

problem. The most important thing is to acknowledge the problem and bring the scientific method to bare to figure out how to correct it.

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"...sending an intensive flow of impulses along the afferent fibers to the spinal ganglia and on into the brain..."⁴ Centimeter waves (3-30 GHz) were less absorbed by the skin than millimeter waves and therefore produced fewer skin effects. Even so, their studies of nonthermal centimeter waves found "...uneven thickenings, mutual impregnation, and varicose distensions..." in skin nerve fibers of animals exposed to 1mW/cm² for one hour daily over 100-200 days.⁵ Decimeter waves (300-3000 MHz) had even less absorption at the skin level and produced the least noticeable skin effects of the microwave range.⁴ However, in rating the overall health hazards of microwaves, Tolgskaya and Gordon rated centimeter waves most harmful, with decimeter and millimeter waves second and third in producing severe effects, based upon animal experiments at lethal microwave exposures.⁴

In concluding the Soviet studies, an interesting insight into the skin/nervous system interrelationships during the development and promotion of microwave sickness was proposed by Tolgskaya and Gordon:⁴ first, electromagnetic exposures at a variety of frequencies (at nonthermal intensities) "...stimulate the sensory nerve fibrils..." of the skin and, penetrating more deeply, the EMFs "...stimulate the sensory nerve fibrils of visceral receptive fields." They stated that the neurons in the spinal ganglia were the primary receptors of this stimulation which was carried to the brain, particularly the "...inter-neuronal synapses of the cerebral cortex...". Therefore, EMF stimulation of the brain occurs directly via deeply penetrating exposures and also indirectly via nerves which carry the stimulation to the brain. Tolgskaya and Gordon further stated that this excessive stimulation will "...induce considerable changes in its nerve cells: shrinking of the cortical cells, swelling and vacuolation of the cytoplasm of the hypothalamic neurons." They concluded that these changes result in neuroendocrine disturbances, leading on to more disfunction within the nervous system and organs of the body EMF exposed.

Poland Studies

In 1961, Poland adopted the Soviet UHF (ultra-high frequency) occupational radiation standards, which limited worker exposure above .01mW/cm².⁶ By 1963, however, Poland relaxed the standards while adding limits for the general public and for intermittent occupational radiation exposure.⁶ The new unrestricted continuous exposure limit for a working day was .2mW/cm²; above that level, restrictions applied with 10mW/cm² as the upper

Microwave Sickness - Part 4

Lucinda Grant

In the ES survey results reported in the last newsletter issue, participants reported illnesses which they believe are related to their electrical sensitivity. Among these illnesses are sensitivity to sun, light, and sound.¹ Soviet documents regarding microwave sickness also mention these sensitivities as a possible consequence of radiation exposure.

In a paper by Kalada, Fukalova and Goncarova presented at the 1973 Warsaw microwave symposium, health effects of 30-300 MHz radiation were outlined.² Among 50 Soviet workers exposed for at least five years, one reported symptom was "...a lowered threshold sensitivity to ultraviolet radiation."²

Another Soviet researcher (Petrov), in summarizing findings of many other Soviet microwave studies, stated that in addition to the characteristic symptoms of headaches, fatigue, dizziness, nausea, chest pain, etc., exposure to bright lights and loud noises can irritate microwave sickness patients.³ Petrov also indicated that as microwave sickness progressed, difficulty concentrating may become manifest.³ In the ES survey results, difficulty concentrating tied for first place with skin problems as the most common ES symptom.¹

Soviet research on skin effects of microwave exposure found thermal-level millimeter waves (30-300 GHz) most apt to produce skin effects.⁴ Tolgskaya and Gordon explained that the millimeter waves were most absorbed by the skin and most irritating to the skin's nerves, resulting in their

limit.^{6,7} The general public's exposure limit was .01mW/cm² for continuous exposure—the Soviet's unrestricted occupational limit. As part of the 1963 regulations, prospective Polish microwave workers were required to undergo a medical evaluation to determine their fitness for work with microwave generators.⁶ These initial exams included a general physical; blood, urine, neurological, and eye tests; a chest x-ray, EEG, and EKG. After employment, annual medical checkups were also required.

The new Polish standards were developed based on a review of Soviet, American, and Czechoslovakian research in addition to their own research.⁶ Although the 1963 standards indicate an optimism about increasing radiation exposure, the scientific literature from Poland shows health problems in Polish microwave workers which are the same as Soviet reports.⁶

In Poland, many health evaluations of microwave workers were undertaken in the 1960s.⁶ One review of worker health complaints found headaches and fatigue the most common symptoms of first-year microwave workers exposed below .1mW/cm².⁶

A six-year study by Siekierzyński assessed the health of 841 male microwave-exposed workers.² The workers were categorized by their estimated exposure level. Among the 507 workers routinely exposed to more than .2mW/cm², 180 (36%) had nervous system symptoms, 87 (17%) had gastrointestinal symptoms, and 50 (10%) had an abnormal EKG. Of this group, 38% were employed fewer than six years. The majority of these workers were under age 31 (56%). At the time of the study's conclusion, 239 of the 507 workers (47%) were classified as now unfit for this type of work, due to their health problems.

The remaining 334 workers, who were exposed to less than .2mW/cm² during employment, had the following symptoms: nervous system 116 (35%), gastrointestinal 78 (23%), and abnormal EKG 32 (10%). In this group, 40% were employed less than six years. The majority of these workers were between ages 31-45 (58%). When the study ended, 167 of the 334 workers (50%) were classified as unfit for this work.

Although the two study groups showed no significant differences related to exposure levels, these workers had a high level of illness in both groups which in many cases lead to becoming unable to continue in that occupation over the long term.

On a final note regarding the Polish studies, the book **Risk Benefit Analysis: The Microwave Case**

reported that prior to 1978 a researcher in Poland personally encountered "...male workers in one factory who could 'sense [and almost quantitate] the presence of microwave energy' at the power levels actually measured, but could not explain how or why they could do it."⁸

- Part 4 of a series -

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EMR and RF/MW Hypersensitivity From the Personal to the General

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(Editor's note: The following article is Copyright © 1997 by Sarah Benson, with the exception of excerpts from the book **The Structure of Scientific Revolutions** by Thomas S. Kuhn, © 1962, 1970 by The University of Chicago and published by The University of Chicago Press. Reprinted by permission of Sarah Benson and The University of Chicago Press.)

My hypersensitivity to RF/MW (radio frequency/-microwave) radiation and high EM (electromagnetic)

fields came after a serious bout of glandular fever six years ago, which resulted in chronic fatigue syndrome and multiple chemical sensitivity.

ES or RFHS (radiofrequency hypersensitivity) set in about three years ago while I was living in close proximity to a communications interstate relay tower that I have since discovered transmits at frequencies 800MHz to 15GHz. This also happened to coincide with the sudden expansion of the mobile phone industry in Australia. I was living in a metal caravan at the time, which possibly was acting as an antenna.

The sorts of symptoms and difficulties I have experienced since then have been many and varied—and have at times been very frightening. Symptoms have included most of what is listed in reports of health effects and other people's experiences of ES, and I have been virtually homeless since becoming ES/RFHS. This is because if I live in a flat or in close proximity to any dwelling in which there are mobile phones, computers, TV, radiators, etc. switched on I will not be able to sleep. Where I live now, in a caravan in a friend's garden, was very difficult at first—before I learned to use the EM modulator. I would be just dropping off to sleep and then start having seizures. Sometimes my heart would stop shortly after falling asleep, and this was the most scary of all. Often this would leave me feeling faint and shaky. If I slept at all I would wake up feeling suicidally depressed. With the help of alternative remedies and the modulator I have been able to keep my head above water sufficiently well to respond to the "flight or fight" mechanism that was triggered after I had heard about the hundreds of low-orbit satellites to be launched in the next couple of years. I chose fight rather than flight (partly because there was nowhere to fly to), and as a result have begun an extraordinary journey. However, I am not able to forget my condition for a minute.

So while my personal situation continues to be worrying, the journey has led to a very positive and broad ranging direction in my thoughts—positive, in that I have been able to develop a much deeper understanding of the possible implications of where all this wireless technology might lead, and it's long term effects on human beings. Observing health effects in myself and others, and then linking them to all the available research literature has enabled me to speculate on the future in a way that would otherwise not have been possible. The canary in the mine shaft scenario! I have also been privileged during this time to meet many new and

fine people in the realms of politics and science who have kept me both motivated and inspired.

In getting a perspective on the situation we need to remember that the human race has evolved against a background of geophysical and cosmic radiation that has been tempered by the earth's atmosphere, and that this radiation is low frequency and time-variable in nature. Living systems have evolved in response to this energy environment—and consequently are dependent on it for survival. The artificial "electrosmog" that we have created and are rapidly escalating is mechanical and unvaried, and billions of times more intense. Although such an elusive and complex issue, scientists have only a short period of time in which to come to grips with the nature of the problem before too much irreversible damage is done. As any effects will be global, they must question vigorously whether it is wise to remain apathetic and just "wait and see".

Many studies have demonstrated that microwaves and radiofrequency radiation even at low power densities, can cause an array of diseases and health effects involving cancer, leukaemia, cataracts, Alzheimer's, depression, nervous system changes, cardiovascular problems, seizures, male infertility, and much else besides. (Newspaper articles regarding male fertility problems have ascribed the cause as possibly due to estrogen-like chemicals, and only give us **50 years**.)

Many of these health conditions may be caused by interference with the pineal gland and the brain, which are sensitive to EMFs and EMR (electromagnetic radiation) generally. Recently, the Australian media has reported that brain-scanning equipment in use just prior to an earthquake in New South Wales measuring 5.5 on the Richter scale showed that the brain was indeed responding electrically to stimuli in a marked way. This quite coincidental discovery lends considerable weight to the research evidence that low power signals of EMR have a marked effect on the brain. Interestingly, the Australian government appears to be taking the problem of low-level EMR interference with electronic equipment far more seriously than the threat to biological systems.

One of the most commonly observable health trends over the last couple of years is endemic short term memory loss. Also on the increase are thought and speech process problems and poor coordination. Generally healthy people are often unable to make the connection between what they experience, and what is in the research literature, and often put adverse health changes down to stress or aging. I believe these symptoms extend beyond mobile

phone users. It is well known that the brain (and the male testes) are adversely affected by heat, and we know that microwaves at thermal levels have a heating effect—it does not take much of a quantum leap to realise that this same effect could be taking place everywhere at low power levels. If this is the case, then memory problems are explained. The brain, arguably the command centre of each human life, is consequently the most vulnerable to the onslaught of microwaves. The brain is also the centre of consciousness, so it would make sense to also question what might be happening at the psychological level—what is happening to consciousness? It would appear that not only is our physical health under threat, but also, possibly, spiritual and mental health. Whether we like it or not, our experience and perception of who we are and what it is to be human are possibly being altered by man-made sources if such pollution becomes impossible to escape.

It is well established that melatonin, which is produced by the pineal gland, is severely disrupted by EMR. A much less known or discussed aspect of the pineal gland is its role in facilitating higher states of consciousness. In ancient times it was regarded by mystics as the gateway to the spirit—to other dimensions. These days, it is claimed that Theta waves—the much slower frequency that is achieved in meditation—in the brain facilitate a different form of consciousness that is closer to dreaming. For example, I personally have found that I am completely unable to meditate in high EM or RF fields, and this has led to some soul-searching as to the ultimate consequences of EMR.

During the last half of this century I have often wondered about the apparent lack of creation of high quality, divinely inspired music, art or literature. Are we being cut off from the source of our inspiration, and hence from the source of our very being? What will the eventual consequences of this be? Interesting too, that coincidentally an article from **New Scientist** (24/8/96) called "Are we killing astronomy?" describes how RFR (radio frequency radiation) from satellites is creating a radiofrequency blanket around the earth that is cutting us off from the visible cosmos.¹ Astronomers are worried about becoming unable to "see" into space using radio telescopes due to the use of the EM spectrum by high-frequency transmitting telecommunications infrastructure, especially satellites. Perhaps this situation could be the material picture of what I have just described as a spiritual problem.

This rather overwhelming and apocalyptic scenar-

io reminds me of a poem, I can't remember who by. It tells the story of two frogs who find themselves about to drown in a bowl of cream. One frog, the more melancholy of the two, despairs of his situation and sinks sadly beneath the cream. The other, determined not to give up in spite of the overwhelming odds, starts to struggle and kick. After a while he finds he has created—a pat of butter! He then climbs out of the bowl and hops away. I tell this story in order to hopefully offset the rather alarming nature of the thoughts expressed here.

I am convinced that a scientific paradigm shift is now due and urgently needed, and that a conceptual transformation must occur in the scientific community soon if we are to make it much past the turning of the millennium.

Thomas S. Kuhn, in his book **The Structure of Scientific Revolutions** (1962), discusses the nature of science, scientific research, methodology and paradigms, how conceptual changes can come about, and what prevents them. In the introduction he says:²

"The most obvious examples of scientific revolutions are those famous episodes in scientific development that have often been labeled revolutions before...Copernicus, Newton, Lavoisier and Einstein. More clearly than most other episodes...these display what all scientific revolutions are about. Each of them necessitated the community's rejection of one time-honored scientific theory in favor of another incompatible with it...each transformed the scientific imagination in ways that we shall ultimately need to describe as a transformation of the world within which scientific work was done. Such changes, together with the controversies that almost always accompany them, are the defining characteristics of scientific revolutions."

However,

"The invention of other new theories regularly, and appropriately, evokes the same response from some of the specialists on whose area of special competence they impinge. For these men the new theory implies a change in the rules governing the prior practice of normal science. Inevitably, therefore, it reflects upon much scientific work they have already successfully completed. That is why a new theory, however special its range of application, is seldom or never just an increment to what is already known. Its assimilation requires the reconstruction of prior theory...an intrinsically revolutionary process that is seldom completed by a single man and never overnight."

And finally,

"Normal science, for example, often suppresses fundamental novelties because they are necessarily subversive of its basic commitments."

In this issue, of course, we have the added burden of a billion dollar industry.

I think it's not unreasonable to suggest that this burgeoning crisis calls for the mainstream scientific community to begin the process of transforming narrow-minded concepts about the relationship between EMR and biological systems towards a thoroughly holistic view of the human being, nature and the surrounding universe. It is imperative that we understand the deeply sensitive nature of the human body and life forces.

Some may say it is too late, and that technology has developed past the point of no return and pretty much sets the global agenda—and all the thinking that goes on in it.

Such a materialistic perversion of paternalism and patriarchalism however cannot continue ad infinitum—the pendulum must eventually change direction towards more compassionate and wholistically intelligent civilisation.

Hopefully, then, the beginning of the second millennium will see the inauguration of new scientific and social paradigms that support life rather than destroy it, and ones that foster an understanding of the interconnections between all life forms, matter and energy.

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ENDNOTES

● **AAEM and ES**-The American Academy of Environmental Medicine (AAEM) is a medical trade association for doctors specializing in environmental illnesses. A free list of doctors in your area who are AAEM members is available from AAEM at their new address: Box CN 1001-8001, New Hope PA 18938; phone (215) 862-4544. Their contact list may help you locate a local doctor knowledgeable about ES.

March, I submitted a proposal to AAEM's educational committee, suggesting that they update all of their educational materials to include ES. One request was for a medical fact sheet on ES, pre-

pared by doctors and distributed through the AAEM. With this fact sheet, detailing the basics of ES from a medical standpoint, ES patients would have a credible document to present to their family and doctors. I specified that this document needs to be a high priority. My second request to the AAEM was for all pamphlets they circulate regarding environmental illness include mention of ES. Also, and most importantly, I asked that their course curriculum include ES in the medical courses they offer to doctors. I saw no mention of ES in April's AAEM course announcements. Comments to AAEM's educational committee may be sent to their address above.

● **NIEHS**-The National Institute of Environmental Health Sciences (NIEHS) held the first of three symposiums March 24-27, 1997 to review studies of EMF health effects from power lines and home electrical use. Topics of this symposium included "EMF effects on calcium", "EMF effects on enzymes and polyamines", "Magnetochemistry and magnetite", etc. Curiously, magnesium—which is helpful for some ES—is a natural calcium channel blocker and works with over 300 enzyme processes in the body, indicating that their research focus may have benefits for the ES. The second and third symposiums are tentatively scheduled for August and September, 1997. Based upon the information generated from these meetings, the NIEHS Director will report the conclusions to Congress in August 1998.

I wrote to the Director, Dr. Kenneth Olden, just prior to the March symposium explaining that living too close to a power line or having faulty electrical wiring in the home were ways that some people became ES. I mentioned that ES should be one of the reported health effects coming out in their final report—that I really don't expect science can draw the line from animal/cell studies and mechanisms to humans without including the ES.

While emphasizing the need for ES to be integrated into all federal EMF research projects as soon as possible, I also asked for a future symposium dedicated specifically to ES. Comments for the Director may be mailed to Dr. Kenneth Olden, NIEHS, PO Box 12233, Mail Drop B2-01, Research Triangle Park NC 27709.

● **ESN Website**-The Electrical Sensitivity Network now has an Internet website to educate the public about ES. Selected topics include ES Basics, Microwave Sickness, Environmental Illness at the work-site, etc. The site can be reached at <http://www.bslnet.com/esn/>

● **Health Updates**-The author of the Scandinavian article "Amalgam Recovery" from the May-June 1996 issue of ES News¹ wrote to update us on their progress one year later:

"Sorry to say, things have changed to the worse again: I spent five hours in a room with fluorescent light bulbs, and the poisoning effects reoccurred. The headache is constantly diminishing, but irregular heartbeat and diarrhea strike in various amounts after exposure to EMF which include UV (ultraviolet) rays. A wavelength of mercury, 254nm, is found in UV rays. Even though my amalgam fillings were removed 7 years ago, Hg (mercury) still is stored in different parts of the body. If you are sensitive to Hg, reactions are natural.

"I just recovered from anaphylactic shock after spending half an hour in a dentist chair, for control. No dental work was performed, but the lights were plenty. The medical doctor who gave the diagnosis said it might be life threatening, so I'm rather eager to find cures.

"The chelator DMSA has obviously lowered the level of Hg in my brain; the smog has left completely! Homeopathic remedies seem to be able to strengthen the mucous membrane to resist the influence of Hg, so I have hopes for the future.

"At the moment I avoid UV like the devil himself, hoping that the next message from the north will be that life is back to normal."

A report from another person relates happy news:

"I would like to share with you my success in curing my sensitivity to cell phones. I worked with Michael Borkin, a Naturopath (phone: (702) 384-8911). I brought a cell phone with me to his office and he experimented with acupuncture beads, nickel and gold coated magnets. It took a while but he was able to turn off the reaction. I also no longer react to ordinary power lines. It does not work however on mega power lines and for a lot of towers especially outside Las Vegas and Flagstaff. We also discovered that when I am exposed to the towers and lines, the reaction is turned off if somebody puts their finger in my left ear (it could be worse). It does not help if someone holds my hand or other body part. I am now able to travel if I have a friendly and understanding companion. It makes life a lot better."

I thought this news intriguing as it indicates a possible connection to polarity with the magnets and grounding, of sorts, via the ear. The report also

reminded me of other instances of magnetism and magnetic fields affecting the ES. For example, some ES have related instead that magnets made them more ill and this fact showed up on the treatment survey results. Others have mentioned becoming ES due to MRI (magnetic resonance imaging). Also, in the book **Tracing EMFs**, EMF tester Karl Riley told of a family he visited who had ES. Their house was found to be improperly wired, causing very high magnetic fields, i.e. 82 milligauss at the family couch.² A child born in this house had three kinds of brain damage.

I wonder how DC and AC magnetic fields are affecting the body's magnetite stores and am reminded of degaussing—a way of demagnetizing ships. Does degaussing have any meaning in understanding ES?

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● **Swedish CFS EMF Study**-Professor Per-Arne Öckerman at the University of Lund, Sweden recently completed a new study.¹ His initial work with ES patients was reported in the July-August 1996 issue of ES News which highlighted blood and urine changes from EMF exposure.² In his latest study, fifty patients with chronic fatigue syndrome (CFS) were similarly exposed to EMFs and their blood-urine changes were even more dramatic than those of the ES group in the prior study. A further study is planned to compare CFS patient reactions to those of a control group. The initial ES study is not yet formally published.

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Contact: Monica Kauppi, Heavy Metal Bulletin, Lilla Aspudsv. 10, S-12649 Hågersten Stockholm Sweden.
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● **Dilantin**-Recently two people separately contacted me about a book by Jack Dreyfus, founder of the Dreyfus mutual fund. His book, called **A Remarkable Medicine has been Overlooked**, has a chapter on "Body Electricity" which outlines his ideas related to a period of depression he went through.¹ His symptoms were fatigue, impatience, depression, daily headaches, frequent stomach problems, and neck pain. Also, he mentioned having a "flat, metallic taste" in his mouth during this time which he re-

membered having once in his youth after an electric shock. He associated the metallic taste with electricity and concluded that he now had too much electrical activity in his brain. He found the anti-convulsant prescription drug Dilantin helped him recover fully. (Of interest, a metallic taste is listed as one symptom of hypercalcemia—excessive calcium in the blood—according to **Physicians Desk Reference**.² Some dental amalgam patients have also reported this symptom as related to their dental fillings.)

His situation does not sound like electrical sensitivity because he was not able to pinpoint his condition to any environmental cause. Also, I have not heard from anyone who has benefited from using Dilantin in treating ES symptoms. If you or someone you know with ES was helped by this drug, I would like to hear about it.

A bibliography of Dilantin's many uses was compiled by The Dreyfus Medical Foundation and is available from The Dreyfus Health Foundation, 205 E. 64th St., Suite 404, New York NY 10021; Phone: (212) 750-5075 (Cost: \$6.00). The bibliography, called **The Broad Range of Clinical Use of Phenytoin: Bioelectrical Modulator**, is based upon 3,100 studies from around the world related to Dilantin's use for neurotransmitter regulatory effects (acetylcholine, serotonin, GABA, etc.), cardiovascular conditions, pain, asthma, acute radiation exposure (in animals), endocrine regulatory effects, etc.³

One study referenced in the bibliography is the following, regarding the use of Dilantin in treating Soviet patients with "hypothalamic syndrome". (The hypothalamic syndrome is mentioned in some Soviet documents as the third and worst stage of microwave sickness, although prior radiation exposure was not mentioned in the study.)^{4,5} This quotation is reprinted as it appeared by permission of Blackwell Science Ltd., Oxford, England. © 1984 Blackwell Scientific Publications Ltd. from the **European Journal of Clinical Investigation**:⁶

"Dilantin: clinical and scientific experience of application. Bechtereva N.P., Nikitina L.I., Iliuchina V.A., Dambinova S.A., Denisova V.V. Institute for Experimental Medicine, USSR Leningrad, 197022 Pavlova 12

"120 patients with hypothalamic syndrome mostly in the form of vegetovascular paroxysms were treated and physiologically examined. The dilantin therapy (50-100mg 2-3 times per day during 2-12 months) resulted in the vanished, less frequent and weaker paroxysms, normalized blood pressure, cessation of headaches, feeling

of fear and irritability; it also produced better sleep. The initially polymorphal low voltage EEG with paroxysmal activity became normal in the course of the therapy and acquired regular alpha-rhythms of normal spatial distribution. As the result of the treatment the infraslow physiological processes of the brain potentials with the period 2-4 sec dominating in these patients became less pronounced. In the patients under investigations the optimally changed condition of the central nervous system, the vegetative nervous system, cardio-vascular reactions and the body temperature were found to stabilize as the result of the lasting therapy (with the individual approach to the time when the medicine was received by the patient).

"Analysis of the dilantin effect on the condition of the major mediatory brain systems - glutamatergic (glutamergic?)- made by studying the binding of H³ glutamat with the cortex synaptic membranes of the animal brain and the human brain biopats allowed to reveal its inhibitory action on the glutamat receptors of the central nervous system. Membrane receptors appeared to be influenced by dilantin at the optimal Ca concentration in the incubation medium."

In summing up the functions of Dilantin, one mechanism mentioned in the bibliography is its ability to regulate the body's sodium, potassium, and calcium. Research grant proposals from medical doctors who are interested in studying non-epilepsy uses of Dilantin are being accepted by Dr. Barry Smith, Director of The Dreyfus Health Foundation at the address above.

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ELECTRICAL SENSITIVITY NEWS

An international newsletter about the latest environmental illness—electrical sensitivity from electromagnetic fields

July - August 1997

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Recent Developments

Lucinda Grant

On May 5, 1997 while phoning Arizona Senator John McCain's Washington D.C. office to investigate the possibility of a Congressional hearing for the electrically sensitive, I was informed of an upcoming Congressional hearing planned for May 13th. This planned hearing was to be essentially an industry affair, at which time various wireless industry groups were to review their concerns regarding cellular antenna siting issues such as the moratoriums, with possible further preemption of local laws in mind. I did not believe that this hearing would be complete without public input regarding the health issues of this technology so I let others know about this hearing. The EMR Alliance was particularly helpful. Several EMF activists with various concerns—antenna sitings on schools, cancer issues, ES, etc.—began calling and faxing Senator McCain's office asking that the public be invited to testify at this hearing regarding health issues. The public was told that the speakers' list was closed, despite the fact that public notice of this hearing had not yet circulated. After much debate, Senator Ernest Hollings of South Carolina, who had the legal right to allow one more speaker, did exercise this right so that one member of the public would be allowed to testify. However, after the public was allowed to come to speak, the hearing was cancelled, actually "indefinitely postponed". Why is unknown. Perhaps the meeting will be postponed to a future date that the public may not so easily find out about and therefore will not attend. The ES need a Congressional hearing at which time the concerns of the ES could be presented in full and held in the company of Congressional

representatives more in our favor. In planning a Congressional hearing, we will need scientists and medical doctors willing to testify on our behalf.

In other Congressional news, Congressman Edward Markey of Massachusetts sent the Food and Drug Administration (FDA) a letter on April 7, 1997 requesting a status report about the safety of cellular phones. Markey states:

*"The government has a responsibility to assess for consumers whether portable wireless phones pose a health risk...In 1993, when I first raised the issue of cellular phone safety, there were roughly 15 million people in the United States using such phones. Today there are 45 million users of wireless phones, yet we are still unable to certify the safety of this product for American consumers because adequate research apparently has not been performed."*¹

The FDA response to Markey stated in part

*"...there is currently no specific information that clearly indicates that use of cellular phones is a human health risk. On the other hand, there is not enough information available to permit a determination that there is no health risk. A significant research effort, involving exposures of large numbers of animals to the various types of cellular phone modulation in current or expected use, coupled with epidemiological surveillance of exposed populations, is needed to provide a further basis for risk assessment of these devices."*²

An experiment is therefore underway on the public with the government apparently neither directly monitoring it nor addressing the health

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WARNING: Environmental illness is a complex topic. Methods or treatments that benefit some people may harm you. Readers are advised to consult appropriate medical, legal, or other professionals for personal guidance prior to making changes in their current program.

issues as they become apparent. For instance, the FDA response included an appendix listing several studies including the Institute for Working Life study from Sweden which showed headaches associated with cellular phone use. (See ES News Vol. 1, No. 1, p. 5.) Headaches related to cellular phone use have been publicly reported in England, Australia, and the U.S. as well.^{3,4,5} In addition, the FDA appendix included the new Australian cancer study which showed twice as much cancer in rats exposed to cellular phones as control group rats.⁶ This was a major, wireless industry funded study by Telstra that used 900 MHz GSM digital cellular phones. Copies of the FDA response letter are available from Rep. Markey's office at 2133 Rayburn Bldg., Washington DC 20515; phone: (202) 225-2836.

On May 16, 1997, the FDA answered my initial letter of January 28, 1997 in which I outlined my concerns regarding the new wireless communications technology as it applies to the ES. Despite my repeated phone calls and letters explaining the urgency of the situation, the FDA is apparently taking a wait and see approach.

The following is an excerpt from the FDA response letter:

"Your letter expresses two primary concerns about those who report electrical sensitivity (ES). First, that no federal agency is monitoring health effects of the electrically sensitive, particularly related to wireless technologies. FDA can set a standard for radiation-emitting electronic devices when a risk to humans has been demonstrated. For example, FDA administers the microwave oven standard. Such a standard must be based upon evidence accepted in the scientific community. In order to evaluate scientific evidence, FDA scientists monitor research done at universities, companies, and other research institutions, participate in scientific meetings, contribute to research agendas, and follow international scientific research. In the case of wireless technologies, FDA is following studies in epidemiology, dosimetry, and in vitro and in vivo bioeffects which are ongoing and being published. As results studies are published concerning electrical hypersensitivity, FDA can monitor these results as well.

"FDA also monitors reports of adverse effects sent to FDA about products regulated by FDA. FDA has established a 'Medwatch' program for such reports. You can receive forms through 1-800-FDA-1088.

"Your second concern is that no federal agency is prepared to do anything about complaints it receives. As we discussed on the phone, individual cases, such as those reported to you, can lead to research studies which are designed to investigate a hypothesis being investigated. Studies which examine possible electrical and magnetic effects require special exposure systems which are not available in a typical toxicology laboratory and thus research funds must be dedicated to developing such exposure systems. The report which you sent, 'Electrical Hypersensitivity' (Danish conference proceedings), also illustrates that conflicting reports can result. Carefully designed studies would be necessary in order to define exposures and examine results.

"FDA has a small internal research program but is not a primary external funding agency. The federal government agency which would be the most likely funding agency to receive proposals and consider funding research in this area is the National Institute of Environmental Health Sciences (NIEHS). It is the agency which has planned and administered the RAPID program addressing possible risks of extremely low frequency (ELF) radiation. NIEHS will issue a report to Congress at the end of the RAPID program. Concerns about electrical sensitivity can be brought to the attention of NIEHS for consideration for future research programs.

"You have specifically asked about the creation of 'neutral zones' of reduced use of wireless technology, and also what measures FDA would take to assist those displaced. Because FDA's role is in regulating radiation-emitting electronic products, creating radiation-free zones is outside FDA's responsibility.

"You also ask what measure FDA will take on behalf of the electrically sensitive and the public in general to assist those displaced and to protect others from being electrically sensitive. FDA works actively with other federal agencies and the scientific community to monitor and develop research which is designed to investigate whether risks exists. Bringing your concerns to research agencies for evaluation for future research programs could help in understanding the reports you are receiving."⁷

The FDA letters reminded me of a class action lawsuit (Verb et al vs. Motorola et al) filed against cellular phone manufacturers that was dismissed in an Illinois court of appeals in 1996.⁸ The suit claimed that cellular phone EMFs cause "biological effects"

and that the manufacturers failed to tell the public regarding the lack of scientific evidence of safety. The appeals court dismissed the case on grounds that the FDA was responsible for regulating cellular phones; therefore, the manufacturers were within the law. In April 1997 the Illinois Supreme Court concurred with the lower court's opinion.⁹ This case points out that excluding the responsible government agencies from such a suit did not allow the lack of research data certifying safety to be formally addressed.

However, in a May 1997 ruling, an Illinois judge held that the decision reached in the Verb vs. Motorola case did not negate future personal injury claims.⁹ Four cases regarding brain cancer are pending in Illinois against cellular phone manufacturers.⁹ These will proceed.

Another court case, this one regarding carpal tunnel syndrome (CTS), was won in December, 1996—the first U.S. CTS lawsuit won against computer manufacturers.¹⁰ Three office workers were awarded a total of \$5.8 million in injury compensation. Digital Equipment Corporation, the defendant in the case, planned to appeal. Digital was not cited for defective keyboards as the plaintiffs had hoped, but was cited for failure to warn about the possible risk of injury from the computer keyboards.

The question of whether manufacturers should warn the public about product hazards also came up at the wireless industry's conference Partnerships for Progress in May, 1997. According to their conference brochure, some medical devices may cause adverse, life-threatening consequences to the user due to electromagnetic interference (EMI) at current exposure levels.¹¹ They questioned whether they are obligated to warn "victims" (medical device users), reduce exposure to potential at-risk medical device users, or reduce accessibility in areas where a potential problem in medical devices could develop. These questions also seem appropriate regarding the wireless technology and the ES: have they warned the ES of potential problems, reduced EMF exposure where the ES are, or limited access where health problems to the ES could develop. On the contrary, an obvious example is hospitals which are among the new cellular antenna sites where the most EMF sensitive have no options, haven't been warned nor has accessibility for the ES been considered. This industry conference also presented a short overview of ES from a psychosomatic perspective.

In other legal news, the English newspapers

Guardian and the Daily Mail reported in October, 1996 that the British electrical utilities are setting up an 8 million pound legal defense fund in anticipation of many more legal cases regarding health hazards from power lines.^{12,13}

The good news: Andrew Weil, M.D., a very popular alternative medicine advocate appeared on a mid-May PBS television show about health. He spoke about the hazards of electromagnetic fields and that some people are more sensitive to EMFs. He spoke favorably about ES and is working on an Integrative Medicine program through the University of Arizona to blend conventional medicine with alternative medicine. He was also on the cover of Time magazine the week of May 12, 1997.

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News from the Cellular Phone Taskforce

Arthur Firstenberg - USA

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I have unfortunately been inundated with phone calls from all over the country about cellular phone antennas coming to where people live without their permission, with catastrophic effects on their health. Bronchitis, sinus problems, headaches, and insomnia are extremely common among the general population wherever these antennas go up. So is dryness of the mouth, eyes and skin. Many people are having eye problems, and some have gone blind. Radiation sickness is being misdiagnosed as flu, allergy, heart virus, food poisoning, and Lyme disease.

There have been an unknown number of deaths. One woman told me her father and her 3 dogs all died after a tower was turned on 50 feet from her house this winter. Those who read my press release of March 4, "Prevailing Scientific Opinion Collides With Reality", will remember Joe D. of the Bronx, a previously healthy 46-year-old man who began experiencing all of the symptoms of radiation sickness last November. He died May 8 of a brain hemorrhage. I have also received a report of a man in another state whose living room was directly above the microwave generating equipment for the antenna on the roof. He died of a brain hemorrhage 3 months after he moved in. (**Editor's note:** Merck Manual states that the most common cause of brain hemorrhage is high blood pressure. According to the Soviet research, during phase one of microwave sickness blood pressure rises.) I have received a report from a man who suddenly lost the vision in his right eye and had a sudden increase in his blood pressure soon after the activation of a PCS system in his area. A month later he suffered a non-fatal heart attack.

It is not just digital signals that are causing illness, and not just cellular technology either. Scanners (monitoring traffic and collecting tolls) are now blanketing toll roads with powerful radio

signals, and I am beginning to hear from truckers who are apparently being affected by them. Scanners are also being used on railroad lines to keep track of individual railroad cars, and I have even seen what looked like a scanning tower sitting in the middle of a shopping center, who knows what for.

To deal with all this more effectively, the Cellular Phone Taskforce has organized as a not-for-profit corporation, and I have hired a lawyer, Curt Rogg-Meltzer, who at this time is researching 3 possible lawsuits. Their description, and a questionnaire, follow this report. At the moment I am paying all legal costs out of my own pocket, with the help of my family. These lawsuits could ultimately cost up to \$100,000. Therefore I am asking for donations. Checks for this purpose should be made out to the Cellular Phone Taskforce, and will be put into an account reserved for this purpose. (**Editor's note:** I requested legal assistance for the ES from the American Civil Liberties Union (Arizona chapter), Sierra Club Legal Defense Fund, Trial Lawyers for Public Justice, and other similar organizations which provide free or low cost legal assistance, but was declined in every case.)

We are getting a lot more publicity for our cause now. WBAI radio in New York has been covering the issue regularly, and they have also been announcing meetings of the Taskforce. There was also a camera crew from Channel 9 news at the June 9 New York City public hearing on additional lamppost franchises. That story has not yet been broadcast, as of this writing. But, significantly, Suzanne Mattei of the Public Advocate's office was at the hearing advocating caution. She took the position that the Telecommunications Act does not require the City to rent out its lampposts, and that in any case an environmental impact study should have been done before the City contemplated placing telecommunications equipment on public property. The Franchise and Concession Review Committee—consisting of the Mayor, the 5 Borough Presidents, and 4 other officials—responded to the considerable public opposition at this hearing by tabling the vote until July 16.

Susan Clarke has been accomplishing miracles in Boston. Due to her efforts, almost the entire Departments of Environmental Health at the Harvard and Boston University Schools of Public Health signed a petition to suspend implementation of PCS (personal communications services) in Boston until there is full public notification of potential hazards, and review and determination of safety by the scientific community. Susan was also quoted in Peter Howe's news story on this issue which was published on June 16

in the Boston Globe, page B3, and she was interviewed on Channel 5 and Channel 38 in Boston, also on June 16.

There will also be national coverage for the first time in July. Look for my article in the upcoming Summer 1997 issue of Earth Island Journal.

The Taskforce is also launching its own newsletter, tentatively called "No Place To Hide", in July 1997. Its purpose will be to connect people and ideas about, and to facilitate action towards halting the expansion of wireless communications. The cost of a year's subscription is \$20. Please address all correspondence to Arthur Firstenberg, Cellular Phone Taskforce, P.O. Box 100404, Brooklyn, NY 11210.

The following was submitted by my attorney, Curt Rogg-Meltzer. Please mail completed questionnaires to him at 516 Fifth Ave., 5th Floor, New York, NY 10036.

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This is a description of our three potential lawsuits:

We are in the process of researching and developing a suit against the FCC and possibly other government agencies to challenge the safety guidelines they have established as to the minimum levels of electromagnetic emissions that they deem safe for the public. We intend that the suit will be based on the Americans With Disabilities Act and Civil Rights Act in that the regulations discriminate against that segment of the population more sensitive to such effects, and discriminate against them by depriving them of their health and welfare. If we are successful in the suit, we have the potential to overturn or at least get the FCC to revise their national standards and to potentially void the issue of preemption of local concerns, which has also become a national issue.

The second suit that we are developing and researching will be for a group of plaintiffs and will be a straightforward personal injury suit against a specific telecommunications carrier(s) that we will have chosen. The critical component of that proposed litigation is the solid medical support establishing that the electromagnetic emissions have caused the injuries we will be claiming. If we are successful in establishing such a case, that will go a long way towards making it easier for any other injured parties to make similar claims throughout the country. Our goal in such a suit is to establish a

blueprint as to how a plaintiff will be able to develop the proofs necessary to win in court (such as how to develop a record, how to establish the medical conditions they are claiming and how to overcome the "causation" hurdle that this type of litigation has a problem with).

The third suit that we are contemplating would be specifically to challenge the award of franchises to add hundreds of microwave antennas to lamp posts in New York City. The basis of that challenge would be whether or not proper procedures were followed, including but not limited to the absence of an environmental impact statement which the City has deemed not necessary in such circumstances. If we can establish that the Telecommunications Act does not preempt that issue and that such environmental impact statements are required, we can delay the implementation of this expansion of microwave antennas in New York City, require significant further medical and environmental studies be made by government, and indeed again provide a blueprint for other local communities to use as a basis for stopping the spread of this potential danger at this time.

We need to accumulate as much information as possible from all people claiming microwave and/or electromagnetic injuries and therefore, we ask that each such injured person fill out and return to us the following form:

- 1) The name, address and phone number that a person can be reached at who claims an injury,
- 2) the specific medical claims as to what is wrong, with as much detail as possible,
- 3) the date of the onset of such symptoms,
- 4) when and how the symptoms increased or decreased,
- 5) why the person claims the symptoms were caused by such microwave or electromagnetic transmissions (including the date of installation of new equipment, transmittal lines, etc.),
- 6) the name and address of the person where medical assistance was sought and/or obtained, and
- 7) copies of results of such examinations or treatment, including but not limited to a doctor's letter, hospital records, etc.,
- 8) a statement as to what if anything the person is doing to solve the problem, including moving, going to Court, filing public complaints, speaking to local government official(s), etc.

The more information we collect, the better the basis we have to analyze the scope of the problem and to truly be able to document in a more effective manner a category of symptoms we believe exists

for these types of injuries.

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Headaches from Cell Phones: Are they real?

Allan H. Frey - USA

(This article is reprinted from the publication **1997 BioElectroMagnetics Health Effects Update** edited by James Beal of EMF Interface Consulting, 5500 Prytania St., Box 406, New Orleans LA 70115 USA. Cost: \$17 USA, \$20 Foreign. Reprinted by permission. Copyright © 1997 by Allan H. Frey.)

On Friday, February 7th (1997), there was a Bioelectromagnetic Society Workshop in Rockville, MD (outside Washington, DC) entitled "Physical characteristics and possible biological effects of microwaves applied in wireless communication". I was one of the speakers. I presented a paper entitled "Headaches from cell phones: are they real?". Following is a summary of my talk.

I stated that I believe that the reported headaches from cell phone usage is a real phenomena. I presented several lines of evidence that supports this conclusion.

First, I noted that there are numerous reports of headaches and that a recent survey indicated that digital phones are implicated more than analog phones.

I noted the transmitting frequencies of the various cell phone systems, their power outputs and their modulation characteristics. I showed that these are characteristics that were found many years ago to be in the optimal band for producing various effects in the head.

I reviewed the data on the microwave hearing effect that I discovered and reported on in the 1960's, an effect that is optimal at what is now the cell phone frequencies. I pointed out that during the microwave hearing research my human subjects reported that they were getting headaches. I also found that I was getting headaches when I was in the em field; and I don't get headaches. I explored the headache phenomena to determine if it was real. I then reported the occurrence of headaches at various meetings and in a published paper in the 1960's. The headache finding led me to decide to no longer use human subjects for microwave hearing research.

A second line of evidence that I discussed was a

series of blood-brain-barrier experiments that I started and reported on in the 1970's. The blood-brain-barrier is a critical regulatory interface that controls what gets into the brain from the blood. I found, and others subsequently found, that em energy with characteristics similar to present day cell phone emissions resulted in the breakdown of the blood-brain-barrier. Recent headache research indicates that the blood-brain-barrier may be involved in headaches.

A third line of evidence that I discussed was a series of experiments that I carried out, starting in the early 1970's, in which I showed that em energy with characteristics similar to present day cell phone emissions apparently influenced brain chemistry. My experiments indicated that the dopamine and opiate systems of the brain were particularly involved. Others, subsequently, also found brain chemistry changes with exposure to em energy.

Thus, I concluded that cell phone frequencies and modulation are in a band that is one of the more significant biologically. I noted that the reports of headaches have a biological basis in theory and in data that was gathered 20-30 years ago. I also noted that the headaches reported may be only the most obvious indicator of a biological effect. Probably, though, only certain specific frequencies and modulations are of consequence biologically.

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Microwave Sickness - Part 5

Lucinda Grant

Czechoslovakian Studies

In 1960 the Institute of Industrial Hygiene and Occupational Diseases in Prague, Czechoslovakia created a Department of High Frequency to investigate the health effects of nonionizing radiation.¹ As part of this investigation, the Department went to about 200 locations of electromagnetic exposures such as "factories, broadcasting stations, television and radar centers" to measure the exposures and interview those exposed.¹ Also, animal studies were carried out in order to confirm the results of the site investigations.

Among the findings from the on-site investigations and the animal studies were cumulative effects of chronic exposure, noting "...in the course of time the organism becomes more perceptive of the effects of the field."¹ Neurological symptoms were predominant. The pattern of symptoms included

head pain, eye pain, fatigue, weakness, dizziness, insomnia, moodiness, fear, slight quivering of the eyelids/tongue/fingers, dermatographism, hair loss, head and forehead skin pressure, muscle pain, memory loss, tension or depression, heart pain, heartbeat irregularity, difficulty breathing, and sexual problems related to infertility and libido.¹ Prolonged exposure to higher intensity fields produced low blood pressure as a late-stage effect which sometimes caused the person to collapse. Differences in sensitivity to EMF exposures were found: women were more likely to have symptoms than men; young people more so than older people.

Based upon this research and EMF research results in other countries, Czechoslovakia adopted radiation standards for occupational and public exposures in 1965.^{1,2,3} Occupational exposure in the frequency range of 300 MHz-3000 GHz was .01mW/cm² for pulsed field exposure, the same occupational limit as Soviet workers had, except that the Czechoslovakian limit was specifically called an average exposure limit, measured over one week. Average exposure limits allow higher actual exposures than fixed radiation limits; the Soviet standards appear to be fixed limits instead. The occupational standard for continuous field (non-pulsed) exposure was an average of .025mW/cm². Public exposure was limited to .001mW/cm² for pulsed waves and .0025mW/cm² for non-pulsed waves averaged over one week for the 300 MHz - 3000 GHz range.

In explaining how these standards were determined, Karel Marha at the Prague Institute of Industrial Hygiene and Occupational Diseases stated that biological effects of microwaves were known to occur at .1mW/cm².¹ At that level, nonthermal, chronic health effects were recognized. In addition, the Czechoslovakian standards, like the Soviet ones, used a safety factor of 10 to reduce occupational radiation exposure to .01mW/cm².² Under the Czechoslovakian rules, radiation-exposed workers were medically evaluated periodically due to the job health risks.¹ Women, and sometimes teenagers, were not allowed to work in areas where the radiation exposure standards were exceeded.¹ The standards were designed with the intent of not only causing no damage, but also to "...prevent unpleasant subjective feelings."¹

After presenting much of this information at a U.S. symposium on microwaves in 1969, Marha at the Prague Institute was asked why scientists were still reporting central nervous system effects at such low levels of exposure, if the Soviet and East

European standards were safe.¹ Marha stated that the health effects he reported occurred between 1959 - 1961 and subsequently, with the radiation standards, no further EMF-related health problems were found. Allan H. Frey, a U.S. scientist in attendance, responded to this comment by saying that those findings were only for Czechoslovakia and did not include the Soviet Union.¹ (The Soviets continued to have many EMF-related illness reports after implementing their radiation standards.)

In 1973 Klimkova-Deutschova of Prague's Neurological Clinic at Charles University reported on neurological effects among microwave-exposed workers.⁴ Mention was made that strict preventative measures were in place at this time to prevent serious injury. However, the date of the following findings is not given and could span the researcher's twenty years of experience. According to Klimkova-Deutschova and others, an early sign of radiation-induced illness is found in electroencephalogram (EEG) recordings.^{2,4,5} In fact, by assessing the number of abnormal EEG recordings in an occupational group, the Clinic could define the level of radiation hazard in that worksite prior to on-site EMF measurements.⁴ Abnormal EEG recordings showed "...pointed synchronized waves of high amplitude and slowed rhythms."⁴ Klimkova-Deutschova considered the EEG an important early indicator proving nervous system disturbance when other clinical signs were less evident. Early EEG changes were often considered small, but intensified after breathing deeply (hyperventilation). Microwave-induced fatigue was indicated by EEG as well as by "...use of the conditioned reflex method of examination."⁴

During the course of medically evaluating workers, the Prague Clinic obtained detailed information about 530 radiation-exposed workers at 29 work locations.⁴ Among workers exposed to various radio or microwave frequencies, the group of employees most ill were those exposed to centimeter range microwaves (3-30 GHz). Common symptoms were headache, fatigue, and excitability. Actual measurements of microwave exposures at the job site indicated that while radiation limits were met in some locations, other spots exceeded the limit by ten times or more.

Of forty microwave-exposed workers examined at the Prague Neurological Clinic, 74% were found to have a slightly elevated fasting blood sugar.⁴ Levels of pyruvic acid and lactic acid in the serum and creatinine in the urine were normal for the majority of the group. However, the abnormal levels were twice as often of low values rather than high values.

These changes were attributed to enzyme dysfunctions.

In concluding the studies from Czechoslovakia, it is pertinent to consider that Marha related changes in sensory thresholds with radiation exposure.² He stated that the sense of smell can be decreased as well as sensitivity to touch. The reduction of nervous system sensitivity was considered to be due to a reduced conductivity of the nerves. This information paralleled with a report I heard about someone wanting to subject ES patients to pulsed high frequency EMFs in an experimental effort to reduce their sensitivity. This proposed experiment sounds like it might produce further nerve damage, which does not sound like a sensible way of reducing ES.

In summary, nonthermal nervous system effects from electromagnetic exposures are well established by human and animal studies from Soviet and East European research. Nonthermal was considered to be below 10mW/cm² at frequencies between 300 MHz and 3000 GHz and determined by changes in rectal temperature of animals. The concept of nonthermal health effects has not received much attention or acceptance outside the Soviet and East European countries. One American scientist, McRee from the National Institute of Environmental Health Sciences, discussed this problem at a New York Academy of Medicine symposium in 1979.⁶ He said that when the Soviets were questioned about these low-level effects, the Soviets responded that the experiments they did were longer than U.S. ones; in order to see chronic effects at low doses the U.S. needed to use 6 month to 1 year exposure times. McRee also related that Soviet and Poland studies had found many effects at intensities below 1mW/cm² and as low as .005mW/cm².

An early account of Soviet views of nonthermal effects called the exposures "microthermal".⁷ That concept seems accurate considering that certain parts of the body with an inadequate blood supply do not have the cooling capacity that blood circulation provides to the rest of the body. These low blood areas at most risk of being heated first and therefore becoming damaged first are the eyes, the brain, and the male testes. A microthermal effect is how I would explain my experiences of excessive skin heating related to "nonthermal" EMF exposures.

Also well established by the Soviet and East European studies is the fact that certain groups of people are more susceptible to the effects of EMFs than others. They typically medically screened

prospective radiation workers to avoid aggravating symptoms predisposed to EMF irritation (epilepsy, cataracts, nervous system problems, cardiovascular injuries, etc.). In the U.S., a letter from the Environmental Protection Agency (EPA) to the Federal Communications Commission (FCC) dated November 9, 1993, pointed out that certain at-risk groups were more heat sensitive which necessitated that any radiation standards consider this factor.⁸ These at-risk groups include "...the elderly, infants, pregnant women, and people who are obese, have hypertension, or take drugs such as diuretics, tranquilizers, sedatives, or vasodilators that decrease heat tolerance."⁸

Today, groups which appear to be specifically at-risk of becoming sensitive to EMFs include the chemically sensitive (MCS), chronic fatigue syndrome (CFS) patients, and those poisoned by mercury from dental amalgams. In understanding why these groups would be more susceptible to electromagnetic radiation in the environment, it is important to consider that each of these illnesses seem to have a neurological component.

Current studies examining the workings of MCS have reported that a primary site impacted by chemical exposures, especially neurotoxic chemicals, is the nervous system.^{9,10} One way chemicals can affect the nervous system is by interfering with the body's enzyme stores as provided by the following example.

Several electrically sensitive (ES) patients have mentioned organophosphate pesticide poisoning as the specific event that lead to their chemical sensitivity (MCS) symptoms and subsequently to their ES. Dr. William Rea's book **Chemical Sensitivity**, Volume 3, states that some MCS have developed heart rate disturbances due to organophosphate insecticide exposure.¹¹ Although not all cases of ES report chemical exposure related to their ES onset, the MCS-related ES cases provide us with an interesting link to radiation health effects by understanding chemical effects. For example, a well known health effect of organophosphate pesticides (Malathion, Parathion, etc.) is their ability to reduce the function of the body's cholinesterase enzyme.^{12,13,14,15} Cholinesterase is an important nervous system enzyme that prevents excessive accumulation of acetylcholine, a neurotransmitter.^{12,15,16} By inhibiting cholinesterase and thus causing an excess of acetylcholine, organophosphate pesticides overstimulate the nervous system, resulting in death in cases of acute poisoning.^{13,14,16,17} These pesticides are chemically related to the even more deadly military

nerve gases, such as Sarin, which use the same mechanism of action — inhibiting cholinesterase.¹⁷

Symptoms of organophosphate poisoning include nausea, muscle weakness, memory and concentration problems, chest pain, breathing difficulty, headache, blurred vision, increased sweating, etc.^{13, 16, 18} A recent ES survey reported the five most common ES symptoms as confusion/poor concentration and/or memory loss, skin itch/rash/flushing/burning and/or tingling, fatigue/weakness, headache, and chest pain/heart problems.¹⁹ Of these five symptoms, all except the skin problems match the symptoms of cholinesterase inhibition from organophosphate pesticide poisoning.

Soviet research of electromagnetic radiation health effects in the 1960's and 1970's found that nonthermal EMF exposures could produce effects similar to other toxins, such as chemicals and heavy metals.²⁰ One consistent finding from the Soviet research was that when humans and animals were exposed to radio wave or microwave frequency, this radiation would inhibit cholinesterase, producing an excess of acetylcholine — the same effect as organophosphate pesticides.^{5, 21, 22} Some Soviet EMF researchers specifically pinpointed this enzyme effect as a significant factor leading to nervous system disfunction.^{5, 20, 23} (Phase one of microwave sickness sometimes produced an increase in recorded cholinesterase, prior to phase two which evidenced decreased cholinesterase activity and central nervous system disfunction.)²¹

In a 1973 Soviet study, blood cholinesterase reduced to below 70% of pre-exposure levels in rats and rabbits exposed to the 30-300 MHz range at intensities of only .01mW/cm² or .0019mW/cm² for 4 months.²³ According to the U.S. National Institute of Occupational Safety and Health (NIOSH), when organophosphate pesticide exposure results in a decrease of blood cholinesterase to less than 70% of the pre-exposure level, that exposure is considered unacceptable due to the health hazard.¹³ A 1994 Soviet study by the Russian Institute of Cell Biophysics produced an average drop in brain cholinesterase to 70% of pre-exposure levels in rats after one 60 minute exposure to pulsed 880 MHz at 1.5mW/cm².²⁴ Also, a U.S. government study conducted in cooperation with Soviet researchers in an effort to replicate Soviet findings discovered that microwaves of 2.45 GHz at .5mW/cm² intensity resulted in blood cholinesterase inhibition in rats exposed during three months for seven hours daily.⁶ This study confirmed prior Soviet accounts of nonthermal microwave health effects.

The importance of this enzyme effect in producing ES-type symptoms from chemicals and from chronic, low-level EMF exposures leads to a mechanism of action for explaining many EMF-related health effects by using conventional medical and scientific knowledge of poisons. That radiation exposure at nonthermal, nonionizing doses can produce the same effect as chemical poisons such as organophosphate pesticides provides sound evidence for a radiation poisoning effect. It also may explain why some MCS patients become ES too and why some ES also become MCS. The agents are different (chemical vs. physical), but the effect is the same — inhibiting cholinesterase.

When trying to conceptualize a problem, it is often helpful to know what the opposite of the problem might be. In this case, the disease myasthenia gravis (MG) appears to have characteristics the opposite of organophosphate pesticide poisoning and cholinesterase inhibition. MG patients may take a type of medication called anticholinesterase, which purposely reduces cholinesterase in order to increase acetylcholine.²⁵ MG is generally considered an autoimmune disease of muscle weakness diagnosed by a blood test for antibodies to the acetylcholine receptor.²⁵ Drugs that make MG worse include magnesium salts and the prescription drugs Dilantin and atropine.^{25, 26} In one Soviet study, Dilantin was shown to be beneficial in treating patients with hypothalamic syndrome, a phase of microwave sickness; magnesium, which assists enzyme processes, has been helpful for some ES.^{19, 27} Some animal studies with Dilantin have shown a reduction in acetylcholine due to the drug's effect.²⁸ Dilantin also has shown a protective effect against insecticide poisoning, specifically regarding organophosphates and DDT.²⁸ (However, Dilantin (phenytoin) appears on a medical list of drugs not recommended for those with porphyria.)²⁹

Organophosphate pesticide poisoning is often treated with the prescription drug atropine or other drugs.¹⁸ Atropine was also used by the Soviets for treating some cases of microwave sickness.^{30, 31}

Summarizing the clues here:

- Atropine and Dilantin are linked to antidote or protective effects regarding organophosphate pesticide poisoning.
- Atropine was used by the Soviets in treating some cases of microwave sickness.
- Dilantin was reported to be helpful in treating hypothalamic syndrome, the final phase of microwave sickness.
- Magnesium is helpful for some ES.

- Magnesium salts, Dilantin, and atropine can make myasthenia gravis patients worse—their illness appearing to have characteristics opposite of radiation poisoning and organophosphate poisoning which inhibit the enzyme cholinesterase.

As an interesting footnote to the acetylcholine line of thought, the animals that have the most nerve synapses that interact with acetylcholine — cholinergic synapses — are animals with electric properties, i.e. the freshwater electric eel *Electrophorus electricus* and the saltwater electric fish *Torpedo*.³²

Also, in studies of brain seizure activity, decreased cholinesterase produced increased sensitivity to acetylcholine, which indicated a possible enhanced risk of a seizure developing.^{33,34} Seizures can be initiated by chemical or electrical exposures which are ways the effectiveness of anticonvulsant drugs are tested on animals. Seizure symptoms seem to be more common in advanced cases of MCS and ES; one Soviet study of hypothalamic syndrome, an advanced phase of microwave sickness, reported seizure symptoms among these patients.²⁷ Abnormal EEGs have been reported in several cases of acute pesticide poisonings as well as microwave sickness.^{4,14}

Chronic fatigue syndrome (CFS), like MCS, also appears to have a neurological link, although the exact nature of the illness is not yet clear. In the newsletter Healthwatch, Winter 1996, Dr. Robert Suhadolnik at Temple University, who is working on developing a blood test to diagnose CFS, stated that he believes CFS to result from a central nervous system virus.³⁵ Reports from ES patients indicate that both MCS and ES may occur with CFS.^{19,36} CFS has many of the symptoms also associated with ES: sound and light sensitivity, tingling and/or burning sensations, ringing in the ears, allergies, seizures, headache, fatigue, memory/concentration problems, etc.³⁶

In 1995, an Australian research team discovered that some CFS patients had significantly more organochlorine chemicals (DDE and hexachlorobenzene) in their body than a non-CFS control group.^{37,38} At the last American Association for Chronic Fatigue Syndrome Conference, organophosphate pesticide exposure was also discussed as a possible factor in the development of CFS.³⁸ As a bit of déjà vu, the former use of DDT pesticide in America had a history of a "mysterious" fatigue syndrome accompanying the exposure.³⁹

Mercury poisoning also has symptoms similar to

chemical and radiation poisonings. Workers in the felt hat industry early this century were known to have symptoms of "chronic mercurialism" which appeared as tremors, headache, drowsiness, weakness, insomnia, metallic taste, dizziness, irritability, dermatographism, etc.⁴⁰ Mercury is a well known nervous system poison.¹⁰ Mercury, like many other poisons, is known to inhibit enzyme function in general.⁴¹

What are enzymes? According to the book **Discovering Enzymes** written by two Harvard University professors, "...enzymes are responsible for carrying out all of the chemical reactions of the living cell, and, as such, they represent the life force of the cell."¹⁷ For example, enzymes assist the body in food digestion and in transmitting nerve impulses.^{17,42} Enzyme deficiency has been linked to chemical sensitivity (MCS), porphyria, and food allergies.^{18,29,43} The body's ability to process and detoxify chemical exposures is reduced when an enzyme deficiency is present.²⁹ In Dr. William Rea's book **Chemical Sensitivity**, Volume 1, he denoted enzyme detoxification failure as a likely mechanism of chemical sensitivity problems.⁴⁴

It is clear that there are many doors to ES, but in each case perhaps the key is the word **poisoned**—whether by chemicals, heavy metals, viruses or radiation. And, perhaps the common denominator in many cases of ES is enzyme inhibition. More information and research is certainly needed along this path. While chemical and heavy metal exposures as well as viruses may lead to ES, the radiation research of the Soviets and East Europeans confirms that low level non-ionizing electromagnetic radiation can also produce neurological damage.

In reviewing the basic U.S. literature regarding toxicology, the science of poisons, I found the focus of this literature primarily on the severe (acute) cases of poisoning. Some of the U.S. documents clearly indicated that the lower dose, longer term (chronic) cases of poisoning were more difficult to determine, both in understanding the symptoms and in determining the diagnosis.^{14,16,45} It appears that the medical need is for a deeper understanding of **chronic** poisoning effects regardless of the agent—physical, chemical, metallic, or biological.

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ENDNOTES

● **Finding Enzymes**-Supplementing the diet with enzymes is sometimes proposed as a way of replacing lost enzymes. However health food store supplements in general can contain additives that some people may be allergic to. The good news is that enzymes are found in all raw, nonirradiated foods. Enzymes are heat sensitive, so once food is cooked, enzymes are easily destroyed.

Salads and raw fruits are some of the common ways of adding enzymes to the diet. One type of raw food that is particularly rich in enzymes is sprouts. Alfalfa sprouts, radish sprouts, and clover sprouts are commonly found at health food stores.

Another kind of sprout is the bean sprout, such as mung bean; the bean sprouts are easy to grow at home and provide a heartier fare.

For example, lentil and mung sprouts can be grown in Mason-type jars using only water and no soil, in 2 to 4 days. Start with organic mung beans or lentils, 1/2 cup quantity. Remove the broken ones and rinse the rest. Place the beans in a Mason-type glass jar filled 1/2 full of room-temperature water. Cover with a towel and let them soak overnight (12 hours). In the morning the beans need to be drained. The mouth of the jar should be covered with a loosely woven cloth or screen to allow air circulation and affixed with a rubber band. Tilt the jar upside down and to one side to drain excess liquid into a bowl or dishdrain allowing air to circulate and cover the jar with a towel. (The sprouts are light sensitive.) The beans need to be rinsed once or twice daily to maintain moisture, then replaced to the covered and tilted position. Within a few days the sprouts will show. The lentil sprouts are ready at 1/2 inch and the mung beans at 1 inch. Remove the ones that haven't sprouted as these will be very hard and inedible. Extra sprouts can be refrigerated in a covered bowl and rinsed once daily. Good in salads, sandwiches, etc. While raw foods are healthy in limited quantities, patients with food sensitivities, chemical toxicity, or porphyria should consult their doctor before adding new enzyme-rich foods to their diet. An excellent booklet called "Sprouting for Health in the 90's: Build Your Immune System and Detox Your Body" provides instructions on growing many types of sprouts at home. This booklet is available from The Handy Pantry, 2129 E. Cedar, #3, Tempe AZ 85281 USA; cost US: \$6.45. Outside the U.S., inquire first regarding the postage cost.

● **Attention: Doctors/Scientists**-The Electrical Sensitivity Network is compiling a list of medical doctors and scientists willing to testify in Congressional hearings and in court cases on behalf of the electrically sensitive. If you are a doctor or scientist willing to assist the ES, please send a synopsis of your area of expertise with contact information to Electrical Sensitivity Network, PO Box 4146, Prescott AZ 86302.

● **Ultrasound Inquiry**-Lana Miller would like to hear from anyone who has been injured by ultrasound. She writes:

"I have hard knots along both sides of my spine that developed during ultrasound. They tense up and prevent me from using both arms in a repetitious way. Please write me at 1655 Gales Court, Forest Grove OR 97116 USA."

ELECTRICAL SENSITIVITY NEWS

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A Local War

Lucinda Grant

In the beginning of January 1997, I started educating the local governments about the onslaught of wireless technology due for this area—Yavapai County, Arizona. In the initial phase of this process, I visited the city and county planning and zoning departments, explained electrical sensitivity, and gave them a letter requesting to be notified about future public hearings for cellular antenna permits. I also spoke with the city and county risk managers and sent the letter to them. The county risk manager suggested that I follow the public notices in the paper or call the planning departments periodically for information about upcoming hearings. This advice proved to be most valuable and was how I found out about two US West cellular antennas proposed for the rural towns of Mayer and Humboldt; the first county hearing for these was June 18.

Prior to the hearing, I prepared an overview of the primary health concerns surrounding this technology—ES and cancer—and gave it to the city and county attorneys and the planning offices. This packet of information was mailed to the county planning and zoning commission members by the county planning office along with the US West application information for review prior to the commission hearing.

The two cellular carriers here, US West and Cellular One, previously sited their analog antennas on surrounding mountains. The Mayer and Humboldt applications were the first direct intrusions on local towns.

Complicating matters for the county, this area

has a large chemically sensitive (MCS) population due to low pesticide use and emphasis on "clean industry". The county became aware of the MCS population a few years ago due to legal problems from the use of lignosite on some of the well-traveled dirt roads to keep the dust down. Now, as I told the county, the MCS would be at risk again with the proliferation of wireless technology throughout the area.

The new county building where the hearing was scheduled was not accessible to most of the MCS, due to the chemicals used in the building's structural materials, now outgassing. In preparation for the June 18 hearing, the Yavapai Association for the Chemically Sensitive and I contacted the county to plan access for the MCS and ES. The county decided on a conference call for those who could testify by phone and written testimony for those unable to use a phone. Given a time to call in, the call participants could testify then listen to the hearing in full by phone via a speaker phone at the hearing site. As it turned out, six people testified by conference call; one used written testimony. The written testimony was entered in the public record of the meeting but was not read aloud, although it should have been read to those in attendance. (Because it was not read aloud, the testimony by letter did not appear in the minutes of the meeting.)

The sound quality of the conference call was not adequate for everyone. This problem could have been due in part to an inoperable microphone for those testifying in person at the hearing room. Also, the on-site participants were not able to hear the

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WARNING: Environmental illness is a complex topic. Methods or treatments that benefit some people may harm you. Readers are advised to consult appropriate medical, legal, or other professionals for personal guidance prior to making changes in their current program.

conference callers well because the county's speaker phone was too small for the size of the room and was not placed in front of the chairman's microphone, which was working.

Three of the MCS and/or ES personally appeared to testify. One wore a respirator, except while testifying. The hearing room had a noticeable chemical odor and was adjacent to a room marked "Electrical Room". Not a suitable location for either the MCS or the ES. I attended in person.

At the hearing, it was announced that the application for the Humboldt antenna was pulled prior to the hearing because of public opposition. A petition was circulated by the community in that case. The Humboldt tower will bypass public input because the proposed site is already zoned for it, necessitating only approval through the county Board of Adjustments regarding safety issues related to where the antenna might fall.

Thirteen people in total opposed the Mayer antenna. Two were elderly women who live close to the proposed tower site and were concerned about the aesthetics of a 150-foot antenna in the neighborhood. After hearing the MCS and ES testify, they also became concerned about the health risks.

My packet of information provided to commission members before the meeting included a request for a six-month moratorium on new wireless applications. During the six-month term, the county could plan placement of the antennas, to minimize public exposures as much as possible. At the meeting, the county attorney was present to state that certain laws restrict the use of moratoriums by counties in Arizona and this use of a moratorium would not fit within the requirements.

During the hearing, I objected to the tower on several grounds:

"First, a 150-foot tower in the middle of Mayer will be an eyesore for many people. I suspect that the primary reason for the tower is to provide better phone service to passersby on the highway, with local Mayer coverage a secondary benefit. As citizens of the Mayer community will not be the primary users of the service, they should not have to bear the brunt of this unsightly menace. Second, I believe the transmitting range for a tower of this size would be about 4 miles in every direction. Why must the Mayer community sit under a transmitter this powerful when it could be relocated further away from the downtown area? Third, no advance planning or consideration has been provided regarding antenna placement with regard to those who are

chemically sensitive and/or electrically sensitive in the Mayer area and in Yavapai County in general. Electrical sensitivity has historically been called radiowave sickness or microwave sickness. Some electrically sensitive patients in other areas have had to leave their homes to escape the symptoms they develop from exposure to electromagnetic radiation from new cellular antennas. And, where will the electrically sensitive go? I suggest that cellular service does not have to be complete everywhere, particularly in the outlying areas—it isn't that important.

What is important is that disabled people are not run out of their homes by an environmental pollutant from which they have no protection in their homes."

Curiously, the Federal Communications Commission rules for antenna sitings developed under the federal Telecommunications Act of 1996, specifically states that "environmental effects" (which are being interpreted to include health effects) cannot be considered in the siting of wireless facilities. Some people say this is unconstitutional, but no one has yet tested it in court. Meanwhile, the county attorney emphasized to the commission members at the hearing that due to the Telecommunications Act, health concerns could not be considered in determining the viability of the tower application. In response to this comment, my testimony included the following:

"No class of citizens are dispensable in the name of technology. That would be against civil rights law, the Americans with Disabilities Act, the National Environmental Policy Act, the Constitution, the Universal Declaration of Human Rights adopted by the United Nations and basic moral and ethical standards of a civilized society."

I concluded my testimony by discussing the Harvard and Boston University petition opposing Sprint's PCS system.

One commission member suggested that the Mayer tower application be set aside for 90 days while the location of a "less sensitive site" was investigated. This motion did not pass. Another commission member asked "Are we going to serve the majority that needs a very good communications system or a minority that may be affected by these radio waves?" This statement and the hearing made page one news of the county newspaper, which favorably reported on the concerns of the MCS and ES. The Mayer tower was approved by the planning and zoning commission members 6 - 2.

The second hearing, for final approval of the

Mayer antenna by the county Board of Supervisors, was scheduled for July 7. A week prior to the hearing, I called the county facilities manager who also handles disability accommodations to let him know we would need conference call arrangements again. I called back on July 3 to confirm the arrangements only to be told that the county incurred an \$800 cost for the last conference call so this accommodation was not available. Instead they decided that a local phone number would be provided, whereby we could call in at an appointed time to testify then hang up and the next person would testify, etc. The possibility of calling many times before getting through and not being able to hear the meeting in process did not sound like proper access to me. I made three phone calls before I found a lawyer who would work for free the day before the 4th of July holiday. The lawyer is with the Arizona Center for Disability Law in Phoenix, which receives federal funding to assist the disabled. Phone communications between this lawyer and the county attorney led to last-minute plans for the upcoming hearing to be outside the building at the covered picnic area. Unfortunately, most of the MCS were hesitant about being in the vicinity of this know "sick building", so I was the only attendee of the MCS/ES community that I know. However, I brought written testimony from a member of the MCS group to read aloud at the hearing along with my own prepared speech. The meeting location was occupied by employees taking a smoker's break when I arrived. I complained about this at the hearing as the smokers were there until one of the supervisors asked them to leave at the start of the meeting. I suggested that we need a third accommodation plan that will provide safer access. The chairman of the hearing agreed on this point.

However, when it was time for the public to testify regarding the Mayer antenna and I requested to speak, one panelist said "I feel it's inappropriate to take testimony to review an issue we can't deal with." The chairman agreed and I was not allowed to read my speech or the speech from the MCS member. I responded by saying that ES people in other areas were running for their lives and have no place to go. Also, I said that the Telecommunications Act did not preempt civil rights law or disability law and that local governments still need to protect the public health.

The antenna was approved unanimously 3 - 0. The only good news was that the reporter who covered the first hearing also came to this one and the story made page one again.

The MCS and ES here have three main problems:

1. Inability to access county meetings held at the new "sick" building. (Our lawyer at the Arizona Center for Disability Law will help us with this one.)
2. Inability to present testimony related to health effects regarding wireless technology.
3. The perceived restriction the Telecommunications Act has over local governments, making them unwilling to act on behalf of the citizens. This is also a national problem. (One environmental lawyer I recently spoke with said that environmental effects do not include health effects and using that interpretation would be "absurd and an abuse of power".)

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The Microwave Debate

Nicholas H. Steneck - USA

(Editor's note: This article is reprinted from the 1984 book *The Microwave Debate* by Nicholas H. Steneck. Reprinted by permission. Copyright © 1984 by Massachusetts Institute of Technology.)

Personal injury claims center on health problems alleged to have been suffered. There are basically two legal avenues for pressing claims of personal injury: workers' compensation and personal damage suits. Both have been used by persons who have claimed injury as a result of exposure to RF (radio frequency) radiation.

The legal basis of workers' compensation claims are federal, state, and local laws that establish rules for compensating workers for injuries suffered on the job. For example, on January 5, 1978, Joseph Kerch, a fifty-eight-year-old pilot who experienced hearing and vision loss after years of flying, filed a claim with the U.S. Department of Labor seeking compensation for injuries. Air America, Inc. had been his employer. Kerch claimed that his vision loss was the result of cataracts caused by exposure to radar while working as a pilot. He was going blind, allegedly as a direct result of his work experience. If this were true, he was due compensation under federal law.

The resolution of Kerch's claim depended on the answer to one central question: Were the injuries, principally the cataracts, caused by work-related factors? If they were, then Kerch qualified for compensation; if not, he did not qualify. The task

faced by Kerch's lawyer, Matthew Shafner, was making connections between work conditions and the injuries. The defendant, Air America, Inc., had to show that such connections could not be made. Crucial to both cases was the validity of Milton Zaret's controversial microwave cataract theory.

The evidence supporting Kerch's claim followed a familiar pattern. During his early career his vision was normal. While working for Air America, his near vision weakened. By the mid-1970s he began to notice a halo effect around objects. In 1977 his ophthalmologist diagnosed his problems as cataracts and referred him to Zaret. Zaret characterized the injuries as typical radiant energy cataracts. Since Kerch's main exposure to RF radiation had been while flying, his cataracts were presumably job related.

The evidence against the claim, presented in part by ophthalmologist Dorothy Leib, contested Zaret's diagnosis. Leib agreed that microwaves could produce unique cataracts but did not believe that Kerch's cataracts were microwave cataracts. Zaret described the cataracts as posterior capsular; Leib did not. If her diagnosis were correct, Kerch's cataracts could not be traced to a unique work place condition (exposure to RF radiation), thus weakening the claim. Kerch also had other medical problems that had contributed to the general decline of his health. He had been diagnosed as once having a detached retina and was being treated for gastrointestinal cancer and a rare tropical disease. Thus there were many complicating factors in any diagnosis.

Kerch's claim was settled out of court in early 1982 for \$30,000, leaving the problem of cause unresolved. The settlement did not establish connections between the claims and payment. Kerch was not being compensated for RF injuries, nor was he being denied compensation. No legal precedents were set. However, legal precedents had been set already in another case that was being appealed when Kerch's claim was settled. The injured party in the other case, Samuel Yannon, had died. The claim for workers' compensation had been filed by his wife, Nettie Yannon, on January 11, 1975.

Yannon's occupational exposure to RF radiation began in 1954 when he was hired as a radioman by New York Telephone. Among other duties he was responsible for tuning about two dozen low-power RF transmitters located in the Empire State Building. Two or three times each working day he entered the room housing the transmitters and spent about twenty minutes adjusting them, working sometime

from behind the units, sometimes in front of them. In 1968, after fourteen years on the job, he began to experience health problems and was placed on disability leave. He was fifty-seven years old. Three years later he was retired from New York Telephone for health reasons. He died three years later.

No one doubted that Yannon died from health problems that first appeared when he worked for New York Telephone. He was in good health until about 1968. After 1968 his health declined rapidly: his hearing and vision failed, he lost his coordination and memory, and his weight dropped from the 180s to under 100. The main issue that needed to be resolved in settling the claim was whether the health problems were actually work related. Nettie Yannon, Sam Yannon's physician Alfredo Santillo, and Milton Zaret argued that there was a connection between the work environment and the health problems. New York Telephone representatives, Sol Michaelson, and a colleague of Michaelson's at Rochester, Robert Hendon, attributed the death to non-work-related causes. The decision on the claim depended on which of the experts was believed.

From a scientific point of view the claim had many weaknesses: The exposure levels were not known, the equipment Yannon had adjusted was no longer in operation so direct measurements could not be made, and it was impossible to recreate his exact work pattern. Did he follow suggested safety rules, turning the antennas off when he worked in front of them? The principal expert supporting the claim, Milton Zaret, was himself under attack by the time hearings took place. Zaret's scientific expertise was limited to eye problems; this case involved much more. The scientific community had never accepted the existence of effects under such ambiguous and controversial conditions. They were not likely to testify in support of this claim.

Law and science do not operate in the same way, however. Only two conditions had to be met to establish legal proof: the disease Yannon contracted—"microwave radiation sickness"—had to be a recognized occupational disease, and he had to contract that disease as a direct result of his normal work experience. Workers' compensation covers health problems experienced as a direct consequence of normal work conditions. If these two conditions could be satisfied—contracting a recognized occupational disease as a direct consequence of normal work conditions—the compensation would be awarded.

The criteria for legal proof worked in the Yannon's favor. The legal experts who were the final arbiters

in the workers' compensation hearings accepted Zaret's contention that microwave radiation sickness is an occupational disease. (Zaret's scientific colleagues had not accepted the evidence he had published over the years as proof that humans were being injured by RF exposure.) Once it was accepted that others had suffered from microwave radiation sickness under exposure conditions similar to Yannon's, making the causal link required easily followed. If Zaret had uncovered examples of the disease, he must also have shown the causal links.

Zaret's pivotal role in this case is more than evident in the final rulings. The three-member Workers' Compensation Board panel who reviewed the original award, made in June 1980, ruled on February 28, 1981, "Upon review the Board Panel finds based on the entire record and particularly the testimony of D. Rieu [a radioman], and Drs. Santillo and Zaret, that there was a direct causal relationship between decedent's [Yannon's] exposure to microwave radiation during his employment and his subsequent disability all of which resulted in his death." Following another appeal, on May 6, 1982, the New York State Supreme Court Appellate Division ruled that "claimant's leading expert, Dr. Milton Zaret, provided the Board with ample evidence of the existence of a disease identified as 'microwave or radiowave sickness.' Dr. Zaret's own studies, including those performed for the United States Government, and excerpts of reports from the Warsaw Conference of 1973 which documented the diagnosis of such a disease in other countries, substantiate this conclusion. The Board was entitled to credit his testimony and that of other experts supporting this view." The scientific community may have had doubts about Zaret's work; the legal community did not.

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Signs and Symptoms of Microwave Sickness

Arthur Firstenberg - USA

(Editor's note: This information is excerpted from the new edition of **Microwaving Our Planet**, available from Arthur Firstenberg, PO Box 100404, Brooklyn NY 11210; cost \$18 USA, outside the US \$20 (includes postage). Please note: This summary is based upon Arthur's research of Soviet studies and contact with others who are ill. Further information on illness due to electromagnetic exposures will

become more clear as medical doctors monitor their patients over time. Reprinted by permission. Copyright © 1997 by Arthur Firstenberg.)

Physical Exam

Look for:

- skin rash
- enlargement or tenderness of the thyroid
- heart rate higher than usual
- blood pressure higher than usual
- shortness of breath (may "look like" an anxiety attack)
- wheezing
- lungs not clear
- increase in the limits of the heart
- liver tenderness
- abdominal tenderness
- general hypersensitivity of the skin
- any elevation of body temperature
- sinus pain/drainage
- deterioration of the teeth/pain in teeth with metallic fillings
- acrocyanosis

Neurological:

- tremors, especially of eyelids and hands
- change in visual acuity
- decreased sensitivity to odors
- decreased sensitivity to pinprick in the hands or feet
- increased sensitivity to vibration
- increased tendon reflexes of the upper or lower extremities
- decreased abdominal reflexes
- general muscle weakness
- anisocoria

Mental:

- agitation
- fatigue
- impaired short or long term memory
- paranoia (in advanced illness)

Patient History

Recent eye problems, especially pressure behind the eyes, but also floaters, difficulty focusing, deteriorating vision, eyeaches, etc.

Sudden dental problems, especially broken fillings

Dryness of the lips, mouth, skin, or eyes

Puffy lips

Swollen or sore throat

Sinusitis

Bronchitis

Headaches

Earaches/ringing in the ears

Electrosensitivity and Digital Cellular Base Stations

(Editor's note: This fact sheet was prepared by the U.S. Environmental Protection Agency's Region 6 office in Dallas Texas.)

The Environmental Protection Agency (EPA) has for many years received similar complaints from relatively few individuals living in the general vicinity of air traffic control radar transmitters, which are pulsed systems similar in many respects to digital cellular telephone systems. Clicking, buzzing, hissing and knocking sounds are known effects in some individuals exposed to high intensity radar signals. However, environmental exposure to pulsed radiation from cellular telephone base stations is at a very much lower intensity than that of radar signals known to stimulate the impression of audible noises in humans.

With the advent of digital cellular telephone and paging systems, the number of complaints similar to those of (name withheld) has increased significantly, both in the United States and world-wide. Symptoms attributed to radio frequency exposure such as nausea, headaches, dizziness, pain in the eyes, ringing of ears, screeching and sizzling sounds, and irregular heartbeat are described collectively by the term, "electrosensitivity." These symptoms are very difficult to quantify in research studies, so little information is available on electrosensitivity to radio-frequency radiation. To our knowledge, the only research program underway at present to address electrosensitivity has just begun in Sweden. Its purpose is to determine whether or not reports of electrosensitivity to radiation from digital cellular telephone and paging systems reflect a real physiological problem. Research programs sponsored by the cellular telephone industry are currently underway, but these programs primarily focus on cancer.

The World Health Organization (WHO) is in the initial stages of planning a research program to investigate health effects of exposures to low levels of radiofrequency fields. Environmental Protection Agency (EPA) staff recently received a draft report from WHO that will serve as a basis for discussion to identify the gaps in knowledge, so that research can be targeted to better assess health risks from exposure to low levels of radiofrequency radiation. EPA staff are in the process of preparing comments which will identify biological effects of pulsed radiofrequency radiation as a significant gap in knowledge which needs to be studied.

"Burning" in any part of the body: chest, eyes, ears, testicles, etc.
Pressure or pain in the chest
Insomnia
Dizziness
Nausea
Loss of appetite
Pelvic discomfort/pain in the testicles or ovaries
Paresthesias
Muscle spasms
Pain in the soles of the feet
Pain in the legs
Muscular, joint, or abdominal pain, especially pains that move around the body
"Electrical currents" in any part of the body
Sweating
Itchy systemic rash
Spontaneous nosebleeds
Frequent urination
Craving for carbohydrates

Laboratory Tests

Abnormal blood sugar curve
Elevated blood histamine
Elevated serum protein and globulin
Lowered albumin/globulin ratio
Increase in cholesterol and beta-lipoprotein
Mild leukopenia or thrombocytopenia. Or any change in leucocytes (increase or decrease) or immunoglobulins for that patient, or IGG subclasses abnormal
Signs of autoimmunity
Altered serum lactic acid
Altered oxygen content or pH of the blood
Increased copper or zinc in the urine
Decreased red blood cell copper
Change in appearance of red blood cells (rouleaux formation, etc.)
Increased thyroid activity
Increased adrenal activity

EKG

Lengthening of the intraauricular and intraventricular conduction. Decrease in amplitude of the R and T teeth. Any arrhythmias.

EEG

Seizure activity. Abnormal excitation.

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Fact Sheet
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