hoping to prove that all schizophrenics, have damage to the right hemisphere of the brain, which results in the inability to distinguish between fantasy (sic) and reality. Since Professor Ramachandran speaks of schizophrenia in the same breath as denial of illness, or *agnosia*, it is not clear, and it would be interesting to know, whether the person with the head injury has been aware or unaware of the head injury. Also does the patient derive comfort and a better chance at reality testing when he is told of the lesion? Does he feel better when he has received the diagnosis? And what should the psychoanalysts – and the psychiatrists, – feel about all those years of treating people of whose head injuries they were absolutely unaware? Was this gross negligence? Were we absolutely deluded in perceiving recovery in a sizeable number of them?

It is, however, lamentable that a neuroscientist with a professed interest in understanding schizophrenia should seek to provide light relief to his audience by making jokes about schizophrenics being people who are "convinced that the CIA has implanted devices in their brain to control their thoughts and actions, or that aliens are controlling them." (Reith Lecture, No 5, 2003).

There is a new desire for **concretisation**. The search for meaning has been replaced by the need for hard proof. If it doesn't light up or add up it doesn't have validity. The physician of the mind has become a surgeon. "He found a lump as big as a grapefruit!"

Facing up to the Dread and Fear of the Uncanny

Freud believed that an exploration of the uncanny would be a major direction of exploration of the mind in this century. The fear of the uncanny has been with us for a very long time. The evil eye, or the terrifying double, or intruder, is a familiar theme in literature, notably of Joseph Conrad in The Secret Sharer, and Maupassant's short story, Le Horla. Freud's analysis of the uncanny led him back to the old animistic conception of the universe: "…it seems as if each one of us has been through a phase of individual development corresponding to the animistic phase in primitive men, that none of us has passed through it without preserving certain residues and traces of it which are still capable of manifesting themselves, and that everything which now strikes us as 'uncanny' fulfils the condition of touching those residues of animistic mental activity within us and bringing them to expression." (Freud: 1919. p.362)

The separation of birth, and the childhood fear of 'spooks in the night', also leave their traces in each and every one of us. The individual experience of being alone in one's mind – the solitary fate of man which has never been questioned before, and upon which the whole history of civilised nurture is based – is now assaulted head-on. Since growing up is largely synonymous with acceptance of one's aloneness, the effort to assuage it is the basis for compassion and protection of others; it is the matrix for the greatest good, that of ordinary human kindness, and is at the heart of the communicating power of great art. Even if we must all live and die alone, we can at least share this knowledge in acts of tenderness which atone for our lonely state. In times of loss and mental breakdown, the starkness of this aloneness is all too clear. The best of social and group constructiveness is an effort to allay the psychotic anxieties that lie at the base of every one of us, and which may be provoked under extreme enough conditions.

The calculated and technological entry into another person's mind is an act of monumental barbarism which obliterates– perhaps with the twiddling of a dial – the history and civilisation of man's mental development. It is more than an abuse of human rights, it is the destruction of meaning. For any one who is forced into the hell of living with an unseen mental rapist, the effort to stay sane is beyond the scope of tolerable endurance. The imaginative capacity of the ordinary mind cannot encompass the horror of it. We have attempted to come to terms with the experiments of the Nazis in concentration camps. We now have the prospect of systematic control authorised by men who issue instructions through satellite communications for the destruction of societies while they are driving new Jaguars and Mercedes, and going to the opera.

This is essentially about humiliation, and disempowerment. It is a manifestation of rage acted out by those who fear impotence with such dread, that their whole effort is directed into the emasculation and destruction of the terrifying rival of their unconscious fantasies. In this apocalypse of the mind the punitive figure wells up as if out of the bowels of the opera stage, and this phantasmagoria is acted out on a global scale. These men may be mad enough to believe they are creating a 'psychocivilised world order". For anyone who has studied damaged children, it is more resonant of the re-enactment from the unconscious, reinforced by a life devoid of the capacity for empathic identification, of the obscenities of the abused and abusing child in the savage nursery. Other people -which were to them like Action Man toys to be dismembered, or Barbie Dolls to be obscenely defiled – become as meaningless in their humanity as pixillated dots on a screen.

Although forced entry into a mind is by definition obscene, an abbreviated assessment of the effects that mind-invaded people describe testifies to the perverted nature of the experiments. Bizarre noises are emitted from the body, a body known well enough by its owner to recognise the noises as extrinsic; air is pumped in and out of orifices as if by a bicycle pump. Gradually the repertoire is augmented – twinges and spasms to the eyes, nose, lips, strange tics, pains in the head, ringing in the ears, obstructions in the throat, pressure on the bowel and bladder causing incontinence; tingling in the fingers, feet, pressures on the heart, on breathing, dizziness, eye problems leading to cataracts; running eyes, running nose; speeding up of heart beats and the raising of pressure in the heart and chest; breathing and chest complaints leading to bronchitis and deterioration of the lungs; agonizing migraines; being woken up at night, sometimes with

terrifying jolts ; insomnia; intolerable levels of stress from the loss of one's privacy. This collection of assorted symptoms is a challenge to any medical practitioner to diagnose.

There are, more seriously, if the afore-going is characterised as non-lethal, the potential lethal effects since the capability of ultrasound and infra-sound to cause cardiac arrest, and brain lesions, paralysis and blindness, as well as blinding by laser beam, or inducing asphyxia by altering the frequencies which control breathing in the brain, epileptic seizure – all these and others may be at the fingertips of those who are developing them. And those who do choose to use them may be sitting with the weapon, which resembles, say, a compact mobile telephone, on the restaurant table next to the bottle of wine, or beside them at the swimming pool.

Finally – if the victims at this point in the new history of this mind-control, cannot yet prove their abuse, it must be asserted that, faced with the available information about technological development – it is certainly not possible for those seeking to evade such claims – to *disprove* them. To wait until the effects become widespread will be too late.

- For these and other reasons which this paper has attempted to address, we would call for an acknowledgement of such technology at a national and international level. Politicians, scientists and neurologists, neuroscientists, physicists and the legal profession should, without further delay, demand public debate on the existence and deployment of psychotronic technology; and for the declassification of information about such devices which abuse helpless people, and threaten democratic freedom.

- Victims' accounts of abuse should be admitted to public account, and the use of psycho-electronic weapons should be made illegal and criminal,

- The medical profession should be helped to recognise the symptoms of mind-control and psychotronic abuse, and intelligence about their deployment should be declassified so that this abuse can be seen to be what it is, and not interpreted automatically as an indication of mental illness.

If, in the present confusion and insecurity about the search for evidence of weapons of mass destruction, we conclude that failure to locate them – whatever the truth of the matter –encourages us to be generally complacent, then we shall be colluding with very dark forces at work if we conclude that a course of extreme vigilance signifies paranoia. For there may well be other weapons of mass destruction being developed and not so far from home; weapons which, being even more difficult to locate, are developed invisibly, unobstructed, unheeded in our midst, using human beings as test-beds. Like ESP, the methods being used on humans have not been detectable using conventional detection equipment. It is likely that the signals being used are part of a physics not known to scientists without the highest level of security clearance. To ignore the evidence of victims is to deny, perhaps with catastrophic results, the only evidence which might otherwise lead the defenders of freedom to becoming alert to the development of a fearful new methods of destruction. Manipulating terrorist groups and governments alike, these sinister and covert forces may well be very thankful for the professional derision of the victims, and for public ignorance.

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The New York Times | http://nyti.ms/1xCDeLE

SundayReview | CONTRIBUTING OP-ED WRITER

Redefining Mental Illness

JAN. 17, 2015

T. M. Luhrmann

TWO months ago, the British Psychological Society released a remarkable document entitled “Understanding Psychosis and Schizophrenia.” Its authors say that hearing voices and feeling paranoid are common experiences, and are often a reaction to trauma, abuse or deprivation: “Calling them symptoms of mental illness, psychosis or schizophrenia is only one way of thinking about them, with advantages and disadvantages.”

The report says that there is no strict dividing line between psychosis and normal experience: “Some people find it useful to think of themselves as having an illness. Others prefer to think of their problems as, for example, an aspect of their personality which sometimes gets them into trouble but which they would not want to be without.”

The report adds that antipsychotic medications are sometimes helpful, but that “there is no evidence that it corrects an underlying biological abnormality.” It then warns about the risk of taking these drugs for years.

And the report says that it is “vital” that those who suffer with distressing symptoms be given an opportunity to “talk in detail about their experiences and to make sense of what has happened to them” — and points out that mental health services rarely make such opportunities available.

This is a radically different vision of severe mental illness from the one held by most Americans, and indeed many American psychiatrists. Americans think of schizophrenia as a brain disorder that can be treated only with medication. Yet there is plenty of scientific evidence for the report’s claims.

Moreover, the perspective is surprisingly consonant — in some ways — with the new approach by our own National Institute of Mental Health, which funds much of the research on mental illness in this country. For decades, American psychiatric science took diagnosis to be fundamental. These categories — depression, schizophrenia, post-traumatic stress disorder — were assumed to represent biologically distinct diseases, and the goal of the research was to figure out the biology of the disease.

That didn’t pan out. In 2013, the institute’s director, Thomas R. Insel, announced that psychiatric science had failed to find unique biological mechanisms associated with specific diagnoses. What genetic underpinnings or neural circuits they had identified were mostly common across diagnostic groups. Diagnoses were neither particularly useful nor accurate for understanding the brain, and would no longer be used to guide research.

And so the institute has begun one of the most interesting and radical experiments in scientific research in years. It jettisoned a decades-long tradition of diagnosis-driven research, in which a scientist became, for example, a schizophrenia researcher. Under a program called Research Domain Criteria, all research must begin from a matrix of neuroscientific structures (genes, cells, circuits) that cut across behavioral, cognitive and social domains (acute fear, loss, arousal). To use an example from the program’s website, psychiatric researchers will no longer study people with anxiety; they will study fear circuitry.

Our current diagnostic system — the main achievement of the biomedical revolution in psychiatry — drew a sharp , clear line between those who were sick and those who were well, and that line was determined by science. The system started with the behavior of persons, and sorted them into types. That approach sank deep roots into our culture, possibly because sorting ourselves into different kinds of people comes naturally to us.

The institute is rejecting this system because it does not lead to useful research. It is starting afresh, with a focus on how the brain and its trillions of synaptic connections work. The British Psychological Society rejects the centrality of diagnosis for seemingly quite different reasons — among them, because defining people by a devastating label may not help them.

Both approaches recognize that mental illnesses are complex individual responses — less like hypothyroidism, in which you fall ill because your body does not secrete enough thyroid hormone, and more like metabolic syndrome, in

which a collection of unrelated risk factors (high blood pressure, body fat around the waist) increases your chance of heart disease.

The implications are that social experience plays a significant role in who becomes mentally ill, when they fall ill and how their illness unfolds. We should view illness as caused not only by brain deficits but also by abuse, deprivation and inequality, which alter the way brains behave. Illness thus requires social interventions, not just pharmacological ones.

ONE outcome of this rethinking could be that talk therapy will regain some of the importance it lost when the new diagnostic system was young. And we know how to do talk therapy. That doesn't rule out medication: while there may be problems with the long-term use of antipsychotics, many people find them useful when their symptoms are severe.

The rethinking comes at a time of disconcerting awareness that mental health problems are far more pervasive than we might have imagined. The World Health Organization estimates that one in four people will have an episode of mental illness in their lifetime. Mental and behavioral problems are the biggest single cause of disability on the planet. But in low- and middle-income countries, about four of five of those disabled by the illnesses do not receive treatment for them.

When the United Nations sets its new Sustainable Development Goals this spring, it should include mental illness, along with diseases like AIDS and malaria, as scourges to be combated. There is much we still do not know about mental illness, and much we can do to improve its care. But we know enough to do something, and to accept that knowing more and doing more should be a fundamental commitment.

Correction: January 25, 2015

An opinion article about mental illness last Sunday incorrectly referred to a group that recently issued a report on schizophrenia. It is the British Psychological Society, not the British Psychological Association.

T. M. Luhrmann is a contributing opinion writer and a professor of anthropology at Stanford.

A version of this op-ed appears in print on January 18, 2015, on page SR5 of the New York edition with the headline: Redefining Mental Illness.

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REPLY TO
ATTENTION OF:

DEC 13 2006

Freedom of Information/
Privacy Office

Mr. Donald Friedman
Confidential Legal Correspondence
1125 Third Street
Napa, California 94559-3015

Dear Mr. Friedman:

References:

a. Your Freedom of Information Act (FOIA) request dated May 25, 2006, to the Department of the Army, Freedom of Information/Privacy Act Division (DA FOIA/PA DIV), for all documents pertaining to the microwave auditory effect, microwave hearing effect, Frey effect, artificial telepathy, and/or any device/weapon which uses and/or causes such effect; and any covert or undisclosed use of hypnosis. On September 5, 2006, the DA FOIA/PA DIV referred a copy of your request to this office. Your request was received on September 11, 2006.

b. Our letter of September 13, 2006, informing you of the search for records at another element of our command and were unable to comply with the 20-day statutory time limit in processing your request.

As noted in our letter, the search has been completed with another element of this command and the record has been returned to this office for our review and direct response to you.

We have completed a mandatory declassification review in accordance with Executive Order (EO) 12958, as amended. As a result of this review, it has been determined that the Army information no longer warrants security classification protection and is releasable to you. A copy of the record is enclosed for your use.

Fees for processing your request are waived.

If you have any questions concerning this action, please feel free to contact this office at (301) 677-2308. Refer to case #614F-06.

Sincerely,

Susan J. Butterfield
Director
Freedom of Information/Privacy Office
Investigative Records Repository

Enclosure

Bioeffects of Selected Nonlethal Weapons(fn 1)

This addendum to the Nonlethal Technologies--Worldwide (NGIC-1147-101-98) study addresses in summary, some of the most often asked questions of nonlethal weapons technology, the physiological responses observed in clinical settings of the biophysical coupling and susceptibility of personnel to nonlethal effects weapons. These results identify and validate some aspects of maturing nonlethal technologies that may likely be encountered or used as nonlethal effectors in the future including:

- Laser and other light phenomena.
- Radiofrequency directed energy.
- Aural bioeffects.

The study of electromagnetic fields and their influence on biological systems is increasing rapidly. Much of this work is taking place because of health concerns. For example, increased concern has arisen regarding the effects of operator exposure to the electromagnetic fields associated with short-wave diathermy devices, high power microwave ovens, radar systems, magnetic resonance imaging units, etc. In addition, much concern has arisen about extremely low frequency (60 Hz power frequency) electric and magnetic fields that originate from high-voltage transmission lines, industrial equipment, and residential appliances. Both occupational and residential long-term exposure have been the focus of epidemiological studies. The studies have suggested possible adverse effects on human health (e.g., cancer, reproduction, etc.). Laboratory research is still being pursued to identify possible mechanisms of interaction. However, other than thermal heating for microwave frequencies, there is no yet agreed-upon mechanism of action. As a consequence, our knowledge base is developed entirely with phenomenological observations. Because of this fact, it is not possible to predict how nonthermal biological effects may differ from one exposure modality to another. It is especially difficult, because of the small data base for fast pulses, to predict biological effects that might be associated with high-power pulses of extremely short duration.

There is, however, a growing perception that microwave irradiation and exposure to low frequency fields can be involved in a wide range of biological interactions. Some investigators are even beginning to describe similarities between microwave irradiation and drugs regarding their effects on biological systems. For example, some suggest that power density and specific absorption rate of microwave irradiation may be thought of as analogous to the concentration of the injection solution and the dosage of drug

administration, respectively. Clearly, the effects of microwaves on brain tissue, chemistry, and functions are complex and selective. Observations of body weight and behavior revealed that rats, exposed under certain conditions to microwaves, eat and drink less, have smaller body weight as a result of nonspecific stress mediated through the central nervous system and have decreased motor activity. It has been found that exposure of the animals to one modality of radiofrequency electromagnetic energy substantially decreases aggressive behavior during exposure. However, the opposite effects of microwaves, in increasing the mobility and aggression of animals, has also been shown for a different exposure modality. Recent published data implicates microwaves as a factor related to a deficit in spatial memory function. A similar type of effect was observed with exposure to a "resonance tuned" extremely low frequency magnetic field. Thus, the data base is replete with phenomenological observations of biological systems "affected" by exposure to electromagnetic energy. (The fact that a biological system responds to an external influence does not automatically nor easily translate to the suggestion of adverse influence on health.) The objective of the present study was to identify information from this developing understanding of electomagnetic effects on animal systems that could be coupled with human biological susceptibilities. Situations where the intersection of these two domains coexist provide possibilities for use in nonlethal applications.

Incapacitating Effect: Microwave Heating

Body heating to mimic a fever is the nature of the RF incapacitation. The objective is to provide heating in a very controlled way so that the body receives nearly uniform heating and no organs are damaged. Core temperatures approximately 41° C are considered to be adequate. At such temperature a considerably changed demeanor will take place with the individual. Most people, under fever conditions, become much less aggressive; some people may become more irritable. The subjective sensations produced by this buildup of heat are far more unpleasant than those accompanying fever. In hyperthermia all the effector processes are strained to the utmost, whereas in fever they are not. It is also possible that microwave hyperthermia (even with only a 1° C increase in brain temperature) may disrupt working memory, thus resulting in disorientation.

Biological Target/Normal Functions/Disease State

The temperature of warm-blooded (homeothermic) animals like the human remains practically unchanged although the surrounding temperature may vary considerably. The normal human body temperature recorded from the mouth is usually given as 37° C, with the rectal temperature one degree higher. Variation between individuals is typically between 35.8° C and 37.8° C orally. Variations also occur in any one individual throughout the day--a difference of 1.0° C or even 2.0° C occurring between the maximum in the late afternoon or early evening, and the minimum between 3 and 5 o'clock in the morning. Strenuous muscular exercise causes a temporary rise in body temperature that is proportional to the severity of the exercise; the level may go as high as 40.0° C.

Extreme heat stress, such that the body's capacity for heat loss is exceeded, causes a pathological increase in the temperature of the body. The subjective sensations produced by this buildup of heat are far more unpleasant than those accompanying fever. In hyperthermia all the effector processes are strained to the utmost, whereas in fevers they are not. The limiting temperature for survival, however, is the same in both cases--a body temperature of 42° C. For brief periods, people have been known to survive temperatures as high as 43 ° C.

In prolonged hyperthermia, with temperatures over 40° C to 41° C, the brain suffers severe damage that usually leads to death. Periods of hyperthermia are accompanied by cerebral edema that damage neurons, and the victim exhibits disorientation, delirium, and convulsions. This syndrome is popularly referred to as sunstroke, or heatstroke, depending on the circumstances. When the hyperthermia is prolonged, brain damage interferes with the central thermoregulatory mechanisms. In particular, sweat secretion ceases, so that the condition is further exacerbated.

Mechanism to Produce the Desired Effects

This concept builds on about 40 years of experience with the heating effects of microwaves. Numerous studies have been performed on animals to identify characteristics of importance to the understanding of energy deposition in animals. As a result of the physics, the relationship between the size of the animal and the wavelength of the radiofrequency energy is most important. In fact, the human exposure guidelines to radiofrequency radiation are designed around knowledge of the differential absorption as a function of frequency and body size. The challenge is to minimize the time to effect while causing no permanent injury to any organ or the total body and to optimize the equipment function. The orientation of the incident energy with respect to the orientation of the animal is also important.

In a study of the effect of RF radiation on body temperature in the Rhesus monkey, a frequency (225 MHz) is purposely chosen that deposits energy deep within the body of the animal. A dose rate of 10 W/kg caused the body temperature to increase to 42° C in a short time (10-15 min). To avoid irreversible adverse effects, the exposure was terminated when a temperature of 42° C was reached. A lower dose rate of 5 W/kg caused the temperature to increase to 41.5° C in less than 2 hours. The reversible nature of this response was demonstrated by the rapid drop in body temperature when RF exposure was terminated before a critical temperature of 42° C was reached. It is estimated for rats that the absorbed threshold convulsive dose lies between 22 and 35 J/g for exposure durations from less than a second to 15 minutes. For 30-minute exposure, the absorbed threshold dose for decrease in endurance is near 20 J/g, the threshold for work stoppage approximately 9 J/g, and the threshold for work perturbation ranges from 5 to 7 J/g. All of the above measures, except convulsions, are types of nonlethal incapacition.

A rough estimate of the power required to heat a human for this technology is on the order of 10 W/kg given about 15 to 30 minutes of target activation. Actual power levels

depend on climatic factors, clothing, and other considerations that affect the heat loss from the individual concerned. A method for expressing dose rate in terms of body surface area (i.e., watts per square meter) rather than body mass (i.e., watts per kilogram) would permit a more reliable prediction of thermal effects across species. However, there are large uncertainties in the ability to extrapolate thermoregulatory effects in laboratory animals to those in human beings.

This technology is an adaptation of technology which has been around for many years. It is well known that microwaves can be used to heat objects. Not only is microwave technology used to cook foods, but it is also used as a directed source of heating in many industrial applications. It was even the subject of the "Pound Proposal" a few years ago in which the idea was to provide residential heating to people, not living space. Because of the apparently safe nature of body heating using microwave techniques, a variety of innovative uses of EM energy for human applications are being explored. The nonlethal application would embody a highly sophisticated microwave assembly that can be used to project microwaves in order to provide a controlled heating of persons. This controlled heating will raise the core temperature of the individuals to a predetermined level to mimic a high fever with the intent of gaining a psychological/capability edge on the enemy, while not inflicting deadly force. The concept of heating is straightforward; the challenge is to identify and produce the correct mix of frequencies and power levels needed to do the remote heating while not injuring specific organs in the individuals illuminated by the beam.

A variety of factors contribute to the attractiveness of this nonlethal technology. First, it is based on a well-known effect, heating. Every human is subject to the effects of heating; therefore, it would have a predictability rating of 100%. The time to onset can probably be engineered to between 15 and 30 minutes; however, timing is the subject of additional research to maximize heating while minimizing adverse effects of localized heating. The onset can be slow enough and/or of such frequency to be unrecognized by the person(s) being irradiated. Safety to innocents could be enhanced by the application and additional development of advanced sensor technologies. Incapacitation time could be extended to almost any desired period consistent with safety. (Given suitable R&D, temperature or other vital signs could be monitored remotely, and temperature could be maintained at a minimum effective point).

Time to Onset

The time to onset is a function of the power level being used. Carefully monitored uniform heating could probably take place in between 15 and 30 minutes. Time to onset could be reduced but with increased risk of adverse effects. Minimum time is dependent on the power level of the equipment and the efficiency of the aiming device.

Duration of Effect

Assuming that the heating is done carefully, reversal of elevated body temperature would begin as soon as the source of heat is removed.

Tunability

This concept is tunable in that any rate of heating, up to the maximum capacity of the source, may be obtained. Thus it is suitable for use in a gradual force or "rheostatic" approach. If the situation allows, and the source is sufficiently powerful, there is the possibility to use this technology in a lethal mode as well. Prolonged body temperature above 43° C is almost certain to result in permanent damage to the brain and death.

Distribution of Human Sensitivities to Desired Effects

No reason has been identified to suggest that anyone would be immune to this technology. Individuals with compromised thermoregulatory mechanisms would be susceptible with a lower incident energy density. This would include people with organic damage to the hypothalamus, the part of the brain that integrates the autonomic mechanisms which control heat loss as well as people with compromised somatic features of heat loss (e.g., respiration, water balance, etc.).

The technologies needed for the thermal technology concept are relatively well developed because of the known biophysical mechanism, the universal susceptibility of humans to the mechanism of heating, and because of a well developed technology base for the production of radiofrequency radiation. Because the human body is inhomogeneous, certain organs are, by virtue of their size and geometry, more easily coupled with one radiofrequency wavelength than another. Therefore, to avoid permanent damage to the suspect or to innocent bystanders, it may be necessary to vary the frequency to avoid localized heating and consequent damage to any organ. Additionally, it will be necessary to avoid the conditions thought to be associated with the induction of cataracts. Thus, while the technology of microwave heating in general is mature, adaptation as a nonlethal technology will require sophisticated biophysical calculations to identify the proper regimen of microwave frequencies and intensities; it will also be necessary to optimize existing hardware to meet the biophysical requirements.

Possible Influence on Subject(s)

If the technology functions approximately as envisioned, the targeted individual could be incapacitated within 15 to 30 minutes. Because this technology is focused on a relatively slow onset, it should only be used in situations where speed is not important. The very uncomfortable nature of a high body temperature may be useful in negotiations or possibly for controlling crowds. It would be equally useful on single persons or crowds. Evidence also indicates a disruption of working memory, thus disorientation may occur because of an inability to consolidate memory of the recent (minutes) past.

Technological Status of Generator/Aiming Device

Equipment needed to explore this concept in the laboratory is available today. Design and construction of the RF/microwave generator will depend on the constraints posed by the calculations, potential generation devices, and energy-directing structures. A variety of

options exist for both of these equipment needs. The use of advanced frequency and modulation-agile RF generation and amplification circuitry will be required to assess fully the frequency/power/time envelope of RF heating profiles required. Although much equipment is commercially available, it is likely that custom hardware and software will be necessary because available equipment has not been designed with the need for frequency/intensity variability, which will probably be needed for safety purposes. In addition, the design of antennas and other energy-directing structures will almost certainly involve unique configurations. Since this technology utilizes radiofrequency energy, it can be defeated by the use of shielding provided by conductive barriers like metal or metal screen.

Incapacitating Effect: Microwave Hearing

Microwave hearing is a phenomenon, described by human observers, as, the sensations of buzzing, ticking, hissing, or knocking sounds that originate within or immediately behind the head. There is no sound propagating through the air like normal sound. This technology in its crudest form could be used to distract individuals; if refined, it could also be used to communicate with hostages or hostage takers directly by Morse code or other message systems, possibly even by voice communication.

Biological Target/Normal Functions/Disease State

This technology makes use of a phenomenon first described in the literature over 30 years ago. Different types of sounds were heard depending on the particulars of the pulse characteristics. Various experiments were performed on humans and laboratory animals exploring the origin of this phenomenon. At this time, virtually all investigators who have studied the phenomenon now accept thermoelastic expansion of the brain, the pressure wave of which is received and processed by the cochlear microphonic system, to be the mechanism of acoustic perception of short pulses of RF energy. One study (in 1975) using human volunteers, identified the threshold energy of microwave-auditory responses in humans as a function of pulse width for 2450 MHz radiofrequency energy. It is also found that about 40 J/cm^2 incident energy density per pulse was required.

Mechanism to Produce the Desired Effects

After the phenomenon was discovered, several mechanisms were suggested to explain the hearing of pulsed RF fields. Thermoelastic expansion within the brain in response to RF pulses was first studied and demonstrated in inert materials and was proposed as the mechanism of hearing of pulsed RF fields. A pressure wave is generated in most solid and liquid materials by a pulse of RF energy--a pressure wave that is several orders of magnitude larger in amplitude than that resulting from radiation pressure or from electrostrictive forces. The characteristics of the field-induced cochlear microphonic in guinea pigs and cats, the relationship of pulse duration and threshold, physical measurements in water and in tissue-simulating materials, as well as numerous theoretical calculations--all point to thermoelastic expansion as the mechanism of the hearing phenomenon.

Scientists have determined the threshold energy level for human observers exposed to pulsed 2450-MHz fields (0.5-to 32 micron pulse widths). They found that, regardless of the peak of the power density and the pulse width, the per-pulse threshold for a normal subject is near 20 mJ/kg. The average elevation of brain temperature associated with a just-perceptible pulse was estimated to be about $5x10^{-6}$° C.

Time to Onset

The physical nature of this thermoelastic expansion dictates that the sounds are heard as the individual pulses are absorbed. Thus, the effect is immediate (within milliseconds). Humans have been exposed to RF energy that resulted in the production of sounds.

Duration of Effect

Microwave hearing lasts only as long as the exposure. There is no residual effect after cessation of RF energy.

Tunability

The phenomenon is tunable in that the characteristic sounds and intensities of those sounds depend on the characteristics of the RF energy as delivered. Because the frequency of the sound heard is dependent on the pulse characteristics of the RF energy, it seems possible that this technology could be developed to the point where words could be transmitted to be heard like the spoken word, except that it could only be heard within a person's head. In one experiment, communication of the words from one to ten using "speech modulated" microwave energy was successfully demonstrated. Microphones next to the person experiencing the voice could not pick up the sound. Additional development of this would open up a wide range of possibilities.

Distribution of Human Sensitivities to Desired Effects

Because the phenomenon acts directly on cochlear processes, the thermoelastic pressure waves produce sounds of varying frequency. Many of the tests run to evaluate the phenomenon produced sounds in the 5 kHz range and higher. Because humans are known to experience a wide range of hearing loss due to cochlear damage, it is possible that some people can hear RF induced sounds that others with high frequency hearing loss cannot. Thus, there is a likely range of sensitivity, primarily based on the type of pulse and the condition of the cochlea. Bilateral destruction of the cochlea has been demonstrated to abolish all RF-induced auditory stimuli.

Recovery/Safety

Humans have been subjected to this phenomenon for many years. The energy deposition required to produce this effect is so small that it is not considered hazardous experimentation when investigating responses at the just-perceptible levels.

Possible Influence on Subject(s)

Application of the microwave hearing technology could facilitate a private message transmission. It may be useful to provide a disruptive condition to a person not aware of the technology. Not only might it be disruptive to the sense of hearing, it could be psychologically devastating if one suddenly heard "voices within one's head."

Technological Status of Generator/Aiming Device

This technology requires no extrapolation to estimate its usefulness. Microwave energy can be applied at a distance, and the appropriate technology can be adapted from existing radar units. Aiming devices likewise are available but for special circumstances which require extreme specificity, there may be a need for additional development. Extreme directional specificity would be required to transmit a message to a single hostage surrounded by his captors. Signals can be transmitted long distances (hundreds of meters) using current technology. Longer distances and more sophisticated signal types will require more bulky equipment, but it seems possible to transmit some type of signals at closer ranges using man-portable equipment.

Range

The effective range could be hundreds of meters.

Incapacitating Effect: Disruption of Neural Control

The nature of the incapacitation is a rhythmic-activity synchronization of brain neurons that disrupts normal cortical control of the corticospinal and corticobulbar pathways; this disrupts normal functioning of the spinal motor neurons which control muscle contraction and body movements. Persons suffering from this condition lose voluntary control of their body. This synchronization may be accompanied by a sudden loss of consciousness and intense muscle spasms.

Biological Target/Normal Functions/Disease State

The normal function of the brain is to control all forms of behavior, voluntary control of body, and the homeostatic parameters of the organism. In normal conditions, all the brain structures, neuron populations, networks, and single units function with specific rhythmic activity depending on the incoming sensory information, information from mnemonic structures, and signals from visceral organs. Each single neuron provides specific processing of information it receives and forms a specific pattern of impulse firing as outgoing information. Synchronization of neuron activity is a natural mechanism of the brain function that uses such controlling processes as motivation, attention and memory (experience) in order to organize behavior. For example, motivational processes are considered as activating ascending signals that synchronize the neuron activity of specific brain structures and neuron networks; this activation/synchronization in turn activates specific forms of behavior such as sexual, aggressive, ingestive activities.

In normal functioning the degree of neuronal synchronization is highly controlled. From experiments that record the neuronal activity in different brain areas simultaneously in animals, it is known that correlation of spike activity between neurons (measured by the correlation level of synchronization) changes depending on the stage of behavior, motivation, attention, or activation of the memory processes. However, under some conditions, such as physical stress, heat shock, or strong emotional stress, the level of synchronization may become higher, involving nonspecific large populations of brain neurons and the synchronization may become uncontrollable.

Depending on at which frequency the synchronization rhythm occurs and how many neurons are involved, it may produce different physical effects; muscle weakness, involuntary muscle contractions, loss of consciousness, or intense (tonic) muscle spasms. The higher level of synchronization takes place in persons affected with epilepsy when they experience periodic seizures since they have a pathologic source (e.g., from injury to the brain) of rhythmic synchronization. Because the neurophysiological mechanisms of epileptiform synchronization are better documented, this incapacitating technology is described in terms of epileptogenesis.

The neurophysiological mechanisms active in epileptogenesis involve changes in membrane conductances and neurotransmitter alterations as they affect neuronal interaction. In the process of epileptogenesis, either some neurons are discharging too easily because of alterations in membrane conductances or there is a failure of inhibitory neurotransmission. The actual discharges have been recognized to result from a neuronal depolarization shift with electrical synchrony in cell populations related in part to changes in membrane conductances. The ionic basis and biochemical substrate of this activation have been areas of considerable study but still leave many questions unanswered. What are the basic cellular properties, present in normal cells and tissue, that could contribute to the generation of abnormal activity? What parts of the systems are low threshold and function as trigger elements?

One of the current hypotheses is involved with microcircuitry, particularly local synaptic interactions in neocortical and limbic system structures. In the hippocampus, the role of the trigger element has been long attributed to the CA3 pyramidal cells--a hypothesis based on the fact that spontaneous synchronous burst discharge can be established in CA3 neurons Some studies describe an intrinsically bursting cell type in the neocortex that plays a role similar to that of CA3 cells in the hippocampus and that of deep cells in the pyriform cortex. The intrinsic nature of these cells appears to be an important contributor to the establishment of synchronized bursting in these regions. Another apparent requirement in such a population is for a certain degree of synaptic interaction among neurons, such that discharge of even one cell enlists the activity of its neighbors. Given the presence of these bursting cells and the occurrence of excitatory interactions among them in normal tissue, it may actually be the morphologic substrate for epileptiform discharges.

Another hyptothesis has focused particularly on the role of N-methyl-D-aspartate (NMDA) receptors. Various factors regulate the efficacy of NMDA receptors: their

voltage-dependent blockade by magnesium and modulation by glycine and polyamines. For example, in the low magnesium model, spontaneous synchronous burst discharge in hippocampal pyramidal cell populations is sensitive to NMDA antagonists. That finding suggests that it is the opening of NMDA channels, by relieving the magnesium blockade, that facilitates epileptiform activity.

Significant attention in the literature is also being given to gamma-amino butyric acid (GABA) receptors for the potential role in control of excitability. Changes in GABA inhibitory efficacy can lead to important effects on the excitability of the system. GABAergic inhibitory post-synaptic potentials (IPSPs) have been shown to be quite labile in response to repetitive activation of cortical cell populations, as may occur during epileptiform discharge. Scientists have shown that even a small percentage change in GABA inhibition can have profound effects on neocortical epileptogenesis. These changes in GABAergic inhibition may be the key to an explanation of how repetitive discharge patterns give rise to ictal discharge. Further, there appears to be a significant increase in excitatory postsynaptic potential (EPSP) frequency prior to seizure initiation an observation that is consistent with loss of IPSP efficacy prior to ictal onset.

The above hypotheses describe different mechanisms of epileptogenesis, but it is quite possible that all of these mechanisms take place, and they reflect large variety of types of epileptic seizures. The common principle of the mechanisms proposed is the change of membrane properties (i.e., conductance, permeability etc.) of certain neurons which results in depolarization and burst discharging. Some factors (e.g., trauma) can affect these specific neurons and initiate synchrony for neurons that control internal communication and communication with various muscle systems not associated with vital functions (i.e., heart beating, breathing). High strength pulsed electric fields could also be such a factor.

Mechanism to Reproduce the Desired Effects

Application of electromagnetic pulses is also a conceptual nonlethal technology that uses electromagnetic energy to induce neural synchrony and disruption of voluntary muscle control. The effectiveness of this concept has not been demonstrated. However, from past work in evaluating the potential for electromagnetic pulse generators to affect humans, it is estimated that sufficiently strong internal fields can be generated within the brain to trigger neurons. Estimates are that 50 to 100 kV/m free field of very sharp pulses (~ 1 nS) are required to produce a cell membranic potential of approximately 2 V; this would probably be sufficient to trigger neurons or make them more susceptible to firing.

The electromagnetic pulse concept is one in which a very fast (nanosecond timeframe) high voltage (approximately 100 kV/m or greater) electromagnetic pulse is repeated at the alpha brain wave frequency (about 15 Hz). It is known that a similar frequency of pulsing light can trigger sensitive individuals (those with some degree of light-sensitivity epilepsy) into a seizure and it is thought that by using a method that could actually trigger nerve synapses directly with an electrical field, essentially 100% of individuals would be susceptible to seizure induction. The photic-induced seizure phenomenon was borne out

demonstrably on December 16, 1997 on Japanese television when hundreds of viewers of a popular cartoon show were treated, inadvertently, to photic seizure induction (figure 31). The photic-induced seizure is indirect in that the eye must receive and transmit the impulses which initially activate a portion of the brain associated with the optic nerve. From that point the excitability spreads to other portions of the brain. With the electromagnetic concept, excitation is directly on the brain, and all regions are excited concurrently. The onset of synchony and disruption of muscular control is anticipated to be nearly instantaneous. Recovery times are expected to be consistent with, or more rapid than, that which is observed in epileptic seizures.

Time to Onset

No experimental evidence is available for this concept. However, light-induced seizures latency onset in photosensitive epileptics varies from 0.1 to about 10 seconds. Because of the fact that the electrical impulses triggered by light must spread to other parts of the brain, photic-induced seizures are expected to have a generally slower onset than neural synchrony induced by high-strength pulsed electric fields.

Duration of Effect

For epileptic individuals, the typical duration of a petit mal event or a psychomotor event is 1 minute or 2, possibly longer, while the duration of a grand mal seizure is 1 to 5 minutes. In a non-epileptic individual who is induced by electromagnetic means, the durations of the different events are expected to be roughly the same as the epileptic individual's events after the external excitation is removed.

Tunability

There are many degrees of epileptic seizure in diseased persons, and it seems reasonable that electromagnetic stimulation of neural synchrony might be tunable with regard to type and degree of bodily influence, depending on the parameters associated with the chosen stimulus. Because there are no actual data to build on, these statements must be considered tentative. It is known that in the study of photic-induced seizures, parameters can be varied so that the individual under study does not actually undergo a grand mal seizure. This knowledge gives confidence that the proposed technology would be tunable.

Distribution of Human Sensitivities to Desired Effects

It is anticipated that 100% of the population would be susceptible. The mechanism is one that could act on many individual neuronal cells concurrently and hence does not depend on spreading regions of electrical activity as in the disease state.

Possible Influence on Subjects(s)

If the technology functions approximately as envisioned, the targeted individual could be incapacitated very quickly. Because there have been no reported studies using the

conditions specified, experimental work is required to characterize onset time. Different types of technologies could be employed to influence wide areas or single individuals. Because this technology is considered to be tunable, the influence on subjects could vary from mild disruption of concentration to muscle spasms and loss of consciousness. The subject(s) would have varying degrees of voluntary control depending on the chosen degree of incapacitation.

Technological Status of Generator/Aiming Device

An electric field strength of roughly 100 Kv/m over a time period of 1 nanosecond is approximately the condition thought to be necessary to produce the desired effect when provided to an overall repetition rate of 15 Hz. Such a field may be developed using a radar-like, high-peak-power, pulsed source or an electromagnetic pulse generator operated at 15 Hz. These technologies exist today sufficient to evaluate the disabling concept. Power requirements are not high because the duty factor is so low. Aiming devices are currently available, but a high degree of directionality at long distances will require development. It may be necessary to provide bursts of these nanosecond pulses in order to stimulate the desired effect. As the duty time increases so does the average power requirement for power source. Because there were no open literature reports from which to make inferences, there is some uncertainty about the power levels required.

Range

The effective range could be hundreds of meters.

Defeat Capabilities/Limitations

Shielding can be provided by conductive barriers like metal or metal screen. There are a number of drugs that are capable of inducing convulsive seizures and others, like phenobarbital, diphenyllhydantoin, trimethadione, 2-4 dinitrophenol, and acetazolamide, which are anticonvulsive. Anticonvulsive drugs are known to be helpful in reducing the effect of seizures in epileptic patients, but their ability to reduce the effect of the proposed technology is unknown (possibly no effect) but expected to be less than for photic-induced seizures.

Incapacitating Effect; Acoustic Energy

The nature of the incapacitation consists of severe pressure sensations, nystagmus (a spasmodic, involuntary motion of the eyes), and nausea caused by high intensities of 9140-155 dB). Nystagmus occurs when convection currents are produced (cupula movement) in the lateral ear canal. This cupula movement causes the eyes to move involuntarily; hence, the external world is interpreted as moving. The subject "sees" his surroundings turning round him and at the same time experiences a sensation of turning. Persons exposed to these levels of sound experience nausea.

Biological Target/Normal Functions/Disease State

The two lateral semicircular canals, one located in each inner ear, alert a person to the fact that his upright head is experiencing angular acceleration. Within the ampulla of the canal are several so called hair cells. The cilia of these cells protrude into the lumen of the ampulla where they are encased in a mass of jelly-like material (the cupula) which is attached to the opposite wall of the canal. As the head accelerates, the cilia are bent by an inertial force of the cupula and the viscous liquid in the canal lumen. The bending of the cilia excites hair cells which in turn excite afferent neurons; these then alert the brain that a change of position of the head has occurred. Similar events occur when the head stops moving. The result of a strong hair cell stimulus to the brain is a rapid eye movement, call nystagmus, a feeling of dizziness and disorientation, and a possibility of nausea and vomiting.

Normal hearing is in the range between the frequencies of 20,000 to 16,000 Hz with the optimal sensitivity for most people between the frequencies of 500 to 6000 Hz.

Mechanism to Produce the Desired Effects

Because the end organs for acoustic and vestibular perception are so closely related, intense acoustic stimulation can result in vestibular effects. The hypothesis is that the sound of normal intensity produces oscillations of the endolymph and perilymph, compensated for by oscillations of the round window. High intensity sound produces eddy currents, which are localized rotational fluid displacements. High intensity sound can also produce nonlinear displacement of the stapes, causing a volume displacement, the result of which can be a fluid void in the labyrinth. To fill the void, fluid may be displaced along the endolymphatic duct and/or block capillary pathways, which, in turn, could stimulate vestibular receptors. Stimulation of the vestibular receptors may lead to nausea and vomiting if the sound pressure level is high enough. Conclude that both eddy currents and volume displacement serve to stimulate vestibular receptors in humans, when exposed to high levels of noise.

One study found nystagmum in guinea pigs exposed to high levels of infrasound via stimulation of the vestibular receptors. However, the same lab was unable to produce nystagmus in human subjects at 5- and 10-second exposures to a pure tone at 135 dB, broadband engine noise, or a 100 Hz tone at 120 dB, pulsed three times/s or 2 minutes. The same research was unable to elicit nystagmus at levels up to 155 dB, and also equally unable to produce nystagmus using infrasound levels of 112-150 dB in guinea pigs, monkeys, and humans. However, research with audible components in the sound spectrum with guinea pigs and monkeys produced nystagmus. Other researchers report other vestibular effects in addition to nystagmus at the following thresholds: 125 dB from 200-500 Hz, 140 dB at 1000 Hz, and 155 dB at 200 Hz. Decrements in vestibular function occur consistently for broadband noise levels of 140 dB (with hearing protection).

Human subjects listened to very high levels of low-frequency noise and infrasound in the protected or unprotected modes. Two-minute duration as high as 140 to 155 dB produced a range of effects from mild discomfort to severe pressure sensations, nausea, gagging,

and giddiness. Effects also included blurred vision and visual field distortions in some exposure conditions. The nature and degree of all effects was dependent on both sound level and frequency with the most severe effects occurring in the audible frequency range (as opposed to infrasound), at levels above about 145 dB. The investigators found no temporary threshold shift (TTS) among their subjects, and the use of hearing protectors greatly alleviated the adverse effects.

Since the early days of jet-engine testing and maintenance, anecdotal evidence has appeared linking exposure to intense noise, with such complaints as dizziness, vertigo, nausea, and vomiting. As a result of siren noise at 140 dB, subjects consistently reported a feeling of being pushed sideways, usually away from the exposed ear, and one subject reported difficulty standing on one foot.

These effects were not as dramatic as from the jet-engine (broadband) noise at 140 dB. This research concludes that the threshold of labyrinthine dysfunction is about 135 to 140 dB and that these effects occur during, but not after, exposure.

Time to Onset

No times to onset of nausea or nystagmus were identified in the literature but is presumed to be relatively immediate based on effects to the labyrinth system occurring during, but not after, exposure to sound pressure levels of 135 to 140 dB.

Duration of Effect

The incapacitation lasts only as long as the incapacitating sound is present.

Tunability

Based on the data presented above, it is unclear whether the degree of nausea or nystagmus is tunable, but similar symptoms caused by other stimuli are variable in degree.

Distribution of Human Sensitivities to Desired Effects

It is most probable that all individuals will be susceptible to this stimulus with the exception of those with a disease or defect (i.e., deaf mutes) of some part or parts of the vestibular system. Data showed no consistent decrease in vestibulo-ocular reflects with increased age.

Recovery/Safety

Normal subjects are likely to recover immediately and experience no or unmeasurable changes in hearing unless well known frequency-intensity-time factors are exceeded. This is based on studies which found no temporary threshold shift in hearing of subjects tested at low frequency. Occupational safety personnel generally recognize that 115

dB(A) is to be avoided and that 70 dB(A) is assumed safe. Is believed that the noise energy with predominating frequencies above 500 Hz have a greater potential for hearing loss than noise energy at lower frequencies. Occupational standards for noise state that a person may be exposed continuously for 8 hours to 90 dB(A) or 15 minutes to 115 dB(A).

Possible Influence on Subject(s)

Induction of nystagmus and nausea will have variable effects on individuals. Effects may be sufficiently incapacitation to allow offensive advantage; the perception of sickness may make a subject susceptible to persuasion. It would be difficult to target single individuals at the present level of sound directing technology. This technology may be better suited for groups of people.

Technological Status of Generator/Aiming Device

Sound generating technology is well developed but not highly portable. Aiming devices are poorly developed.

Range

Under normal circumstances the sound pressure level decreases 6 dB(A) when the distance from the source is doubled. For example if the sound is 100 dB(A) at 100 ft, at 200 ft the sound would be 94 dB(A). At very high sound levels, certain conditions may lead to nonlinear effects in propagation and greatly increase range accuracy.

Defeat Capabilities/Limitations

Negative effects of audible sound are greatly decreased if hearing protection is worn. High frequency sound is more easily blocked than low frequency sound due to wavelength effects.

Laser-Induced Biological Effects

Their are three basic damage mechanisms associated with exposure to laser radiation: chemical, thermal, and mechanical or acoustic-mechanical.

The laser-induced, chemical alterations in irradiated tissue are referred to as photochemical damage. The likelihood of laser radiation in the blue-light portion of the electromagnetic spectrum (.380 to .550 microns) inducing photochemical reactions progressively decreases with increasing wavelength. Photochemical effects are not observed upon exposure to radiation with wavelengths exceeding .550 to .650 microns because the kinetic energy associated with these photons is insufficient to initiate a photochemical change.

On the other hand, the thermal effect is a primary mechanism for laser-induced injury. The extent of the injuries induced depends upon the wavelength and energy of the incident radiation, duration of exposure, and the nature of the exposed tissue and its absorption characteristics. Generally, this mechanism predominates in the visible and the near-infrared (.760 to 1.4 microns) portions of the electromagnetic spectrum and for almost all CW and pulsed exposures between 0.1 milliseconds and 1 to 5 seconds.

The third injury mechanism associated with exposure to laser radiation is the mechanical or acoustical-mechanical effect. The radiant energy is absorbed into the tissue and, as a result of rapid thermal expansion following a short (1 nanosecond to 0.1 millisecond) laser radiation pulse, a pressure wave is generated that may result in explosive tissue injury.

Generally, all three mechanisms operate concurrently in an irradiated animal. Thermal effects currently predominate for continuous wave (CW) lasers, while mechanical effects are of increased significance for pulsed-mode lasers. With even higher power, one must also consider nonlinear phenomena such as multiphoton absorption and electromagnetic field effects.

The organs most susceptible to external laser radiation are the skin and eyes. The severity of injury is affected by the nature of the target, the energy density delivered to the target, the frequency and power of the laser, atmospheric attenuation of the beam, and the use of filtering or amplifying optics by the target, etc.

The primary effect on the skin is thermal damage (burns). The severity varies from slight erythema or reddening to severe blistering or charring, depending on such factors as total energy deposition, skin pigmentation, and the tissue's ability to dissipate heat.

The eye is particularly susceptible to intense pulse of laser radiation because of its unique sensitivity to light. The focusing effect is similar to that of a magnifying lens, which focuses the energy on a particular spot. Since the cornea and lens of the eye amplify the intensity of the light incident upon the retina, the retina is extremely sensitive to visible and near-infrared light, and damage to the retina may result in temporary or permanent loss of visual acuity. Laser eye injuries vary according to incident power, spot size, beam angle, temporal mode (CW or pulsed), and pulse repetition frequency. Reported effects include corneal lesions, burns, cataracts, and retinal lesions.

Some high-power lasers can cause antipersonnel effects by the deposition of thermal energy. These lasers must operate at a wavelength that is readily absorbed by the skin or the cornea. These generally include the far- and mid-IR regions (10 to 12 microns and 3 to 5 microns) as well as the ultraviolet region (<0.4 microns). However, ultraviolet wavelengths generally do not propagate well in the atmosphere, so the primary threat wavelengths to be considered are between 3 and 12 microns. Although relatively modest amounts of far-IR laser power are required to produce superficial burns on the skin at short ranges, and efforts to design rheostatically lethal laser weapons are on going.

Nonlethal blinding laser weapons generally use collimated beams with very low beam divergence, and the energy contained in the beam diminishes relatively slowly over great distances. Imaging systems such as eyes and EO vision systems have focusing optics that bring the incident plane wave of light to focus at the sensor plane. This results in a high optical gain (greater than 100,000 for eyes), which makes the associated sensor vulnerable to relatively low fluences of laser energy.

The effects of lasers on eyes are threefold:

- Dazzling or induced glare.
- Flashblinding or loss of night adaptation.
- Permanent or semipermanent blinding.

The severity of laser eye injuries varies according to the incident power, spot size, beam angle, pupil diameter (ambient light conditions), temporal mode (CW or pulsed), and PRF of the laser. Reported effects include corneal burns, cataracts (a permanent cloudiness of the lens), and retinal burns and perforations. Low-energy laser weapons are capable of causing the latter.

Exposure to relatively low laser energies can produce temporary changes in the ability to see without producing permanent injury. Exposure to laser light can produce an effect called glare or dazzle, which is similar to the temporary loss of vision experience when viewing the headlights of an oncoming car. The visual effects last only as long as the light is present in the field of view (FOV). At slightly higher energy exposures, the same laser radiation can saturate or flashblind the photoreceptor cells, resulting in after images that fade with time after exposure. Only visible radiation will induce veiling glare or after images; near-IR radiation will not produce these effects even though the radiant energy reaches the photoreceptor cells. Flashblindness and dazzle, while not permanent injuries, can cause discomfort and temporary loss of vision. Some studies have shown that dazzle and flashblindness can seriously impact mission performance, especially in highly visual tasks such as piloting an aircraft or aiming.

Blinding is the permanent or semipermanent loss of visual acuity. The effect can last from several hours onward and generally is evidenced by a dark spot in the field of vision. This spot is called a scotoma. The impact of the scotoma on visual acuity will vary with the size and position of the injury. Human vision is greatly affected when the laser damage is to the central vision area of the retina called the fovea. Nonfoveal laser damage may be less severe or even go unnoticed because it affects only the peripheral vision. The most serious retinal injuries occur when the incident light is so intense that a perforation in the retina is formed, resulting in a hemorrhage into either the subretinal layer or, in the most severe cases, the vitreous humor of the eye. Less severe exposures result in lesions on the retina.

Footnote:

1-(U) This appendix is classified FOR OFFICIAL USE ONLY in its entirety.

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RESOLUTION NO. 51-15

RESOLUTION OF THE COUNCIL OF THE CITY OF RICHMOND, CALIFORNIA IN SUPPORT OF THE SPACE PRESERVATION ACT AND THE SPACE PRESERVATION TREATY TO PERMANENTLY BAN SPACE-BASED WEAPONS

WHEREAS, the Space Preservation Act and the companion Space Preservation Treaty has established a permanent ban on all space-based weapons, on the use of weapons to destroy or damage objects or persons from or that are in orbit; and the permanent termination of research and development, testing, manufacturing, production and deployment of all space-based weapons; and

WHEREAS, the Space Preservation Act, companion to the Space Preservation Treaty, introduced by U.S. Congressmen Dennis Kucinich (D-Ohio), requires the U.S. President to continue enforcement of banning space-based weapons and the use of weapons to destroy or damage persons or objects that are in or from orbit; and

WHEREAS, the Space Preservation Treaty has established an outer space peacekeeping agency to monitor outer space and enforce the permanent ban of space-based weapons. In addition, this legislation serves as a safeguard for targeted individuals who claim to be under assault from weaponry that should be outlawed by the Space Preservation Act.

WHEREAS, the well-being of all residents is of the upmost importance to the City of Richmond.

NOW THEREFORE BE IT RESOLVED that the City Council of the City of Richmond hereby supports the Space Preservation Act and companion Space Preservation Treaty, to ensure that individuals will not be targets of space-based weapons

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I CERTIFY that the foregoing resolution was adopted at a regular meeting of the City Council on May 19, 2015 by the following vote:

AYES:	Councilmembers Bates, Beckles, Martinez, McLaughlin, and Vice Mayor Myrick.
NOES:	Councilmember Pimplé and Mayor Butt.
ABSTENTIONS:	None.
ABSENT:	None.

PAMELA CHRISTIAN
CLERK OF THE CITY OF RICHMOND
(SEAL)

Approved:

TOM BUTT
Mayor

Approved as to form:

BRUCE GOODMILLER
City Attorney

State of California }
County of Contra Costa : ss.
City of Richmond }

I certify that the foregoing is a true copy of **Resolution No. 51-15**, finally passed and adopted by the City Council of the City of Richmond at a regular meeting held on May 19, 2015.

Pamela Christian, City Clerk of the City of Richmond

MICROWAVE BIOEFFECT CONGRUENCE WITH SCHIZOPHRENIA

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Donations toward future research are gratefully appreciated at http://www.slavery.org.uk/FutureResearch.htm

ABSTRACT

The substantiation for microwave voice transmission development, which can be isolated to an individual, prompts review of the correlation between microwave bioeffects and schizophrenia. These correlations are extensive. Studies of both conditions report short-term and spatial memory deficit, time estimation changes, deficits in sequencing, coordination deficit, numerous electrophysiologic changes, startle decrease, neurotransmitter changes, hormone alterations, immune alterations, mitochondria deficits, lipid phosphorylation decrease, lipid peroxidation, deleterious histologic change in disease reduced brain areas, activation of hallucination involved brain areas, and ocular disease. Schizophrenia findings correlate with microwave bioeffects so extensively as to indicate a congruence, and appear to implicate a microwave involvement with enough patients to be remarkable in study results. The development of methods to exclude microwave means in psychosis is imperative, and research is proposed.

INTRODUCTION

Remote microwave induced sound [1] [2] [3] and internal voice technology has long been discovered, [4] developed, [5] [6] detailed in patents, [7] [8] [9] [10] with weapons applications described. [11] [12] [13] [14] That such technology can be applied remotely and coupled to target tracking technology [15] has implications for patients who, by virtue of voice transmission complaint and other symptoms, are diagnosed with various mental disorders. [16] Auditory hallucination is most prevalent in schizophrenia, which features in 60% of cases. [17] [18] A frequent patient understanding of the origin of voices is by remote transmission, though the very concept is considered delusional, [19] and often the diagnosis is psychosis of varying severity depending on functional ability, [20] without any investigation of described internal voice capabilities.

The substantiation of microwave voice transmission development suggests examination of any microwave bioeffect correlation with schizophrenia findings. The hypothesis tested was that perhaps some discrepant schizophrenia study results could differentiate patients subjected to technological assault. Unfortunately, little differentiation was evident, because the correlations appear too extensive, as presented in overview Table I. Unless otherwise noted, the microwave exposure effects examined are at low intensity, and are expressed in text parenthesis in terms of existing exposure standards. [21] [b] Since most of the observed correlations are close to microwave exposure standards, the possibility of an environmental microwave association with schizophrenia is considered.

Cognitive Function

Schizophrenics are particularly impaired in memory. [22], [23] Pulsed radar exposed Latvian children are deficient in short term memory compared to unexposed children. [24] Rats exposed to microwaves during gestation exhibit conditioned avoidance acquisition deficit as adults (at 1.61 X US occup. std.). [25] Adult rat microwave exposure yields avoidance conditioning deficits (at 31% of US occup. std. & 1.75 X ICNIRP [c] pop. std.),[26] [27] and there is some mention of 'retrograde amnesia' with such conditioning (at 63% of US pop. std.). [28] [29] Schizophrenic 'working memory' is considered central to many schizophrenic symptoms. [30] Schizophrenia deficits are in multiple areas of working memory, and the disorder exhibits deficits specifically in spatial working memory. [31] [32] [33] [34] Rat spatial 'working memory' on microwave exposure is deficient for performance in a water maze, (1.2 X US pop. std.) [35] [36] and in the 12 arm radial maze (60% of US pop. std.), [37] [38] but apparently not when distal cues are present for radial mazes, [39] [40] which are preferred in rodents. [41] [42]

Schizophrenia time estimation is altered with overestimation of short time intervals. [43] [44] [45] [46] Microwave exposed rats, when trained on inter-response time reinforcements reflect the same direction of deficit by increased total lever presses (at 31% of US occup. std. & 1.75 X ICNIRP pop. std.), [25] [26] shorter inter-response times (62% of US occup. std.), [47] which are even greater for pulsed microwaves (1.1 X US occup. std.). [48] A rat time estimation task on microwave pulsation indicated change in discriminating stimulus duration, increased time to complete tasks, and increased the amount of non-response (at 90% of ICNIRP pop. std.). [49] The authors suggest an effect on the animal's internal clock.

Schizophrenia patients exhibit deficits in memory for temporal order. [50] [51] [52] [53] Microwave exposed rats with simple response sequence conditioning (½ to 1.6 X US occup. std.) [54] [55] [56] [57] [58] exhibit analogous sequencing deficits. In humans, the order threshold of discriminating the ear of first tone presentation as succeeded by a tone separated by

decreasing intervals to the other ear, increases after 50 minutes cell phone exposure, while the threshold decreases with no exposure rest. [59]

The hippocampus has general importance to memory, [60] while sub serving spatial, temporal, and sequence memory. [61] In rodents the hippocampus is one of the most responsive brain regions to microwave exposure (at US pop. std. to ½ US occup. std.), [62] [63] and microwave induced histologic damage is observed (at ¼ ICNIRP pop. std. to 1.8 X US occup. std.). [64] [65] [66] Some schizophrenics have anti-hippocampal antibodies, [67] and

Table I

SCHIZOPHRENIA SIGN/SYMPTOM CORRELATION WITH MICROWAVE BIOEFFECTS

Cognitive/Physiologic Parameter	Schizophrenia Sign/Symptom	Microwave Bioeffect
Cognitive Function		
Memory Deficit	Deficits in Memory and Working Memory	Child Short Term Memory Deficit, Rat Conditioned Avoidance and Spatial Memory Deficits
Time Estimation	Overestimation of Short Intervals	Rat Shortened Inter-Response Times and Increased Responses in Time Estimation Tasks
Temporal Order	Temporal Order Memory Deficits	Human Decrease in Temporal Order Discrimination, Rat Response Sequencing Deficits
Startle Response	Decreased in Some Patients	Decreased in Animals
Coordination/Balance	Decreased Coordination and Balance	Decreased Child Coordination, Rat Decrease in Coordination and/or Balance
Electrophysiology		
Contingent Negative Variation	Decreased in Patients	Decreased on Human Cell Phone Exposure
Event Related Auditory Response	Decreased in Patients	Decreased in Animals, Component Decrease in Human Cell Phone Exposure
EEG Delta Waves	Increased in Patients	Increased in Humans and Animals
EEG Beta Waves	Increased in Patients	Increased in Humans and Rats

TABLE I, continued

SCHIZOPHRENIA SIGN/SYMPTOM CORRELATION WITH MICROWAVE BIOEFFECTS

Physiologic Parameter	Schizophrenia Sign/Symptom	Microwave Bioeffect
Neurotransmitters		

Dopamine	Indicated Decreased in Negative Symptom Schizophrenia	Indicated Decreased Based on Extensive Evidence
Serotonin	Indicated Decreased in Patients Based on Numerous Studies	Found Decreased in Rats
γ-Aminobutyric Acid	Decreased Uptake & Release in Schizophrenia Synaptosomes	Decreased Receptor Specific Binding
Acetylcholine	α 7-nicotinic Receptor Decrease in Some Brain Areas Consistent with Acetylcholine Decrease	Decreased Rat Acetylcholine Release, and Precursor Uptake in Same Brain Areas
Hormones		
Corticosteroids	ACTH, Cortisol, and Corticosterone Reported Increased	Adrenal Depletion with ACTH, Cortisol, and Corticosterone Increase Reported
Melatonin	Decrease Reported in Some Patients	Decreased on Human Cell Phone and EMF Exposure
Mitochondria	Decreased Number in Schizophrenia Brain	Deleterious Changes with Decreased ATP, Creatine Phosphate, and Marker Enzymes
Immunology		
Autoimmunity	Suggested from Autoantibody Levels and Autoimmune Disease Incidence	Reported Induced and Stimulated
Tumor Necrosis Factor	Reported Increased	Numerous Reports of Increase in Animals
B Lymphocytes	Balance of Evidence Shows Increase in Some Patients	Increased in Mouse Spleen with Genetic Control

Table I, continued.

SCHIZOPHRENIA SIGN/SYMPTOM CORRELATION WITH MICROWAVE BIOEFFECTS

Physiologic Parameter	Schizophrenia Sign/Symptom	Microwave Bioeffect
Lipids		
Phosphorylation	Decreased on Magnetic Resonance Spectroscopy	Decreased P^{32} Lipid Incorporation
Peroxidation	Increase in Patients	Increased in vitro and in Rats
Blood-Brain Barrier	Suggested Impaired in Patients	Reported Decreased in Numerous Studies
Anatomy & Histology		
Hippocampus	Hippocampal-amagdala Complex Volume Reduced in Most Studies	Degenerative Hippocampus Histology Reported

Thalamus	Volume Reduction Observed in Many Studies	Degenerative Histology Reported
Cerebellum	Changes Observed in Many Studies	Degenerative Histology Reported
Cortex	Volume Reductions Observed in Frontal and Parietal Cortex by Many Studies	Several Reports of Degenerative Unspecified Cortex Histology
Metabolic Activation	Hallucination Activates Temporal Lobe, and Thalamus with Collicular Activation Found in Some Studies	Animal Activation of Temporal Lobe, Thalamus, and Inferior Colliculus on Hearing Effect Pulsed Microwaves
Ocular Disease		
Cataract	Subcapsular Cataract Reported Without Association to Medication	Known Cause of Subcapsular Cataract
Retinopathy	Associated with Widely Prescribed Anti-Psychotics	Associated with Occupational Exposure and Experimentally Produced
Voice Transmission	Hallucination Most Common Symptom	Voice Transmission Affirmed

the same hippocampus CA1 region that is volume decreased in schizophrenia, [68] on microwave exposure shows altered neuronal activity in vitro slices from rats, [69] as well as decreased acetylcholine release in vivo rats (1/2 US occup. std.). [70] Mouse hippocampus mitochondrial activity is indicated decreased on microwave exposure (1/4 US pop. std.).[71] Although not actually affecting performance, cell phones are reported to affect a magnetoencephalographic (MEG) component of verbal memory encoding, suggesting interference. [72] Multiple human case reports of memory difficulty, with other neurasthenic complaints exist on excess microwave exposure. [73] [74] [75] Microwave exposed rats with avoidance conditioning, exhibit changes in emotion and integrative function [76] from which parallels to schizophrenia can be drawn. Accidental and/or occupational 1-10 GHz excess radar exposure exhibits frontal lobe neuropsychiatric symptoms. [77]

Startle Response

Some schizophrenics have little or no startle response. [78] Microwave exposed rats exhibit decreased startle under both continuous wave [79] and pulsed [80] [81] conditions (1.2 X US occup. std.) with the latter decreasing startle in mice. [82] Pre-natal rat exposure decreases startle in females (1.2 X US occup. std.). [83] Some schizophrenics are hypo- or non-responders to orienting responses [84] and normally evoked electrodermal activity. [85] Microwave occupational exposure inhibits galvanic skin response. [86] Rats also fight less on microwave exposure (6% & 23% of US pop. std.), [87] [88] will avoid hearing effect pulsed microwaves, [89] and mice decrease exposure by their orientation in a field. [90]

Coordination, Balance, and Exercise Tolerance

Schizophrenics have decreased ability in coordination tasks, and more instability in balance. [91] [92] [93] [94] Latvian children exposed to pulsed radar have less motor competence than unexposed children. [24] Microwave exposed rats show degradation of motor coordination and/or balance (at 21% of US pop. std.). [95]

High peak power pulsed microwave 25 minute exposures decreased rat treadmill running by about one-third. [96] A German abstract states schizophrenics could only achieve one-third of the aerobic-anaerobic threshold for untrained controls. [97] Schizophrenics have shown abnormal thermoregulation on exercise with greater increases in core temperature. [98] [99]

Electrophysiology

An electrophysiologic indicator of 'working memory', contingent negative variation (CNV) [100] is decreased in schizophrenia, [101] [102] [103] which is reported to correlate to ratings for negative symptoms of affective flattening and avolition-apathy. [104] Cell phone radiation also decreases human CNV. [105] [106] The test involves a warning stimulus and an imperative stimulus with the intervening evoked waveform representative of sensory and motor adjustment prior to expected action.

Electrophysiologic auditory event related P300 and antecedents are reduced in some schizophrenics, [107] [108] with increased latency indicated. [109] [110] Decreased auditory event response is observed during hallucination in magnetoencephalographic (MEG) [111] and functional magnetic resonance imaging [112] studies, which resembles the interfering sound response. [113] Like hallucination or outside sound, microwave hearing exposure decreases cortical auditory evoked potential amplitudes with increased latency in rats, rabbits, (less than US occup. std.) [114] and cats. [115] Schizophrenia auditory P300 reduction is related to deleterious signs and poor prognosis. [116] The human N100 amplitude is decreased on GSM cell phone exposure, [117] [118] which is also decreased in schizophrenia [119] [120] [121] with the reduction correlating to withdrawal-retardation scores, [122] and paranoid diagnosis. [123]

Hearing effect pulsed microwaves evoke brain responses similar to auditory stimuli. [124] [125] [126] Radio frequency exposure increases human hearing threshold for auditory tones. [127] Sound also decreases the brain stem microwave hearing response. [128]

Auditory brain stem responses (ABR) in schizophrenics having hallucination, [129] [130] [131] never medicated hospitalization, [132] marked personality deterioration, [133] and negative symptoms [134] involve abnormalities of increased peak latency and missing peaks. Since microwave hearing produces an ABR, [135] [136] interference is expected, which would complicate ABR topographic appearance. Increased ABR latency is reported from a cell phone study, [137] though this is not replicated by all cell phone studies. [138] [139]

Soviet and American microwave exposure of humans report EEG increases in delta or "slow" waves, abnormal to adult alertness in quantity. Acute human exposure to continuous or pulsed microwaves, exhibit increased electroencephalogram (EEG) delta waves (less than US pop. std.). [140] Soviet and East European microwave occupational exposure review observes increased EEG delta waves. [141] Cell phones also increase human delta waves in adults [142] and children. [143]

Rabbit and rat microwave irradiation yield delta waves as well. Daily 3 hour rabbit exposures produces delta wave increases at 1 month to pulsed microwaves and at 2 months to continuous wave exposure (1/2 US occup. std.). [144] Daily 7

hours of microwave exposure produced delta waves after 10-15 days in rabbits at 1/3rd the US population exposure standard, but took 1 month for delta wave increase at 1/30th this standard. [145] Rat microwave irradiation induces delta waves in the left hemisphere by continuous wave, but in the right hemisphere when modulated. [146] Delta waves are also produced by extra low frequency radiation in rabbits [147] or magnetic fields in humans. [148]

Microwave delta wave increases correspond to delta wave increases widely noted in untreated, [149] [150] [151] [152] [153] [154] [155] [156] [157] [158] [159] [160] [161] and medicated [162] [163] [164] [165] [166] [167] [168] [169] schizophrenia EEGs. [170] Delta waves particularly correspond to psychotic episodes, [171] [172] and occur immediately prior to auditory hallucination. [173] Higher delta power correlates with negative schizophrenia symptoms, [174] [175] and 'psychomotor poverty', [176] [177] while higher left temporal delta wave dipole density correlates to ratings for hallucination and paranoia. [178]

Intermittent long-term occupational exposure to microwaves increases EEG beta frequencies. [179] A therapeutic microwave instrument immediately increased beta wave power in humans, and cell phones increase these frequencies after a 15 minute delay. 142 Cell phones also increase human beta waves during tasks. [180] Microwave exposure increases beta frequencies in the rat (at ½ pop. std. to 1.2 X occup. std.). [181] [182] [183]

Though some anti-psychotic drugs decrease beta frequencies, schizophrenia EEG studies exhibit increased beta frequencies. 150 151 152 154 155 156 160 161 162 167 175 [184] [185] [186] [187] [188] [189] [190] MEG frequencies in the beta band are observed on auditory hallucination. [191] Treatment-resistant patients have greater increases in beta frequencies above 18 Hz, [192] [193] with dipole location sources of beta frequencies varying on auditory stimulation according to symptom severity. [194] Greater increase in beta frequencies is associated with decreased mismatch negativity amplitudes, [195] and 'psychomotor poverty'. 174 176 177 The sources of increased schizophrenia beta frequencies are also more anterior and superficial than controls. [196] [197] Superficial tissue absorbs more microwave energy than deep tissues. [198]

Electromagnetic field EEG entrainment occurs especially within physiologic brain frequencies (1-40 Hz.), either with a so modulated carrier wave or at these extra low frequencies. Microwave EEG entrainment (or change to exposure frequency) is demonstrated in cats, [199] and rats. [200] Lower frequency radiation or magnetic EEG entrainment is observed in rabbits, [201] monkeys, [202] and humans. [203] In addition to the capacity of entrainment to produce delta or beta waves, the effect forms a basis for schizophrenic thought interference complaints, and is of non-lethal weapon concern. [204]

Neurotransmitters

Both schizophrenia and microwave exposure involve brain dopamine alterations. Many have long attributed positive schizophrenic symptoms to dopamine increases based on differential drug effects. [205] However, findings in schizophrenics with negative symptoms for dopamine metabolites, dopamine receptors, and drug studies indicate decreased dopamine. [206] Based on behavioral changes, drug study results, and enzyme alterations, microwave exposure also indicates decreased dopamine. [207] [208] [209]

Other neurotransmitter alterations correspond in both microwave bioeffects and schizophrenia. Brain postmortem tissue analysis, cerebrospinal fluid, and drug studies find decreased schizophrenia serotonin. [210] Although rat serotonin metabolite ratios indicate increased serotonin turnover rates on acute microwave exposure (3.1 X US pop. std.), [211] brain serotonin decrease occurs on prolonged exposure (near US occup. std.). 126 Rat microwave exposure from birth to 15 days decreased serotonin in adults (near ½ US occup. std.). [212]

Cortical synaptosome γ-aminobutyric acid (GABA) uptake and release is reported decreased in schizophrenics, who have decreased GABA neurons, [213] and synthetic enzymes. [214] GABA receptor binding (by ^{3}H-muscimol) decreases in rat neocortex on microwave irradiation (2.6 X US occup. std.). [215] Immunohistochemistry also indicates decreases in rat cellular GABA content in Purkinje cells of the cerebellum (10 X ICNIRP occup. std.). [216]

There is evidence for a cholinergic decrease in Lewy Body Syndrome, which is a psychosis that can have schizophrenia diagnosis, [217] and there is consistent evidence for a decrease in the α 7-nicotinic acetylcholine receptor in schizophrenia hippocampal and frontal areas, [218] which indicates decreased acetylcholine levels. [219] Acetylcholine release is found decreased on in vivo rat microwave exposure for the hippocampus (1/2 US occup. std.). 70 Acute rat microwave exposure also decreases sodium dependent choline uptake, the rate limiting step in acetylcholine synthesis, especially in frontal cortex followed by the striatum on either pulsed or continuous wave, but only pulsation decreased hippocampal choline uptake (60 % of US pop. std.). 37 [220] [221] The hippocampus and striatum are limbic structures-- a brain system prominent in schizophrenia pathogenesis, which is implicated in microwave bioeffects, [222] and rats differently responsive to the vocalizations of other shocked rats, differ in behavior and neurotransmitter levels on very low microwave exposure (1/2 % of US pop. std.). [223]

Hormones

Corticotrophin is indicated to mediate microwave stress, [224] [225] and microwaves influence adrenal steroids. Satellite station operator microwave exposures produce a stress reaction of urinary increases in 11-oxycorticosteroids and stress hormone diurnal pattern shift (1/10th of US pop. std.). [226] Cell phone exposure transiently increases blood cortisol levels. [227] Rat

microwave exposure yields adrenal activation resulting in adrenal medulla epinephrine and corticosteroid depletion (1.8 X US occup. std.). [228] Female rat microwave exposure increased blood corticosterone and ACTH, with decreased estradiol independent of pregnancy (1.2 X US pop. std. to 1.2 X US occup. std.). [229] [230] [231] Schizophrenic patients have increased cortisol [232] with less dexamethasone cortisol suppression than controls, [233] [234] and corticosterone increase is reported. [235] Schizophrenics have such hypothalamic-pituitary-adrenal axis over activity with ACTH increase as to feature the metabolic syndrome. [236] Patient cortisol lacks sleep inhibition, and correlates with paranoia and hallucination.

Decreased melatonin is consistently reported in schizophrenia, [237] [238] [239] [240] [241] with such a finding in paranoid patients. [242] [243] Electromagnetic fields diminish melatonin in animals. [207] [244] Human melatonin decrease is both at lower frequency exposure, [245] [246] [247] [248] and on cell phone use. [249] The pineal gland synthesizes melatonin from serotonin, [250] also decreased as above. Abnormal EEG and decreased melatonin are associated with pineal calcification, [251] which has lower incidence in undeveloped societies [252] who also show better schizophrenic prognosis. [253]

Mitochondria Changes

Mitochondria are altered in both schizophrenia and microwave exposure. Mitochondria deformation, size reduction, and decrease in number from 20-33% in schizophrenia brain are observed. [254] Cytochrome c oxidase, of the mitochondria oxidative phosphorylation system, is reduced from 30-63% in the schizophrenic brain. [255] Schizophrenic mitochondria gene expression is decreased in five pathways. [256] Acute microwave exposure evidences mitochondria matrix density decrease, and cristae degeneration in vitro for liver cells (1.2 X US occup. std.), [257] with pulsation experiments inducing normal cristae pattern loss, lamellar body formation, and mitochondrial membrane breaks in neuroblastoma cells. [258] Adenosine triphosphate (ATP) and creatine phosphate (CP) levels depend on oxidative phosphorylation, which requires electron transport components of mitochondria cristae. Very brief (5 min) whole body microwave exposure significantly decreased rat brain ATP and CP levels (2.5 X occup. std.). [259] [260] Mitochondrial marker enzymes of succinate dehydrogenase and monoamine oxidase are decreased in mouse hippocampus and hypothalamus on 3 hour microwave exposure (1/4 of US pop. std.). [71]

Immune Alterations

Elevated schizophrenia autoimmune activity is indicated by several immune alterations, including abnormally high autoantibodies against brain and somatic antigens.[261] [262] Increases of anti-brain antibodies and reaction to brain antigens is also reported with microwave exposure. [263] Higher autoimmune disease prevalence in schizophrenic patients is reported. [264] [265] Foreign abstracts indicate microwaves cause more general autoimmune stimulation. [266] [267] [268]

Cytokine interleukin-6 (IL-6) increase features in autoimmune disease. [262] Ten reports of IL-6 increase for schizophrenia are versus six normal reports, while four IL-1_β increase reports for the disease are versus six normal reports. [269] Electromagnetic field exposure of human monocytes, the most important producer of these cytokines, dramatically increased IL-6 and IL-1_β production. [270]

High Tumor Necrosis Factor (TNF) levels are reported in schizophrenia. [261] Very low intensity microwave whole body exposure increases TNF production in peritoneal macrophages and spleen T cells (2 X 10^{-4} of US pop. std.). [271] [272] TNF increase on microwave exposure has several other reports. [273] [274] [275]

The balance of evidence shows B lymphocyte increase in schizophrenia (5 reports of increase versus 3 of normal levels). [269] Whole body microwave exposure increases the proportion of mouse spleen B lymphocytes (4.9 X US occup. std.).[276] [277] This increase is not caused by proliferation, but from stimulation of already existing precursor B cell maturation, [278] and is under genetic control, [279] [280] with apparent humoral mediation. [281] Microwaves also induce human lymphocyte lymphoblastoid transformation in vitro. [282]

Lipid Phosphorylation and Peroxidation

Schizophrenic brain magnetic resonance spectroscopy shows decreased phosphomonoesters, and increased phosphodiesters. [283] This represents reduced lipid membrane building blocks, and increased lipid degradation products. [283] Microwave exposed rabbits decrease P^{32} incorporation into brain lipids (1.8 X US pop. std.). [284]

Lipid peroxidation is found increased in schizophrenia, [285] [286] accompanied by alteration in antioxidant enzymes with superoxide dismutase (SOD) consistently found elevated. [287] Parameters of antioxidant status in schizophrenia are associated with positive, [288] negative, [289] or severe symptoms [290] and there is report of improved patient function on appropriate supplementation. [291] Lipid peroxidation results from increased free radicals, which react with mono- and polyunsaturated fatty acids that are required for maintaining membrane fluidity and permeability characteristics. [292] [293]

Microwave exposure membrane fluidity changes, [294] receptor shedding, [295] and readily increased reactive oxygen species [296] implicate lipid peroxidation. Peroxidation is detected in liposome, [297] and living rat microwave exposure, [298] even at mobile phone exposure levels (~3 X ICNIRP pop. std.[d]). [65] Foreign abstracts indicate microwave exposure

increases an indicator of lipid peroxidation, and SOD activity in platelets, [299] and pig retinal ganglion cultures. [300] A mechanism for such effects is by magnetic field stabilization of electron triplet states that results in an increase in the rate of free radical formation. [301] [302] [303]

Many favor a neurodevelopment hypothesis for schizophrenia, but there is evidence for a neurodegenerative process in a sub-population. [304] [305] Neurodegenerative diseases such as Parkinsonism, Alzheimer's, and amyotrophic lateral sclerosis (ALS) are linked to electromagnetic field exposure. [306] Though Parkinsonism association has only exposure linkage with little evaluative data, the association data is greater for Alzheimer's disease, while a considerable number of studies have strongly associated ALS with electromagnetic field exposure. [307] [308] [309] Oxidative stress is believed to play a role in these neurodegenerative diseases [310] in which psychosis is frequently a component. [311]

Schizophrenia is consistently coexistent in patients developing ALS, [312] with both these syndromes linked to chromosome 21q22. [313] The locus for cytoplasmic Zn/Cu superoxide dismutase is at chromosome 21q22, and familial ALS has confirmed mutations for this enzyme, [314] though mutated protein is not yet confirmed in schizophrenia. A normal variant Mn superoxide dismutase believed to mis-target the enzyme's mitochondrial location also has ALS association [315] with this enzyme mapping to chromosome 6q25, [316] which is a schizophrenia linked locus. [317] [318] Mn superoxide dismutase is found decreased in schizophrenia hippocampus. [319] Though this ALS linked variant enzyme is associated with schizophrenia [320] or tardive dyskinesia development, [321] this is not consistent for populations from less developed countries. [322] Both superoxide dismutase enzymes are important in anti-oxidant defense. A third common chromosome linkage is 9q25, which is linked to familial ALS, frontotemporal dementia, [323] and schizophrenia. [324] [325]

Blood Brain Barrier Permeability

Molecular and cellular evidence suggests blood-brain barrier (BBB) impairment in 18-29% of Schizophrenics. [326] Non-thermal microwave alteration of the BBB permeability is consistently observed (1.3 X US occup. std.), [88] [327] [328] [329] and is attributed to pinocytosis. [330] [331] The alteration is proposed induced by heat shock protein phosphorylation, [332] and heat shock protein antibodies are among the evidence for schizophrenia BBB impairment. [269] Studies not showing a microwave BBB effect have utilized short exposures, thermal microwave levels, and are criticized for procedure or publication behavior. [333] Thermal microwave BBB studies are complicated by decreased BBB permeability at about 40° brain temperature, [334] but at 2° higher the permeability greatly increases. [335] [336]

Anatomy and Histology

Schizophrenia reduction of medial temporal lobe structures, particularly the hippocampal-amygdala complex, [107] [337] is observed in 74 % of magnetic resonance imaging studies. [338] Chinese hamster 15 day microwave exposure produces pyknotic neurons in the hippocampus, hypothalamus, and unspecified cortex areas (1.8 X US occup. std.). [66] Rat GSM cell phone exposures produce scattered groups of shrunken neurons having loss of microstructures in the hippocampus, basal ganglia, and cortex, [65] which is replicated by another study having additional findings of some microvacuole formation and blood-brain barrier albumin leakage. [64] Rat pre- thru post-natal ultra-wideband microwave exposure increased hippocampus lateral length. [339] Such enlargement may indicate edema, reflecting pathology resulting in eventual size reduction.

The thalamus is volume decreased in 42 % of schizophrenia studies, [338] with lower neuron number in the anterioventral nucleus observed. [340] Light and electron microscopy of hamster 22 day microwave exposure reveals cytoplasm vacuolization and chromatolysis with a pale frothy cytoplasm in ventral thalamic neurons, and little rough endoplasmic reticulum, with very few polyribosomes (3 X occup. std.). [341] Dendrites had vacuoles, myelin figures, and few microtubules.

Schizophrenia cerebellum changes are evident in numerous studies of neurological signs, postmortem specimens, [342] and in 31 % of neuroimaging studies. [338] Atrophy is the main anatomic observation, but several studies show Purkinje cell loss. [343] Rat and quail pre-natal prolonged microwave exposure produces Purkinje cell loss and histologic change respectively (1.2 X US occup. std. & 3.1 X US pop. std.). [344] [345] Rat post-natal microwave exposure also produces Purkinje cell decrease and cellular changes (1.2 X US occup. std.). [346] Pulsed microwave rat balancing ability deficit suggests cerebellum motor influence (23 % of US pop. std.). [95]

Prefrontal and parietal lobe volume reduction is reported by 60 % of studies for each area. [338] Several microwave reports are of cortex or unspecified brain area change. Prolonged microwave rat exposure produces neuronal cytoplasm vacuolation, swelling, and beading of axons, with dendrite spine decrease (less than US occup. std.).[347] Extended microwave exposure produces myelin degeneration in guinea pig and rabbit cortex (1.75 & 2.5 X US pop. std.). [348] Studies cited above also noted degenerative cortex histology. [64] [65] [66] Histologic study of microwave exposed rats that exhibited discriminative conditioning deficits, [58] revealed cortical dendrite myelin figures at 6 weeks post exposure (1/2 ICNIRP occup. std.). [349] None of the above microwave histologic studies noted gliosis.

A neurodevelopment schizophrenia hypothesis is favored, since autopsied brain has no inflammation or gliosis resulting in scarring. Yet, brain atrophy by apoptosis lacks gross change. Several microwave studies report apoptosis: in vitro via the

Fas pathway in human Jarkat T cells (3.1 X US pop. std.), [350] in vivo in mice thymocytes, [351] from exposed rat cranium cell phone irradiation, [352] and in rat hippocampus on high power exposure. [353]

Brain Metabolic Activity

Glucose uptake and blood flow during hallucination shows temporal lobe activation over baseline or control in 85 % of studies, and thalamic activity is apparent in some studies. [354] Rat blood flow increases significantly in the temporal cortex, as well as in both the lateral and medial geniculate bodies with acute microwave exposure pulsed for the hearing effect (1.6 X US occup. std.). [355] Both geniculate bodies indicated active during microwave hearing exposure are part of the thalamus. [356] Acute hearing effect pulsed microwave exposure increased rat brain glucose metabolism by [^{14}C] 2-deoxy-D-glucose with particular prominence in auditory related structures of the inferior colliculus, and medial geniculate body, as well as the cochlear nucleus and the superior olivary complex (30% of & 1.2 X US occup. std.). [357] These latter two structures are within the brain stem or associated structures, where large blood vessel pulsation obscures resolution on functional imaging. Though inferior colliculus activation has been infrequently noted during hallucination, one study noted activity in the region of the colliculii while stipulating problematic brain stem localization, [358] and another study detected activity within the inferior colliculus while ascribing detection to imaging without scanner noise. [359] At least four studies during hallucination detect activity in the thalamus. [359] [360] [361] [362] Therefore microwave hearing studies particularly correspond to a number of observations during hallucination in temporal and thalamus regions, while a couple of studies have indicated activation of initial sensory pathways for hearing by sound or microwaves. Considering all the methodological limitations, such a mechanism in some patients cannot be excluded. A study of unmedicated schizophrenia without hallucination assessment locates increased patient glucose metabolism for the pulvinar in which the geniculate bodies are located. [363] Possible geniculate contribution to the observation lacks discussion in this PET image co-registration with MRI study. [e]

Brief human cell phone [364] and rat microwave exposures increase brain blood flow (1.2 X US occup. std.), [182] but longer exposure of pregnant rats exhibited decreased uteroplacental circulation (1.2 X US pop. std. & 1.2 X US occup. std.). [230] [231] Acute psychosis studies have shown increased global brain blood flow, [365] [366] with psychosis and delusion correlation, yet the chronic patients most studied show hypoperfusion. Microwave exposures inducing thermal effects initially increases, but eventually decreases brain blood flow, though associated with cellular injury. [367] Specific cerebral blood flow regions are increased while hallucinating, but sensory stimuli and endogenous verbal imagery activates hallucinator brain regions less than non-hallucinators. [354] [368] [369]

Schizophrenia brain perfusion during tasks includes globally increased blood flow, or less dominant hemisphere activity and more non-dominant increases than controls. [369] The shift of brain activity to other brain areas could have mechanism in a technologic etiology. Although perceptual processing is usually lateralized to the left hemisphere, the right hemisphere is normally activated for pitch discrimination, non-verbal, and degenerate sounds. [370] Microwave activation may be akin to degenerate or non-verbal sound, particularly since continuous waves without hearing effect activate auditory brain structures and elevate hearing threshold. [357]

Schizophrenia brain activation changes are particularly in the frontal lobes. [371] At rest, schizophrenics exhibit lower glucose utilization in the frontal lobes relative to either occipital or whole brain. [372] The schizophrenia prefrontal blood flow is especially deficient while performing tasks specific to this region. [369] Consistent with a prefrontal deficit are microwave deficits above noted in frontal choline uptake, memory, contingent negative variation, and frontal neuropsychiatric symptoms. Schizophrenia decreased brain activity also has basis in decreased brain area volume, mitochondria, and neurotransmitters corresponding to microwave bioeffects.

A microwave mechanism for EEG delta wave increase is proposed by corpus callosum tract fatigue, making unavailable this interhemispheric connection, with inherent corticospinal and spinocortical tract delta rhythm predominant. [145] Schizophrenia corpus callosum dysfunction [373] and decreased brain activity may enlist abnormal brain area activation. A gamma wave distribution model relates normal development delta wave amplitude and cortical metabolic rate to transient neuronal organization. [374] A re-organization may apply in technologic assault.

Positive Symptoms

Although microwave bioeffects are consistent with negative schizophrenic symptoms, [f] internal voice transmission effects provide basis for several prominent positive schizophrenic symptoms. [g] Psychiatric prejudice presently considers casual discussion of this presentation delusional without detailing extensive references. Because internal voice is similar to thought, and may be directive, these technologies are capable of altering thought itself and ongoing behavior. Positive symptoms of attention deficit and thought disorder have some explanation in hallucination. Exacerbating both these symptoms are microwave altered cognitive function, and EEG entrainment capability. Microwave manipulation, then could account for the major positive schizophrenia symptoms of hallucination, delusion, attention deficit, and thought disorder.

Though some first admission studies suggest a decline in schizophrenia, true incidence change is questioned by changing demographic and diagnostic patterns [375] with diagnoses of borderline states, [376] and paranoid psychosis [377] matching some apparent declines. A recent literature review concludes that schizophrenia incidence has increased. [378] Paranoid schizophrenics are most likely to believe in technologic assault. More studies of this diagnosis show less genetic association, a

later onset, [379] [380] and reported increase of the paranoid subtype within the past century. [381] [382] Paranoid schizophrenia is apparently preponderantly sporadic, [383] [384] with EEG abnormalities reported as more frequent, for this diagnosis. [385]

Ocular Disease

Microwave exposures produce eye disease. Microwaves particularly produce subcapsular cataracts. [386] [387] Anterior subcapsular cataracts were significantly more prevalent in schizophrenics than a visually impaired population, without medication association, except that phenothiazines actually had less cataract prevalence. [388] As expected for a group of little occupational exposure, schizophrenics have less cataract incidence of all types than the general population, [389] but schizophrenia cataracts have been associated with high doses of chlorpromazine (a phenothiazine). [390]

Schizophrenia retinopathy is associated with thioridazine, [391] and generally with phenothiazines. [390] [392] Photoreceptor cell Electroretinogram (ERG) changes are reported in schizophrenia. [393] Microwave exposures are occupationally associated with retinopathy, [77] [394] [395] and have shown retinal damage experimentally at higher [396] and low intensity exposure. [397] [398] [399] However one monkey low intensity radiation study observed abnormalities in the ERG and glycogen storage that can be associated with more serious retinal changes, [400] but did not observe the frank degeneration previously observed, [397] [398] [399] although the study did not replicate pulse width, degenerative time course, and 16 Hz pulsation conditions. Several groups have reported that radio frequency modulation at 16 Hz produces calcium ion effects, [401] [402] [403] [404] [405] [406] [407] [408] [409] [410] for which ion parametric (or cyclotron resonance) has been proposed for such a modulation specific mechanism. [411] [412] [413] Chinese abstracts of retinal ganglion culture microwave exposure indicate lipid peroxide production, [414] actual damage, [415] and production of apoptosis related genes. [416]

All the schizophrenia ocular disease associated drugs are older, and may have prescriptive preferences for public medical assistance generic availability or particular patient symptom profiles. Phenothiazines were so broadly utilized that direct association with schizophrenia cannot be excluded. Visual care is a neglected area of schizophrenia physical health, [417] and visual field testing is non-routine.

Standards and Environmental Considerations

East European and Russian occupational microwave standards of 10 $\mu W/cm^2$ are based on a neurasthenia syndrome. [418] Reported symptoms are headache, dizziness, increased irritability, loss of appetite, sleepiness, increased fatigability, sweating, difficulties in concentration or memory, depression, emotional instability, dermatographism, thyroid enlargement, and tremor of the extended fingers. [141] Discomfort, gait difficulty, and sleep disturbance are also reported with the syndrome. [419] The American microwave study of increased human EEG delta waves noted short-term memory impairment, concentration inhibition, irritability, apprehension, frontal headache, and work interfering sluggishness the next day. [140] Neurasthenia is consistent with many schizophrenic symptoms. Though the syndrome is dismissed on subjective grounds by many but not all Western investigators, [420] complaints of such symptoms are reported in a dose response relationship near a cell phone base station. [419]

The Russian standard contrasts with a 1000 times greater US standard of 10 mW/cm^2, which was too weakly written to sustain lawsuit. [418] The original US standard was set at one-tenth the level known to increase body temperature. Present US standards (ANSI/IEEE C95.1) lowered the occupational standards within certain frequencies, and finally set population standards, though at ~100 times the Russian. [21] The main microwave research sponsor, the Defense Department has vigorously defended the thermal rationale with suppression of non-thermodynamic effect investigations. [421] Standard setting for optimal equipment performance on national security grounds is suggested. [422] There are many reported effects at, or near these standards, which are incongruous with a 'precautionary principle.'

A 1975 Environmental Protection Agency survey indicated that less than 1% of the population had routine exposure to more than 1 $\mu W/cm^2$, and that high exposure areas (building tops with radio frequency transmitter clusters) could run as high as 100-200 $\mu W/cm^2$. [418] [423] Cell phones can reach 200 mW power output with the exposure standard set above that for whole body, by allowing head and trunk exposure of 2 W/kg. [424] Not well studied is chronic exposure, and exposure change since 1975 is considerable.

Unproven is an environmental microwave schizophrenia causation, however microwaves are a hypothesized as a mechanism for hallucination production by spread spectrum communications, [425] and for a reported sunspot activity association with schizophrenia. [426] Even though a manufactured system may meet the standards, sources are proliferating, and standards may be exceeded in some situations, particularly with increasing cell phone use. Recognized excessive exposure occurs with heat sealing appliances, [418] cell phone base stations increase exposure, and there are observations that can only be regarded as toxic in cell phone reports, or at exposures near these levels. Dysesthesia symptoms of some patients have correlated with clinical tests,[427] and patients report a dermatologic electromagnetic hypersensitivity syndrome, as well as a type resembling neurasthenia recognized by the Russians. [428] Though many Western investigators are skeptical of such syndromes, reported yeast cell effects are some seven orders of magnitude below the Russian standard. [429]

Discussion

Remote microwave voice transmission has had development. [4 6 7 8 9 10 15] Microwave internal voice weapons are considered [5 11] [430] [431] and weapons have been indicated. [13 14] Continuous symptoms can be maintained by available tracking technology. [15] Since similar means are a frequent patient complaint, it is compulsory that methods be developed to rule out involvement of these technologies in delusional disorder and psychosis. To further ignore the evidence, and disdain the right for appropriate complaint is unethical.

Microwave bioeffects have a high level of congruence with major lines of schizophrenia investigation. In both schizophrenia and low intensity microwave exposure, there are deficits in memory, time estimation, sequencing, and motor ability, as well as numerous electrophysiologic signs including decreased contingent negative variation, abnormal or decreased auditory evoked response, with increased EEG delta and beta waves. Startle response and galvanic skin response are found decreased in both conditions. For neurotransmitter levels of both conditions serotonin is found decreased, with dopamine and GABA indicated as decreased, while acetylcholine is indicated decreased in some brain areas. Hormone changes of melatonin decrease, and adrenal activation are common to both conditions. Immune function, mitochondria, and the blood-brain barrier are indicated similarly altered in both situations. Microwaves induce deleterious histology in several brain structures observed reduced in schizophrenia. Microwave exposure activates brain structures corresponding to those noted on hallucination, and a few studies indicate activation of primary sensory pathways, which is consistent with voice transmission. Subcapsular cataracts have been associated with both conditions. Retinopathy is associated with both widely prescribed anti-psychotic medication, and microwave exposure. Microwave voice transmission, bioeffects, and EEG entrainment provide some basis for positive symptoms. The correlations between microwave bioeffects and schizophrenia may not apply to all patients, but is most consistent with the negative symptom group that hears voices and is likely paranoid. The potential for voice transmittal to mimic positive schizophrenia symptoms, and the congruence of other symptoms with microwave bioeffects indicates that a technologic etiology may involve more than a few patients.

The medical community has been remiss in refusing investigation of such an etiology. Psychiatrists have actively ignored longstanding patient complaints of being affected by technologies that have literature basis for such influence. [15] Microwave bioeffects, including sound and voice perception have long been described.

More than presumption and prejudice must rule out such an etiology. Though direct substantiation of this hypothesis is limited to sight publication of field strength around victims and anecdotal reports of such measurement, [15] formal investigation must begin. The evidence for a technologic etiology regarding microwaves practically comprehensively correlates with schizophrenic symptoms to such congruence that this word's mathematical sense cannot be excluded. This hypothesis is more circumstantially defined than any other environmental pathogenic mechanism, and should mandate investigation to develop methods for ruling out such an etiology.

The congruence of microwave bioeffects with schizophrenia symptoms does not have to involve voice transmittal in a technologic etiology. Potentially toxic effects to functioning exist near, and below exposure standards. Hypersensitivity and neurasthenic syndromes are reported with radio frequency fields, though these symptom complexes have particular dispute. Neurodegenerative diseases are also associated with lower frequency exposure especially in ALS, which also has linkage to schizophrenia.

The late adolescent onset typical of most schizophrenia cases and other factors has led many to favor a neurodevelopmental hypothesis, and some peri-natal microwave exposure studies show abnormalities. [25 83 212 339 344 345 346] There is considerable evidence that a significant portion of schizophrenia patients have genetic susceptibility linkage. [432] Microwave exposure B lymphocyte response is indicated to have genetic determinants,[279 280] and differences in reaction to exposure are reported according to rat temperament. [223] The indicated increase in free radicals by microwaves [65 297 298 299 300] or electromagnetic fields implicates genetic susceptibility for ALS-schizophrenia linkage, which would also have developmental interplay. However, no developmental or genetic relation is evident for most of the schizophrenia correlations to microwave exposure. The extensiveness of these correlations leads to a variant hypothesis of a technologic etiology without assault. A review indicating an approximate doubling of schizophrenia incidence in the recent past would support either technologic variant hypothesis, [378] and is difficult to explain by previous theory. Of course these hypotheses may not involve all cases, as reference is often made to "the schizophrenias," and multifactor etiologies are common in pathology.

Patients subject to internal voice assault would have hallucination, and likely paranoia with belief that voices are transmitted to them. It would be most probable among sporadic cases with non-adolescent onset, having some or all of the correlations here noted. Probably the most common present clinical measurement that could be useful is the auditory brain stem response. [433] Observation of auditory brain stem responses on 'hallucination' that indicate primary sensory pathway activation would strongly support technologic assault. Clinical investigation would include radio frequency measurement. Attention should be given to likely cranial directional localization within the spectrum indicated for voice transmission. [15] Establishing radiation characteristics with the Brunkan or Leyser patent burst and pulse pattern, or modulation characteristic of the O'Laughlin et al. patents would be highly pertinent, but less important. There are inconclusive, largely anecdotal reports of victim ability to record harassment effects, however condenser microphones are responsive to the same thermoacoustic mechanism that produces microwave hearing, and other microphone designs contain elements similar to those productive of thermoacoustic sound. [434] Since microwave-induced thermoacoustic tomography is utilized to generate ultrasound from tissues [435] and ultrasound components could be expected from some microwave voice transmission patents, there is some prospect that such a signal could affect transducers for ultrasound or normal acoustics as applied to the head. [434]

Investigation of patient responses within and outside of rooms shielded from electromagnetic radiation is relevant. Practical considerations are that shielded facilities already exist for MRI and magnetoencephalgraphy. Observations of hallucination, event related auditory response, contingent negative variation, or EEG delta and beta wave index in selected patients would likely be parameters more immediately responsive to microwave cessation. Although existing facilities may be

adequately shielded, [436] the shielding must be radar effective, with serious determination of adequacy.

Subcapsular cataract and retinopathy epidemiologic study in schizophrenia would also have relevance. The specific cataract type is known to be microwave induced, and is reported without medication association. Patient signs relating to other microwave bioeffect correlations would have bearing on any coincidence of these symptoms in patient subtypes.

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U. S. Patents are printable free from the U. S. Patent Office website.

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[a] Address: 903 N. Calvert St., Baltimore MD 21202. Email- Johnmcmurt@aol.com Phone- 410-539-5140, the author is open to co-authorship appropriate to publication.

[b] Standards: pop. std. = population standard, occup. std. = occupational standard. All numbers are calculated in terms of the US standard, unless designated as ICNIRP, which stands for the International Commission on Non-Ionizing Radiation Protection.

[c] International Commission on Non-Ionizing Radiation Protection

[d] Though the ICNIRP standard is 0.08 W/kg for whole body exposure, standards for head and trunk exposure allow 2 W/kg, at which the experiment was conducted. Calculation is in terms of whole body exposure limits.

[e] Indeed the image presented shows two discrete areas of activation, and must be a quite distal section considering the size indicated of the other nuclei imaged, which would approach, if not include, geniculate body location.

[f] Alogia, affective blunting, anhedonia/asociality, avolution/apathy, and attention impairment.

[g] Hallucination, delusions, positive thought disorder (e.g. derailment, tangentially, incoherence, etc) bizarre behavior, and inappropriate affect.

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What our governments do not tell us

Weapons based on radio waves - electromagnetic weapons

In 2009, the president of the United States of America, Barack Obama, announced that he was going to work hard towards a world without nuclear weapons. Of course he would say that, the United States has developed a whole new generation of weapons that are much more effective in torture and killing. Countries with these new weapons can only be threatened by nuclear weapons.

Nuclear weapons are of course terrible weapons; however, they cannot be used without leaving evidence. That is why their use is restricted. There is another, unknown to public domain, category of weapons that leaves no evidence. These are weapons based on radio waves. Attacks with these weapons are invisible and can go through walls. We are talking about electromagnetic weapons, also called electronic weapons. Examples include: microwave weapons, laser weapons, sound weapons, as well as equipment to read and influence the human mind. These weapons are widely used by secret services and the military. This happens all over the world, and due to their high-tech character, more commonly in our 'democratic West'. These weapons are rarely mentioned by popular media, never have been acknowledged by any government, but have covertly been used against people like: whistleblowers, activists, politicians - to steal, to eliminate – for several decades. And in order to develop and perfect these weapons, random ordinary men, women and children are non consensually used as guinea pigs to test them. These are often horrible crimes against humanity, and our governments aren't telling us anything about this.

One of the most terrible implications of these weapons is that it is no longer possible to protect yourself, your children, your loved ones. You can no longer say: 'stay in this room, then you will be safe'. The attackers look through the walls of your house, cook, burn, control your body, and read and manipulate your thoughts. Police are not equipped to do anything and can't help you, no one can help you.

The rest of this page is split into two main topics:

- General information about electromagnetic weapons
- Victims of experiments and crimes with these weapons

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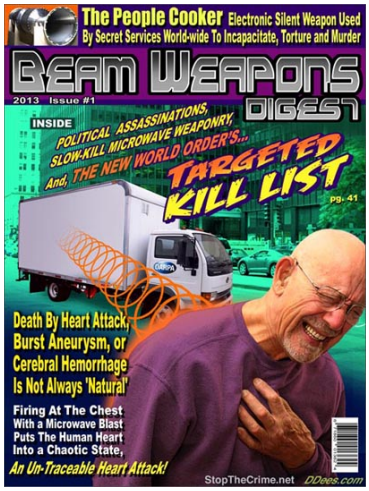
Weapons-1. Suppression of information



It is unprecedented that information about electromagnetic weapons has been suppressed from the public in all possible ways and that governments of all countries go along with this secret in the fear of paybacks by the powerful. Instead governments choose to deny rather than recognize and expose the existence of these deadly weapons, thus failing to inform their citizens. This actually shows that we are not ruled by politicians but by a self-proclaimed world's elite. The ultimate goal is the suppression of the population by this elite.
(Illustration David Dees)

Weapons-2. History

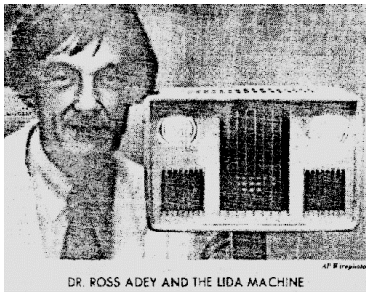
The development of weapons based on radio waves started after the Second World War. The Nazis were already developing them and the Russians and the Americans followed. One of the first notable results was the LIDA machine (1950). By focusing radio waves on the brain you can almost instantly send someone to sleep. The same device can be used to keep people from their sleep as well. In the 1970s, the Americans discovered that their Moscow Embassy was irradiated with microwaves. This was not made public but

Victims-1. Experiments with these weapons

There is a group of people on whom these weapons are tested in order to further develop their capabilities and effectiveness. They are often random, innocent civilians, and come from all over the world.
They call themselves **Targeted Individuals** and despite usually being kept totally isolated by their attackers, in recent years, they found each other via the internet. They are looking for recognition of the crimes committed against them. The experiments that are performed on them are illegal and often horrific, many are suffering and many die. One could argue that these are war crimes against citizens. **These are inhumane and degrading crimes against mankind, a disgrace to the human race!**

Victims-2. Wrong diagnosis

People who are attacked with such weapons initially end up in a kind of shock. They know that there are all kinds of things that don't add up but do not know what, as it's not something they have learned about or something that is in the newspapers. Family and friends will say they have to go to a family doctor, psycholog or psychiatrist. The symptoms that they show are similar to known physical symptoms and mental illness. That's no coincidence: this is intentionally done so that the victims will not be able to find anybody that

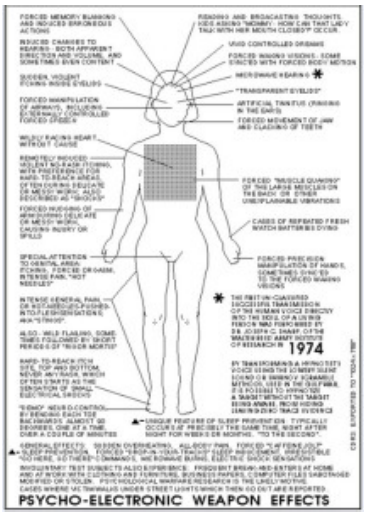

DR. ROSS ADEY AND THE LIDA MACHINE

was the beginning of the arms race of weapons based on radio waves. Everyone knows the laser pen or laser pointer. Not only pilots were shone with it, also footballer Wesley Sneijder complained about he was being blinded when taking a free kick. A kitchen microwave cooks meat with radio waves, you can easily imagine what a weapon based on it can do to the human body. A kidney stone pulverizer can from a distance crush a stone in the human body. All this is done with invisible radio waves. More recent there have been developments in which brain signals are used to control prostheses, for example, a hand.

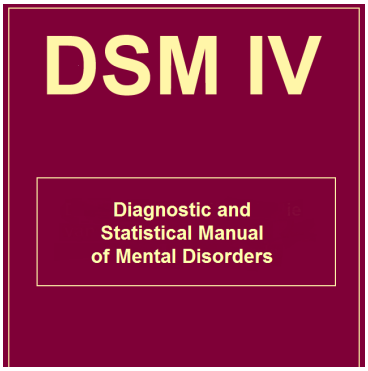
Weapons-3. Arms must be tested

The arms industry, the military, in combination with the secret services, develop weapons and torture methodology, which need to be tested on. No one however, wants to be a guinea pig of this kind of experiments as they are very dangerous. Think of a microwave weapon, with which you cook the human body, knowing for certain that body functions will eventually fail. Imagine a weapon with which you can stop someone's heart. In the course of history, these organizations took it for granted that they could do this to unaware people. But that is all illegal of course, and so it is done secretly.

Weapons-4. Developed for the body



The development of weapons based on radio waves turned out to be a great challenge. The radar, after some adjustments was able to send focused energy, and shortly after the microwave was invented. The first weapons were primitive but already very effective. New developments lead to laser weapons, and later this was all grouped under the heading of 'Directed Energy Weapons'. Many of these are classified as non-lethal weapons but in most cases, this is pure nonsense. Pointing a powerful laser weapon at the human body will have a similar result as a bullet being fired at it. Both can be very damaging, both can be deadly. Read also: Bioeffects of



will listen to them when they claim that they are being attacked with these weapons. To get rid of this torture, victims commit suicide or accept the diagnosis of a psychiatrist, often paranoid schizophrenia. They end up in Psychiatric care where there are further experiments made on them. A small group is able to understand what is happening and to offer resistance, and although they are often called crazy by those around them, they keep insisting they are being preyed upon.

Victims-3. Human rights, but not for everyone

The victims of these crimes go to the police, write letters to their government or, or the Mayor of their city, they contact established human rights organizations such as: Amnesty International, Human Rights Watch, United Nations or the International Criminal Court. Comments are invariably negative. They are knocking on doors everywhere but nobody is really listening. They often leave their stories behind in the hope that something will happen. But they never hear anything back. The crimes that are committed against them are among the most serious in the human history. And, while all their human rights are being violated, the organizations where you would expect help from give no assistance.

Victims-4. Attack of the body

How do you call it, when you suddenly feel a strange pain in your arm, and then, quite suddenly, it seems to go away? You come back home, and its starts again. If you go and sit somewhere else, it disappears, but very soon, it comes back and burns you, again. It may take sometime before you realize the fact that you are being attacked with radiation that passes through a wall. And, from that moment on, it is called torture. The pain depends on the intensity and duration. In many cases, the torture follows you wherever you go. Some victims describe the feeling of being cooked alive, or burned alive. Another form of torture is making people hearing voices. The first successful experiments with this started in 1974! (Voice-

Selected Non-Lethal Weapons declassified US Army Intelligence document, 1998.

Weapons-5. Developed for the mind

The human body is extremely sensitive to electromagnetic radiation (radio waves). In addition, human body also sends out radiation. In other words, man is both: a bio-electromagnetic transmitter and a bio-electromagnetic receiver. For many years, research has been undertaken into the collection of signals from the brain (mind-reading), as well as, effective ways to send signals to the brain (mind-influencing). In the beginning, electrodes and implants were needed/might have been required, but new developments in science and technology made this unnecessary. Now, it is not only possible to read minds from a distance, but it is also possible to force thoughts into minds, which appear as if they were their own (this is different from hearing voices). There are projects that explore how you can make large groups of people think of the same thing, and, also, how to prevent groups of people thinking of certain things. Another project is to take over a human as a person (see also the movie Avatar).

Weapons-6. Examples of use

Some examples of possible use of these weapons:
- On 21 July 2009 NATO boss De Hoop Scheffer suddenly got a heart attack while visiting Belgium during the Belgian national holiday.
- On July 26, 2009 the president of France fell to the ground while he was out running. We were told that his heart had beaten irregularly for a short period.
- On September 3, 2009, Dutch Minister Verburg collapsed whilst speaking on a subject in the House of Representatives.
- On September 14, 2010 Dutch swimming celebrity Erica Terpstra drove into a tree because of a huge coughing fit.
- In 2010 Gerard Kemkers sent Dutch champion ice skater Sven Kramer to the wrong lane at the Olympic 10 km.
- In recent years there have been several posts about groups of birds that have fallen from the sky, about groups of whales that were totally off course, and groups of cows that suddenly died.

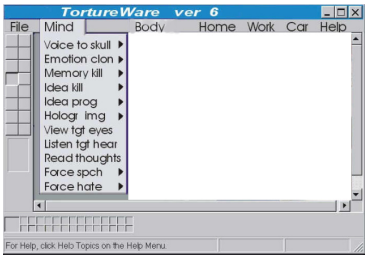
Of course, it cannot be proven that all this was caused by electromagnetic weapons, but no one can say that this can not be done with these weapons.

And that is the reason why these weapons must be banned. A knife leaves a stab wound, a gun leaves a bullet hole, in both cases there is perceptible damage to the body. This is no longer the case with electromagnetic weapons. We can make to-skull, V2K, microwave hearing). Often, these voices constantly belittle someone, aiming to drive them insane.

Victims-5. Attack of the mind

A device to read someone's mind is a weapon. After all, you attack this person; you attack not his body, but his mind. The same can be said of a device that forces thoughts into a brain without the victim knowing it. This not only is possible today, it is actually being done. A number of victims claim to be robbed of ideas, others claim to be blackmailed with their, now no longer secret, thoughts, or have obsessive thoughts that keep repeating, or strange dreams. Mind reading is used to torment you through feedback on your thoughts. Passers-by say things about you which only you can know about. The last thing you would expect to be private, your thoughts, is available to those that attack you, an incredibly terrible feeling. And those who do not realise and are guided by their thoughts, are actually no more than robots. As just can imagine, many victims have their thoughts about the 'bizarre' shooting incidents in which a disturbed person just carelessly kills people.

Victims-6. Examples of attacks



There are a number of physical effects that can occur; scratching, abdominal pain, need to urinate, urge to relief, diarrhoea, coughing, belching, farting, heart complaints, erectile dysfunction, sexual stimulation, headache, sudden confusion, sudden memory loss.
Ways in which these weapons can be used to attack our brain are: mind reading, hearing voices, tinnitus symptoms, planting thoughts in your head with an inability to distinguish them from your own thoughts unless you are aware of this, dream manipulation.

Below the link to an article from 2003 by Carole Smith, psychoanalyst: On the Need for New Criteria of Diagnosis of Psychosis in the Light of Mind Invasive Technology She writes among other things: 'A doubly cruel sentence is being imposed on people who are the victims of the most appalling abuse by scientific-military experiments, and a totally uncomprehending society is indifferent to their evidence. For the development of a new class of weaponry now has the capability of entering the brain and mind and body of another person by technological means.'

Electronic torture is attacking someone 24/7 with these weapons. At home and outdoors: the environment is the torture chamber.

no distinction anymore between reality and what has been done.

Weapons-7. There's even more

Above is only very limited information. Weapons based on radio waves are now installed in airplanes and on warships. Smaller versions are being tested in prisons in the United States. Minds can be controlled from nearby equipment or cell towers. Sound weapons are used to move people away from certain areas. In addition, there are the antenna-fields, also called HAARP installations. They use the atmosphere around the Earth to send energy across to other points. It is said that these installations are used to influence the weather and cause earthquakes.

Below is the link to the press release by Institute of Science in Society published on 29 May 2007: Bio-electromagnetic Weapons: The ultimate weapon At the beginning of the article Harlan Girard says: "A weapon system that operates at the speed of light, that can kill, torture, enslave and escape detection."

Victims-7. Organizations for victims

In addition to the countless websites and Web pages of victims there are now a number of organizations who are committed to disclosing these crimes and trying to support victims.

- STOPEG - STOP Electronic weapons and Gang stalking
  Website: http://www.stopeg.nl
- Freedom From Covert Harassment and Surveillance (FFCHS)
  Website: http://www.freedomfchs.com
- European Coalition Against Covert Harassment (EUCACH)
  Website: http://www.eucach.org
- Christians Against Mental Slavery
  Website: http://www.slavery.org.uk
- Verein gegen den Missbrauch psychophysischer Waffen e.V.
  Website: http://www.psychophysical-torture.de.tl
- Initiative gegen elektromagnetische Folter
  Website: http://www.e-waffen.de
- International Center Against Abuse of Covert Technologies (ICAACT)
  Website: http://www.icaact.org

Finally

Thank you for reading and I hope this page supplements your knowledge. I also hope that you understand that this must be made public. If we don't, then humanity-as-we-know-it will come to an end, the world as we know it today will no longer exist. Everyone except the elite and some technicians, will be tied to the electronic chain. George Orwell wrote in his book 1984 about this thought policy. That's not science fiction anymore - we are already in this situation!

I also hope that you have gained some insight in the practices of secret services and the military. Snowden's revelations already showed that there are many cases where they act outside the law. But what you didn't know is that they perform gruesome experiments, war crimes, against ordinary innocent civilians. This should stop immediately, be further investigated, the guilty brought to justice, and the victims compensated.

Finally, I hope that I am contributing to a better understanding of the victims of these crimes. They can't go anywhere. I ask you therefore to have compassion for their often unimaginable stories. The extent of their suffering is hard to explain if you are not a victim.

More questions? Read more on the Internet (directed energy weapons, active denial system, electronic harassment, microwave hearing, remote neural monitoring, synthetic telepathy, electronic torture, voice-to-skull, i.e.) or contact me.

Peter Mooring
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M: +31 6 4124 3030.

Would you like to comment or be kept informed?

Leave your comment below and/or your email address.

Email address:

Comment:

Send

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Some of the data collected from spies using microwave weapons

The Communications Industry is in the position where it is spiralling out of any person's ability to control it

An open letter Open Letter from Barrie Trower:

To whom it may concern...

The Communications Industry, because of its usefulness to Government, Finance, Intelligence gathering and Warfare, is really in the position where it is spiralling out of any person's ability to control it, with regard to advancing technology.

Initially, all systems "pulsed". However, when it was realised that stealth microwave warfare relies on entrainment of a brain from such pulses, now being used as a domestic instrument, the pulses had to be re-named as "modulations". The difference between them is infinitesimally small, but the effect is just the same. Only the name has changed.

I believe that this explains the **dramatic changes in behaviour** we are now witnessing - **group suicides**, **disruption in schools**, **aggression** and so on.

Over the years, I have compiled a list of known entrainment responses (followed by long-term potentiation) from these microwaves. It should be appreciated that each person will respond slightly differently, although the same area of brain/temporal/amygdaloid temporal/parotid/etc., will remain the same.

Pulses/Modulations
Per second/
Possible Result

all of these pulse frequencies are added to varying communication devices.

- 1 Heartbeat Rhythm
- 1-3 Sleep Pattern
- 3-5 Paranoia/Hallucinations/Amnesia/Illusions/Drowsiness 'Absent' Feeling
- 6-7 Depression/Suicidal Feelings/Visual Distortion/Confusion
- 8-11 Cannot Relax/Feeling Unwell/Unhappy
- 11-13 Anger/Manic Behaviour/Problems with Movement/Flashes/Loss of Appetite
- 14-18 Small Seizures/Disturbed Orientation/Auditory/Visual Hallucinations
- 18+ Inability to make decisions/Sensory problems (sight/touch/sound)

- 24+** Confusion/Flickering/flashing lights/Dizziness

- 35+ Mania/Hyperactivity

- 40+ Anxiety/Sleep disturbance/Reaction time slowed/Unable to make decisions

** It is worth mentioning that a mobile phone with a pulse/modulation frequency of 25 could act directly on visual sight (if being held at head), or heartbeat (if in a chest pocket). A frequency of 25 can disrupt both visual and heart neurotransmitters.

Clearly a susceptible person may have any combination of these. Electrosensitive persons may recognise many of their own symptoms. My work on electrosensitivity and the brain can be found on http://www.mastsanity.org .

I think the problem is that young Governments and young communications engineers have no knowledge of Cold War warfare and don't know who to ask; even if they did, the Government would probably be in denial. The situation is a mess, made worse by greed.

If anyone would like clarification of any of the foregoing, or I can help in any way, please let me know.

Barrie Trower
3 Flowers Meadow
Liverton
Devon
TQ12 6UP
01626 821014

(3)

Extracts from U.S. Defence Intelligence Agency Documents from 1972-1983.

Note: Comments in *bold italics* are mine.

1. Ref: DST-1810S-076-76 March 1976. "If the more advanced nations of the West are strict in the enforcement of stringent exposure standards, there could be unfavourable effects on industrial output and military functions".
2. Ref: DST-1810S-074-76 March 1976 "Personnel exposed to microwave radiation below thermal levels experience more neurological, cardiovascular, and haemodynamic disturbances than do their unexposed counterparts. Some of the ..... effects attributed to exposure include bradycardia, hypotension, and changes in EKG indices." "Subjects exposed to microwave exhibited a variety of neurasthenic disorders against a background of angiodystonia (abnormal changes in tonicity of blood vessels). The most common subjective complaints were headache, fatigue, perspiring, dizziness, menstrual disorders, irritability, agitation, tension, drowsiness, sleeplessness, depression, anxiety, forgetfulness, and lack of concentration". ***The very things that some mobile phone users report (Mild et al 1998)***
3. Ref: ST-CS-01-169-72 July 1972. "Low frequency electromagnetic fields have been found ..... to generate sonic and ultrasonic oscillations in living organisms. These oscillations produce elastic deformations in the organism. If the frequency of the outside field corresponds to the oscillation frequency of the cells, the latter deteriorate ....." "Since almost all of the Soviet data on electromagnetic radiation (below visible) applies to physiological response, one can only imply that they have substantial knowledge of the psychological effects". "The UCLA Brain Information Service in Los Angeles ..... has compiled an extensive bibliographic list on the biological effects of electromagnetic fields (below visible frequencies) especially on the central nervous system". ***Numerous studies have since confirmed this including Wever(1974), Konig (1974), Beale et al.(1997), Lilienfeld et al. (1978), Robinette et al.(1980).***
4. Ref: DST-1810S-074-76 March 1976 "Soviet research has produced guidelines which were used to establish a value of 10 uW/cm2 per working day ***UK standard 110 uW/cm2***..... Should subsequent research result in adoption of the Soviet standard..... industries ..... could be required to make costly modifications to protect workers. Recognition of the standard could also limit the application of new electronic technology by making the commercial exploitation of some products unattractive because of increased costs imposed by the need for additional safeguards". Another possibility is the alteration of the permeability of the blood-brain barrier. This could allow neurotoxins in the blood to cross. As a result, an individual could develop severe neuropathological symptoms and either die or become seriously impaired neurologically" ***Proven by Salford et al.(1993)(1994)(1999). Parkinsons, Alzheimers, and vCJD are such possibilities.***
5. Ref: ST-CS-01-169-72 July 1972 "Low frequency emfs have been found to generate oscillations in living organisms. If the frequency of the outside field corresponds to the oscillation frequency of the cells, the latter deteriorate as a result of the mechanical resonance" ***The human brain & heart function at frequencies within the spectra of cellphones, computers etc.***
6. DST-1810S-074-76 March 1976 "personnel exposed to microwave radiation below thermal levels experience more neurological, cardiovascular and hemodynamic disturbances than do their unexposed counterparts (microwaves)

(1) used in all cellphones, Wi-fi, tablets etc. with pulse frequencies added.

(2) Most common symptoms

(3) Now proven by experiment many times.

Donald Stevens. Nov. 2000

(a 500 word essay for a magazine) (4)

Are you being targeted?
The answer may surprise you.

Several individuals contact me on a weekly basis from all over the World, claiming that they, or specific areas of their bodies, are deliberately being microwaved. The initial questions are:

Is it possible? Is there evidence? Has it been done? Is there proof? Is it happening, today? The simple answer is "Yes" to all of those questions!

The **PANDORA** project, funded by the CIA in the 60's was only one of very many experiments carried out on unknowing humans, to test how low-level microwaves cause physical and neurological harm. Dr Ross Adey claimed that: **"...all aspects of human behaviour can be affected – even controlled....."** (1) - Most secret experiments had the prefix MK before the codeword.

Even today, TETRA (Airwave) is an epidemiological study, until 2018, where neurological effects from calcium efflux is known to occur and the Government Scientists admit that they cannot exclude harm from the TETRA pulse system or cancer. TETRA is, of course, transmitted over approximately 150 countries. (2)

Synthetic telepathy (induced auditory influence) or, put more simply - hearing voices/suddenly having an impulse to do or act in some way – is legally transmitted to people in shops, supermarkets – in fact, anywhere. 'Patents' were taken out on such transmitters to:

(i) communicate with the deaf – i.e. microwave pulses, etc., direct into the brain
(ii) prevent people in shops from shoplifting, using a similar frequency (3)

It does not take a great leap of the imagination to realise that other experimental pulses/frequencies – known, from previous studies, to cause both neurological/physiological changes – could be used to the advantage of the transmitting body for a) research and b) profit.
NB: One US East Coast Store Chain has reported a $600,000 profit in nine months from this technology. (3)

Should the reader care to look at the list of both physical and neurological effects from my list of microwave pulses, it will become clear that these patented devices (of which there are many) can be open to abuse. (4)

Notwithstanding all of the above, 'Agencies' can always know exactly where you are (with or without you carrying a cellphone), watch your movements on one of the types of 'human radar' (5), and listen to anything you say (even if your phone is turned off). (6) Put simply, everything you do and say can be monitored 24 hours a day, wherever you are, should an Agency wish it to be.

Therefore, if you can be monitored, you can be targeted (let's be honest – Agencies are not going to ask for volunteers!).

In 1991, Hamline Universities Public Administration report on **MK ULTRA (1988)** found that victims had to settle out of court, as the US and Canadian Governments cited 'National Security'. The UK Government's 'Porton Down' does not walk with clean hands on human experimentation, either.

So, what can you do if you are being targeted?

i) Recognise the symptoms. (7)
ii) Do not carry a cellphone. If you have to, carry it in a wire mesh shield or metal tin (childs school pen/pencil box). Few people realize that some phones can be activated (even if off) and act as a relay antennae for another persons' call.
iii) If you do not carry a phone, avoid being tracked by 'radar' – which eliminates static objects near you – by mingling for a few minutes in a crowd. The computer will confuse your 'signal' with that one others.
iv) Wear shielding (specialized clothing) to reduce your absorption – hence symptoms.
v) Shield your home (ES-UK produces company lists and articles on this, if you are a new reader).

In summary, microwave stealth weapons have been used from the '50's to the present day. They are a perfect Governmental asset; hence the Government's complicity to protect the Communications Industry – they need each other to continue.

With more powerful computers, these weapons grow accordingly and have to be tested – which is where you come in....

Will you stop them? In 1999 the EU Parliament called for a World Convention to ban all human experimentation/manipulation (28th January – A4-0005/99 EP1159)....
You have somewhere to go....

Finally, little used these days, but not obsolete, if you have an implant (chip) have it detected with a reader (microwave detector or reader like Vets use to identify stray pets), thence have it x-rayed and removed.

In conclusion, several years ago in the West Country I approached a Knighted, top-Government Scientist and informed him that he could be causing brain damage, neurological damage and cancer to those being experimented upon in his 'trial'. He looked me straight in the eye and said "***What's wrong with that?"***

This is the mind-set of the decision-makers.....

Barrie Trower

February 2012

(1) Satellite Surveillance and Human Experimentation – Illegal experimentation on Humans P7
Paul Bird. Feb 2009.

(2) Most Confidential Report on the TETRA (Airwave) Communications System (Strictly for the Public & Commercial Services Union)
B Trower June 2009

(3) Advanced Electronics Security
Microwave Detection: Remote Mind Control Technology P3
Patents: 6587729 USA 5123844 USA 5289438 USA
Anna Keeler May 2010

(4) "The Communications Industry is in the position where it is spiralling out of any person's ability to control it"...
B Trower – Open letter (Internet).

(5) "Smart Antennae – they know where you are" Scientific American P48
Martin Cooper July 2003
"Celldar" Electronic News
Steve Bush Dec 2002

(6) "Your mobile phone is a wiretap – even if it is turned off".
www.next-up.org 27.11.09

(7) ES and EHS – ISBN 978-1-872072-20-3 P6
ES-UK (See address in magazine)
Michael Bevington Feb 2010

By Julianne McKinney, Director

Electronic Surveillance Project

Association of National Security Alumni

Silver Spring, Maryland

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The prospect of domination of the nation's scholars by federal employment, project allocations, and the power of money is ever present—and is gravely to be regarded. Yet, in holding scientific research and discovery in respect, as we should, we must also be alert to the equal and opposite danger that public policy could itself become the captive of a scientific-technological elite.

[*President Dwight D. Eisenhower, January 17, 1961*]

> ***Covert actions are counterproductive and damaging to the national interest of the United States. They are inimical to the operation of an effective national intelligence system, and corruptive of civil liberties, including the functioning of the judiciary and a free press. Most importantly, they contradict the principles of democracy, national self-determination and international law to which the United States is publicly committed.***

[*Credo of the Association of National Security Alumni*]

MICROWAVE HARASSMENT

AND

MIND-CONTROL EXPERIMENTATION

by Julianne McKinney

Director, Electronic Surveillance Project

Association of National Security Alumni

December 1992

Whither the KGB?

In February 1974, Georgetown University's Center for Strategic and International Studies (CSIS) hosted discussions on the plight of dissenters in the Soviet Union, and on the means by which the U.S. Government might most effectively intervene. Highlights of these discussions are reported in *Understanding the Solzhenitzyn Affair: Dissent and its Control in the USSR* (CSIS, 1974).

KGB strategies were addressed in some detail during these discussions. It was noted that the KGB's success depended on the extensive use of informant networks and *agents provocateurs;* and, following Brezhnev's rise to power, on the use of drugs and psychiatrists for further purposes of manipulation and control. Shadowing, bugging, slandering, blacklisting and other related tactics were also cited as serving KGB purposes. Participants in the conference agreed that the KGB's obvious intent was to divide and isolate the populace, to spread fear, and to silence dissenters.

Agencies of our own government are on record as having employed precisely these same tactics on a recurrent basis. The Church and Rockefeller Committee Hearings in the mid-1970's purportedly put an end to these practices. Based on recent developments, it would appear that the CIA's and FBI's Operations MKULTRA, MHCHAOS and COINTELPRO (the focus of these Senate Committee and Vice-Presidential-level Hearings) were instead merely driven underground. We are now in contact with a total of 25* individuals, scattered throughout the United States, who firmly believe they are being harassed by agencies of the U.S. Government. Others have been brought to our attention whom we will be contacting in the future. The

majority of these individuals claim that their harassment and surveillance began in 1989.

The methods reportedly employed in these harassment campaigns bear a striking resemblance to those attributed to the CIA and FBI during Operations MKULTRA, MHCHAOS and COINTELPRO. The only difference now is that electronic harassment and experimentation also appear to be (more blatantly) involved.

The Berlin Wall is down, Communism is in the midst of a death rattle, and the KGB no longer poses the threat which purportedly served to justify the U.S. Government's resort to such operations as MKULTRA, MHCHAOS and COINTELPRO. The KGB, since 1989, has been reduced to an increasingly distant memory.

Reactivation of surveillance/harassment/mind-control operations in this country suggests that the KGB, as an institution, was never the real threat. A KGB "mentality," with its underlying pragmatic contempt for civil liberties, appears, instead, to have been the driving force behind MKULTRA, MHCHAOS and COINTELPRO, and the operations now being reported to us.

The KGB "mentality" is a matter of personal predilection, not ideology. Its objective is power and control, regardless of human cost. It is a corrupting, cancerous influence, which feeds on fear, conformity and government funding.

Four months ago, when this Project commenced, we approached these complaints of government harassment and experimentation with an admitted "high degree of caution." We are no longer skeptical. The growing numbers of independent complaints and the similarities between those complaints cannot be ignored. Under the circumstances, the KGB should be proud of itself. As a "mentality," the KGB appears to be accomplishing more in "burying this country" from within, than it could ever have hoped to have achieved as an institution. It would appear that this country has a serious problem on its hands which needs to be resolved.

Part I of this report, which is reprinted from the June-July 1992 edition of the Association's publication, *Unclassified,* preliminarily addresses the complaints brought to our attention as of July 1992. Our objective, as noted, was to weigh the legitimacy of those complaints in terms of the directed-energy technologies reportedly involved. Part II discusses the overt and covert patterns of harassment identified as a result of our investigations, to date. A part of our objective, here, is to limit the success of such operations in the future, by according them widespread publicity.

In Part II, we do not identify individuals by name, both to honor their privacy and because our investigations have not been completed. Part II, like Part I, is a preliminary finding. Our focus is on the similarities of the complaints being received—similarities which Federal and State legislators, the courts, the FBI, local law enforcement agencies, the medical and psychiatric professions, and organizations such as the ACLU and Amnesty International have so far chosen to ignore.

We frankly find it curious that more attention and credibility is being accorded purported victims of UFO experiences and spectral visitations, than to persons who complain of systematic harassment and experimentation by the U.S. Government, involving technologies which the U.S. Government is only now grudgingly admitting to possess. These complaints require investigation. In due course (and provided financial support is obtained), we hope to be able to acquire the technology and supportive medical expertise to substantiate the claims being made. We also hope to alter the institutional mindset that U.S. Intelligence can be trusted. History, repeatedly, has proven otherwise.

PART I - THE PROBLEM SURFACES

[*Reprinted from the June-July 1992 edition of UNCLASSIFIED (Vol. IV, No. 3),*

published by The Association of National Security Alumni, Washington, D.C.]

The August-September 1991 issue of *UNCLASSIFIED* reviewed Hamline University's *Public Administration* report on the resolution of MKULTRA cases in 1988. Although the shocking details of medical ethics abuses by the U.S. and Canadian governments were amply detailed, Washington and Ottawa—citing national security and government privilege—stalled for so long that the cases never came to trial. The surviving victims settled for a pittance in an out-of-court settlement.

Since no individuals or agencies were held legally accountable, the door was left open for possible resumption of similar "mind-control" activities.

In the context of that article, we mentioned briefly that some half-dozen people had contacted us with appeals for assistance in ending what they believe to be electronic harassment and mind-control experimentation, possibly involving the CIA. We decided to take a closer look at this situation.

We are now in touch with approximately a dozen individuals located throughout the United States who appear to be targets of harassment and mind-control experimentation involving directed-energy technologies. [By mid-November 1992, that number had increased to 25.]

Typically, persons who complain of being "zapped by radio waves" and of "hearing voices" are stigmatized as psychotic, delusional or schizophrenic. Being mindful of this, as well as aware of the treatment accorded UFO and psychic phenomena "freaks," we approach this subject with a high degree of caution. Based on our preliminary investigation, including interviews with the affected individuals, we conclude that the matter is serious and should be pursued further.

The Existing Directed-Energy Arsenal

Our first step was to determine what, if any technology exists which might be used for electronic harassment. That information was found in a "white paper" published in 1991 by the U.S. Global Strategy Council—a Washington-based organization, under the chairmanship of Ray Cline, former Deputy Director of the CIA, who maintains very close ties with the U.S. Intelligence community. The "white paper" describes the foreign and domestic uses foreseen for laser weapons, isotropic radiators, infrasound, non-nuclear electromagnetic pulse generators, and high-power microwave emitters.

The term, "non-lethal," used to describe this technology is misleading. The energy emitted from all of these weapons can kill when appropriately amplified. At lower levels of amplification, they can cause extreme forms of physical discomfort and debilitation.

The Department of Army (DA) identifies these same weapons as "non-conventional." They were so identified in an exhibit at a DA-sponsored symposium on "The Soldier As A System," in Crystal City, VA, on June 30, 1992. Beta wave incapacitators were separately mentioned during the symposium as being of particular interest to the U.S. Marine Corps.

We discussed these "non-conventional" directed-energy weapons with Mr. Vernon Shisler,

manager of the exhibit and the Army's delegate to NATO in matters pertaining to "The Soldier As A System." Mr. Shisler acknowledged not only that directed-energy weapons are in DoD's arsenal, but also that the American soldier will remain vulnerable to their effects, should they be employed in the battlefield.

The U.S. Global Strategy Council recognizes the issue of vulnerability, as well, and urges ongoing research into effective countermeasures.

Interested readers may want to send for the U.S. Global Strategy Council's complete project proposal on this subject: (Title: *Nonlethality: Development of a National Policy and Employing Nonlethal Means in a New Strategic Era*, prepared by Janet Morris). A number of references in this Proposal to unidentified, elusive "enemies" of the U.S. Government and to the potential domestic applications of this "non-lethal" technology invite serious consideration by the public at large.

The Council's address is 1800 K Street, N.W., Washington, D.C. 20006, (202) 466-6029.

Bioeffects of Microwave Radiation

Research into the biological and psychological effects of exposure to microwave radiation is voluminous. The U.S. public has been led to believe that the former Soviet Union leads in this research. The fact is, the CIA and DoD [Department of Defense] have jointly pursued precisely the same research since commencement of Project Pandora in the 1950's. The current primary users of this research appear to be the CIA, DoD, the National Security Agency (NSA) and the Department of Energy (DoE).

The Walter Reed Army Institute of Research (WRAIR) has participated in this research since Project Pandora. In 1973, WRAIR discovered that externally-induced auditory input could be achieved by means of pulsed microwave audiograms, or analogs of spoken words' sounds. The effect on the receiving end is the (schizophrenic) sensation of "hearing voices" which are not part of the recipients' own thought processes.

The experiment prompted the following comment in *The Body Electric: Electromagnetism and the Foundation of Life,* by Robert O. Becker, M.D., and Gary Selden (Wm. Morrow & Company, NY, 1985): "Such a device has obvious applications in covert operations designed to drive a target crazy with 'voices' or deliver undetectable instructions to a programmed assassin."

This research has continued, and the results are published in various publicly available scientific and technical journals. Interested readers might consult, for example: Lin, James C., *Electromagnetic Interaction With Biological Systems* (Plenum Press, NY, 1989). Professor Lin, then with the Department of Bioengineering, University of Illinois, Chicago, has published a number of books and articles on this subject. [He has more recently informed us that he had designed the experiment referenced above in Dr. Becker's book.]

WRAIR has more recently been studying the biological effects of exposure to high-power microwave radiation. WRAIR presented a paper on this subject to a DoD-sponsored symposium on "MW [microwave] Weapons" at the Naval Postgraduate School in Monterey, CA, in mid-1989.

A matter of interest to us is why WRAIR should be experimenting with auditory effects of pulsed microwave audiograms. Also, recent statements by an Army psychiatrist assigned to the Walter Reed Army Medical Center (WRAMC) suggest that WRAIR may be experimenting upon

select psychiatric inpatients with microwaves. This, too, is a matter of interest to us.

Congressional Oversight

The Government's past record of abuses in the area of civil rights is well documented. Within the past 30 years alone, we have witnessed the effects of Operations MKULTRA, MHCHAOS and COINTELPRO.

Primarily because of MKULTRA, MHCHAOS and COINTELPRO, Executive Orders and implementing regulations were published which prohibited military and CIA domestic covert intelligence operations. Experiments on involuntary human subjects, and the surveillance of/collection of personal information on U.S. citizens, except under strictly regulated conditions were also prohibited.

Congressional committees were created to oversee compliance with these (quasi-) legal prohibitions. We have evidence that this is not being done. Moreover, where there are laws and, in this case, no laws enacted, there are loopholes, as well as individual and institutions who deliberately capitalize upon the existence of loopholes. Iran-Contra is one of the more blatant recent examples. Loopholes are also found in government resort to "black" intelligence and weapons programs, in the use of contractors, and in the absence of clear definitions of such terms as "national security" and "national security risk."

Executive Orders and regulations which currently limit official U.S. Intelligence activities do not extend to non-intelligence government agencies or to their contractors. In fact, Executive Order 12333 specifies that government contractors do not need to know that their services support U.S. Intelligence objectives.

In its report of July 8, 1992, the Senate Subcommittee on Oversight of Government Management addresses the problem of tracking funds granted to government-contracted research and development (R&D) centers. The report notes that the problem is compounded by DoD's penchant for creating hard-to-monitor "shell" contractors as disbursement centers for funding programs.

Neither shell contractors nor their subcontractors are directly accountable to Congress. Being beyond Congressional oversight, they have the license to operate as Government surrogates in intelligence operations about which, "officially" they know nothing.

In this context, a publication disseminated at DA's "The Soldier As A System" symposium noted that the Army's Research and Technology Program sponsors 42 laboratories and R&D centers, employing approximately 10,000 scientists and engineers. The annual budget of $1.3 billion is only a small part of overall DoD research spending.

Weapons research, which includes the development and testing of "non-lethal" weapons, is not governed by laws restricting the activities of U.S. Intelligence agencies, though it may be presumed that these agencies contribute to and benefit from such research.

Preliminary Findings

1. The technology exists for the types of harassment and experimentation reported to us.

2. About a dozen U.S. citizens have informed us of continuing experiences with effects which directed-energy weapons are designed to produce.

3. U.S. Government-sponsored research into the bioeffects of exposure to microwave radiation is extensive and continuing.

4. The U.S. Government has a past record of having engaged in mind-control experimentation; and various agencies of the Government have a record of circumventing legal restrictions upon their activities.

5. Neither Congress nor the courts appear willing to look closely into "black" intelligence and weapons procurement programs.

6. A number of U.S. Government agencies might have interest in testing directed-energy technologies on U.S. citizens under non-clinical/non-controlled circumstances—DoD, to test ranges and degrees of "non-lethality"; DoE, to explore "safety" limits; CIA, to test "mind-control" capabilities, and NSA, for technological refinement.

PART II - OVERT AND COVERT HARASSMENT

Since publication of the preceding article less than four months ago, the association of National Security Alumni/Electronic Surveillance Project has heard from an additional 13* individuals who report both overt harassment and a range of symptoms which coincide with the known effects of exposure to microwaves, electromagnetic/radio frequency (RF) radiation and/or infrasound.

The similarity of these symptoms will be addressed in greater detail in future Project reports. Suffice it to say, at this point, that the physical and psychological symptoms being reported to us are consistent with the effects which directed-energy weapons are designed to produce. Indeed, the numerous afflictions (or "inflictions") being reported appear to parallel standard torture "sequelae,"[1] (aftereffects).

Overt Harassment

Overt Harassment—which obviously is *meant* to be observed—may be intended to "precondition" individuals for eventual long-term electronic harassment. Persons terrified by unexplained overt harassment are not likely to cope with the sudden onset of electronic harassment in any more reasoned fashion. This phased pattern of harassment is apparent in all of the cases now being investigated. The fact that the overt harassment continues in these cases even after the electronic targeting commences suggests that the objective is to maintain long-term extremes of stress.

Many of the overt harassment tactics discussed below are surfacing in cases which (so far) have *not* involved discernible forms of electronic harassment. These are cases involving so-called "whistleblowers" who, because of their inside knowledge of certain potentially newsworthy events, pose particular threats of embarrassment to the Government or to government-affiliated employers. We have noticed that electronic harassment is beginning to surface as a form of retaliation against persons who try to assist electronic "harassees." Retaliation suggests loss of control. Under the circumstances, we are not entirely confident that "whistleblowers" will continue to be exempted from this type of harassment in the long term.

The individuals now in touch with the Project describe their circumstances as involving most, if not all, of the following overt forms of harassment:

· Sudden, bizarrely-rude treatment, isolation and acts of harassment and vandalism by formerly friendly neighbors.

· Harassing telephone calls, which continue even after the targeted individual obtains new, unlisted telephone numbers.

· Mail interception, theft and tampering.

· Noise campaigns.

While unrelenting harassing telephone calls might be considered in this context, other tactics are employed. Blaring horns, whistles, sirens, garbage disposal (run concurrently in apartment settings, for excessively prolonged periods of time), and amplified transmissions of recorded "general racket" have been used on a recurrent basis under circumstances intended to persuade the individual that he or she is under surveillance.

In all of these cases, the individuals' neighbors apparently pretend to be oblivious and/or indifferent to these sudden, continuous explosions of noise.

Door slamming is also a popular pastime, particularly in apartment buildings. One individual reported that, during a peak period of harassment, the neighbor across the hall began entering and leaving his apartment every 10 minutes, slamming his door loudly on each occasion. This was a daily occurrence, encompassing periods of several hours, over a period of several months. It apparently served to trigger a door-slamming "chain reaction" on the part of neighbors both on that floor and on the floors immediately above and below. When our contact politely asked her immediate neighbor to close his door more quietly, he slammed the door in her face. Prior to commencement of this harassment, that neighbor had apparently been quite friendly and courteous.

In another case, the primary door-slammer is an employee of Radix Systems, Inc., Rockville, MD, a DoD contractor engaged in the "super-secret" research and development of some type of electronic equipment.

Several individuals reported recurrent, loud, strange noises in their ventilation systems

during the preliminary stages of their harassment. One individual complained of being recurrently awakened in the middle of the night by the sound of wires being fed into his (independent) ventilation system. On checking further, he found that a tubular construction had been built into his vent system which appears to lead to the apartment upstairs. His upstairs neighbor is employed by the Department of Justice.

A number of individuals report that occupants of upstairs and downstairs apartments appear to follow them from room to room, tapping on the floor or engaging in other activities which appear intended to advertise an ongoing surveillance.

The Justice Department employee mentioned above went so far as to offer an unsolicited apology to her downstairs neighbor for the all-night “pacing about” in her bedroom (in the event he had happened to notice it). She claimed to be an insomniac. That pacing-about continued during her recent 36-hour absence from the area. When our contact politely alerted her to the fact that her apartment had apparently been entered during her absence, she told him, in effect, to mind his own business and then immediately complained to the building manager that he was stalking her.

She conveniently forgot to inform the building manager that she had assiduously “courted” this individual for several months, without success; and that she had been stealing his newspapers on a regular basis. (On one occasion, she handed him a week’s accumulation of those papers, claiming that they had been left outside the door of another apartment. Her reason for collecting and saving newspapers which had not been delivered to her directly is unknown.)

· Recurrent confrontations by unusually hostile strangers; and comments by strangers which appear intended to evoke “paranoid” reactions.

In this context, we note that several individuals have reported confrontations with “homeless” people who, on closer examination, were found to be fastidiously clean, though garbed in offbeat fashion (wigs included). The same “eccentric” confronted two of the individuals in contact with us, at separate distant locations. He is reported as having feigned mental illness on both occasions, and as having apparently enjoyed creating a public scene.

· Entries into the individual’s residence, during late-night hours while he/she is sleeping, and/or during the day when the individual is elsewhere.

In virtually all such cases, the burglars leave evidence of their visits, such as by relocating objects, or by committing petty and not-so-petty acts of vandalism. In two cases, the burglar’s “calling card” was to slaughter caged pets, leaving the mangled carcasses inside their locked cages.

In one case, the burglar stole several pieces of correspondence and left a packet of crack cocaine behind as a “calling card.” Our contact in this case—an individual who has no criminal record and no history of experimentation with drugs—is also being harassed (stalked) by a police officer in her community. One of his recent acts was to “frame” her with a drug possession charge. After pulling her off the road (a frequent pastime) and subjecting her to an illegal search (done, twice, so far), he conveniently managed to find a glassine packet of cocaine eight feet away, in front of his squad car. He retrieved the packet with his fingers and then charged her with Possession. Our contact found the packet of crack cocaine in her apartment shortly after this investigator reminded the attorney handling her case that the police officer had smudged his only piece of evidence with his own fingerprints. It would appear that someone is interested in correcting that police officer’s oversight.

In another case, the individual reports that a tremendous amount of money had been stolen from a hiding place in her apartment, within hours after she had withdrawn the money from her

bank. There were no obvious signs of entry into her apartment. The police conducted a cursory inquiry which failed to produce evidence of a crime worthy of investigation. (This case is an anomaly. Money is not usually stolen. Documents appear to be the preferred objects of theft, when thefts occur.)

In another case, the burglars replaced installed lightbulbs with “exploding” bulbs, many of which were *Made in Hungary.* The lightbulbs are now in our possession.

· Rapidly deteriorating health, generally of a digestive nature.

In two cases of the cases reported, massive rectal bleeding accompanied the sudden onset of severe gastrointestinal disturbances. One of these individuals abruptly terminated the deteriorative process simply by changing the locks on her door.

· Sleep disruption/deprivation.

This is achieved by means of both overt and electronic harassment. Sleep deprivation, as a tactic, invariably surfaces when the targeted individual begins exhibiting a strong emotional and irrational response to the other forms of harassment.

· Vandalism of privately-owned vehicles.

Vehicles invite peculiarly ferocious attacks in these harassment campaigns—slashed tires, smashed windows, oil drainage, oil contamination, destruction of electronic components and batteries (frequently involving wildly fluctuating, grounded fuel gages, often within range of weapons research facilities and/or other microwave emitters); and suddenly failed brakes and clutches (possibly involving anti-traction polymers, which are also in DoD’s “non-lethal” weapons arsenal). Recurrent auto thefts have also been reported.

Two individuals reported finding their oil contaminated immediately after having the oil changed by reputable mechanics. In one of these cases, the oil viscosified (thickened) while the individual was driving through a remote rural area. Her car ground to a halt. Getting the “gunk” cleaned out of her engine proved to be an expensive ordeal. (Viscosification agents are also lauded by the U.S. Global Strategy Council as serving “non-lethal” strategic purposes—a topic discussed in Part I of this publication. Had this woman been assaulted while awaiting help in the said isolated area, the “non-lethal” attributes of viscosification agents might have required redefinition.)

Most of those who have experienced these attacks on a recurring basis have abandoned driving all together—an objective apparently sought by their tormentors as a means of increasing their isolation.

· Staged accidents.

The majority of those in touch with us have reported these types of experiences. One individual, for example, was tailgated at a high rate of speed by two vehicles, while concurrently being threatened with a gun by one of the vehicles’ occupants. Two others narrowly avoided what appeared to be deliberately attempted collisions by drivers who quickly sped away from the scene. One avoided three attempts in four days at being run off the road. One survived being run off the road in two incidents within a one-week period, which resulted in “totaling” of her two vehicles. Another narrowly avoided being crushed into an expressway retaining wall, on four occasions, by an off-duty metro bus, as well as, within the same time frame, being “fried” by two suddenly-malfunctioned household appliances which subsequently repaired themselves.

It should be noted that, in some of these cases, “accidental” deaths do occur. One individual in contact with us reported that his mother drove off a cliff to her death, during a period when he

was researching evidence that a still-respected, high level State Department official had passed A-bomb secrets to the Soviet Government during World War II. The accident occurred shortly after her car had undergone routine maintenance. She was returning from a dental appointment when the accident occurred. Witnesses state that it appeared that she had suddenly stepped on the accelerator before running off the road. The accident served to terminate this person's research project.

We are also currently looking into the recent death of a woman in Lexington, MO, who was killed when the brakes on her tractor failed. We are informed that she had been collecting affidavits from persons who believe they are the targets of government harassment and experimentation when her "accident" occurred. We are also informed that those affidavits have disappeared.

Suicides might also qualify as "staged accidents," particularly where "plausibly deniable" government involvement has been surfaced. We are currently looking into the recent suicide of a man in Trappe, PA, who, as early as 1981, had asked the FBI and CIA to intervene in his case. We have copies of that early correspondence. The man, a former U.S. Army radar technician, had a highly technical and—given the date of his correspondence—"precocious" grasp of the experimental objectives apparently being sought in his case. It is apparent from his correspondence that he had wanted to believe that the Soviets were conducting these experiments. The FBI and CIA, of course, did not intervene. We are informed that members of his family have also been targets of this experimentation.

· Isolation of the individual from members of his/her immediate family—virtually assured when highly focused forms of electronic harassment commence.

The exception to this is when elderly parents and young children in the family become targets for apparent purposes of intimidation. This situation has been reported in eight of our cases, to date.

One individual (driven to extremes of stress by ongoing electronic harassment focusing on her children) killed one child in an effort to protect her from further pain.[2] It appears that lasers were being used in this individual's case. The targeting intensified after she called the Soviet Embassy to report the harassment, which she believed to be U.S. Government-sponsored. It became even more deadly when, in a further show of defiance, she then called the representative of the Iraqi Government to portray the U.S. Government's war in the Middle East as "hypocritical." She is now hospitalized in a midwestern psychiatric facility, where, apparently, the experimentation is now continuing.

(That psychiatric facility is in a State where a disproportionate number of complaints of electronic harassment are beginning to surface. It is also within range of a U.S. Air Force base which houses a "super secret" research facility. We are currently looking into information that spouses and children of persons employed on that USAF base may be the targets of involuntary experimentation involving directed-energy weapons technologies.)

Another individual, during a telephone conversation, was told by an employee of a local power company that, if she valued the lives of her children, she would drop her public opposition to the company's installation of high power lines. Since receiving that threat, the individual's 11-year-old daughter has been reduced to extremes of pain, resulting in her recurrent hospitalization for treatment of illnesses which cannot be diagnosed. It is now also apparent to this individual that her three-year-old son is on the receiving end of externally-induced auditory input. (DoE figures prominently in this case.)

· Progressive financial impoverishment, brought on by termination of the individual's employment, and compounded by expenses associated with the harassment.

The majority of those now in contact with the Project—educated, white-collar professionals—have lost their jobs. Termination of employment in many of these cases involved prefatory harassment by the employer and co-workers, which coincided with the other overt forms of harassment discussed above.

The overt harassment tactics are being described as recurrent, non-sequential and overlapping. As noted above, the overt harassment continues even after the electronic harassment commences.

Failure of "Establishment" Support Systems

Those individuals who have tried to resolve their respective situations through resort to "establishment" channels have invariably encountered the following:

· Apathy, indifference and/or professed helplessness on the part of members of Congress and state legislators.

· Dismissal and/or attempted discrediting by psychiatrists who refuse to include the terms, "government harassment," "mind-control experimentation" and "torture" in their vocabulary.

Several individuals, thinking that psychiatrists might help to alleviate the extreme stress associated with their harassment, were accorded "treatment" which clearly pointed to cooperation between their psychiatrists and members of the U.S. Intelligence community. One such psychiatrist, in fact, bragged about being a member of the U.S. Intelligence "inner circle," informing our contact that her harassment was a "Pavlovian Experiment," intended to "break" her.

· Lack of interest, courage and/or competency in legal circles.

Few of those in contact with us have been able to acquire legal assistance—not helped by their straitened financial circumstances. Most have found that few attorneys are willing to risk their careers by pursuing cases involving what is believed to be government-sponsored harassment and experimentation.

A few attorneys reportedly engaged in egregious violations of codes of professional conduct, in what appear to have been deliberate efforts at sabotaging our contacts' cases. Subsequent attempts by two individuals at obtaining legal redress were met with stonewalling, obstruction, and high-level denials of wrongdoing.

· Refusal of the mass media to address this topic, except in those cases where suspected experimentees have been driven to the point of committing murder or suicide.

Such cases (particularly where an individual has claimed to be the victim of CIA-directed mind-control involving auditory input) are treated by the press as "curiosities." An example of this is the individual who shot a Navy officer outside the Pentagon in mid-1991.[3] He claimed to be a victim of CIA mind control, involving auditory input. According to the press, "he worried 'about being run over by trains'..." (ref. incident described in following paragraph). He is now permanently residing in a psychiatric facility. He, being institutionalized, and others in the preliminary stages of his predicament are no longer of interest to the media.

Another recent case which received short-lived press attention[4] involved a woman diagnosed as having "suffered from periods of confusion" who climbed over a fence onto a railroad track and walked into an oncoming train. Because the incident occurred in a community

in which an unusually large number of these mind-control experiments have been reported, we are looking into the situation. The woman was reportedly “under a physician’s care” because of her “periods of confusion.” A family member described the physician to this investigator as “a psychiatrist.” We find that the alleged “psychiatrist” is a General Practitioner, otherwise non-accredited, practicing out of his home. We find also that the suicide may have been witnessed under peculiarly-timed circumstances by an alleged “homeless” person who has since disappeared. Needless to say, our interest has been whetted.

· Refusal and/or inability of local police to intervene.

The tendency of local police is to dismiss an individual’s complaints of government harassment as the ravings of a “fruitcake.” In one case, discussed above, it is apparent that one police officer is actively cooperating in the harassment. Some police agencies, while acknowledging the reality of the situation, hesitate to intervene in cases involving what they believe to be U.S. Intelligence. On a few occasions, certain police officials did attempt to intervene, based on what they perceived to be evidence of a systematic harassment/illegal surveillance campaign. Absent a clear mandate to prosecute “stalkers” acting under the aegis of U.S. Intelligence, the police obviously had their hands tied.

· Refusal of the FBI to intervene in any of the cases brought to our attention thus far.

FBI spokesmen do acknowledge that they have received a large number of requests for assistance from “mentally disturbed persons” who believe that they are being “zapped by radio waves” and/or “are hearing voices...” “from Mars, that is.”

In one case, an FBI spokesman reacted in an angry, defensive and bizarre fashion when our contact briefly alluded to PROJECT SLAMMER as possibly being related to her surveillance. (PROJECT SLAMMER is a CIA-funded study, managed by CIA and FBI behavioral scientist, which explores the “mental make-up” of alleged security risks, along with their family members and close associates. Participants in PROJECT SLAMMER include NSA, DIA, and Army, Navy and Air Force Intelligence.)

Until PROJECT SLAMMER was mentioned, the FBI spokesman’s approach in this case was to politely and redundantly explain that the law, as currently constructed, prevents the FBI’s intervening in this individual’s case. When she briefly pointed out that the surveillance activities might fall under the purview of PROJECT SLAMMER, the spokesman’s response was to abruptly and angrily declaim, “**You** don’t know who is conducting that surveillance! **You** don’t know if that is a state police surveillance! ...or a local police surveillance! It could be a totally unrelated operation! **You** don’t know who is conducting that surveillance! [etc., etc.]!”

It was apparent from this response that the FBI was at least acknowledging the existence of a surveillance, if in somewhat emotional fashion. The individual in question subsequently furnished acquired evidence to the local police, who made it clear that they are not participants in the surveillance which, based on the evidence, pointedly suggest that our contact is the target.

· Refusal or inability of the ACLU and Amnesty International to intervene.

Both organizations acknowledge receiving many complaints from persons claiming to be the targets of some type of electronic harassment. An ACLU spokes-woman characterized the complaints as appearing to be rational, except in a few cases. The complaints are not being investigated, she said, because of “limited resources.” We have to wonder, of course, why the ACLU could recently find resources to defend the rights of prostitutes and the Ku Klux Klan, yet remains incapable of intervening in cases such as we are now pursuing.

Amnesty International recently informed one of our contacts that they could not intervene in

her case because their focus is on the U.S. Government's treatment of prison inmates. While incarceration does appear to be one sought-for objective in these harassment/mind control experiments, we would like to think that protections by such organizations as Amnesty International can be achieved beforehand.

Related Covert Methodologies

The persons engaged in this harassment tend to become careless, possibly the result of arrogance born of an assumption that nobody can stop them. "Harassees" who have noted this carelessness have furnished us with the following insights into the covert side of these harassment activities.

· Impersonation of military officers.

One individual found that her next-door neighbor had claimed to be a military intelligence officer, assigned to a space technology unit in California, on year-long "TDY" (temporary duty) in the individual's apartment building. It was subsequently determined that this alleged officer is not in fact a member of the U.S. Armed Forces; and that he had used this bogus status to acquire information from a major defense contractor. Our contact is certain that this person's apartment was used as a base of harassment operations.

· Use of concealment devices, and emitters detected to date.

Several individuals and supportive associates report having seen some of the electronic devices being used in these harassment campaigns.

One saw electronic equipment concealed inside a false-front upright piano being moved out of her apartment building. She had previously noted that all of her surrounding neighbors had identical upright pianos in their apartments, not one of which was ever played.

Other suspected participants in the harassment may be concealing devices in oversized stereo speakers, measuring approximately 5' in height x 3' x 3'. Several of our contacts have noted the presence of such speakers in adjacent dwellings.

One individual was told by a resident of her building that her upstairs neighbor has "microwave ovens" in his bedroom and livingroom, but none in the kitchen.

Another individual, while standing outside, looked into her neighbor's window to find that her bedroom appeared to be the target of a gray-colored, elongated box-like device, measuring approximately 1' in length x 5" in height (side view). A large, black-framed lens protruded from the end facing her window. The electrical cord, if any, was not visible from that vantage point. The equipment was being operated by a stranger in a three-piece suit, who appeared to be quite startled to find that he was being observed.

Another was given strong reason to believe that portable emitters are being concealed in oversized, extremely heavy, sometimes expandable "briefcases" for use in places of public assembly, such as meeting halls, auditoriums and restaurants. Smaller varieties are apparently being used on aircraft.

On one 3-hour flight, our contact noticed that the man sitting next to her seemed peculiarly intent on keeping the attaché case on his lap propped open with his fingertips, while he gazed "blankly" into the distance during the entire flight. She believed that she was being electronically harassed while on the flight (a common complaint, in most of the cases now being investigated).

Our contact reports that, when they prepared to land, the man opened his attaché case to hastily check its contents, thus disclosing the presence of a raised, built-in “concealment device” covering the entire bottom surface of the attaché case. The low-slung, lift-off cover did not appear to be capable of concealing a laptop computer. At one point during the flight — apparently aware that his “reverie” was inviting attention, —the man devoted approximately ten minutes to scribbling assorted entries on a sheet of lined paper, which he had placed on top of his briefcase two hours previously. He devoted roughly ten minutes to the effort (obviously preferring a pen to a laptop computer). His attaché case remained ajar during this process.[5]

One individual reports that mobile emitters may be installed in certain oversized, non-attributable medical emergency vehicles, possibly for eventual use in civil disturbances. Her unsuccessful attempts at following the “medical emergency” vehicle which had surfaced in her case ended with a high-speed chase.

The phony military intelligence officer, when recently moving out of our contact’s apartment building, was found to possess a device which resembles an oversized microwave oven, measuring approximately 4' in width x 2' in height x 2 1/2' in depth. A subsequent examination of his apartment revealed that he had tapped numerous additional lines into existing, in-house telephone and TV cables; and that he had gone to great pains to conceal a major excavation into one wall abutting the “harassee’s.” Judging from photographs taken immediately after this person’s departure, the wiring suggests that he was hooked by modem into a computer network, and that at least some of his electronic equipment was situated in a large walk-in closet, again abutting the “harassee’s.”

When the alleged officer moved out, his equipment (except for the oversized “microwave oven”) was packaged in boxes identifying the contents only as stereo components. During his year-long residency in this building, no sounds emanated from his apartment to indicate use of this “stereo” equipment.

· Use of modified license plates and vehicle look-alikes.

Some individuals have noted that their neighbors’ vehicles are periodically replaced (during peak periods of harassment) by others which qualify as “rough look-alikes.” The tags on these latter closely resemble those on the homeowners’ vehicles, with a difference being noted in only one digit or one letter. These modified plates appear to have been acquired through State DMV channels, thus suggesting government/intelligence agency involvement.

In one case, where the individual has obtained police assistance, tracking of one plate surfaced evidence of a drug connection. That plate rapidly disappeared from the vehicle in question, to be replaced by another, again bearing a one-letter modification.

· Use of neighbors’ residences as bases of operation and training.

One individual recently saw a team of “technicians” in the house behind hers—a consequence of the team’s failure to close the curtains and/or dim lighting when puttering around in the kitchen at 5:00 in the morning. The three men (strangers to this individual, all stripped down to their T-shirts) behaved as if they were unaware that they were being watched. Their observer had long suspected that this house was being used as a base of electronic harassment operations. The harassment had been ongoing throughout the night.

To provoke a response from these men, the individual eventually commented aloud on their activities. They responded immediately by turning the lights off and switching to the use of flashlights. Why they failed to close the curtains is unknown.

This individual is working with the police in an effort at ending this surveillance and harassment, with mixed results.

* * *

Another individual, paying a surprise visit to the apartment upstairs, overheard one of her own telephone conversations being played on a tape recorder inside that apartment. Lacking both a legitimate pretext to enter the apartment and the support of the building's management personnel and/or the police, she was prevented from pursuing this further. Her upstairs neighbor is purportedly employed by Stanford University Hospital, in Stanford, CA.

The target of surveillance and harassment in this case is still *also* trying to recover from the effects of exposure to potentially lethal doses of radiation, administered in the 1970's by a dangerously "incompetent" dentist. This might explain the involvement of alleged Stanford University Hospital personnel in her situation.

The government is on record as having experimented on unwitting U.S. citizens with radioactive materials during the 1970's (and earlier).[6] The House Subcommittee on Energy and Commerce based their investigation into this matter on a 30-year accumulation of documents maintained by the Department of Energy. Under the circumstances, it will come as no surprise if it is ultimately found that DoE has been involved in this woman's surveillance and harassment.

* * *

Another individual paid a surprise visit to the apartment immediately beneath hers, in an attempt to identify the source of a tremendous racket in her ventilation system. Standing outside the door, she could hear an individual moving around, a short distance from the door. She also heard the sound of rustling paper and the steady, sonar-like "pinging" of some type of electronic device. In response to her repeated knockings on the door, the person inside simply stopped moving about. The sound of rustling paper (perhaps a printout of some type) and the steady "...pin-ng! ...pin-ng!" sound continued. The occupant of this apartment resumed moving about only after it was (incorrectly) believed that our contact had departed the area. Typically, this situation could not be pursued further.

* * *

All of those who live in apartment buildings report unusual patterns of occupancy in the apartments surrounding their own; i.e., upstairs, downstairs and on all sides. They have become quite convinced—if only because of the highly focused nature of the symptoms being experienced—that these surrounding apartments are being used as bases of operation. Perhaps this encirclement facilitates studies of holographic human telemetries; or perhaps it is intended to increase the prospect of brain entrainment by electronic means ("entrainment" being one published objective sought in mind control experiments).[7]

In examining this situation more closely, a number of individuals have found that surrounding apartments are either permanently vacant, for unknown reasons, or that they have been "sub-let" by the original occupants to persons who are purportedly unknown to the buildings' management personnel. In one case, the surrounding renters all list two residences in the local telephone book. Not one lives in the apartment building in question, though the address is identified as one of the renters' places of residence. One individual suspects that the original occupants of apartments surrounding hers have simply been relocated to other apartments in the same (large) building. Another suspects that an adjacent apartment, which has been permanently rented to the U.S. Government for use by "visitors" is also being used as a base of operations.

One individual found that an immediate neighbor's housemate has the same (unusual) name of a university professor who has engaged in extensive research on behalf of the government, studying the bioeffects of exposure to microwave radiation.

· Use of informants/*agents provocateurs,* frequently members of the opposite sex.

As noted in the U.S. House of Representatives Committee on Interior and Insular Affair's draft report, *Alyeska Pipeline Service Company Covert Operation* (July 1992), the Wackenhut Corporation's Special Investigations Division adopted this tactic when pursuing Alyeska's critics.

A number of individuals in touch with us report a range of experiences with new "friends" who—apparently posing as confidants—used acquired personalia to abruptly end these "friendships" under deliberately degrading and humiliating circumstances. When taken in the context of the ongoing surveillances and harassment, these exercises appear intended to heighten emotional trauma, perhaps to provoke an uncontrolled response and/or to enforce isolation.

· Misuse of covert intelligence personnel (possible former case officers).

One individual, while under contract to the U.S. Government, properly reported what he believed to be an approach by a hostile intelligence service. Within a few weeks, alleged U.S. Intelligence officers contacted this individual. In addition to questioning him about his background, these alleged intelligence officers asked that he keep in constant touch with them, particularly when planning to travel.

It soon became apparent that the alleged intelligence officers were intent only on forcing this individual to report to them as directed, and to account for his activities. He was not asked to assist the U.S. Government in any form of intelligence operation; he was not asked to execute any form of secrecy affirmation statement acknowledging the classified nature of these meetings; nor was he told why these meetings—involving a total of seven alleged case officers —were necessary.

When he began to balk at a continuation of this process, one of his "handlers" conveyed a threat, suggesting that his continued compliance might be "enforced." Finally, when this individual adamantly refused to cooperate further, massive overt harassment commenced and is currently ongoing.

The operation (clearly intended to bully this individual into submissive compliance for purposes which are still unknown) involved crude tactics formerly prized by the KGB.

Whether or not legitimate U.S. Intelligence case officers were involved in this activity remains to be determined. Some private firms retain former U.S. Intelligence case officers for contracting out as "security specialist." The founder and CEO of one such firm (Gerald P. Burke, The Parvus Company, Silver Spring, MD) has informed us that the activities of contract case officers are neither monitored nor subject to formal restraint.

· Use of psychotropic drugs by cooperative physicians.

Shortly after resigning from the CIA, one of our contacts underwent a range of experiences which suggested that she had been massively drugged. One of the alleged perpetrators, whom we have met, alternately claims to be employed by NASA and/or by a firm in Miami, handling, "microwave equipment." NASA has no record of this person under the name furnished.

The "experimentee" ultimately sought the assistance of a psychiatrist, whom her parents had located as a referral. The psychiatrist treated her reported "flashbacks" by immediately placing her on a regimen of Stelazine, which quickly aggravated her condition. He also made comments to this individual which suggested that he had a foreknowledge of her situation, and that he was cooperating with U.S. Intelligence. On one occasion the psychiatrist intimated that our contact might be employable as an assassin; and he repeatedly urged her to move to Great Britain where, he said, she would be put in touch with an unidentified Member of Parliament.

Interestingly, he had a tremendous computer system in his office suite, which he explained as being connected by modem into a national level system which, in turn, connected into private residences. When showing her this equipment, this psychiatrist informed our contact that she had been “CAT scanned,” pointing out that she was the subject of the vast series of “A’s” and “B’s” being printed out by one of the many terminals at his disposal.

Our contact also found that this psychiatrist kept a military uniform in his closet which bore the rank and insignia of a three-star general.

The individual ultimately sought psychiatric support elsewhere. Her new psychiatrist, formerly employed by DoD, immediately put her on a regimen of Haldol Decanoate, Klonopin and Benzatropine. The combined effect of these drugs was loss of memory and a state of mind which, under other circumstances, might be diagnosed as Depersonalization or Dissociative Disorder. All three drugs proved to be highly addictive. Our contact, since severing contact with this psychiatrist as well, has finally successfully overcome the addiction.

* * *

Another individual—the one whose psychiatrist had informed her of her role in a “Pavlovian Experiment”—was subjected to attempted drugging by Trazodone, one of the strongest sedatives on the market. The psychiatrist in question kept no record of the individual’s outpatient visits, nor of her Trazodone prescriptions. Being unaware that the individual was not adhering to his regimen, the psychiatrist urged her to rapidly increase her dosage, renewing her 30-day prescription after a period of only 11 days.

Though aware of her heart condition, he failed to monitor her condition, dismissing her complaints of (electronically-induced) pains in her heart as inconsequential. Trazodone is known to aggravate heart conditions. Perhaps the intent was to have this individual succumb to a “heart attack” as the result of “imagined” government harassment. Neither the appropriate psychiatric society nor the FBI would touch this case.

* * *

Another individual (a clear target of retaliation) sought medical assistance to counter sudden massive headaches and recurrent attacks of vomiting—effects which can be produced by infrasound. The physician to whom she was referred (an alleged specialist in Internal Medicine) placed her on a combination of Compazine and Xanax, prescribing dosages which the Physicians’ Desk Reference warns against.

Compazine, in addition to being an anti-emetic, is used in the treatment of psychotic disorders. It can also cause tardive dyskinesia, an irreversible syndrome involving loss of motor control. Xanax is known to induce vomiting. Both drugs can lead to dependency and a worsening of the patient’s condition. The effects of all such drugs, in fact, can be mutated in high-energy fields, thus increasing the likelihood of adverse reactions.

We have recently found that this prescribing “physician” is not licensed to practice medicine in the State in which she has been practicing since at least 1989.

Our contact, being concerned about the long-term effects of Xanax and Compazine, consulted another physician in that same office. This physician immediately prescribed Prozac, failing to concurrently recommend that her patient discontinue the Xanax and Compazine prescriptions. When our contact refused to take any psychotropic drugs, the doctor became upset and asked, “Don’t you want to get well?”

This second physician is a licensed practitioner in Internal Medicine, with no background in Psychiatry. We have also found that she apparently refers her patients to yet a third physician in

the office who claims to be a psychiatrist. She, too, is licensed to practice Internal Medicine, only. Her receptionist described this third physician as having a psychiatric “sub-specialty,” ... “as an internist.” The receptionist also informed us that this internist “is treating a number of psychiatric patients.”

On pursuing this further, we find that these physicians are in a small “medical group” which is not listed by specialty in standard regional telephone directories. The group bears the same name as one of the CIA’s most infamous recruited physicians (perhaps best described as “the Mengele of MKULTRA”).

The doctor’s offices are located in a bank building, which, we have found, is a favored hiding place for security-oriented businesses and government agencies. Two computer firms, co-located with an attorney who represents “Island Resort Development, Ltd.,” are situated immediately beneath the doctors’ offices. The prospect of our finding island resort developments within 500 miles of this attorney’s office is limited.

Our contact, being apprised of these findings, is seeking medical help elsewhere.

* * *

In two of our cases, urologists took it upon themselves to play the role of “psychiatrist”; i.e., they rendered psychiatric diagnoses and prescribed psychotropic drugs. One of these urologists, employed by The Mayo Clinic in Rochester, MN, prescribed Haldol, informing our contact that he perceived her to be “psychotic.” His efforts at getting a Clinic psychiatrist to confirm this diagnosis were unsuccessful. The psychiatrist, apparently a rare individual who subscribes to codes of medical ethics, found nothing wrong with this woman, even given the nature of her complaints. The urologist’s response to this was to issue his own Haldol prescription. Sensing that something was amiss, the woman refused to have the prescription filled.

* * *

Yet another individual ended up in the hands of a psychiatrist who, as a purported means of ending the stress associated with her harassment, offered to put her under hypnosis. She described the hypnotic state as “equivalent to floating” and (based on her overall experiences with this physician) has not ruled out the possibility that drugs may have been surreptitiously administered. The psychiatrist claimed to be interested in psychic phenomena and demonstrated an apparently remarkable ability to read this individual’s mind.

While in her “hypnotic state, the individual felt a sharp, painful pressure inside her nose, as if something were being shoved up her nostrils to the sinus cavities. She awoke to find blood pouring out of her nostrils. The psychiatrist casually dismissed this as owing to a probable cold.

Shortly after that experience, the individual began to hear loud tones in her head, followed in due coarse by auditory input. Brain scans have failed to yield evidence of an implanted device. (We have recommended that she undergo a scan by means of a suitably adapted non-linear junction detector, as a preliminary.) Suffice it to say, this individual has severed contact with the psychiatrist and is continuing to cope with ongoing overt and electronic harassment by other non-medical means.

· Use of medical implant devices.

The situation just described is not our first encounter with the apparent use of medical implant devices in these harassment/mind-control cases. Another of our contacts began receiving auditory input roughly 15 years after she had 4 mm. cochlear implants placed in her ears. The “voices” claimed to be affiliated with the CIA and, among other things, expressed

intentions of running this woman as an agent in denied areas by “piggybacking” their audio transmissions onto standard FM frequencies to avoid detection.

We have been unable to locate the surgeon who implanted these devices, though we do have a copy of his operative reports. A recent CAT scan of this individual failed to disclose the presence of the cochlear implants.

Several years ago, the individual (now a psychologist) applied for a position with the CIA. She was interviewed by four Langley-based, purported psychologist, who allegedly informed her that her job would involve the assessment of certain criminals for purposes of weighing their prospects for loyalty to this agency.

During these interviews, she was told to read several books by such persons as Philip Agee, Stansfield Turner and Ralph McGehee, all of whom were unknown to her. The alleged psychologist claimed that these authors had described the CIA “as it really is.” Our contact was not asked to execute a secrecy affirmation statement acknowledging the classified nature of these proceedings.

The unconventional manner of this interview process suggests that this individual was being toyed with, for reasons which remain to be determined. She did not get the job and in fact more recently lost her job with a state penitentiary. She was fired on the recommendation of the prison’s psychiatrist, because of her insistence that she is receiving auditory input from CIA personnel who persist in feeding her classified information.

Interestingly, though this individual was deemed unfit to function as a psychologist in the penitentiary system, the State has rehired her, assigning her to a mental health facility where, apparently, she is to develop a behavioral modification program for retarded adults with diagnosed mental illnesses.

This individual claimed to be receiving and responding to externally-induced auditory “advice” while working with prison inmates. It may be presumed that the process will continue. Under the circumstances, we have to wonder if this case qualifies as a benchmark in mind-control experimentation; i.e., employment of a mind-controlled psychologist to run the equivalent of mind-control experiments on mentally-ill retarded adults. We will continue to monitor the situation.

* * *

The individual whom we previously identified as having challenged a local power company also appears to have been “tagged” by some type of implant device. During a recent symposium, she was approached by a man whose business card identifies him as “Program Manager, Electromagnetic Radiation Division,” DoE. His approach was suitably sympathetic. Our contact ultimately accepted the man’s invitation to continue discussing their common ranges of interest in his hotel room. During this meeting, she accepted the offer of a drink, blacked out after consuming it, and awoke four hours later, still in this man’s hotel room, to find that the back of her ear had been punctured and was bleeding. There was no evidence of a sexual assault. The man glibly evaded this woman’s requests for an explanation. She has since found two adjacent puncture marks behind her ear, which are not healing properly, and between which she can feel the presence of a “wire” measuring approximately 1/4" in length. We are pursuing this further.

The said DoE Project Manager has more recently initiated contact with yet another activist in touch with this Association. His call was unsolicited. He apparently wanted to know if this woman would be attending an upcoming conference. We have warned the individual to avoid any form of private meeting with the said Project Manager.

* * *

To date, we are aware of three cases involving clandestine behavior on the part of alleged DoE employees. The CIA figures prominently (if peculiarly) in the majority of our other cases. Two of those have been discussed above.

In another, also involving auditory input, the individual is certain that the current Director of Central Intelligence (DCI) participated in the "voice transmission" process on at least one occasion. She claims to have recognized his voice. When she commented aloud on the DCI's perceived involvement in this experimentation, the "voice" responded with stuttered and stammered denials. We are told that this particular "voice" has not been heard from since.

* * *

In yet another case involving auditory input, the individual has allegedly been informed by her "voices" that the technologies being used against her were stolen from the CIA by a maverick employee, whose group is now targeting her from a distance of 2,000 miles. She reported this to the DCI's office and was allegedly informed by the Deputy DCI that she will be awarded millions of dollars if she can produce the equipment and any of the personnel involved in her harassment.

One unusually-candid CIA spokesman also allegedly informed this individual that, "while the CIA does not deny having this equipment," they "do not use it in this country." Perhaps this explains why a number of our contacts have also been electronically harassed while traveling overseas.

This woman has also been repeatedly assured by CIA DDS (security) personnel of the Agency's sincere concern for her welfare. During a recent telephone conversation with that Office, we confirmed that she is indeed known to the CIA. Based on this, we asked that the Agency "put its money where its mouth is," so to speak, by conducting a long-term electronic sweep of this individual's premises. That was two months ago. No sweep has been conducted, though CIA spokesmen continue to "sympathize" with her predicament.

* * *

Another individual, a target of harassment and experimentation since 1952 (apparently singled out because of his student activism while at Penn State University) began hearing "voices" after having most of his teeth capped. He has more recently been informed by his "handlers" that implanted devices are no longer used for purposes of inducing auditory input. No explanation was offered. He was quite visibly surprised when informed by this investigator that auditory input can be achieved solely by means of pulsed microwave audiograms (discussed in Part I of this report).

This individual's "handlers" allegedly have also stated that their experiments on U.S. citizens are in pursuit of a variety of objectives; viz.,

(1) develop an effective means for creating a perfect, "robotized" soldier;

(2) alter individual sexual preferences, such as by turning heterosexuals into homosexuals (they allegedly claim to be having "difficulties" reversing the process): and

(3) enhance or destroy levels of academic achievement, at will, such as by degrading the performance of otherwise brilliant students, and by drastically improving the performance of poor students.

Given the technology at the government's disposal and a predisposition on the part of

certain governmental agencies to “play God” in experimental fashion with citizens’ lives, these purported projects do not come across as being totally far-fetched.

* * *

Another case involves a woman whose experiences suggest that she, too, is an MKULTRA experimentee being kept on the books, so to speak. The woman, apparently a “pet” experimentee, found herself being introduced to a wide array of prominent individuals whose connections with the CIA she believed to be quite apparent. One of those she states, was Robert Jay Lifton, a well-known author and expert on brainwashing, whose books include *The Nazi Doctors: Medical Killing and the Psychology of Genocide* (Basic Books, 1986).

Her experiences included a voluntary (“referral”) admission to Hollywood Hospital, Vancouver, British Columbia, Canada, in 1973, during an era when MKULTRA experiments at the Alan Memorial Institute, McGill University, Montreal, Canada, were only beginning to capture the attention of the U.S. Senate.[8]

More recently, in 1990, she was transported to New York University’s Cameron Medical Center, in Westchester, NY (under circumstances which qualify as an abduction), where she was forcibly wrestled to the ground by approximately six Center staffers and forcibly confined for a period of approximately three weeks. She was neither psychiatrically counseled nor formally tested while in that facility. The psychiatrists assigned to her case appeared more intent on forcing her to take a combination of neuroleptic drugs, to include Haldol, Navane, and Cogentin. (Haldol and Navane can cause tardive dyskinesia.) She resisted those attempts.

A court ultimately ordered this woman released from the Center, stipulating that she was not to be administered drugs. On subsequently acquiring her medical records, under conditions which prevented censoring or doctoring of those records, she found that her psychiatrists had planned to inject her with drugs (in defiance of the court order) on the day of her release. As luck would have it, she was released a day early.

This woman states also that she has met Budd Hopkins, of the Intruders Foundation, and that she had a long-term, confiding relationship with John E. Mack, Professor of Psychiatry, Harvard Medical School, and founding Director of the Center for Psychological Studies in the Nuclear Age (previously named, Research Program for the Study of Human Continuity; and, still previously, rumored to have cooperated with the CIA in studies of “human ecology”).

At one point in their relationship, Professor Mack apparently accompanied this woman to a “support group” meeting of UFO abductees, who, she observed bemusedly, “spent their time comparing [extraterrestrially] implanted devices.” Professor Mack is on record as promoting the perception that UFO abductions are legitimate.[9]

We frankly doubt that extraterrestrials who have a means to commute intergalactically would stoop to implanting comparatively primitive devices in human beings. However, should it be proved that the psychiatrist, surgeon and DoE Project Manager discussed above are extraterrestrials posing as humans, we will be happy to weigh that information. If it is similarly established that the vehicular “abduction” of the woman discussed above was the work of an extraterrestrial named Kaplan, who is posing as a human with Cornell Medical Center connections, we will be happy to ponder that as well.

In the meantime, it would seem reasonable that the government would want the public to believe that extraterrestrial visitations are on the upswing. Mind-altering drugs, externally-induced auditory input, holographic projections (also a DoD capability),[10] appropriately focused directed-energy targeting, device implantations, special effects and abductions are all within this government’s capabilities and can be used for purposes of creating illusions of UFO experiences. Persons not cognizant of this might be more inclined to fall for the UFO

mythologies now being officially “legitimized.”

* * *

Other cases, possibly involving U.S. Navy Intelligence, NSA, the Drug Enforcement Agency (DEA) and, peripherally, members of former Soviet Bloc intelligence services will be discussed in future reports.

Harassment Objectives

In his book, *Psychiatry and the CIA: Victims of Mind Control,* Dr. Harvey Weinstein quotes the following passage from a book entitled, *Battle for the Mind: A Physiology of Conversion and Brainwashing,* by William Sargant (Greenwood Press, Westport, CT, 1957):

“By increasing or prolonging stresses in various ways, or inducing physical debilitation, a more thorough alteration of the person’s thinking processes may be achieved. ...If the stress or the physical debilitation, or both, are carried one stage further, it may happen that patterns of thought and behavior, especially those of recent acquisition, become disrupted. New patterns can then be substituted, or suppressed patterns allowed to reassert themselves; or the subject may begin to think or act in ways that precisely contradict his former ones.

“‘...If a complete sudden collapse can be produced by prolonging or intensifying emotional stress, the cortical slate may be wiped clean temporarily of its more recently implanted patterns of behavior, perhaps allowing others to be substituted more easily.’”

Dr. Weinstein then comments: “The parallel with [Dr. Ewen] Cameron’s theory of differential amnesia is striking, and the relationship to brainwashing is abundantly clear.”[11] Dr. Cameron, employed by McGill University’s Allan Memorial Institute in Montreal, Quebec, Canada, between 1943 and 1964, conducted brainwashing experiments upon select, non-volunteer psychiatric patients on behalf of the CIA. Dr. Weinstein’s father was one of Cameron’s victims.

Sargant’s theorems and Cameron’s associated experimental findings appear to be the driving force behind the harassment and experimentation now being reported to this Association. All of these individuals are being subjected to a series of overlapping circumstances which apparently are meant to induce and sustain long-term extremes of stress. All of these individuals have been effectively isolated. Unethical psychiatrists and physicians are involved in the majority of these cases. Mind-altering prescription drugs are being used for clearly non-therapeutic purposes. Evidence of LSD use is also beginning to surface (one of Cameron’s favored mind-altering substances). And “psychic driving” techniques—Cameron’s pet brainwashing method—are involved in all these cases, to a much greater and more potentially effective degree where auditory input is involved.

The long-term objectives of these harassment and experimentation campaigns appear to be quite fundamental; viz.,

(1) induce a sense of perverted “loyalty” toward the very agencies engaged in the individual’s harassment, to confuse his or her priorities where the possibility of obtaining legal redress might be concerned;

(2) redirect the targeted individual’s feelings of hopelessness, anger and frustration toward racial and ethnic groups, and toward select, prominent political figures, to include the President of the United States; and

(3) force the individual to commit an act of violence, whether suicide or murder, under conditions which can be plausibly denied by the government.

An operation's ultimate success apparently hangs on this latter objective. We have successfully obstructed this process in a number of cases now being investigated.

The "Stalker" Phenomenon

In recent weeks, considerable publicity has been given the trauma suffered by victims of "stalkers" (persons who obsessively surveil, harass and, in some cases, kill targeted individuals for assorted, unfathomable reasons). Movie stars who have been stalked recurrently make the news. Stalking, as a problem, is in fact becoming widespread, to the point where, in some States, the activity has finally been specifically proscribed by law.

The individuals in contact with our Association are reporting the same terrifying ranges of experiences as are now being reported in the press on behalf of other victims of stalkers. The only difference in the cases reported to us is that the stalkers operate in groups over extremely prolong periods of time, and (it would appear) with the blessing of certain agencies of the U.S. Government. The laws being passed to protect victims of stalkers are clearly being selectively applied. We hope to put an end to this situation; that is, in addition to achieving the objectives discussed above.

It should be noted that the FBI, though unwilling to intervene in the cases described above recently intervened on a massive scale to protect Joy Silverman, a Bush-appointed trustee of the J.F. Kennedy Center for the Performing Arts, from the ardent "stalkings" of her estranged paramour, Sol Wachtler, Chief Justice, Court of Appeals for the State of New York.[12]

Wachtler had apparently threatened to kidnap Silverman's daughter if not paid $20,000. Since no kidnapping had occurred, and the case qualified merely as an attempted extortion, a question arises as to why the New York State Police could not have handled this investigation. Mrs. Silverman resides in New York.

It would appear that the FBI devoted more than 100 agents and technicians to the effort, resolving the case within approximately 30 days. On November 7, 1992, the day of his arrest, Wachtler ran a gauntlet of 80 FBI special agents on the Long Island Expressway. Apparently the FBI does not have enough to do, if staking out a lone stalker is their top priority. We have to wonder, of course, if the FBI's massive response was prompted by what was perceived to be Wachtler's usurpation of governmental stalking prerogatives.

Mrs. Silverman's $300,000 donations to Republican Party causes could be considered a basis for the FBI's solicitous concern for her welfare. It would appear, under the circumstances, that the "stalking victims" discussed above—being by now quite poverty-stricken—should abandon all hope of FBI intervention in their respective situations. FBI protection appears to have a price tag, which not one of our contacts can afford.

> ***There can never be any justification for torture. It creates an escalation of violence in the internal affairs of states. It spreads like a contagious disease from country to country. It has lasting effects on the mental and physical health of the victim and brutalizes the torturer. It is our fundamental duty as human beings to express what is surely the conscience of humanity and to eradicate this evil.***

[*Amnesty International, February 1990, in the context of the U.S. Government's continuing failure to ratify the U.N. Convention Against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment, dated December 10, 1984*]

Footnotes

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* 71 (7-30-93)

* 59 (7-30-93)

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[1] Peters, Edward, *Torture,* Basil Blackwell, Inc., New York/London, 1985.

[2] *The Plain Dealer,* Cleveland, OH, June 28, 1991, p. 4-B ("Psychiatrist Testifies at mom's Hearing"); November 6, 1991, ("Woman Ruled Competent for Trial"); and December 21, 1991, p. 4-C ("Ruling Expected Monday on Sanity of Parma Mother/Woman says she stabbed her 3 children to protect them").

[3] *The Washington Post,* June 1, 1991, p. C-I ("'Voices' Led to Tragedy for 2 Men/Pentagon Suspect's Mother Says Institutions Should Have Held Son") and December 14, 1991, p. D- 3 ("Suspect in Pentagon Killing Is Found Unfit to Stand Trial").

[4] *The Washington Post,* September 4, 1992, p. D-3 ("Freight Train kills Woman Near Home in Silver Spring").

[5] *Jane's Security and Co-In [Counter-Insurgency] Equipment,* (Surrey, UK, 1991-92), as a preliminary source, contains a number of references to attaché-case concealment devices, for use in surveillance/communications operations. The electronic components are built into the bottom interior of these cases. Obviously the man just described could not have carried a "microcircuitried" attaché case aboard a U.S. airliner without first clearing Security. We are advised by a former CIA DDS (Security) employee that credential-carrying members of U.S. Intelligence can bypass airport security checks of their carry- on luggage.

[6] *St. Paul Pioneer Press Dispatch,* October 15, 1986, p. 1-A ("U.S. Used Humans for Radiation Guinea Pigs").

[7] See, for example, Weinstein, Harvey M., M.D., *Psychiatry and the CIA: Victims of Mind Control,* American Psychiatric Press, Washington, D.C., 1990; Marks, John, *The Search for the "Manchurian Candidate": The CIA and Mind Control,* Times Books, New York, 1979; Delgado, Jose M. R., M.D., *Physical Control of the Mind: Toward a Psychocivilized Society,* Harper & Row, New York, 1969; and Hutchison, Michael, *Megabrain: New Tools and Techniques for Brain Growth and Mind Expansion,* Ballantine Books, New York, 1986.

[8] According to a *Vancouver Sun* archivist, Hollywood Hospital, Ltd. (a privately-owned institution), went out of business in 1975, two years after this woman's hospitalization and after approximately 30 years of doing business. The event coincided with findings by the U.S. Senate Church Committee concerning the CIA's brainwashing experiments under MKULTRA. Our contact also identified the Director of Hollywood Hospital as Dr. Ross MacLean—information also confirmed by the *Vancouver Sun.* Nothing in these records, copies of which are being obtained, points to CIA involvement with the hospital. Perhaps a portion of history has been overlooked. Cornell Medical Center's role in MKULTRA is a matter of public record. (See, for

example, Thomas, Gordon, *Journey Into Madness: The True Story of Secret CIA Mind Control and Medical Abuse,* Bantam Books, New York, 1989).

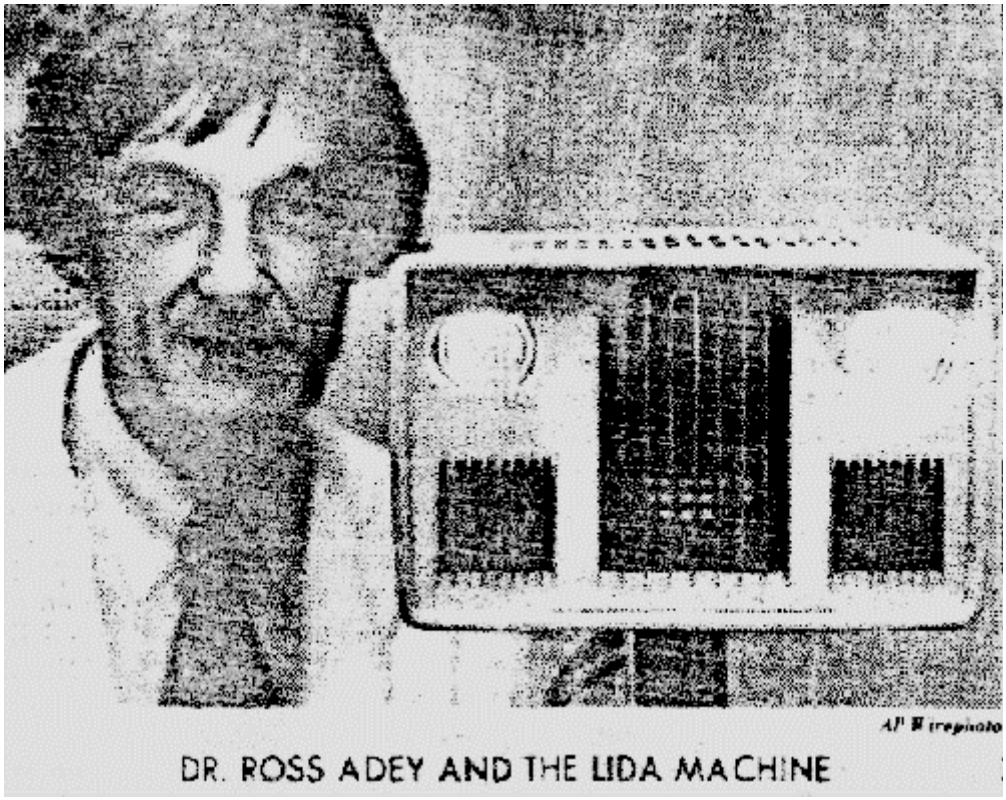
[9] The Roper Organization, *Unusual Personal Experiences: An Analysis of the Data from Three National Surveys,* (Bigelow Holding Corp., Las Vegas, NV, 1991. Contributors lending "credibility" to this publication include John Mack and Budd Hopkins.

[10] *Defense Week,* October 19, 1992, Vol. 13, No. 41, pp. I and II, ("Pentagon, State [Department] Collaborate on Counterterror Gear").

[11] Op. cit., Weinstein, pp. 140-141.

[12] *The Washington Post,* November 10, 1992, p. A-I ("An Unlikely Suspect for Scandal/Top N.Y. Judge Accused of Breaking Law in Secret Life").

THE LIDA MACHINE



DR. ROSS ADEY AND THE LIDA MACHINE

An old medical, Russian-made device that transmits pulses of 40 MHz radio signal at pulse rates designed to match relaxed and sleeping states originally.

The machine, known as the LIDA, is on loan to the Jerry L. Pettis Memorial Veterans Hospital through a medical exchange program between the Soviet Union and the United States.

Hospital researchers have found in changes behavior in animals.

"It looks as though instead of taking a valium when you want to relax yourself it would be possible to achieve a similar result, probably in a safer way, by the use of a radio field that will relax you" said Dr. Ross Adey, chief of research at the hospital. [Dr. Adey is now deceased.]

[Missing one line on the photocopy] ... manual shows it being used on a human in a clinical setting, Adey said. The manual says it is a "distant pulse treating apparatus" for psychological problems, including sleeplessness, hyper-tension and neurotic disturbances.

The device has not been approved for use with humans in thiscountry, although the Russians have done so since at least 1960, Adey Said.

Low frequency radio waves simulate the brain's own electromagnetic current and produce a trance-like state.

Adey said he put a cat in a box and turned on the LIDA.

"Within a matter of two or three minutes it is sitting there very quietly ... it stays almost as though it were transfixed" he said.

Tho hospital's experiment with the machine has been underway for three months and should be completed within a year, Adey said.

Eleanor White's comments (Dr. Byrd's statement follows):

1. Heavy "fatigue attacks" are a very common experience among involuntary neuro-electromagnetic experimentees. The LIDA device could, right out of the box, be used as a fatigue attack weapon, FROM HIDING, thru non- or semi-conductive walls.

2. If the LIDA machine is tuned for tranquilizing effect, then it might also be tuned for "force awake" and other effects too. This device is an electronic harassment weapon, AS IS. A TV documentary stated the Russian medical establishment considers this 1950s device obsolete. (Wonder what has taken it's place?)

Below is a statement from Dr. Eldon Byrd, U.S. psychotronic researcher who funded Dr. Adey's work with the LIDA machine:

"The LIDA machine was made in the 1950's by the Soviets. The CIA purchased one through a Canadian front for Dr. Ross Adey, but didn't give him any funds to evaluate it.

"I provided those funds from my project in 1981, and he determined that the LIDA would put rabbits into a stupor at a distance and make cats go into REM.

"The Soviets included a picture with the device that showed an entire auditorium full of people asleep with the LIDA on the podium. The LIDA put out an electric field, a magnetic field, light, heat, and sound (of course light and heat are electromagnetic waves, but at a much higher frequency than the low frequencies of the electric and magnetic fields mentioned above).

"The purported purpose of the LIDA was for medical treatments; however, the North Koreans used it as a brain washing device during the Korean War. The big question is: what did they do with the technology? It could have been improved and/or made smaller. It is unlikely that they abandoned something that worked.

"Direct communication with Ross Adey: While he was testing the LIDA 4, an electrician was walking by and asked him where he got the "North Korean brain washing machine". Ross told him that is was a Russian medical device.

"The guy said he had been brain-washed by a device like that when he was in a POW camp. They placed the vertical plates alongside his head and read questions and answers to him. He said he felt like he was in a dream. Later when the Red Cross came and asked questions, he responded with what had been read to him while under the influence of the device. He said he seemed to have no control over the answers.

"The LIDA is PATENTED IN THE US. Why? They are not sold in the US--the only one I know

that exists is the one that was at Loma Linda Medical Center where Adey used to work. Eldon"

Involuntary neuro-experimentation activist Cheryl Welsh, Davis CA, sent in this clipping from an article by Dr. Ross Adey but without complete bibliographic references:

"Soviet investigators have also developed a therapeutic device utilizing low frequency square wave modulation of a radiofrequency field. This instrument known as the Lida was developed by L. Rabichev and his colleagues in Soviet Armenia, and is designed for "the treatment of neuropsychic and somatic disorders, such as neuroses, psychoses, insomnia, hypertension, stammering, bronchia asthma, and asthenic and reactive disturbances".

It is covered by U.S. Patent # 3,773,049. In addition to the pulsed RF field, the device also delivers pulsed light, pulsed sound, and pulsed heat. Each stimulus train can be independently adjusted in intensity and frequency.

The radiofrequency field has a nominal carrier frequency of 40 MHz and a maximum output of approximately 40 Watts. The E- field is applied to the patient on the sides of the neck through two disc electrodes approximately 10 cm in diameter. The electrodes are located at a distance of 2-4 cm from the skin.

[Eleanor White's comment: The fact that Dr. Ross Adey mentioned an "audience" being put to sleep by the LIDA suggests that the "E-field" electrodes may not play an essential role. The radio signal appears to be the primary cause of the sleep/trance effect.]

Optimal repetition frequencies are said to lie in the range from 40 to 80 pulses per minute. Pulse duration is typically 0.2 sec. In an 8 year trial period, the instrument was tested on 740 patients, including adults and children. Postivive therapeutic effects were claimed in more..."

RL-TR-94-53
In-House Report
June 1994

RADIOFREQUENCY/MICROWAVE RADIATION BIOLOGICAL EFFECTS AND SAFETY STANDARDS: A REVIEW

Scott M. Bolen

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED.

Rome Laboratory
Air Force Materiel Command
Griffiss Air Force Base, New York

This report has been reviewed by the Rome Laboratory Public Affairs Office (PA) and is releasable to the National Technical Information Service (NTIS). At NTIS it will be releasable to the general public, including foreign nations.

RL-TR-94-53 has been reviewed and is approved for publication.

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The study of human exposure to radiofrequency/microwave (RF/MW) radiation has been the subject of widespread investigation and analysis. It is known that electromagnetic radiation has a biological effect on human tissue. An attempt has been made by researchers to quantify the effects of radiation exposure on the human body and to set guidelines for safe exposure levels. A review of the pertinent findings is presented along with the American National Standards Institute (ANSI) recommended safety standard (C95.1-1982) and the United States Air Force permissible exposure limit for RF/MW radiation (AFOSH Standard 161-9, 12 Feb 87). An overview of research conducted in the Soviet Union and Eastern Europe is also included in this report.

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Radiofrequency/Micowave Radiation Biological Effects and Safety Standards: A Review

Scott M. Bolen
June 1988

Abstract

The study of human exposure to radiofrequency/microwave radiation has been the subject of widespread investigation and analysis. It is known that electromagnetic radiation has a biological effect on human tissue. An attempt has been made by researchers to quantify the effects of radiation on the human body and to set guidelines for safe exposure levels. A review of the pertinent findings is presented along with the American National Standards Institute (ANSI) recommended safety standard (C95.1-1982) and the United States Air Force permissible exposure limit for RF/MW radiation (AFOSH Standard 161-9, 12 February 1987). An overview of research that was conducted in the Soviet Union and Eastern Europe is also included in this report.

I. INTRODUCTION

In 1956, the Department of Defense (DOD) directed the Armed Forces to investigate the biological effects of exposure to radiofrequency/microwave (RF/MW) radiation. The Army, Navy, and Air Force Departments commissioned a Tri-Service Program under the supervision of the Air Force to meet the DOD directive [14], [15]. The Rome Air Development Center and the Air Research and Development Headquarters were ultimately given responsibility to manage the program. On July 15-16, 1957 the first of four Tri-Service Conferences was held to discuss the effects of RF/MW radiation. These conferences were the first major effort put forth by the scientific community to explore the biological effects of exposure to RF/MW radiation [14]. Since then, researchers have discovered a number of biological dysfunctions that can occur in living organisms. Exposure of the human body to RF/MW radiation has many biological implications. The effects range from innocuous sensations of warmth to serious physiological damage to the eye [1], [2], [5], [6], [8], [15]. There is also evidence that RF/MW radiation can cause cancer [8].

The absorption of RF/MW radiated energy causes biological reactions to occur in the tissue of the human body. In order to determine safe exposure levels and to understand the effect of RF/MW radiation it is necessary to know the absorption characteristics of the human tissue. The National Institute for Occupational Safety and Health (NIOSH) [8] has reported several physical properties that account for energy absorption in biological materials. Factors which govern energy absorption include: (1) strength of the external electromagnetic (EM) field, 2) frequency of the RF/MW source, 3) the degree of hydration of the tissue, and 4) the physical dimensions, geometry, and orientation of the absorbing body with respect to the radiation EM field [8]. There is some disagreement among researchers in determining a specific measure for the dose of RF/MW radiation contracted by

biological materials. The most commonly accepted measure is the Specific Absorption Rate (SAR). The SAR is defined as the rate at which RF/MW radiated energy is imparted to the body - typically in units of watts per kilogram (W/Kg) [4]. The deposition of energy specified in terms of milliwatts per square centimeter (mW/cm^2) over the irradiated surface is also widely accepted [9].

Based on the known absorption rates and the inherent biological effects of RF/MW radiated energy, researchers have put forth a number of standards regarding safe exposure levels. In some instances standards recommended by different examining authorities are in conflict. For example, the USAF Standard 161-9 (enacted 12 February 1987) allows for a permissible exposure level of 10 mW/cm^2 for persons working in restricted areas and 5 mW/cm^2 for persons working in unrestricted areas [10]. The ANSI guideline specifies a maximum safe exposure level of 5 mW/cm^2 over the whole-body area for anyone in contact with RF/MW radiation [9]. These differences reflect the way in which each examining authority has interpreted the available RF/MW radiation exposure data.

II. BIOLOGICAL EFFECTS

Exposure to RF/MW radiation is known to have a biological effect on animals and humans. Damage to major organs, disruption of important biological processes, and the potential risk of cancer represent the dangers of RF/MW radiation to living organisms. Pulsed radiation appears to have the greatest impact on biological materials [8].

The response of biological materials to the absorption of thermal energy is the most perceptible effect of exposure to RF/MW radiation [7]. The energy emitted from an RF/MW source is absorbed by the human tissue primarily as heat. In this case, the radiated energy is disposed in the molecules of the tissue. Dipole molecules of water and protein are stimulated and will vibrate as energy is absorbed throughout the irradiated tissue area. Ionic conduction will also occur in the same area where the radiation is incident. It is from these two natural processes that radiant energy is converted into heat [11]. The thermal effect of continuous wave (CW) and pulsed radiation is considered to be the same [13].

Nonthermal responses can be less noticeable and are often more difficult to explain than thermal effects. These responses are related to the disturbances in the tissue not caused by heating. Electromagnetic fields can interact with the bioelectrical functions of the irradiated human tissue [8]. Research conducted in the Soviet Union and Eastern Europe suggests that the human body may be more sensitive to the nonthermal effects of RF/MW radiation [3].

There are many reported biological effects to humans and animals that are exposed to RF/MW radiation. A review of the important findings is given in the following:

A. Heating Effect on the Skin

Most RF/MW radiation penetrates only to the outer surface of the body. This is especially true for RF/MW frequencies greater than 3 GHz where the likely depth of penetration is about 1-10 mm [3]. At frequencies above 10 GHz the absorption of energy will occur mostly at the outer skin surface. Since the thermal receptors of the body are contained primarily in this region, the perception of RF/MW radiation at these frequencies

may be similar to that of infrared (IR) radiation [3], [6].

In 1937, J. Hardy and T. Oppel published an investigative paper on the thermal effects of IR radiation. Their findings were used by Om Gandhi and Abbas Riazi [6] to explain the thermal effect of RF/MW radiation on the human body (the reference for Hardy and Oppel can be found in [6]). Figure 1 shows the results obtained from the 1937 report. As described by Gandhi and Riazi, the findings presented by Hardy and Oppel show that sensations of warmth begin to occur when the whole-body is irradiated at a CW power density of about 0.67 mW/cm^2. Hardy and Oppel based their work on exposure to IR radiation. From other published reports, Gandhi and Riazi noted that there is a correlation between the radiating frequency of the incident RF/MW energy and the threshold for perception. For example, on an exposed area of the forehead of 37 cm^2 a perception of warmth was reported for incident power densities of 29.9 and 12.5 mW/cm^2 from sources radiating at 3 and 10 GHz respectively [6].

Other observations made by Hardy and Oppel showed that when smaller body areas were irradiated, larger power densities were required to stimulate the thermal receptors in the skin. Gandhi and Riazi were able to confirm this result with reports from recent papers. They found that irradiation of an exposed body area of 40.6 cm^2 to a power density of about 21.7 mW/cm^2 yielded the same thermal perception as did the irradiation of a smaller body area of 9.6 cm^2 to a power density of about 55.9 mW/cm^2. Hardy and Oppel reported that thermal sensations occurred within about 3 seconds after irradiation of the body tissue. More recent findings indicate a reaction time of closer to 1 second [6].

Gandhi and Riazi [6] have also reported that the depth of penetration of RF/MW radiation has an impact on the power density threshold needed to stimulate the perception of warmth. As a comparison, IR radiation will not penetrate the outer body surface as deeply as RF/MW radiation emitted at a frequency of 2.45 GHz. Clinical observations have shown that irradiation of the ventral surface of the arm by an RF/MW source radiation at 2.45 GHz will cause a sensation of warmth when the incident power density is about 26.7 mW/cm^2. For incident IR radiation a perception of warmth occurs at a power density of 1.7 mW/cm^2. They estimated that at millimeter wavelengths the perception of warmth may occur at a power density level of about 8.7 mW/cm^2.

Exposure to higher levels of radiation can cause serious biological effects. Because of the physical dimensions and geometry of the human body, RF/MW radiated energy is nonuniformily deposited over the whole-body surface. Some areas on the skin and outer body surface will absorb higher amounts of the radiated energy. These areas will be marked by "hot spots" of high temperatures [7], [11], [16]. Experiments conducted on laboratory animals have shown, that skin burns typically occur in the areas of hot spots. The penetration of RF/MW radiation also causes skin burns to be relatively deep [11]. In experiments sponsored by the Tri-Service Commission, it was reported that RF/MW radiation burns over the rib cages of dogs caused severe subcutaneous damage that did not visibly appear for weeks after the injury was sustained [20]. Burns can cause increased vascular permeability. This can lead to significant losses of body fluids and electrolytes. Serious burns can suffer fluid losses for a few days. Blood circulation can be altered in the effected area and other biological functions could be indirectly affected [12].

B. Whole-Body Hyperthermia

Thermal energy absorbed by the whole-body can cause a rise in body temperature. When the human body is irradiated by an RF/MW source at an incident power density of 10 mW/cm^2 there will be a rise in body temperature of about 1° C. The total thermal energy absorbed at this power density is about 58 watts. Typically, at rest the human basal metabolic rate is about 80 watts and it is about 290 watts during periods of moderate activity. Exposure of the human body to low power RF/MW radiation does not appear to impose any appreciable thermal hazard. These figures were reported by The U.S. Department of Health, Education and Welfare [3].

Adverse biological effects can occur when the body is subjected to high doses of RF/MW radiation [16]. In this instance large amounts of thermal energy can be absorbed by the body. A dramatic influx of energy can overburden thermoregulatory mechanisms. If excess heat cannot be exhausted the core temperature of the body will rise to a dangerous level resulting in hyperthermia [12], [16]. The biological response to excess heat buildup is the dilation of blood vessels at the surface of the skin and the evaporation of water through sweating. These are the primary mechanisms for heat dissipation. Hyperthermia can cause severe dehydration and the loss of electrolytes such as sodium chloride. Other harmful effects include fever, heat exhaustion, and heat fatigue. Heat stress is the most serious consequence of hyperthermia. Cardiac failure and heat stroke can result from heat stress [12].

It has also been noted that hyperthermia may cause injury to blood-brain barrier (BBB) [19]. This barrier refers to the several biological materials that separate the essential elements of the central nervous system from the blood [18]. High cerebral temperatures exceeding 43°C may damage the BBB. The result can be a disruption of blood vessel continuity or integrity and degradation of the flow of blood and other body fluids in the brain [19].

C. Local Hyperthermia

The nonuniform deposition of RF/MW radiated energy over the whole-body surface causes the body to be heated unevenly. Local areas where temperatures rise above 41.6°C can experience damage to the tissue [16]. In these areas it is possible that harmful toxins could be released as result of the high temperatures. Heating can cause cell membranes and blood capillaries to become more permeable. An increase in capillary permeability can lead to a loss of plasma proteins. The denaturation of proteins can also occur within cells [11], [16]. This can lead to changes in the physical properties and biological functions of proteins [18]. Denaturation of proteins can also cause polypeptide and histamine-like substances to become active [11], [16]. Histamines can stimulate gastric secretion, accelerate the heart rate, and cause the dilation of blood vessels resulting in lower blood pressure [18]. Areas of the body where blood circulation is poor or where thermal regulation is insufficient, are more susceptible to injury [11].

D. Carcinogenic Effects

The carcinogenic effects of exposure to RF/MW radiation are not well known. It is difficult to clinically establish a link to cancer. The problem that researchers have in linking

RF/MW radiation to cancer is that the disease itself is prevalent and can be caused by a variety of environmental factors. In fact cancer is the second leading cause of death in the United States. There are, however, published reports that reveal some insights into the carcinogenic nature of RF/MW radiation. Nonthermal effects may provide important clues to the understanding of carcinogenic reactions in the human body [8],[32].

i. Pathological Reports

In 1962, S. Prausnitz and C. Susskind reported experimental results that showed an increase in cancer among test animals exposed to RF/MW radiation. In the experiment, 100 male Swiss albino mice were irradiated by a 10 GHz RF/MW source at an incident power density of about 100 mW/cm^2. The mice were exposed for 4.5 minutes/day, 5 days/week for a total of 59 weeks. It was noted that irradiation caused the whole-body temperature of the mice to rise about 3.3°C. Upon examination, it was found that 35% of the mice had developed cancer of the white blood cells. The disease was observed as monocytic or lymphatic leucosis or lymphatic or myeloid leukemia. Only 10% of a similar control group had developed cancer [21].

There have been a few allegations that RF/MW radiation has induced cancer in humans [8], [15]. The NIOSH Technical Report [8] cites charges made in the early 1970's against Philco-Ford and The Boeing Corporation that occupational exposure to RF/MW radiation caused cancer among employees. One incident was reported at each company. At Philco-Ford it was claimed that exposure caused a rare form of brain cancer to manifest in one worker that eventually resulted in death. In each case, there was no scientific proof that RF/MW radiation had induced cancer in the company employees. There was also a report that EM fields induced cancer in an individual that worked at the U.S. Embassy in Moscow. Again, there was no scientific evidence that supported the claim [8].

Recently, the Observer Dispatch, a local newspaper published in Utica, New York, reported that a major study has just been completed in Sweden. The study concluded that children who live near high power lines have a greater risk of developing leukemia than children who live farther away from the power lines. The study involved 500,000 people and provided some evidence to link the electromagnetic fields produced by low frequency power lines to cancer. The researchers, however, cautioned against drawing firm conclusions as a result of the research [33]

ii. Effect on Chromosomes

It has been observed that disturbances in chromosomic activity can cause cancerous aberrations to occur in the human body. In 1974, a paper published by K. Chen, A. Samuel, and R. Hoopingarner (reference found in [8]) reported that chromosomal abnormalities can be linked to chronic myeloid leukemia. Serious genetic mutations can also result from such abnormalities that can lead to malignancies in the tissue [8].

In 1976, A. A. Kapustin, M. I. Rudnev, G. I. Leonskaia, and G.I. Knobecva (reference found in [17]) reported alterations in the chromosomes of bone marrow cells in laboratory animals that were exposed to RW/MW radiation. They exposed inbred albino rats to a 2500 MHz RF/MW source at incident power density levels of 50 and 500 uW/cm^2. Irradiation lasted for 7 hours/day for 10 days. Upon examination of the animals, they

observed chromosomal anomalies that appeared in forms described as polyploidy, aneuploidy, chormatic deletion, acentric fragments and chromatic gaps [17].

The NIOSH Technical Report [8] summarizes the findings of several researchers. Chromosomal and mitotic anomalies have been observed in a variety of animal and human cells for varying exposures to RF/MW radiation. Pulsed and CW radiation ranging in frequency from 15 to 2950 MHz and power densities from 7 to 200 mW/cm^2 have caused abnormalities to occur in chromosomes. The reported affects include: linear shortening of the chromosomes, irregularities in the chromosomal envelope, abnormal bridges and stickiness, translocations, chromosomal breaks and gaps, chromatid breaks, acentric chromosomes, dicentric chromosomes, deletions, fragmentation, and ring chromosomes [8].

iii. Mutagenic Effects

Reported evidence indicates that biological interaction with EM fields can cause the formation of mutagens in cells. In 1974, three Soviet researchers, Danilenko, Mirutenko, and Kudrenko (reference found in [8]) published results showing a mutagenic effect of RF/MW radiation. Mutagens were observed to form in cells that were irradiated by a pulsed RF/MW source operating at 37 GHz and 1 mW/cm^2 power intensity. They concluded that irradiation of tissue by pulsed RF/MW sources causes cell membranes to become more permeable to destructive chemical mutagens [8].

Results published in 1963 by G. H. Mickey (reference found in [8]) showed hereditary changes to occur in drosphila germ cells that were exposed to pulsed modulated RF/MW radiation for carrier frequencies between 5-40 MHz [8]. Evidence of RF/MW induced teratogenesis in animals has also been reported by researchers. The effect of exposure to CW radiation was observed by Rugh and McManaway in 1976 (reference found in [8]). They found gross congenital abnormalities in rodent fetuses that were irradiated by a 2450 MHz RF/MW source at an incident power intensity of 107.4 mW/g [8].

iv. Lymphoblastoid Transformations

Lymphoblastoid Transformations refer to changes in the physical nature of lymphoblasts. Mature lymphoblast cells (i.e. lymphocytes) participate in the immune system of the body [18]. Lymphoblastoid transformations induced by RF/MW radiation appear to be similar to transformations present in disorders contributing to abnormal growth in lymphoid tissues and in certain types of leukemia. RF/MW radiation induced transformations, however, do not appear to be malignant and are not likely to spread among healthy cells [8].

W. Stodlink-Baranska reported (reference found in [8]) lymphoblastoid transformations to occur when human lymphocyte cells were exposed to a 2950 MHz pulsed RF/MW source at power density levels of 7 and 20 mW/cm^2. In 1975, P. Czerski also reported (reference found in [8]) observing lymphoblastoid transformations after irradiation of purified human lymphocyte suspensions by an RF/MW source radiating at 2950 MHz for variable power density levels. In addition, Czerski reported acute transformations occurring in adult mice and rabbits that were irradiated by a pulsed RF/MW source radiating at 2950 MHz and at low power density levels of 0.5 and 5 mW/cm^2 respectively [8].

v. Oncogenic Effects

Oncogenic effects have been linked to imbalances in the regulatory mechanisms of the body. A 1974 report published by E. Klimkova-Deutschova (reference found in [8]) claimed that persons exposed to RF/MW radiation experience biochemical reactions. The report indicated alterations in fasting blood sugar levels, a decrease in the ability to dispose of normal metabolic waste, and depressed serum levels of pyruvate and lactate. These biochemical reactions point to the possibility of regulatory malfunctions occurring in the body. It has been suggested that certain regulatory imbalances may promote the growth of tumors. A change in hormonal levels has been observed to cause oncogenic effects in tissues that require hormonal balances to function properly. The presence of hormones in other tissue areas may effect the development of existing tumors in those areas [8].

E. Cardiovascular Effects

Most of the cardiovascular effects of RF/MW radiation have been reported by researchers in the Soviet Union and Eastern Europe. Soviet investigators claim that exposure to low levels of RF/MW radiation that are not sufficient to induce hyperthermia can cause aberrations in the cardiovascular system of the body [7].

One experiment performed on rabbits indicates that several types of cardiovascular dysfunctions could be possible. An RF/MW source radiating at 2375 MHz was used to irradiate rabbits for a test period of 60 days under varying field intensities. For field strengths ranging from 3-6 V/M researchers noted a sharp increase in the heart rate of the animals. This effect was observed to subside with time. Exposure to field strengths of 0.5-1.0 V/M caused the heart rate to become slower than normal. No effect was reported for rabbits that were exposed to EM field intensities below 0.2 V/M [17]. Other effects that have been observed by Soviet researchers, are alterations in EKG and low blood pressure [7], [17].

The NIOSH Technical Report [8] references a Soviet study published in 1974 by M. N. Sadcikoiva that suggests some connection between RF/MW radiation exposure and the potential for cardiovascular disturbances in humans. Researchers examined 100 patients suffering from radiation sickness. It was found that 71 of the patients had some type of cardiovascular problem. Most of these patients had been exposed to RF/MW radiation for periods ranging from 5-15 years. A smaller group of patients exposed for shorter time periods also experienced cardiovascular irregularities. The study concluded that there is a probable link between exposure to RF/MW radiation and cardiovascular disease [8].

F. The North Karelian Project

In response to earlier Soviet reports, the World Health Organization (WHO) decided to conduct a comprehensive study on the biological effects of exposure to RF/MW radiation. In 1976, M. Zaret published the results of the study (reference found in [8]). The WHO investigation focused on the population of North Karelia, a remote area of Finland that borders the Soviet Union. This region was selected because of its close proximity to a then Soviet early warning radar station. North Karelia is geographically located in the path of intercontinental ballistic missiles that would originate from the midwest United States. To

detect these missiles, the Soviets constructed a number of high power tropospheric scattering radar units adjacent to nearby Lake Ladoga. The operation of these units exposes the residents of North Karelia to large doses of ground and scatter radiation. The WHO investigation found evidence linking exposure of RF/MW radiation to cardiovascular disease and cancer. The North Karelian population suffered from an unusually high number of heart attacks and cases of cancer. In addition, it was found that the affliction rate of these diseases was much higher among residents living closest to the radar site [8].

G. Hematologic Effects

There is evidence that RF/MW radiation can effect the blood and blood forming systems of animals and humans. Experiments conducted in the Soviet Union have indicated changes in blood cell levels and alterations in the biological activities of hematologic elements. Other investigators have reported similar effects [7], [8], [17].

The results of an experiment reported in 1979 by V. M. Shtemier showed a decrease in the biological activity of butyryl cholinesterase in rats that were exposed to pulsed RF/MW radiation (reference found in [17]). The experiment subjected 15 rats to a 3000 MHz pulsed RF/MW source with an incident power density of 10 mW/cm^2. The rats were irradiated for 1 hour/day over several days. After 42 days, there was a loss of biological activity of the butyryl cholinesterase enzyme caused by a decrease in the concentration of the enzyme in the bloodstream of the rats [17]. Cholinesterase is a catalyst in the hydrolysis of acetylcholine into choline and an anion. Choline is a useful enzyme that prevents the deposition of fat in the liver [18].

In another experiment, 20 male rats were exposed to a 2376 MHz pulsed RF/MW source with an incident power density of 24.4 mW/cm_2. Each rat was exposed for 4 hours/day, 5 days/week for 7 weeks. Blood samples were taken periodically and examined for anomalies. After repeated exposures, it was discovered that the number of lymphocytes and leukocytes (white blood cells) in the bloodstream of the rats was lower than normal. The biological activity of alkaline phosphatase in neutrophil leukocytes was also found to increase when the rats were irradiated [17].

The results of several other experiments are summarized in the NIOSH Technical Report [8]. RF/MW radiation has been observed to cause: an increase in the amount of exudate in bone marrow, the transient disappearance of fat cells from bone marrow, destruction and loss of essential bone marrow cells, underdeveloped marrow, a decrease in the number of red blood cells, and an imbalance in the number of lymphocytes in the bloodstream [8].

H. Effect to the Central Nervous System

There is documented evidence that exposure to RF/MW radiation can cause a disturbance in the central nervous system (CNS) of living organisms [3], [8], [11], [17]. Soviet investigators claim that exposure to low-level radiation can induce serious CNS dysfunctions. Experiments conducted in the Soviet Union and Eastern Europe have exposed live subjects to radiation levels that are near or below the recommended safe levels prescribed by the ANSI Standard and the USAF AFOSH Standard [17].

i. Pathological Report

Soviet investigators claim that the central nervous system (CNS) is highly sensitive to RF/MW radiation [3], [8], [11], [17]. The NIOSH Technical Report [8] summarized the results of a pathological study published by A. A. Letavet and Z. V. Gordon in 1960. The researchers reported that several CNS related disorders were discovered among 525 workers exposed to RF/MW radiation. The symptoms were listed as: hypotension, slower than normal heart rates, an increase in the histamine content of the blood, an increase in the activity of the thyroid gland, disruption of the endocrine-hormonal process, alterations in the sensitivity to smell, headaches, irritability, and increased fatigue. Other researchers have acknowledged similar biological responses [8].

ii. Soviet Union Experimental Results

Several experiments have been performed in the Soviet Union and Eastern Europe that demonstrate a variety of biological effects that can occur in living organisms. observations of laboratory animals subjected to low power EM fields showed alterations in the electrical activity of the cerebral cortex and disruptions in the activity of neurons [17].

L. K. Yereshova and YU. D. Dumanski (reference found in [17]) exposed rabbits and white male rats to a continuous wave 2.50 GHz RF/MW source. The animals were irradiated for 8 hours/day over a period of 3 to 4 months at power density levels of 1, 5, and 10 uW/cm^2. It was observed that rabbits exposed to the 5 and 10 uW/cm^2 power density levels suffered alterations in the electrical activity of the cerebra cortex and disturbances to the conditioned reflex response. They concluded that exposure to RF/MW radiation caused perturbations in the higher functioning centers of the CNS in the laboratory animals [17].

An experiment conducted by V. R. Faytel'berg-Blank and G. M. Perevalov demonstrated the biological effects of RF/MW radiation on the activity of neurons (reference found in [17]. They subjected chinchilla rabbits to a 460 MHz RF/MW source at incident power densities of 2 and 5 mW/cm^2. Only the heads of the rabbits were irradiated and exposures lasted for 10 minutes. Exposure at the 2 mW/cm^2 power density level caused neuronal activity to increase and evoked an electroencephalogram (EEG) activation reaction. Neuronal activity was observed to decrease at the higher power density level. These results indicated that RF/MW radiation can cause neurophysiological alterations in animals. These biological responses may be dependent on the intensity of the radiation [17].

iii. Behavioral Effects

Exposure to RF/MW radiation has been observed to cause a disruption in the behavior of animals. Experiments conducted on rats and nonhuman primates indicates that conditioned responses can be altered as a result of irradiation. Researchers indicate that behavior may be the most sensitive biological component to RF/MW radiation [1], [7], [9], [29].

D. R. Justesen and N. W. King (reference found in [7]) reported experimental results that demonstrated a degenerative behavioral effect in laboratory animals that were exposed to RF/MW radiation. The results were published in 1970. They exposed rats to a 2450 MHz multimodal resonating cavity system. Exposure was periodic with irradiation times lasting for 5 minutes and recurring every 5 minutes. This cycle as sustained for 60 minutes. The

experiment tested the effect of irradiation at whole-body energy absorption rates of 3.0, 6.2, and 9.2 W/Kg. It was observed that for a SAR of 6.2 W/Kg the behavioral performance of the rats degraded significantly and activity usually terminated at the end of the 60 minute exposure period [7].

In 1977, James Lin, Arthur Guy, and Lynn Caldwell [29] reported experimental results that showed alterations in the behavioral response of rats that were exposed to RF/MW radiation. White female rats were trained to execute a "head raising" movement in return for a food pellet. The total number of such movements was counted during each exposure session in order to quantify the effect of irradiation. The animals were exposed to a 918 MHz RF/MW source at power density levels of 10, 20, and 40 mW/cm^2. Clinical observations showed that baseline responses remained unchanged for irradiation at the lower power density levels of 10 and 20 mW/cm^2. At 40 mW/cm^2, however, behavioral responses decreased rapidly after 5 minutes of continuous exposure. After about 15 minutes of exposure, behavioral activity terminated. It was determined that the peak energy absorption at 40 mW/cm^2 was about 32 W/Kg and the average absorption was 8.4 W/Kg over the whole-body surface [29].

iv. Synergetic Effect of Drugs RF/MW Radiation

In 1979, J. R. Thomas et al. reported that psychoactive drugs and RF/MW radiation may have a synergetic effect on living organisms (references for Thomas can be found in [1]). Experiments were conducted on laboratory animals. Male albino rats were administered dextroamphetamine and irradiated with a pulsed 2450 MHz RF/MW source at 1 W/cm^2 power intensity for periods of 30 minutes. It was found that the number of clinical responses observed per minute in the rats diminished more rapidly under the stimulus of both agents than in the control condition where just the drug was administered. This indicates that the effects of RF/MW radiation may be enhanced by certain drugs [1].

v. Analeptic Effect in Animals

Pulsed RF/MW radiation was reported to have an analeptic effect in laboratory animals. Experimental results presented by R. D. McAfee in 1971 showed that anethesized animals could be awakened by irradiation from a pulsed 10 GHz RF/MW source. The energy incident on the test animals was estimated to have a power density of between 20-40 mW/cm^2. Experiments conducted on rats showed that these animals were aroused from states of deep sleep by irradiation. It was observed that the blood pressure of a rat decreased simultaneously with the arousal response and that laryngeal spasms would occur when the rat was awakened. McAfee reported that the laryngeal spasms would obstruct the airway causing convulsions, asphyxiation, and eventually death. Other experiments performed on rabbits, cats, and dogs showed that these animals could also be awakened by irradiation. The larger animals, however, did not asphyxiate themselves, The blood pressure of the dogs and cats was observed to rise as they were awakened. In all cases, the arousal response was stimulated only when the head of the animal was irradiated. The body temperature of the test animals was not observed to rise as a result of irradiation. This indicates that the analeptic effect of RF/MW radiation may be nonthermal in nature [20].

I. Immunological Effect

Exposure to RF/MW radiation has been observed to cause physical alterations in the essential cells of the immune system and a degradation of immunologic responses [7], [17]. Experimental results published by Soviet and Eastern European researchers indicate that irradiation can cause injury and trauma to the internal body organs that comprise the immune system. Even exposure to low levels of RF/MW radiation can impair immunologic functions [17].

As discussed earlier, lymphoblasts can undergo physical alterations as a result of irradiation. Lymohiblastoid mutagens are similar in structure to leukemia cells [8]. Lymphoblasts are the precursors to leukocyte cells that participate in the immune system [18].

In 1979, N. P. Zalyubovskaya and R. I. Kiselev (reference found in [17]) reported that exposure to RF/MW radiation caused serious damage to the immune system of laboratory animals. They exposed mice to an RF/MW source radiating at 46.1 GHz with an incident power intensity of 1 mW/cm^2 for 15 minutes/day for 20 days, it was observed that the number of leukocytes in the bloodstream of the mice decreased as a result of irradiation. Effective quantities of enzymatic proteins in serum that combine with antigen-antibody complex and antibacterial agents such as lysozyme were also reduced. Zalyubovskaya and Kiselev reported a decrease in the phagocytic activity of neutrophils and a diminished resistance to infections caused by tetanic toxins. Immunity to typhoid and other tetanic toxins induced by vaccination or by the administration of antitoxins was rendered ineffective. Further examination of the mice revealed injury and trauma to the internal body organs. Irradiation had caused physical alterations in the thymus, spleen, and lymph nodes. The lymphoid organs suffered a total loss of mass [17].

J. Effect on the Eye

Clinical studies indicate that exposure to RF/MW radiation causes physiological damage to the eye that can result in loss of sight. It has been observed that irradiation causes the formation of cataracts in the lens of the eye. Tissue damage appears to be the result of thermal trauma induced by the heating property of RF/MW radiation. Experiments conducted on laboratory animals have demonstrated severe ocular damage as a result of exposure [30], [31].

i. Ocular Sensitivity

Exposure of the eye to RF/MW radiation causes physical duress that can lead to damage of the ocular tissue. The incident power intensity and the duration of radiation exposure are factors that determine the amount of tissue damage. The lens of the eye appears to be most susceptible to RF/MW energy radiated at frequencies between 1-10 GHz. For this frequency range, it has been observed that lens fibers will suffer irreversible damage to a greater extent than other ocular elements [30]. Lens fibers are elongated, thread-like structures that form the substance of the lens [18]. In 1979, Stephen Cleary reported [30] that cataracts are formed in the lens as a result of alterations in the paracystalline state of lens proteins. Physical, chemical or metabolic stress may be responsible for opacification of

the lens [30].

ii. Experiments on Rabbits

Severe tissue damage has been observed in rabbits that have been exposed to RF/MW radiation. Stephen Cleary [30] reports that intense radiation exposure can cause "immediate tearing, injection, pupillary constriction, and anterior turbity" in the rabbit eye. Lens opacities can occur when the eye is irradiated by a 2450 MHz RF/MW source at incident power density levels of 100-300 mW/cm^2. At this exposure level, cataracts have been observed to form 24-48 hours after irradiation [30]. In 1976, Kramer, Harris, Emery, and Guy (reference found in [30]) reported observing the formation of cataracts in rabbit eyes that were exposed to 2450 MHz RF/MW radiation at an incident power density level of 180 mW/cm^2 for an exposure time of 140 minutes [30].

Acute ocular damage and the formation of cataracts appears to be the result of local hyperthermia of the eye. It has been observed, however, that trauma induced by heating of the ocular tissue may be unique to the exposure effects of RF/MW radiation [30]. In 1975, Kramer, Harris, Emery, and Guy (reference found in [30]) reported subjecting rabbits to hyperthermia not induced by exposure to RF/MW radiation. Heating caused the intra-ocular temperature of the eye to rise above normal. The retrolental temperature was reported to be about 42°C during the test period. Hyperthermia was sustained for approximately 30 minutes. Despite heating conditions that were similar to exposure from RF/MW radiation, lens opacities did not occur in the rabbit eyes [30]. Similar results have been reported by other researchers [30]. These results indicate that hyperthermia alone may not be sufficient to cause the formation of cataracts. Direct exposure to RF/MW radiation may be necessary to induce opacities in the lens [30].

iii. Cataracts in Humans

Exposure to RF/MW radiation is known to cause cataracts in the human eye. Several cases have been documented that report RF/MW induced cataracts in humans. Typically, lens opacities have resulted from exposure levels that are greater than specified by the various safety standards. However, minimum exposure levels sufficient to cause ocular damage are not certain [30].

In 1970, Zaret, Kaplan and Kay (reference found in [30]) reported a large number of cataracts induced in humans as result of occupational exposure. This report cited 42 cases of chronic exposure to RF/MW radiation. They reported that workers suffered damage to the posterior lens capsule. In one case, exposure periods lasted about 50 hours/week for 4 years. During most of the 4 year period the incident average power density level was approximately 10 mW/cm^2. For one 6 month period, however, power density levels may have reached 1 W/cm^2 [30].

In 1966, S. Cleary and B. Pasternack (reference found in [30]) published the results of an epidemiological study of military and industrial microwave workers. It was reported that minor alterations had occurred in the ocular lenses of the workers as a possible result of chronic RF/MW radiation exposure. Defects were found in the posterior pole of the lens. Cleary and Pasternack noted that the number of minor ocular defects was related to the specific occupational duties of the workers. The greatest number of defects was found

among persons working in research and development jobs. The results of the study were based on a comparison of the microwave workers with a similar control group. The researchers concluded that exposure to RF/MW radiation had caused the lens of the eye to age faster than normal [30].

Similar cases of RF/MW radiation induced ocular damage have been reported by other researchers. In one case, a 22 year old microwave technician was exposed 5 times over a 1 month period to a 3 GHz radiation source. The incident power density level was about 300 mW/cm^2 and irradiation lasted approximately 3 minutes during each exposure time. It was reported that the technician had developed bilateral cataracts as a result of irradiation [30]. In another case, M. Zaret (reference found in [30]) reported that a 50 year old woman had developed cataracts after intermittent exposure to a 2.45 GHz microwave oven. The incident power density levels were about 1 mW/cm^2 during operation of the oven and as high as 90 mW/cm^2 when the oven door was opened [30].

K. Auditory Effect

Individuals exposed to pulsed RF/MW radiation have reported hearing a chirping, clicking or buzzing sound emanating from inside or behind the head. The auditory response has been observed only for pulsed modulated radiation emitted as a square-wave pulse train. The pulse width and pulse repetition rate are factors that appear to determine the type of sound perceived [1], [31].

James Lin [31] reports that the sensation of hearing in humans occurs when the head is irradiated at an average incident power density level of about 0.1 mW/cm^2 and a peak intensity near 300 mW/cm^2. Auditory responses have been observed for a frequency range of 200-3000 MHz and for pulse widths from 1-100 us [32].

III. RF/MW ENERGY DEPOSITION

The absorption of RF/MW radiated energy causes biological reactions to occur in living organisms. In order to understand the potential effects of RF/MW radiation, it is important to quantify the absorption characteristics of biological materials. Researchers have identified several principal factors that govern the absorption of RF/MW energy by the human body. Experimental results have indicated that clothing thickness, physical dimensions, degree of hydration, and the resonance frequency of the human body are important parameters that determine the amount of energy absorbed by the body [1], [8], [9], [16], [22].

A. Specific Absorption Rate (SAR)

The specific absorption rate (SAR) is a measure of the dose of RF/MW energy absorbed by biological materials. It is intended to give a quantitative understanding to the absorption of energy. The SAR is defined as the amount of energy that is imparted to the body as a function of body mass [4]. SAR's are usually expressed in terms of watts of incident power per kilograms of irradiated body mass (W/Kg) [4], [9].

B. Depth of Energy Penetration

It is known that RF/MW radiated energy will be absorbed by the tissue of the human body. The depth of energy penetration into he tissue depends primarily on the wavelength of the incident radiation and the water content of the tissue [3], [6].

Energy emitted in the millimeter-wave band is not likely to penetrate to more than about 1 or 2 mm into the tissue [6]. Essentially, RF/MW energy radiated at wavelengths less than 3 centimeters will be captured in the outer skinsurface. RF/MW wavelengths from 3 to 10 centimeters will penetrate to a depth of about 1 to 10 mm. The greatest depth of penetration into the body will occur at wavelengths between 25 to 200 centimeters. At these wavelengths RF/MW radiated energy can directly effect internal body organs and cause serious injury. The human body is reported to be "transparent" to RF/MW radiated energy emitted at wavelengths greater than 200 centimeters. Also, at frequencies above 300 MHz it has been observed that the depth of energy penetration fluctuates rapidly with changes in frequency. In general, the depth of energy penetration into the body will decline as the frequency of the incident radiation increases. At 10 GHz, the absorption of RF/MW energy will be similar to IR radiation [3]. These figures were published by the U. S. Department of Health, Education and Welfare [3].

The water content of the human tissue will also influence the depth of energy penetration into the body. Millimeter-wave radiation is reported by Ghandi and Riazi [6] to penetrate less than 2 mm into the body because of the "Debye relaxation of the water molecules" in the tissue [6]. The Debye Effect was observed by a Dutch physicist named Peter Debye [23]. He discovered that EM waves are absorbed by a dielectric because of molecular dipoles present in the dielectric material [24]. Water molecules are essentially dipoles constructed from atoms of hydrogen and oxygen. Biological materials such as skin are dielectrics that consist mostly of water. Hence, these dielectrics are rich in molecular dipoles and are able to quickly absorb millimeter-wave radiation. High frequency radiation emissions are not expected to penetrate deeply into the human body [6].

C. Effect of Geometry

The orientation of the human body with respect to the incident EM field will determine the amount of RF/MW energy that is absorbed by the tissue. Experimental results published by Om Gandhi in 1980 indicate that the condition for maximum absorption occurs when the electric field is parallel to the major axis of the body and the direction of the field propagation is from arm to arm. Figure 2 shows the amount of energy absorbed versus the radiating frequency for various EM field orientations [22].

D. Effect of the Resonance Frequency

Researchers have reported that the human body will absorb the greatest amount of RF/MW energy from sources radiating at the whole-body resonance frequency [1], [9], [22], [25], [27]. The ANSI Standard [9] reports that the human body will absorb 7 times more energy from radiation emitted at the resonance frequency than at a frequency of 2450 MHz [9]. Experiments conducted on fabricated human models have been used to determine the resonance frequency of the human body [22]. Partial-body resonances have also been

observed by researchers. Computer simulation techniques have been used to estimate the resonance frequency of the human head [26].

The free space whole-body resonance frequency is reported to be between 61.8-77 MHz for a Standard Model of Man [9], [22], [25]. The standard model depicts an average man standing 175 cm tall [9]. Experimental results tend to differ somewhat from numerical calculations. The ANSI Standard [9] reports the whole-body resonance frequency to be 70 MHZ [9]. Similarly, experimental results presented by Hagman, Gandhi, and Durney [25] indicate the resonance frequency to be between 68-71 MHz. However, calculations put forth by the same researchers place the whole-body resonance at 77 MHz [25]. In 1980, Om Gandhi reported that the maximum absorption of energy will occur at frequencies where the free space wavelength (λ) of the incident radiation is about 2.50-2.77 times greater than the major length (L) of the body (i.e. $\lambda > 23.50L$-$2.77L$). This formula puts the value of the resonant frequency between 61.8-68.5 MHz for a standard model of man. When the human body is in contact with the electrical ground, the whole-body resonance frequency is reduced to about 47 MHz [22]. Figure 3 shows the SAR versus the incident EM field frequency for conditions of free space and grounding [22].

Numerical calculations have been presented by Hagman, Gandhi, D'Andrea, and Chatterjee [26] that indicate the free space resonance frequency of the human head to be about 375 MHz [26]. In a separate report, Gandhi determined that the head resonance will occur when the free space wavelength of the incident radiation is about 4 times the diameter of the head [22]. The condition for maximum energy absorption occurs when the direction of the EM field propagation is parallel to the long axis of the body. This orientation differs from the condition determined for RF/MW energy absorption by the whole-body. Figures 4 and 5 show the absorption of energy versus frequency for different EM field orientations [26].

E. Effect of Clothing

Clothing can act as an impedance matching transformer for RF/MW radiation. In 1986, Gandhi and Riazi [6] reported that the coupling efficiency of clothing may be as high as 90-95 percent for incident radiation in the millimeter-wave band. They determined that the thickness of the clothing and frequency of the incident radiation are important factors in the coupling condition. Figure 6 shows the relationship between clothing thickness and coupling efficiency as a function of frequency. The authors note that wet or damp clothing may actually reduce the amount of energy absorbed by the body because of the Debye relaxation of the water molecules [6].

IV. RF/MW RADIATION EXPOSURE STANDARDS

Exposure of living organisms to RF/MW radiation can have a potentially dangerous biological effect. To ensure the public safety and to safeguard the workplace against unnecessary RF/MW radiation exposure, protective guidelines have been adopted by the United States and several other nations. The maximum safe exposure levels recognized by individual examining authorities tends to vary as a result of differing interpretations of the

available RF/MW exposure data. There is a large distinction between permissible exposure levels observed in the United States and the Soviet Union. East Block countries have set more stringent standards than nations in the West [3], [8], [11], [22].

A. ANSI Standard C95.1-1982

In response to the need for a national RF/MW radiation protection guide, the American Standards Association commissioned the Department of the Navy and The Institute of Electrical and Electronics Engineers to cooperate in formulating an acceptable standard for safe radiation exposure levels. In 1960, the Radiation Hazards Standards Project was established to coordinate the efforts of researchers. Since then, work has progressed and in 1982 a modern RF/MW radiation protection guide was established. The American National Standards Institute (ANSI) designated this guide as C95.1-1982 [9]. Presently, a new ANSI guide is due for publication in May 1993. The new guide is entitled "ANSI/IEEE C95.1-1992". This guide will supersede C95.1-1982 when it is published.

i. Recommendations

The ANSI C95.1-1982 Standard specifies the maximum recommended RF/MW radiation exposure levels over a frequency range of 300 KHz to 100 GHz. Typically, the standard calls for an exposure of no more than 5 mW/cm^2 for frequencies between 1500 MHz to 100,000 MHz. The reader should consult with the actual ANSI publication for the detailed recommendations. In addition, the standard limits the whole-body SAR to 0.4 W/Kg and indicates that the spatial peak SAR should not exceed 8.0 W/Kg over any one gram of tissue. For both CW and pulsed EM fields the exposure time should not exceed 6 minutes at the recommended levels. These maximum safe levels are not intended to apply to the medical treatment of patients where irradiation is sometimes useful in combating diseases like cancer. The standard does pertain to the general public and to persons that work in electromagnetic environments. There are two exceptions to the recommendation: 1) at frequencies between 100 KHz and 1 GHz the maximum exposure levels may be exceeded as long as the stated SAR values are not violated and 2) at frequencies between 300 KHz and 1 GHz the exposure levels may be exceeded if the output power of the radiating device is less than 7 W [9].

ii. Philosophy

An explanation of the recommended maximum exposure levels is given as part of the protection guide. The ANSI Standard is intended to afford the best possible protection of human life against RF/MW radiation exposure. The biological effect on the human body for all RF/MW frequencies and modulation schemes is not known, therefore, investigators sought to interpret the available data in a way that would allow for the construction of the best possible RF/MW radiation protection guide. Investigators emphasized studies that reported harmful or potentially serious biological effects. Unlike past standards, researchers agreed that the modern protection guide would also account for the nonthermal effects of RF/MW radiation [9].

The safe exposure levels expressed by the ANSI guideline were determined for far field exposures. The plane wave model used to specify the maximum exposure levels may not be accurate to describe conditions in the near field. However, the power density levels expressed in the protection guide are not considered great enough to induce EM fields with sufficient energy intensities capable of exceeding the recommend SAR's [9].

In selecting a measure for the dose of RF/MW radiation, it was recognized that the SAR does not encompass all of the important factors necessary to determine safe exposure levels. The modulation frequency and peak power of the incident EM field should also be considered. Some of the investigators warned that extra care should be taken by persons that are subjected to pulsed EM fields or by fields that are modulated near the whole-body resonance frequency [9]

In assessing the biological effects, it was found that behavior was the most sensitive biological component to RF/MW irradiation. It was observed that behavioral effects were reversible for exposure to carrier frequencies between 600 MHz and 2450 MHz when whole-body SAR's were limited to between 4 and 8 W/Kg. For these SAR's, power densities were calculated or measured to range from 10 mW/cm^2 to 50 mW/cm^2. Behavioral effects were considered to be among the most serious consequences of exposure to RF/MW radiation [9].

It was established that in order to ensure an acceptable margin of safety the whole-body average SAR should not exceed 0.4 W/Kg. Most of the researchers concluded that this was a necessary and reasonable standard. The exceptions cited in the recommendations were justified on the basis of the total rate of energy absorption by the human body. The Standard reports that small radio transceivers are able to emit EM fields that exceed the prescribed power density levels. Such devices, however, are not expected to compromise the prescribed maximum SAR levels. In general, compliance with the ANSI RF/MW protection guide is the best safeguard against harmful biological effects [9].

B. USAF PEL (AFOSH Standard 161-9, 12 February 1987)

Since the early investigations of the Tri-Service Commission, the United States Air Force has recognized the need to establish an RF/MW protection standard. The USAF permissible exposure level (PEL) is specified in AFOSH Standard 161-9 enacted 12 February 1987. This standard stipulates maximum safe RF/MW radiation exposure levels over a frequency range of 10 KHz to 300 GHz. The PELs are shown in Figures 7 and 8 [10].

In general, the USAF protection guideline agrees with the ANSI Standard except that a distinction is made between exposure to persons in restricted and unrestricted areas. No explanation for this policy is given in the USAF Standard. The PEL for restricted areas shows only a slight alteration from the ANSI recommendation. For a frequency range of 1500-300,000 MHz the USAF PEL is given as 10 mW/cm^2. The PEL put forth by the USAF is intended to protect personnel from harm by limiting the whole-body SAR to 0.4 W/Kg. Exposure periods at the maximum safe levels should be limited to 6 minutes. It is also recommended that exposure in the near zone to RF/MW sources radiating at less than 30 MHz may require a separate evaluation to determine safe exposure levels of irradiation [10].

C. Canada Western Europe

Concern over safe RF/MW radiation exposure levels has sparked controversy and sharp debate in many countries around the world. The ANSI Standard is currently recognized by most countries of the Free World including Canada, the United Kingdom, Sweden, France, and West Germany [8], [22].

D. Soviet Union & Eastern European Standards

The RF/MW radiation exposure standards prescribed in the Soviet Union and Eastern Europe are more conservative than standards adopted by countries in the West [3], [8], [11]. In the Soviet Union, permissible exposure levels for whole-body irradiation are specified for various time intervals. RF/MW radiation exposures may not exceed 0.01 mW/cm^2 for 3 hours/day, 0.1 mW/cm^2 for 2 hours/day, and 1.0 mW/cm^2 for 15-20 minutes provided that safety goggles be worn [3]. Czechoslovakia has recommended a maximum exposure level of 0.025 mW/cm^2 for an average working day [8].

Investigators in the Soviet Union and Eastern Europe have placed a great emphasis on the nonthermal effects of biological exposure to RF/MW radiation. They contend that electromagnetic interactions with the bioelectrical and biochemical functions of the body constitute a more serious health risk than effects from thermal heating. Nonthermal disruptions have been observed to occur at power density levels that are much lower than are necessary to induce thermal effects. Soviet researchers have attributed alterations in the central nervous system and the cardiovascular system to the nonthermal effect of low level RF/MW radiation exposure [3], [8].

The U. S. Department of Health, Education and Welfare [3] reports that the differing standards put forth by the East and West may be attributed to philosophical differences in basic research. Soviet investigators were intent on examining the effect of RF/MW radiation on the conditioned reflex response of living organisms whereas their counterparts in the West do not view this effect as an appropriate endpoint to research [3]. Recently, however, researchers in the West have sought to account for nonthermal effects in modern permissible RF/MW radiation exposure standards [9].

V. CONCLUSION

Exposure to RF/MW radiation is known to have a biological effect on living organisms. Research conducted over the past 30 years has provided a basis for understanding the effect of irradiation of biological materials. Experimental evidence has shown that exposure to low intensity radiation can have a profound effect on biological processes. The nonthermal effects of RF/MW radiation exposure are becoming important measures of biological interaction with EM fields. Modern RF/MW radiation protection guides have sought to account for the effects of low level radiation exposure. Adherence to the ANSI Standard [9] should provide protection against harmful thermal effects and help to minimize the interaction of EM fields with the biological processes of the human body [9].

It is essentially the absorption of RF/MW energy that causes stress and trauma to biological systems. The greatest amount of energy will be absorbed when the incident radiation is emitted at the resonance frequency of biological material [9], [22]. In this regard, RF/MW radiation emitted at nonresonant frequencies should be absorbed to the

greatest extent when the radiating mode is a pulsed signal. The generation of such signals creates transient responses that will match the resonant frequencies of biological materials. Nonresonant pulsed RF/MW radiation may be more harmful to living organisms than CW radiation emitted at nonresonant frequencies.

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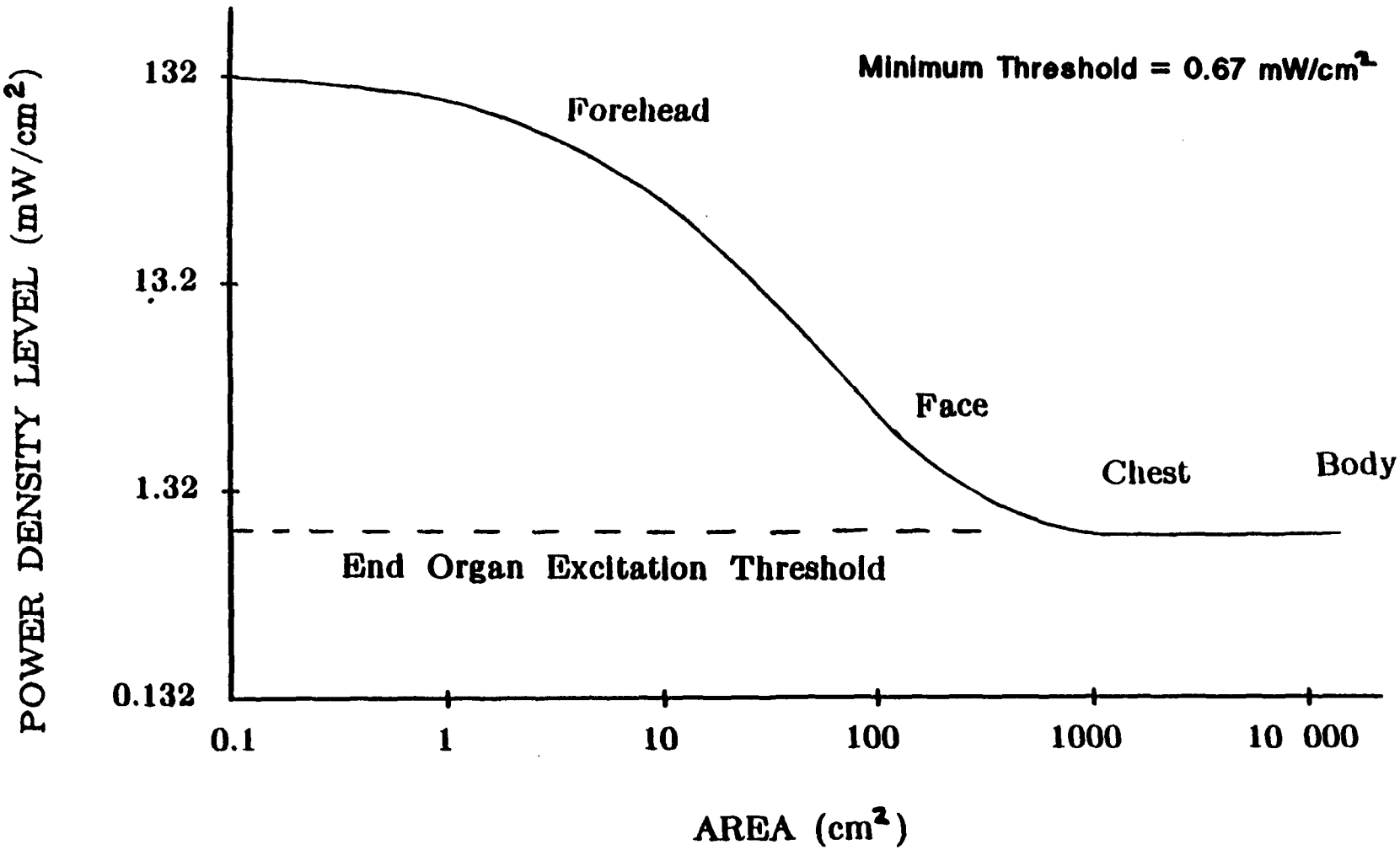

Figure 1: Observed threshold of infrared perception.
Absorbed continuous wave intensity versus exposed body area.

(ref: J. Hardy & T. Oppel, results reported by Om Gandhi and Abbas Riazi, IEEE MTT-34, pp. 228-235, Feb 1986)

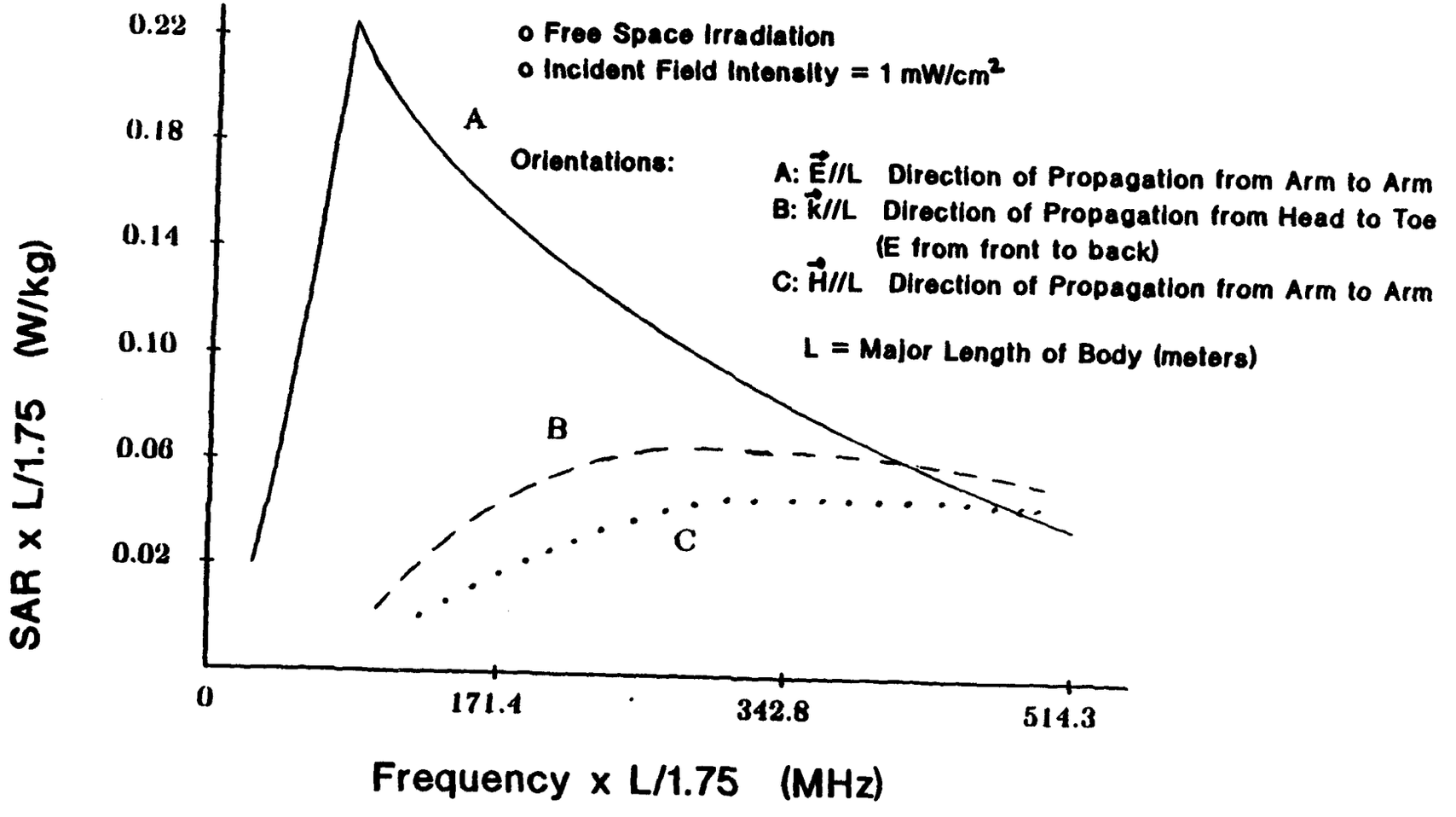

Figure 2: Comparison of field orientations for whole-body exposure of humans. Normalized SAR versus normalized radiated wave frequency.

(ref: Om Gandhi, Proceedings IEEE, Vol. 68, pp. 24-32, Jan 1980)

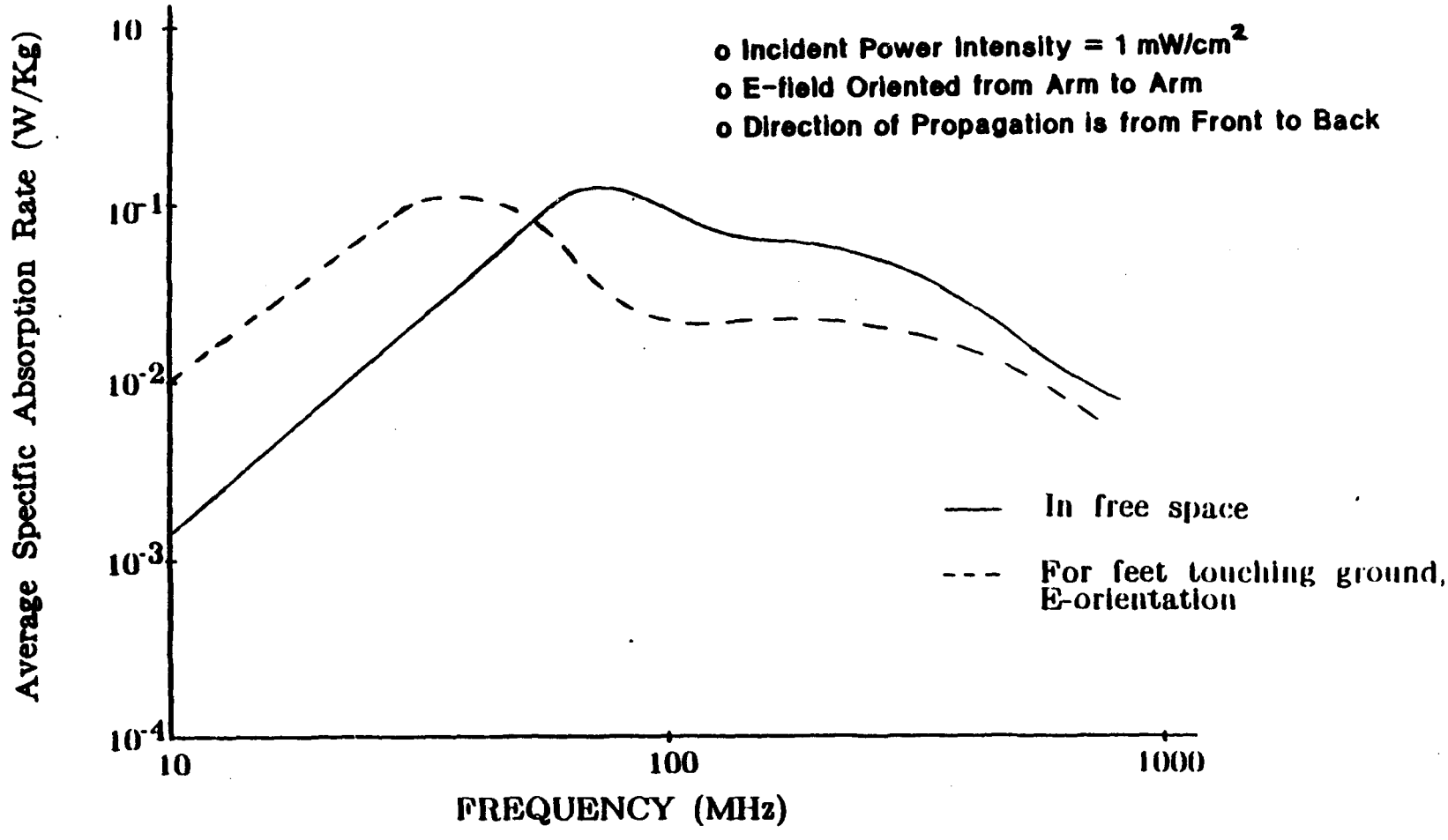

Figure 3: SAR versus frequency of incident radiation for a homogenous model of man.

(ref: OM Gandhi, Proceedings IEEE, Vol. 68, pp. 24-32, Jan 1980)

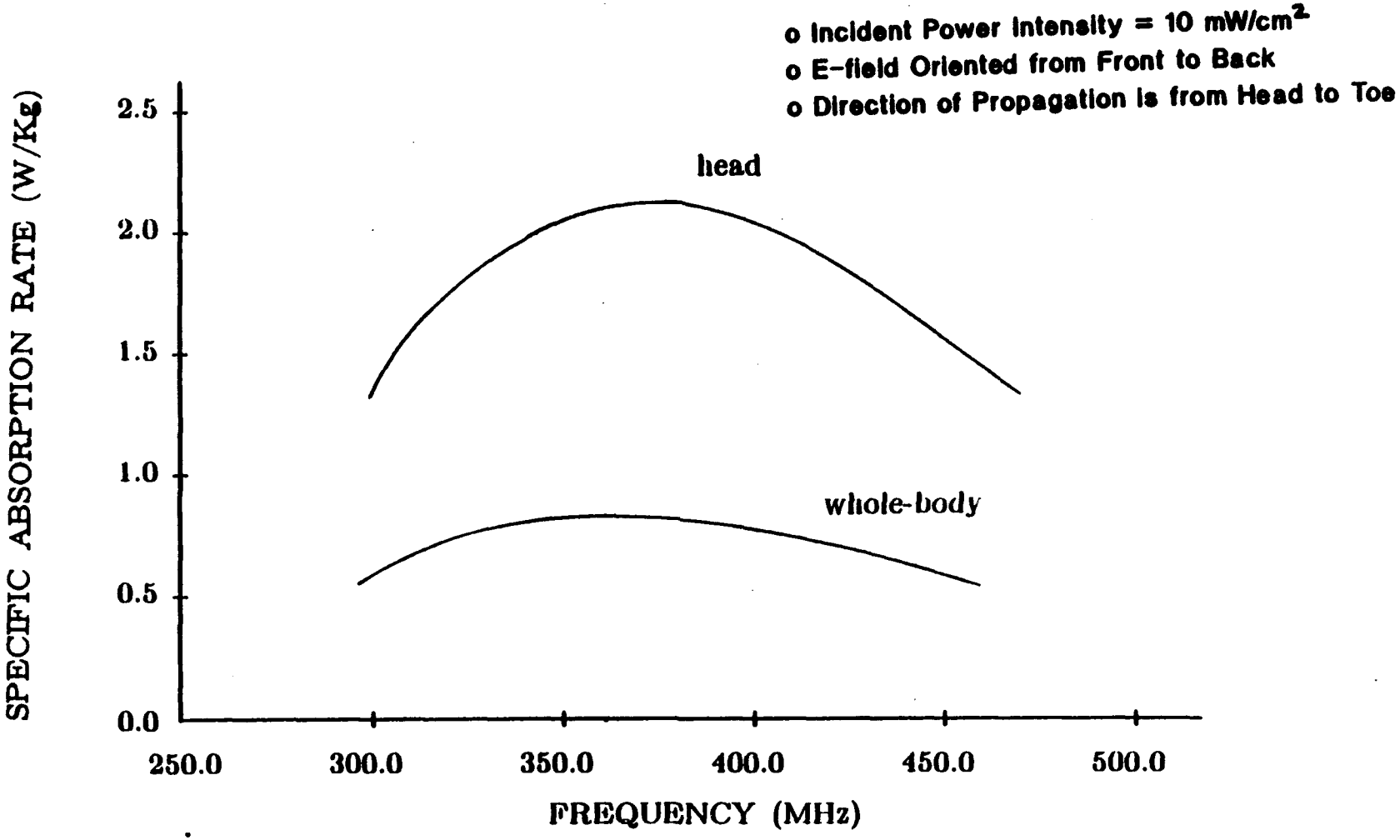

Figure 4: Head and whole-body energy absorption.
SAR versus frequency of incident radiation.

(ref: Hagmann, Gandhi, D'Andera, and Chatterjee, IEEE MTT-27, pp. 809-813, Sep 1979))

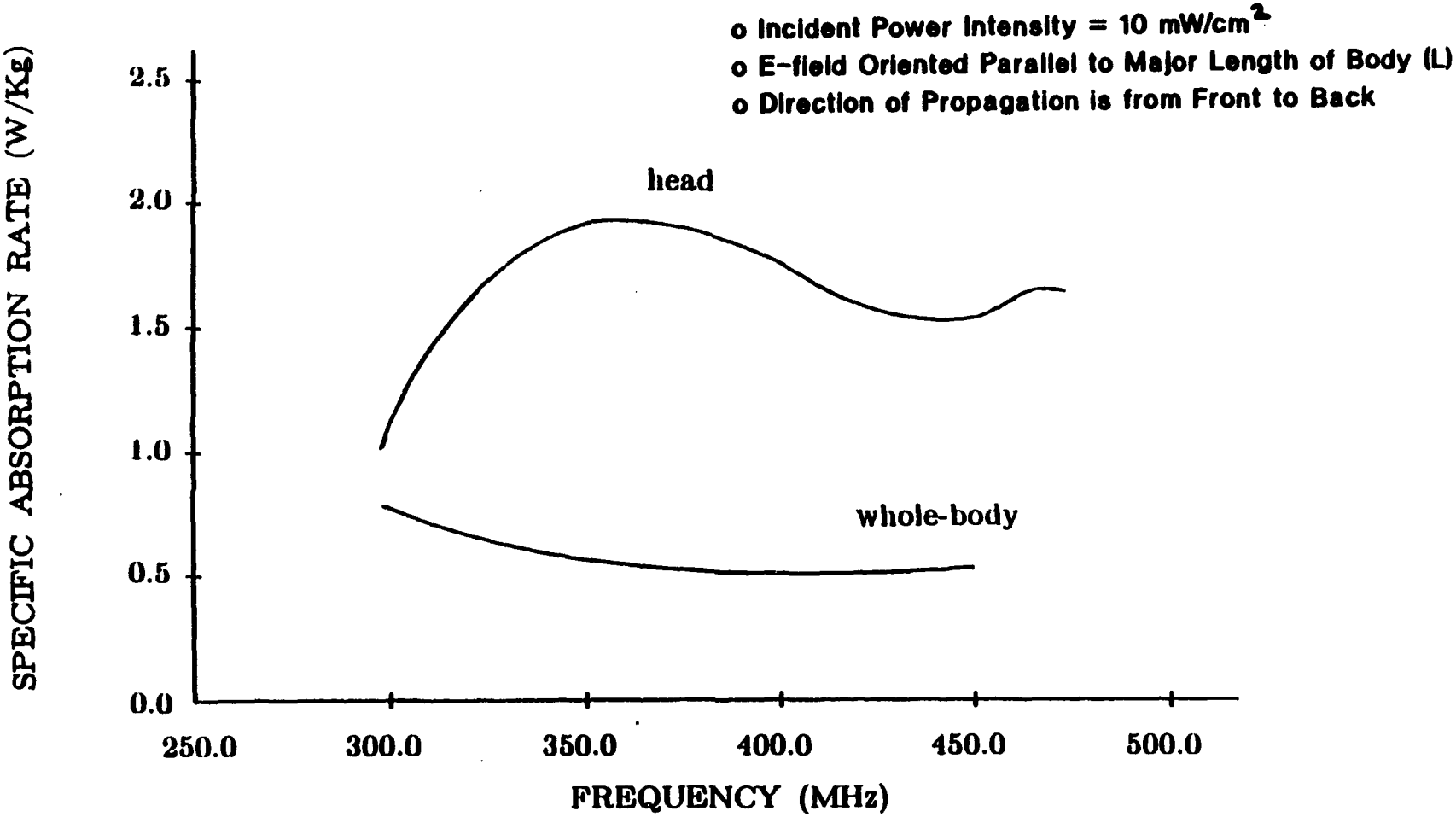

Figure 5: Head and whole-body energy absorption for $\vec{E}$//L.
SAR versus frequency of incident radiation.

(ref: Hagmann, Gandhi, D'Andera, and Chatterjee, IEEE MTT-27, pp. 809-813, Sep 1979)

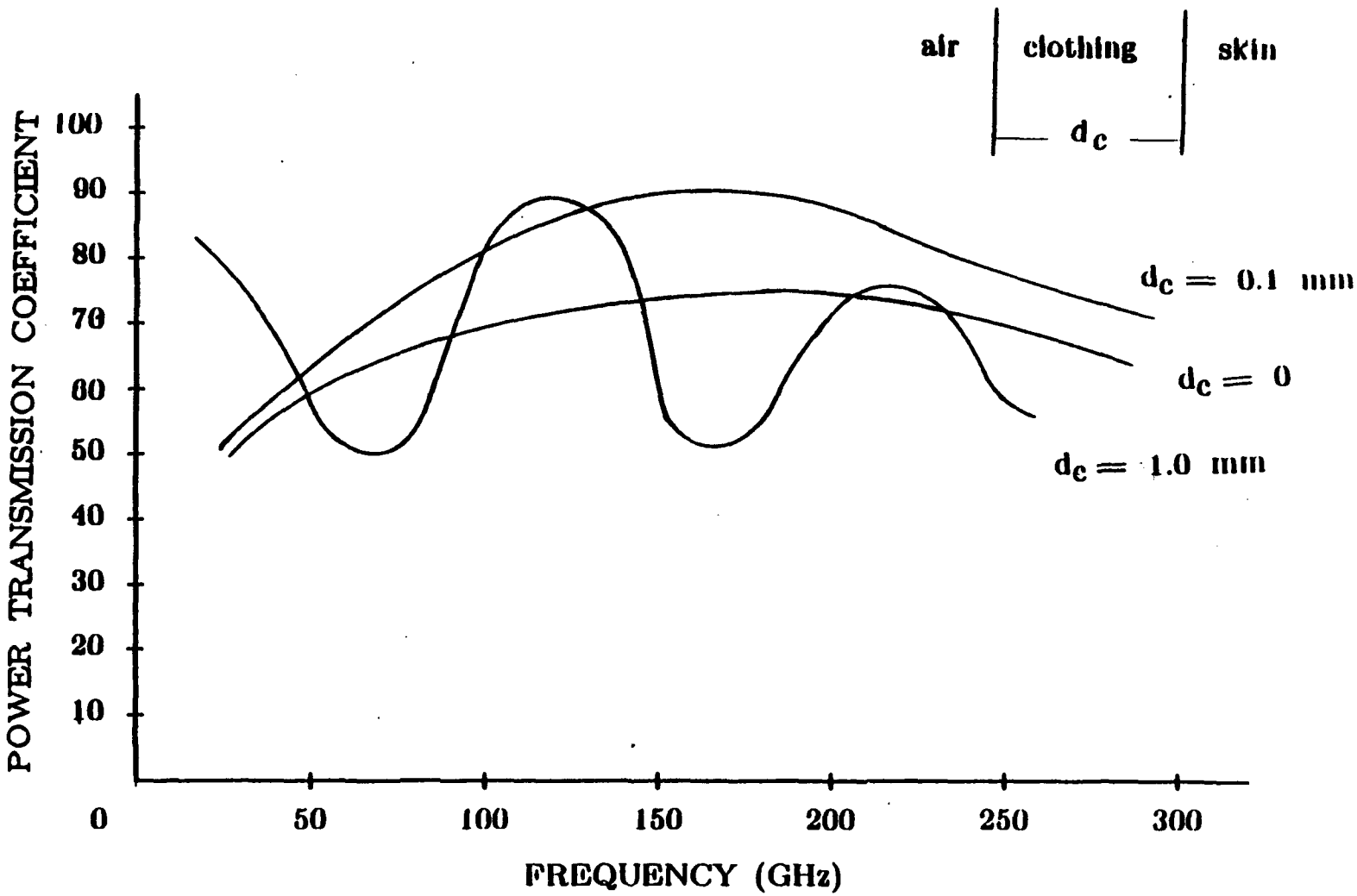

Figure 6: Comparison of transmission coefficient with and without clothing; no air gap between skin and exterior clothing.

(ref: Om Gandhi and Abbas Riazi, IEEE MTT-34, pp. 228-235, Feb 1986)

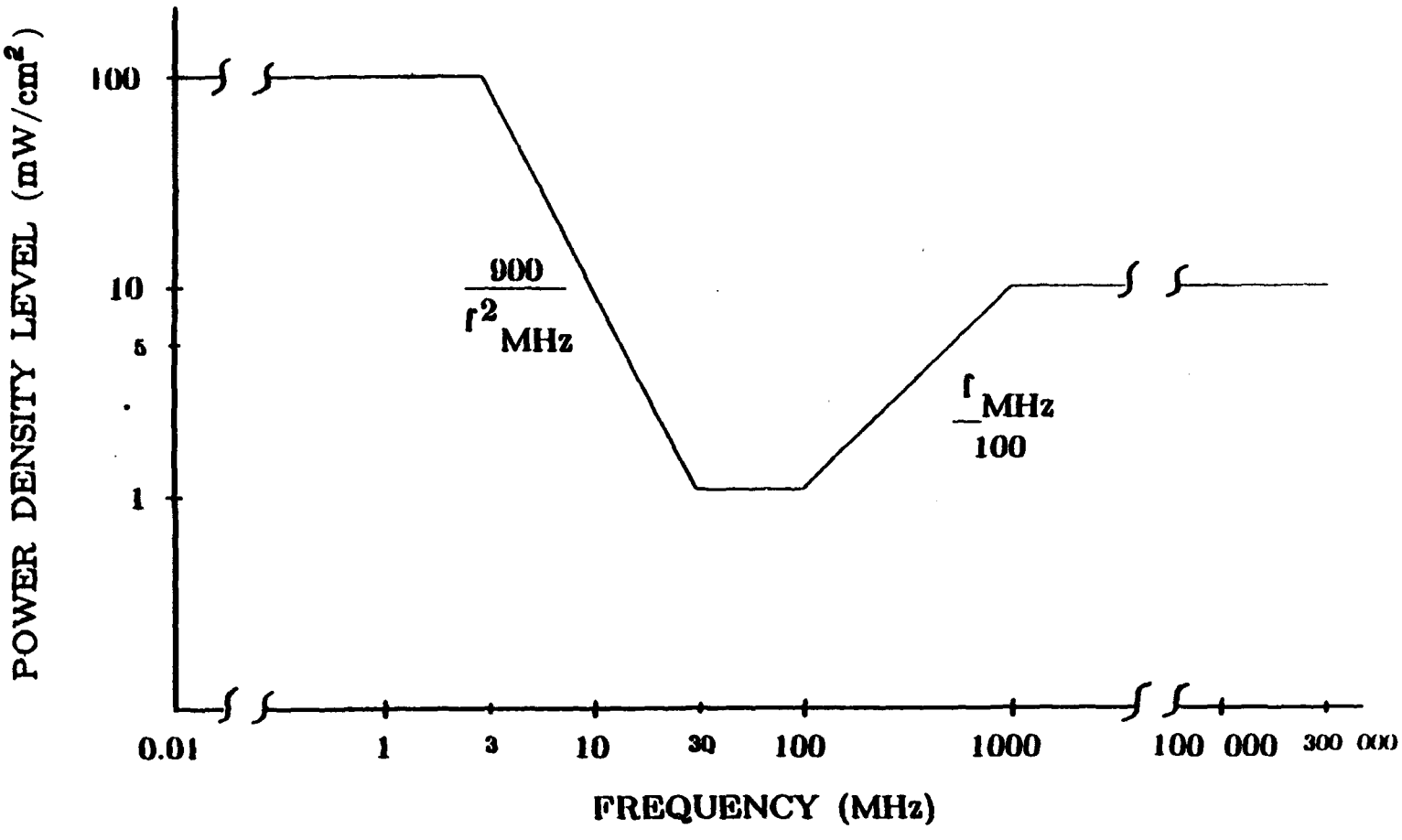

Figure 7: USAF RF/MW radiation permissible exposure limit (PEL) for humans working in restricted areas.

(ref: AFOSH Standard 161-9, 12 Feb 1987)

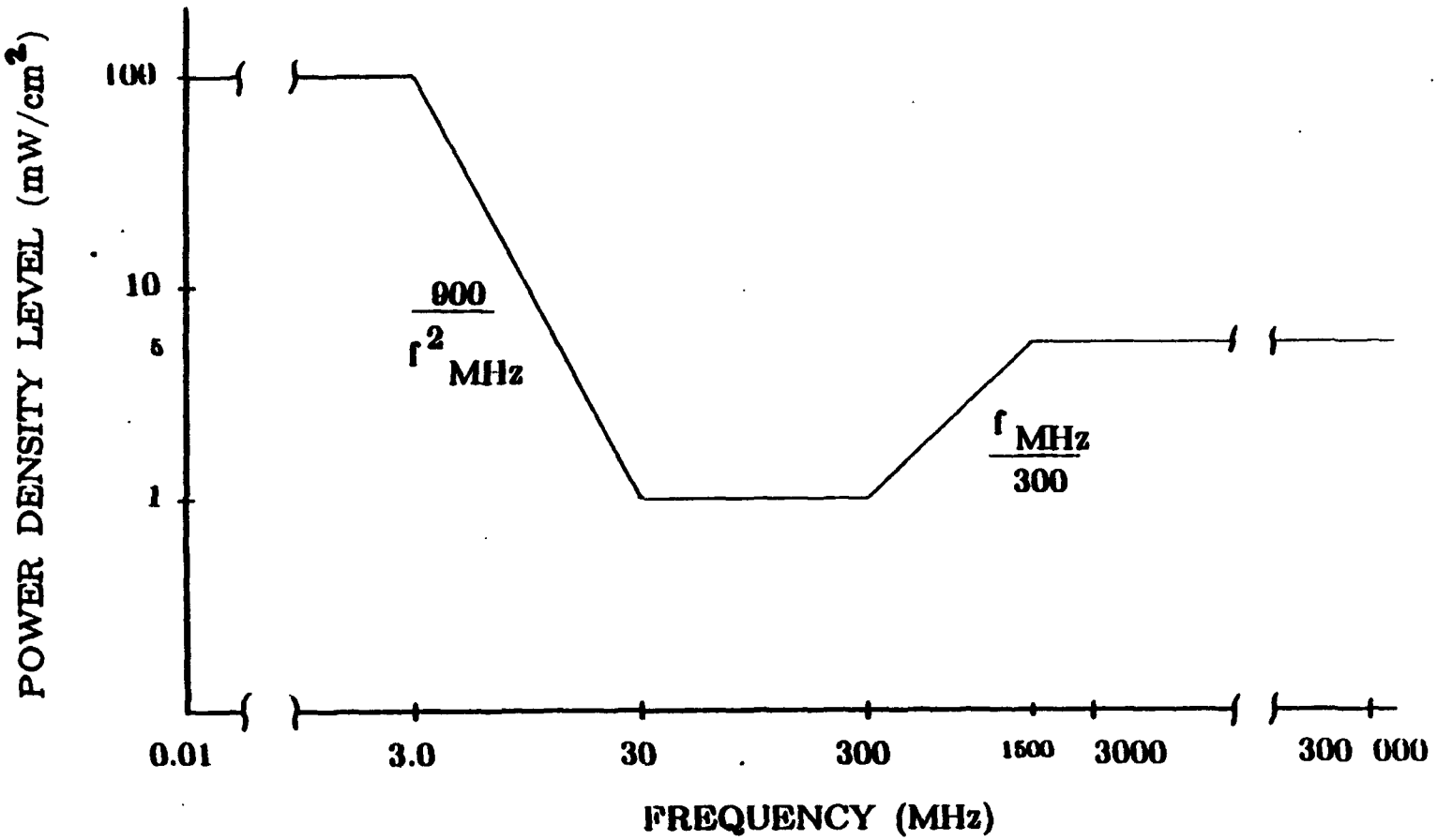

Figure 8: USAF RF/MW radiation permissible exposure limit (PEL) for humans working in unrestricted areas.

(ref: AFOSH Standard 161-9, 12 Feb 1987)

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