

INSIDE...

EMF NEWS pp.2-7

Power Line Talk:

**Stossel and ABC on EMF Risks • More
Ado on NAS-NRC Report • Consumers
Union Says Electric Blankets Are Safe •
Brussels Meeting Raises Eyebrows •
NCRP Talks and EMF Report**

WHO's EMF Project Gets No U.S. Dollars

New York Property Lawsuit Loses Round

Appeals Court Upholds Glazer Suit Dismissal

Electric Fields in the Limelight Again

EMF RAPID Biomedical Research Grants

EMFs Tied to Lou Gehrig's Disease

Alzheimer's and ALS References

HIGHLIGHTS pp.8-12

Wireless Notes:

**Industry Complaints on Siting Delays •
FCC Forum • CWA-EMR Alliance and PCIA
on Towers • PCS and the EM Sensitive**

Blaming Wireless Technology:

**Wacky Cash Machines, Bad Vibes at
Home and a Haywire Security System**

FCC Delays New RF/MW Rules for Towers

EC Plan for Wireless Research

Motorola Win in Georgia Cell Phone Case

RF/MW-Cancer Link References

FROM THE FIELD pp.12-15

Flashback: 5, 10, 15 Years Ago

Motorola: "War-Gaming" Lai-Singh Study

Air Force's RF/MW Mind Games

Blank Verse on Physicists

Clippings from All Over

CONFERENCES p.16

1997 Calendar (Part II)

UPDATES pp.17-18

**Clandestine Colon Cancer • Pacemaker EMI
Papers • People in the News • NRPB RF
Pamphlet • Annotated Bibliography**

VIEWS ON THE NEWS p.19

Plus Ça Change: Why We're Running in Place

Stronger Evidence for an Alzheimer's-EMF Connection

Epidemiological studies in the U.S. and in Sweden have produced new evidence of a link between Alzheimer's disease (AD) and occupational exposures to electromagnetic fields (EMFs). A specific biological hypothesis has been proposed that could account for the connection, and laboratory studies are planned to test it.

In the December 1996 issue of *Neurology*, Dr. Eugene Sobel and colleagues reported a fourfold increase in the risk of AD for subjects who had worked in jobs with medium-to-high EMF exposure. It was Sobel who reported the first evidence of an EMF-Alzheimer's link in July 1994, based on an analysis of three separate groups of Alzheimer's patients.

"It's an interesting observation," Dr. Zaven Khachaturian, director of the Alzheimer's Association's Reagan Research Institute, said in an interview from his office in Potomac, MD. He said that the finding should be followed up, but cautioned that the association might be caused by other risk factors in the workplace.

On November 21, Dr. Maria Feychting presented the results of her recent study in Sweden at the Department of Energy's annual research review in San Antonio. Among subjects who were 75 years or younger at the time of diagnosis, she found that those who had worked in jobs with the higher EMF exposures were five times more likely to develop AD.

Although these findings by Sobel and Feychting are both statistically significant, there are inconsistencies between them, and Feychting urged "a cautious interpretation." Still, she told *Microwave News*, she was surprised by her

(continued on p.6)

New Focus on Broadcast Radiation: Is There a Leukemia Risk?

Two new studies from the U.K. and Australia show elevated rates of leukemia near television and FM radio broadcast towers. The new results support past studies pointing to leukemia risks due to exposure to radiofrequency and microwave (RF/MW) radiation from communications and radar transmitters.

Rates of adult leukemia were nearly twice those expected within two kilometers of a TV and FM tower operated by the British Broadcasting Corp. (BBC) in Sutton Coldfield near Birmingham, England. Writing in the January 1997 *American Journal of Epidemiology (AJE)*, Dr. Helen Dolk and colleagues at the London School of Hygiene and Tropical Medicine reported that the decline in leukemia risk with distance is highly statistically significant.

Dolk looked at leukemia rates in concentric circles around the Sutton Coldfield tower. Within a half kilometer, there were nine times the expected number of cases. In the area within the next half kilometer, the rate was double that

(continued on p.11)

« Power Line Talk »

Blaming power line EMFs for health effects is as logical as concluding that diet soda causes obesity after seeing a fat person drinking a Diet Coke. So reasoned ABC-TV's **John Stossel** on *Good Morning America*. Stossel conceded that studies have shown higher rates of cancer near power lines but called these findings deceptive. "It may be that people who live near power lines also live near busy streets and are exposed to more pollution from cars. They might eat more fried foods or exercise less or anything," he said. When *GMA*'s Charles Gibson asked whether people are just imagining that they suffer from EMFs, Stossel responded, "It's hard to say what people are imagining. Anything is possible. It's possible that all the cancer in America is caused by radiation from the planet Uranus. You can't prove what isn't true." The two reports on EMFs, which aired January 6-7, served as a teaser for Stossel's January 9 hour-long special *Junk Science: What You Know That May Not Be So*, in which he argued that science is often twisted to fit the agendas of activists, bureaucrats and lawyers (see *MWN*, J/A96 and N/D96). So who can be trusted on controversial scientific issues? Stossel touted the opinions of "the quiet scientists who are respected by their peers." In the EMF series, Stossel presented two scientific experts: **Michael Fumento**, a science writer and author of *The Myth of Heterosexual AIDS*, and Dr. **Richard Wilson** of Harvard University in Cambridge, MA. Wilson, who has ties to the Atlantic Legal Foundation in New York City, coordinated that organization's *amicus* brief for San Diego Gas & Electric Co. in the *Covalt* case, a property devaluation suit in California (see *MWN*, N/D95). Representing the other side of the scientific debate were several women who have homes near power lines, including **Joan Tukey**, a citizen activist. Meanwhile, health and safety officials at ABC head-

quarters in New York City are not taking any chances. In December, ABC paid a six-figure sum to **Field Management Services**, a Los Angeles-based EMF mitigation firm, to design and install shielding on the ground floor of one of its buildings. Prior to shielding, ambient levels averaged 100-200 mG. **Joe Manetta**, an ABC network health and safety executive, did not respond to requests for comment. While ABC's concern may well have been electromagnetic interference, one professional in the EMF mitigation business told *Microwave News*, "The health issue is always there in the background."

« « « » » »

Seven members of the **NAS-NRC** EMF committee are trying to change the way the academy releases its reports to the public (see *MWN*, N/D96). *Microwave News* has learned that in early January they wrote to Dr. **Bruce Alberts**, the president of the academy, to raise concerns about the process by which press releases are drafted and specifically about the wording in the release announcing the **EMF report**. The academy is now polling all 16 members of the EMF panel to gauge how it should answer its critics. The dissenting seven are waiting for the response before making their concerns public. Meanwhile, in a much more strongly worded letter, Dr. **Kjell Hansson Mild** of the National Institute for Working Life in Umeå, Sweden, asked Dr. **Charles Stevens** of the Salk Institute in La Jolla, CA, the chair of the EMF panel, how "the report turned out to be so biased in [its] selection of papers." Mild, past president of the Bioelectromagnetics Society, noted that the report mainly included papers that showed no effect and omitted those that found a biological response. As of the end of January, Mild had not heard from Stevens or the NAS-NRC.

WHO EMF Project Gets No Funds from the U.S.

The World Health Organization (WHO) EMF project has failed to raise any funds from U.S. health agencies. The U.S. military may provide some support, but only for working groups.

The EMF project had actually received only 10% of its \$3.3 million budget by the end of last May. Indeed, according to a confidential funding update obtained by *Microwave News*, the project had raised essentially all of its unrestricted contributions from only three countries.

The WHO itself is not contributing any money. Dr. Wilfried Kreisel, the WHO's executive director for Health and Environment, explained at a project meeting last May that the United Nations agency, which is based in Geneva, Switzerland, had other "commitments in areas of high priority."

In early 1997, Dr. Michael Repacholi, the director of the WHO project, said that he now had "just under \$2 million" in hand. But he did not respond to questions about the sources of the funds and whether they were for general support or for specific tasks such as meetings or training. Repacholi was previously at the Royal Adelaide Hospital in South Australia.

As of last August, the project's unrestricted funds, received or promised, were \$50,000/year for five years from Australia,

\$60,000/year for five years from Britain and \$100,000 from Ireland—and lesser amounts from Hong Kong (US\$13,000, or HK\$100,000), Sweden (\$20,000/year for two years) and Switzerland (US\$7,300, or SF10,000).

"We have no funds to contribute," said Dr. Russell Owen of the U.S. Food and Drug Administration (FDA) in Rockville, MD. The FDA's Dr. Mary Beth Jacobs attended the EMF project's International Advisory Committee meeting, held in Geneva just prior to the formal announcement of the project last June (see *MWN*, J/A96). Planning for the EMF project had begun some years earlier.

Repacholi has also solicited funds, without success, from the National Institute of Environmental Health Sciences, the Department of Energy (DOE) and the National Institute for Occupational Safety and Health (NIOSH). "The WHO EMF effort is largely duplicative of the RAPID effort," said the DOE's Dr. Imre Gyuk. NIOSH's Dr. Gregory Lotz said that his agency does not have any funds to contribute.

Six countries have pledged resources for scientific meetings, working groups and training courses: Austria, Canada, France, Germany, Indonesia and Italy.

«« »»

Consumers Union (CU) is no longer worried about EMFs from **electric blankets**—at least in part because of the recent **NAS-NRC report**. In an update appearing in the January 1997 issue of its magazine, *Consumer Reports*, CU advises that the NAS finding of “no conclusive evidence” of EMF health impacts and the new generation of reduced-EMF blankets suggest “that electric bedding should not be a concern for most people.” CU does caution children and pregnant women only to warm the bed and then turn off the blanket or heating pad “to avoid overheating.” Back in 1989, CU recommended that pregnant women avoid electric blankets because of the heat and the EMFs (see *MWN*, N/D89). In its November 1995 issue, *Consumer Reports* stated that its own tests then showed that the EMFs from low-field blankets and pads were “close to the ‘background’ level produced by any house’s wiring.” A recent paper by a team at the University of Nevada, Reno, however, found that blankets with reduced magnetic fields generate electric fields that can actually be higher than those from conventional electric blankets. The Nevada researchers reported that the currents induced in the body by low-field blankets are still about two-thirds of that from conventional models (see *MWN*, N/D96).

«« »»

Eyebrows were raised from coast to coast when the program of an EMF symposium held in **Brussels, Belgium**, on January 21 reached this side of the Atlantic. Three of the four featured American speakers are among the most outspoken skeptics of EMF health effects. Dr. **Patricia Buffer** of the University of California, Berkeley, presented the epidemiological data and Dr. **John Moulder** of the Medical College of Wisconsin, Milwaukee, summarized

the biomedical literature as a whole. Both Moulder and Buffer have served as paid experts for the electric utility industry. Another synthesis of the EMF science was presented by **Gary Taubes**, the journalist who has been adopted by the utilities as their answer to Paul Brodeur. Taubes’s talk was entitled, “EMF, the Press and the Ease of Getting It Wrong.” The fourth speaker was Dr. **Charles Graham** of the Midwest Research Institute in Kansas City, MO. “Where’s the balance?” asked one surprised observer. The symposium was sponsored by **EDF** and **Electrabel**, the French and Belgian electric utilities, respectively, and was chaired by Dr. **Michael Repacholi** of the **WHO** in Geneva (see p.2).

«« »»

The theme of this year’s annual meeting of the **National Council on Radiation Protection and Measurements (NCRP)** will be *The Effects of Pre- and Postconception Exposure to Radiation*. In addition to the talks on ionizing radiation and ultrasound, there will be presentations on EMFs and RF/MW radiation by Drs. **Larry Anderson** of the Battelle Pacific Northwest Labs in Richland, WA, **Mary Ellen O’Connor** of the University of Tulsa, OK, and **Elisabeth Robert** of the Institut Européen des Génomutations in Lyon, France. The NCRP’s long-awaited **EMF report** apparently will not be released anytime soon. A draft of the committee’s report, which recommended that strong action be taken to curb human exposures to EMFs, attracted a great deal of attention when it became public in the summer of 1995 (see *MWN*, J/A95). The report is still being reviewed, according to the NCRP’s Dr. **Constantine Maletskos**. “We are expecting it to be released by the end of 1997,” Maletskos said in an interview. The NCRP meeting will be held at the Crystal City Marriott in Arlington, VA, April 2-3. For more information, call (301) 657-2652 or fax (301) 907-8768.

New York EMF Property Devaluation Case Dismissed

In a victory for Consolidated Edison Co., a New York appellate court has thrown out a lawsuit seeking damages for loss of property value due to public fears of EMFs. The suit, filed by Howard and Eve Reiss, charged that a Con Ed power line next to their property had caused them to lose money on the sale of their home in the Village of Pleasantville. The Reisses have filed an appeal.

Reiss is a test case for several similar lawsuits pending in the New York courts, five others against Con Ed and three against Long Island Lighting Co. (see *MWN*, J/A94).

The December 5 ruling found that the EMF issue had in fact affected the local housing market, and that the Reisses had lost tens of thousands of dollars as a result: “The record reveals that the ultimate sale price [of \$230,000] was 30% less than comparable properties in the village due to the public perception that the power line posed a health hazard.”

But in wording similar to that of the recent *Covalt* decision by the California Supreme Court (see *MWN*, S/O96), Justice D. Bruce Crew wrote that EMFs “are incapable of being perceived by the senses and, thus, are not capable of resulting in a ‘physical’ invasion.” Since the Reisses had not tried to prove that EMFs

had harmed their health, and since EMFs do not cause offensive odors or noise, the court ruled that the Reisses’ property had not been infringed upon, and so they were not entitled to damages.

“We’re obviously pleased with the decision,” said Richard Mulieri, a spokesperson for Con Ed in New York City. “We feel it can act as a precedent, not just in our service area but in the rest of the state as well.”

Michael Rikon of Goldstein, Goldstein and Rikon in New York City, a lawyer for the Reisses, said that an appeal was filed on January 10, and that he expected the dismissal to be overturned. “This decision does not make any sense,” he said in an interview. “It ignores the 1993 *Criscuola* decision by New York’s highest court, which allows plaintiffs to sue for damages whether or not the danger is proven scientifically” (see *MWN*, N/D93 and J/F 94). “Our briefs and Con Ed’s both referred to *Criscuola* repeatedly,” said Rikon, “but this decision doesn’t mention it once.”

Rikon noted that both Crew and another member of the five-judge panel had served on the court that handed down a ruling against the *Criscuola* brothers, which was later overturned on appeal. But Mulieri said that Con Ed was not too concerned about the *Reiss* decision meeting a similar fate. “Good decisions usually hold up on appeal,” he remarked.

Certainly the two cases are not the same. In *Criscuola*, Con Ed had already taken a portion of the brothers’ property by emi-

ment domain, and the issue was how much compensation they deserved. The Reisses sought to demonstrate that the presence of a Con Ed power line adjacent to their property amounted to a *de facto* "taking," since it depressed the property's value, and one of their lawyers admitted that this was going "one step further than *Criscuola*" (see *MWN*, J/A94). But the court's decision did not address this issue.

Court Throws Out Cancer Suit Against Florida Power & Light

On January 22, a state appeals court upheld the dismissal of Leonard Glazer's lawsuit against Florida Power & Light (FPL). Glazer had filed suit in 1994, following his wife's death from chronic myelogenous leukemia (CML) in 1988, and his own diagnosis with the same rare disease in 1992. His attorneys have asked the Court of Appeal to reconsider its decision.

The *Glazer* case was the first to focus on the role of ground currents as a source of residential EMFs. Both sides agreed that most of the EMFs in the Glazer home arose from grounding connections to conductive plumbing, and not directly from FPL's distribution lines outside the house. Glazer's own experts testified that the latter alone were too weak to cause cancer (see *MWN*, M/J96).

In April 1996, the lower court granted FPL's request to limit its liability to the EMFs from its power lines, noting that FPL did not own or control the water main, and the case was subsequently dismissed.

Glazer argued on appeal that regardless of the immediate source of the EMFs, FPL had a duty to warn its customers about their potential hazards. "A manufacturer is responsible for his product wherever it might foreseeably be used," one of Glazer's attorneys, Howard Talenfeld of Colodny, Fass & Talenfeld in Ft. Lauderdale, told *Microwave News*.

Indeed, the Court of Appeal rejected FPL's argument that because it did not own the water line, it was entirely free of responsibility. The court ruled that had the utility clearly known that EMFs from ground currents posed a health risk, "FPL could not sit silently and not warn its customers of this potential hazard."

But the appellate panel still accepted the distinction between EMFs from ground currents versus those from power lines. No study during the time Glazer lived in his home, it held, "specifically examined...whether magnetic fields emanating from plumbing lines may be linked to cancer." Therefore, it ruled, FPL had no duty to warn its customers about EMFs from ground currents.

A separate opinion from Judge Gerald Cope criticized the majority's logic on this point, writing, "There is no particularly good reason why...the fields created by water lines should necessarily be considered apart from magnetic fields created by the distribution wires." Cope agreed with the majority that FPL had no duty to warn—but only because "the level of scientific knowledge...does not...sufficiently establish the existence of a health risk."

"The company is very pleased with this result," said FPL's lead attorney, Alvin Davis of Steel, Hector & Davis in Miami. "It was a difficult and emotional case, and the company and I are both sympathetic to Mr. Glazer because of his illness. But it was

Focus Again on Electric Fields: Now a Link to Brain Tumors

A new paper from France has made it clear that the revived interest in electric fields and cancer is not just a fad.

Drs. Marcel Goldberg, Pascal Guénel and coworkers, who collaborated on the joint Canadian-French epidemiological study published in 1994, have found a statistically significant threefold increase in the risk of brain tumors for those utility workers with the highest cumulative exposure to 50 Hz electric fields. They saw no link between electric fields and leukemia. Goldberg and Guénel are with INSERM in Saint-Maurice, a suburb of Paris.

Those workers exposed to average fields of 13 V/m or more for 25 years or longer had seven times the expected rate of brain tumors. There was an indication of a dose-response relationship, but it was not a smooth association. Goldberg also saw an "unexpected" association with colon cancer.

Writing in the December 15, 1996, issue of the *American Journal of Epidemiology* (144, pp.1107-1121), the French researchers called the brain tumor association "remarkable," since "brain tumors were with leukemia the sites most strongly suspected *a priori* to be linked with extremely low frequency fields." They added that, "If the observed association with brain tumor is real, it implies that electric fields may have their own role in the development of the disease, in conjunction or not with magnetic fields."

The original analysis of the Canadian-French data showed an association between magnetic fields and leukemia and a lesser link with brain tumors (see *MWN*, M/A94). Last year, Canada's Dr. Anthony Miller of the University of Toronto found even higher risks of leukemia among Ontario Hydro workers when he took into account both magnetic and electric fields (see *MWN*, J/A96).

Also last year, a group at the U.K.'s University of Bristol proposed that electric fields play a critical role by concentrating radon decay products (see *MWN*, M/A96 and S/O96). Another U.K. study has linked electric fields to childhood leukemia (see *MWN*, N/D96).

A meta-analysis of 29 occupational epidemiological studies by the Electric Power Research Institute in Palo Alto, CA, found "a small but significant" increase in brain cancer among workers exposed to EMFs (see *MWN*, J/F96; also M/A90).

not the company's fault."

If the Court of Appeal refuses to reconsider its decision, Glazer's only option would be to appeal to the state's Supreme Court. Asked if his client would do so, Talenfeld said, "We're studying the decision very carefully—but Mr. Glazer is committed to proceeding."

In September a judge found that Glazer was liable for paying a large portion of FPL's legal costs, and the utility has demanded \$268,000 (see *MWN*, S/O96). FPL's attorney, Davis, would not comment when asked if the company would drop this demand if Glazer agreed not to appeal.

EMF RAPID Innovative Biomedical Research Grants

In early January, the National Institute of Environmental Health Sciences (NIEHS) awarded 21 grants as part of the EMF Research and Public Information Dissemination (RAPID) innovative biomedical research program. Funding began on January 10, 1997, and will last for one or two years. For past awards, see *MWN*, S/O94 and M/A95. Those researchers who received earlier RAPID grants are marked with a †.

Investigator/Institution	Award	Project
Dr. Dean Astumian † University of Chicago	\$100,000 (2 years)	To develop theories of biophysical, nonlinear mechanisms of EMF effects that address biologically relevant EMF exposure conditions on cells.
Dr. Elizabeth Balcer-Kubiczek † University of Maryland, Baltimore	\$100,000 (2 years)	To investigate changes in immediate, early gene transcription induced by 60 Hz EMFs with a high harmonic content.
Dr. Martin Blank Columbia University, New York City	\$100,000 (2 years)	To characterize the mechanism of EMF signal transduction by cells and to determine the environmentally relevant exposure parameters using the enzyme cytochrome oxidase.
Dr. Lucio Costa University of Washington, Seattle	\$99,944 (2 years)	To study the ability of 60 Hz EMFs to increase the basal- and mitogen-stimulated proliferation of human astrocytoma (brain tumor) cells and the possible role of protein kinase C.
Dr. Gale Louise Craviso University of Nevada, Reno	\$100,000 (2 years)	To use fluorescence imaging of intracellular calcium in isolated adrenal medullary chromaffin cells to define the EMF-induced calcium response as a function of several EMF parameters.
Dr. Reba Goodman Columbia University, New York City	\$100,000 (2 years)	To evaluate the effects on gene expression by intermittent EMF exposures during the suppression and induction of neoplastic transformation.
Dr. Guy David Griffin Oak Ridge National Lab, Oak Ridge, TN	\$98,665 (2 years)	To begin to explain the mechanisms by which EMFs can affect gap junctional intercellular communications and thereby their role in tumorigenesis.
Dr. Charles Buell Grissom University of Utah, Salt Lake City	\$100,000 (2 years)	To study the influence of weak DC magnetic fields (<10 G) on biochemically important enzymatic reactions—with emphasis on changes in radical pair recombination.
Dr. Theodore Hahn VA Medical Center, West Los Angeles	\$99,970 (2 years)	To see whether continuous EMF exposures can induce or promote brain tumors in animals, with or without ionizing radiation, using tissue from a previous lifetime mouse lymphoma study.
Dr. Tom Hei Columbia University, New York City	\$100,000 (2 years)	To examine, using double-blind studies, the possible mutagenic effects of extremely low frequency (ELF) magnetic fields in combination with gamma rays or benzo(a)pyrene.
Dr. Daniel Kripke University of California, San Diego	\$98,729 (2 years)	To critically test whether EMF exposures in the bedroom influence the daily excretion of melatonin among aging volunteers.
Dr. Henry Lai † University of Washington, Seattle	\$98,792 (2 years)	To further confirm the blocking effect of melatonin on magnetic-field-induced single- and double-strand DNA breaks in brain cells of rats and the involvement of free radicals.
Dr. Howard Lieberman Columbia University, New York City	\$100,000 (2 years)	To identify the changes in protein synthesis profiles in yeast induced by ELF EMFs and the controlling molecular mechanisms for these alterations in gene expression.
Dr. Lise Loberg IIT Research Institute (IITRI), Chicago	\$100,000 (2 years)	To test the hypothesis that EMFs alter the molecular regulatory pathways that are normally activated in cells exposed to DNA damaging agents using A-T cells.
Dr. David McCormick † IITRI, Chicago	\$50,000 (1 year)	To address the biological activity of complex EMF metrics—including harmonics, transients and time-varying magnetic fields—on pineal function in rats.
Dr. Lee James McDonald IITRI, Chicago	\$100,000 (2 years)	To systematically explore the effects of 60 Hz EMFs on the stress response of cultured human cells.
Dr. Russel Reiter † University of Texas, San Antonio	\$85,660 (2 years)	To determine whether 60 Hz magnetic fields increase the DNA damage caused by a carcinogen (due to an increase in the concentration of free radicals).
Dr. Bernadette Ryan IITRI, Chicago	\$50,000 (1 year)	To define the potential risk to the developing fetus of harmonics, transients and varying field intensities in conjunction with 60 Hz magnetic fields.
Dr. Asher Sheppard Loma Linda University, Loma Linda, CA	\$99,970 (2 years)	To estimate the attributable fraction of childhood leukemia from exposures to power frequency magnetic fields using novel methods of exposure assessment.
Dr. Jesse Siskin University of Kentucky, Lexington	\$100,000 (2 years)	To resolve whether power frequency EMFs can affect signal transduction mechanisms—specifically the capacitative calcium entry system—that regulate cellular proliferation.
Dr. Michael Yost University of Washington, Seattle	\$98,249 (2 years)	To analyze an existing data set on EMF exposures and nocturnal melatonin levels to investigate the possible roles of exposure metrics, exposure timing and job tasks.

A Special Emphasis Panel reviewed proposals October 28-29, 1996. The members of the panel were: Drs. Jerry Williams (chairman), Johns Hopkins University, Baltimore; Teresa Audesirk, University of Colorado, Denver; Kenneth Cantor, National Cancer Institute, Rockville, MD; Christopher Davis, University of Maryland, College Park; Om Gandhi, University of Utah, Salt Lake City; Ann Ganesan, Stanford University, Stanford, CA; Sek Wen Hui, Roswell Park Cancer Institute, Buffalo, NY; Susan Ledoux, University of South Alabama, Mobile; Howard Liber, Harvard School of Public Health, Boston; Dana Loomis, University of North Carolina, Chapel Hill; Gregory Lotz, National Institute for Occupational Safety and Health, Cincinnati; Michael McCabe, Wayne State University, Detroit; Kenneth McLeod, State University of New York, Stony Brook; Martin Misakian, National Institute of Standards and Technology, Gaithersburg, MD; Howard Petty, Wayne State University; Charles Polk, University of Rhode Island, Kingston; Jeffrey Schwartz, University of Washington, Seattle; Douglas Spitz, Washington University Medical School, St. Louis; Robert Ullrich, University of Texas, Galveston; Peter Valberg, Gradient Corp., Cambridge, MA; Lynn Wiley, University of California, Davis; Steven Yellon, Loma Linda University, Loma Linda, CA.

own results: "I had expected no association at all."

The link between AD and EMFs in the workplace was also raised in a broad study of occupational mortality in 27 states over a ten-year period conducted by researchers at the National Institute for Occupational Safety and Health in Cincinnati and at Johns Hopkins University in Baltimore. In the September 1996 *American Journal of Public Health*, they reported higher death rates from AD and motor neuron diseases "among occupations that could have exposure to EMFs," such as radio and TV station employees, power plant workers, electricians and telephone installers. They stressed that further study was needed before the association could be regarded as confirmed.

A biological mechanism through which EMF exposure might lead to AD was proposed by Sobel and Dr. Zoreh Davanipour, both of the University of Southern California School of Medicine in Los Angeles, in a second paper in the same issue of *Neurology*. They cited experiments by Drs. Ross Adey, Carl Blackman, Robert Liburdy and Ewa Lindström, among others, in which EMF exposures led to a rise in intracellular calcium ion concentrations. Sobel and Davanipour then described how this change could increase production of a protein that plays a key role in the development of Alzheimer's disease.

"People who study magnetic field biology and those studying AD don't talk to each other that much," commented Sobel. "But they're publishing things that fit together like a jigsaw puzzle."

U.S. and Swedish Studies

Sobel's team studied 326 Alzheimer's patients and used 152 patients with other forms of dementia as controls. Their primary occupations throughout their lives were classified by the researchers as likely to result in low, medium or high EMF exposures. They found that those whose main occupations were thought to have had high or medium EMF levels were almost four times more likely to have developed AD. For men alone there was a fivefold increase, while for women alone the risk was more than three times greater.

Sobel's previous study had examined two groups of AD patients in Finland and one in Southern California, and he consistently found that working in medium-to-high EMF jobs tripled the risk of the disease (see *MWN*, J/A94). Sobel has now examined four separate groups of AD patients, using a different type of control population each time. Since two sets of controls had other dementias, Sobel told *Microwave News*, "We suspect that what we've found may be specific to Alzheimer's disease and not involve other kinds of dementia."

One limitation of all the studies, Sobel noted, was exposure assessment. In his latest effort, jobs were categorized on the basis of the existing literature on occupational exposure levels, with medium-to-high exposure defined as an average of more than 2 mG, or intermittent exposure over 10 mG. "There's a fair amount of error in these assessments," said Sobel. "We don't know what kind of equipment people used or how close they were, and there can be a lot of variation within an occupation." Also, since data were not collected on length of employment in different occupations, it was not possible to tell whether there was a dose-response relationship. Writing in *Neurology*, Sobel urged that future investigators "examine dose-response relationships using

Lou Gehrig's Disease and EMFs

Davanipour and Sobel have also uncovered a link between occupational EMF exposures and amyotrophic lateral sclerosis (ALS), more commonly known as "Lou Gehrig's disease." Their findings, which were first presented at the Department of Energy (DOE) EMF research review in November 1995, appear in the first issue of *Bioelectromagnetics* for 1997 (see *MWN*, N/D95).

The researchers examined 28 ALS patients and 32 controls, and estimated lifetime EMF exposures on the job. They wrote that the study "indicates a trend in increased risk with increased exposure." For subjects with at least 20 years of work experience, the 25% who were most exposed faced a risk more than seven times as great as those who were least exposed.

"This was a small study," commented Sobel, "and obviously needs to be replicated with more participants and better controls." Several previous studies have indicated that occupational EMF exposure could be a risk factor for ALS, but all have used much less precise exposure assessments.

The importance of knowledge of relevant exposures was underlined by an earlier case study published by Davanipour. She described an office worker with ALS who was exposed to fields of over 75 mG because his desk was located directly above a transformer (see *MWN*, M/A92).

Davanipour and Sobel's paper in *Bioelectromagnetics* proposed a mechanism to explain EMFs' role in ALS. They suggested that EMFs may infrequently trigger an immune response creating an antibody that binds to certain calcium channels in motor neurons, thus interfering with the cells' ability to regulate calcium ion concentrations. "The idea, put forward by Dr. Stanley Appel, is that too much calcium then gets into the motor neurons and kills them," Sobel explained.

direct EMF exposure measurements on comparable equipment and estimated duration and frequency of exposure."

Drawing on data from a broad study of aging using the Swedish twin registry, Feychting and coworkers examined 55 people with AD and 12 with vascular dementia, and two separate control groups of cognitively normal people. They found that subjects whose last job had average EMF exposures of more than 2 mG were about two and a half times more likely to have AD. This result was not statistically significant; however, for subjects 75 years old or younger at the time of diagnosis, a significant fivefold increase in the risk of AD was observed.

Feychting's study, which has been submitted for publication, also found a significantly increased risk for both kinds of dementia taken together. The odds were between three and four times greater for all ages, and almost six times higher for those 75 years or younger when diagnosed.

But Feychting and her colleagues found this association with respect to the subjects' *most recent* occupation. When they examined EMF exposures in each subject's *primary* job throughout life, as Sobel had, there was no noticeable increase in the risk of AD at all. This was probably the most important inconsistency between the U.S. and Swedish studies.

When Sobel was asked what might account for the difference, he said that only in his most recent study had the questionnaire

clearly asked for primary occupation throughout the subject's life. "We didn't do the data collection," he explained. "In the first three it was worded something like, 'What was this person's occupation?', and so the answers could have been a mix." For example, he said, one subject's occupation was entered as "army general"—clearly not his primary lifetime occupation.

Another inconsistency lies in the fact that the Swedish study found that the risk for vascular dementia went up at least as much as the risk for AD. This is at odds with Sobel's results from one group in Finland, in which vascular dementia patients were used as controls and the relative risk of AD was found to be three times greater. "We still think the effect is specific to AD," said Sobel, "but it's clear there's a need for further work on this."

Feychting, of the Karolinska Institute in Stockholm, told *Microwave News*, "Our findings, together with Sobel's, indicate that it may be worthwhile to pursue research in this area." However, Feychting indicated that she currently has no such plans.

A Biological Mechanism?

Sobel and Davanipour's proposed biological mechanism starts with the observation that "EMF exposure appears capable of upsetting intracellular [calcium ion] homeostasis." An increase in intracellular calcium ion concentration has been shown to increase production of soluble amyloid beta, a protein thought to initiate a cascade of reactions that cause senile plaques in the brain and eventually lead to Alzheimer's disease.

Especially significant to this hypothesis is the evidence that amyloid beta is produced outside of the brain, with deposits of the protein found not only in the brain but also in the skin, subcutaneous tissue and intestine. Thus, even if EMF exposures of the brain are low, high exposures at the hands, feet or torso might still contribute to the development of AD. Sobel and Davanipour describe how a protein produced by a gene that is a known risk factor for Alzheimer's disease might help soluble amyloid beta to cross the blood-brain barrier.

"It seems reasonable that changing levels of calcium in the cells could lead to the disease," said the Reagan Institute's Khachaturian. "But whether EMFs do change calcium concentrations remains a question. Going from *in vitro* tests to human beings is a big step."

"Alzheimer's is not a single disease," observed Khachaturian, "and some forms are dictated by strong genetic factors. But genetic factors seem to interact with environmental ones." Sobel's team made some attempt to exclude subjects with early-onset familial AD, which they noted is primarily genetic in origin.

Khachaturian said that Sobel's model deserves further examination. "In this field we don't have the luxury of throwing out any ideas. Some of these concepts sound far-fetched at first—but too many times ideas that were dismissed by the gurus of science turned out to be important. As long as an idea can be tested, it shouldn't be rejected out of hand."

Testing this hypothesis is exactly what Sobel plans to do next. Sobel and Davanipour have drafted proposals for a set of laboratory experiments that would examine their proposed mechanism, to be conducted by the Health and Environment Research Institute (HERI), a nonprofit research foundation which they recently established in Upland, CA. One experiment would involve

measuring the levels of soluble amyloid beta in the blood of sewing machine operators before and after EMF exposures from their machines. They have also developed plans for HERI to conduct a broad population-based study of AD and occupational EMF exposure in Finland, using subjects from five ongoing studies of aging—one of which has been in progress for 37 years.

"I would emphasize that we were looking at occupational exposures," said Sobel, "which are much higher than those usually found in the home." In their hypothesis paper in *Neurology*, Sobel and Davanipour stressed that "low-cost public health measures can be taken to reduce occupational EMF exposure."

A case in point is sewing machines. Sobel and Davanipour have just completed an EMF exposure study of home sewing machines for the Department of Energy's RAPID program. Their report, completed in December, noted that, "Home sewing machines are used in many occupations and not just for making or repairing clothing at home." Past work by Sobel and others has shown that garment workers have some of the highest EMF exposures of any occupation, sometimes as high as 600 mG (see *MWN*, M/A95 and S/O95).

Sobel and Davanipour found that exposures from newer, computer-assisted home sewing machines, which use DC motors, could be reduced fairly easily. The main source of EMFs in these machines is the transformer, which can be separated from the machine. This is common with other devices, such as notebook computers, and would drastically reduce exposure.

This is not relevant to industrial-style machines, since almost all of them use AC. But on industrial models the motor itself is separate from the machine—it is mounted under the operator's table, and provides the machine with power by a belt. "Moving the motor further from the operator would help a lot," Sobel said, "and should not be too difficult to design."

References on Alzheimer's, ALS and EMFs

- Z. Davanipour, E. Sobel, J. Bowman et al., "Amyotrophic Lateral Sclerosis and Occupational Exposure to [EMFs]," *Bioelectromagnetics*, 18, pp.28-45, 1997.
- Z. Davanipour et al., "[EMF] Exposure and Amyotrophic Lateral Sclerosis," *Neuroepidemiology*, 10, p.308, 1991.
- N.L. Pedersen, M. Feychting et al., "Occupational Exposure to [EMFs] and Alzheimer's Disease," presented at the *Annual Review of Research on Biological Effects of Electric and Magnetic Fields from the Generation, Delivery and Use of Electricity*, Paper No.A-47, San Antonio, TX, November 19-21, 1996.
- P. Schulte et al., "Neurodegenerative Diseases: Occupational Occurrence and Potential Risk Factors, 1982 through 1991," *American Journal of Public Health*, 86, pp.1281-1288, September 1996.
- E. Sobel et al., "Occupations with Exposure to [EMFs]: A Possible Risk Factor for Alzheimer's Disease," *American Journal of Epidemiology*, 142, pp.515-524, September 1, 1995.
- E. Sobel et al., "Elevated Risk of Alzheimer's Disease Among Workers with Likely [EMF] Exposure," *Neurology*, 47, pp.1477-1481, December 1996.
- E. Sobel and Z. Davanipour, "[EMF] Exposure May Cause Increased Production of Amyloid Beta and Eventually Lead to Alzheimer's Disease," *Neurology*, 47, pp.1594-1600, December 1996.
- E. Sobel and Z. Davanipour, *Preliminary Investigation into EMF Exposures Resulting from the Use of Home Sewing Machines: Final Report*, Washington, DC: DOE (prepared for EMF RAPID Program), December 6, 1996, 9 pp.

HIGHLIGHTS

« Wireless Notes »

The cellular phone and personal communications industry continues to be frustrated by delays in cellular tower siting, even after Congress preempted state and local RF/MW standards in the 1996 **Telecommunications Act** and President **Bill Clinton** issued an executive order expediting the use of federal land and buildings (see *MWN*, S/O95). It blames communities that have set moratoriums to block, at least temporarily, the installation of transmitters (see *MWN*, M/J96, S/O96 and N/D96) and those federal agencies that have denied phone companies access to government property. Now, the industry is putting its foot down: It has asked the FCC and the President for relief. On December 16, the CTIA filed a formal petition with the FCC seeking to preempt moratoriums. At that time CTIA President **Thomas Wheeler** argued that moratoriums “are too often being used as a subterfuge to avoid complying with federal law.” He also asked the FCC to “fulfill its obligation to develop and maintain a uniform and consistent national policy that will eliminate such barriers.” In support of its petition, the CTIA sent the FCC a list of 150 communities with moratoriums in place—20 of which, it claims, will last indefinitely. On another front, in a January 3, 1997, letter to the FCC, Wheeler attacked state and local governments for charging phone companies “excessive” fees and for attempting to set their own RF/MW exposure standards. Michele Farquhar, chief of the FCC’s Wireless Telecommunications Bureau (WTB), agreed in her January 13 response that some of these tactics are illegal under the telecom act, but added that the courts—not the FCC—have jurisdiction over them. Meanwhile, on January 28, the **Personal Communications Industry Association (PCIA)** petitioned the FCC to preempt moratoriums longer than three months, to end the prohibition of antennas on existing structures and to stop discrimination against new service providers. The CTIA’s Wheeler has also asked Clinton whether federal agencies have violated his executive order. “The wireless telecommunications industry continues to experience significant antenna-siting resistance from far too many federal agencies in defiance of your order and the law,” Wheeler wrote in a December 2, 1996, letter. The President has not yet replied, but several agencies have since begun to discuss the problem with the CTIA, according to **Tim Ayers**, a spokesperson for the Washington-based industry group. “We’ve had a number of subsequent meetings with these agencies,” Ayers told *Microwave News*. The situation has been touchy even in cases where federal agencies have cooperated. Last year, two communities accused the U.S. Postal Service of not seeking their permission before allowing antennas on its property (see *MWN*, N/D96).

«« »»

The FCC’s WTB has scheduled a three-hour **public forum** on siting issues in Washington for February 10, 1997. Those who cannot attend can now obtain a free video of the proceedings by sending a blank T-120 tape and a request indicating the date and title of the forum to: FCC, Office of Public Affairs, Television Staff, Room 202, 1919 M St., NW, Washington, DC 20554, (202) 418-0460, Fax: (202) 418-2809.

«« »»

Two new booklets—one from the **PCIA** and the other from the **Communications Workers of America (CWA)** and the **EMR Alliance** (see *MWN*, S/O96)—offer local officials vastly different perspectives on tower siting. While the industry views cellular and PCS towers as a boon, activists see them as a blight. According to the PCIA’s 13-page *Understanding the Future Today: A Wireless Industry Guide to Towers and Communities*, PCS will benefit communities, creating an estimated 300,000 new jobs over the next 15 years. Because antennas are placed high up and point away from the ground, the PCIA maintains that RF/MW radiation is “typically far below the levels determined by widely cited expert groups to pose health-related concerns to the public.” But the 48-page CWA-EMR Alliance booklet, *Your Community Guide to Cellular Phone Towers*, has a different take: “The jury is still out on health effects. We should proceed with caution until conclusive health evidence is in.” The PCIA contends that towers may improve property values by bringing access to phone services. The CWA-EMR Alliance booklet, on the other hand, lists property devaluation as one of the main reasons to oppose wireless facilities. It compares cellular towers to power lines, which, the union and the activists claim, cause nearby homes to depreciate in value by 30-40%. The EMR Alliance has also issued an eight-page pamphlet, *Cell Tower Static*, which similarly outlines the history of wireless technology and notes some successful efforts to oppose towers. For a copy of the PCIA booklet, which costs \$3.00 for members and \$4.00 for nonmembers, contact: PCIA, 500 Montgomery St., Suite 700, Alexandria, VA 22314, (703) 739-0300, Fax: (703) 836-1608, E-mail: <lee.h@pcia.geis.com>. To order the CWA-EMR Alliance booklet (\$10.00, or \$15.00 outside the U.S.), contact: EMR Alliance, 410 West 53rd St., Suite 402, New York, NY 10019, (212) 554-4073, Fax: (212) 977-5541, E-mail: <emrall@aol.com>.

«« »»

The influx of **PCS** antennas on 3,000 lampposts throughout **New York City** (see *MWN*, S/O96) has not gone unnoticed by some electromagnetically sensitive residents. An ad in the December 25-31 *New York Press*, a free weekly, voiced their concerns:

If you have been ill since 11/15/96 with any of the following: eye pain, insomnia, dry lips, swollen throat, pressure or pain in chest, headache, dizziness, nausea, shakiness, other aches & pains, or flu that won’t go away, you may be a victim of a new **MICROWAVE SYSTEM BLANKETING THE CITY**. We need to hear from you.

The text was followed by the address and telephone number for the Cellular Phone Taskforce, whose president, **Arthur Firstenberg**, fled the city in mid-November, shortly after the PCS systems were up and running. Firstenberg, who himself is sensitive, told *Microwave News* that his condition had worsened and that he is now seeking out other New Yorkers with similar symptoms to bring a lawsuit. In early January, he said that he had received more than 20 responses, adding that each caller knew of at least one other person claiming to be electrically sensitive. “It sounds like hundreds or thousands of people are having these same symptoms,” Firstenberg said. “I think there’s grounds for a personal injury lawsuit.”

Wireless Transmissions Blamed for Mysterious Problems

ATMs Get Dirty Data

Last November in Albuquerque, NM, the automated teller machines (ATMs) in a local grocery chain started behaving erratically. "They were on and off for a couple of days," said Paul Boushelle of First Security Bank of New Mexico, which operates the machines. Boushelle told *Microwave News* that the problem was eventually traced to a new cellular phone service provider. "That company was on a frequency that was next to ours, and it started to bleed into our signal," he explained. "But ours was carrying data that has to be totally clean."

Boushelle would not specify whether the interference was caused by a cellular tower or by passing phones, nor would he name the phone company involved: "We identified it, and it's been resolved. I'd prefer not to say more than that." But he noted that First Security has used RF transmitters in its ATMs for about eight years, and that this was the machines' first experience with electromagnetic interference (EMI). "They've been economical," he said, "and helped avoid problems like phone lines cut by construction projects."

This kind of EMI will become more common since ATMs with RF transmitters are becoming widespread, said Boushelle. "Everybody in the world seems to have decided that wireless is the way to do things," he commented. "Pretty soon they're going to use satellites. With the increase in electronic payment transactions, more and more financial institutions will have enough volume that satellites will make sense."

Bad Vibrations in Apache Junction

"It was a very annoying and obnoxious sensation," said utility representative Mike Zimmerman. "I wouldn't want to be subjected to that all the time." Zimmerman, community relations supervisor for the Salt River Project in Phoenix, was talking about the persistent hum in Judy Hill's home in Apache Junction, AZ. "It's not an audible noise to me," Zimmerman told *Microwave News*. "It was a sensation or feeling—a low, pulsating vibration."

William Wright, non-ionizing radiation program manager at the Arizona Radiation Regulatory Agency (ARRA) in Phoenix, said, "I could hear it, and almost feel it. You had two different frequencies—one high-pitched and one much lower, which felt like it was around 60 cycles."

Hill blames the tower operated by Cellular One, which overlooks her home from a distance of about 1,000 feet. She points to articles in the scientific literature about RF hearing, sometimes called the Frey effect, a well-established phenomenon in which pulsed microwaves can directly cause auditory sensations.

"The noise started in 1992, after they changed from the whip antennas to the reflector-wall antennas," Hill said in an interview. The possible connection did not occur to her until 1994, at which time she began to read whatever she could about microwave effects. She added that her daughter had suffered from serious headaches, but that these had abated after the child's bed was moved to a different location in the house.

"When Mrs. Hill called us a few weeks back, we went right out there," David McCarley, vice president of network operations for Cellular One in Phoenix, said in an interview. "We have cooperated fully with everyone involved, including state officials, and there's no indication that we are the source. All our antennas are licensed by the FCC and in compliance with all federal regulations." According to McCarley, the tower has both omnidirectional and panel antennas for conventional cellular transmissions in the 800 MHz band, and a low-power point-to-point dish operating at 2 GHz.

The RF hearing effect has only been demonstrated with pulsed microwave transmissions, and McCarley said that none of the antennas use pulsed signals. While the antennas might use digital signals in the future, he added, they now use analog signals and have always done so.

Wright said that he had done measurements from 300 MHz up to 2 GHz and found nothing unusual, and that tests with an OSHA hearing meter failed to find auditory signals that might account for the vibration. But he explained that the latter does not completely rule out an acoustic source: "A frequency might've been missed, or the meter may have averaged it in. What you need is a sound spectrum analyzer, but that's an awfully expensive piece of equipment which we don't have."

Wright intends to return to Hill's home and measure RF/MW power densities at the site. "We'll try and see if it's something modulated from the antenna's transmissions," he said. "Right now we're kind of scratching our heads." Zimmerman took readings in the home with a 60 Hz gaussmeter but found magnetic fields of only 1-2 mG. He said that he had only felt the vibration in two rooms, but that the sensation was distinctive and unusual.

In being described as somewhere between a noise and a vibration, the phenomenon at Hill's home is similar to the "Taos hum," which was investigated in 1993 by scientists from the University of New Mexico, Sandia National Laboratories, Los Alamos National Labs and Phillips Lab at Kirtland Air Force Base, all in New Mexico (see *MWN*, M/J93 and N/D93). Researchers failed to find any acoustic, electromagnetic or seismic source for the hum. In 1993, Rep. Bill Richardson (D-NM)—recently nominated by President Clinton to be the U.S. ambassador to the United Nations—charged that some Department of Defense project was the most likely cause of the Taos hum.

Hudson Valley Woman Alarmed

In upstate New York, Diana Novosel has filed a complaint with the state Public Service Commission alleging that a nearby cellular phone tower is interfering with her home security system. The alarm has often gone off for no apparent reason, and an alarm company technician told Novosel that the problem was caused by the tower.

But, in October, a technician from Hudson Valley Cellular, which operates the tower on behalf of NYNEX, was unable to trigger the alarm with any of a series of test calls transmitted through the tower. "We saw no connection," Hudson Valley Cellular's general manager, Peter Mercer, told *Microwave News*, pointing out that the tower transmits in the 800-900 MHz range, while the alarm system operates at 40.6 MHz.

Mercer said that although Novosel's house is in a "completely rural" area in Columbia County, it is in a very complex RF environment: "On the same property as our tower, there's a guy who operates a paging company and who is also an avid ham radio operator. Also, Novosel's home is a few hundred yards from the New York State Thruway, where you've got the trucks with their two-way radios." Finally, he noted, the alarm system operates at close to the 46-48 MHz band used by many cordless phones. Asked whether Hudson Valley Cellular transmissions could generate a subharmonic or a modulated signal that might trigger the alarm system, Mercer said, "It seems highly unlikely—unless that alarm is really bad and has no filters on it at all."

Mercer said that his company was more than willing to do further testing jointly with the alarm company, adding, "The whole RF issue and tower siting is very sensitive, so when someone has a problem we try to respond as thoroughly as we can." However, he said that so far the alarm firm has not made anyone available.

Novosel confirmed this and expressed her frustration with the situation: "I'm willing to open up my home to anyone who can help. I just want my security system to work, and to know that there's not a problem with exposure to microwaves." She said that her migraine headaches had become worse in this period and that her 12-year-old son had started having migraines for the first time. "I don't know that they're linked," she said, "but I am concerned."

FCC Delays RF/MW Safety Rules for Towers, Not Phones

Antennas for radio and TV broadcast, cellular towers and other fixed transmitters will not have to comply with the new RF/MW guidelines of the Federal Communications Commission (FCC) until September 1, 1997. A delay had been requested by the Cellular Telecommunications Industry Association (CTIA), National Association of Broadcasters (NAB), Personal Communications Industry Association (PCIA) and seven wireless service providers, and was granted in a unanimous FCC order on December 23.

"We do not concur with petitioners who suggest that granting any extension of the transition period will have significant adverse effects on public health," the commission stated in its ruling. The request for a delay had been opposed by several citizens' groups, including the Brooklyn Green Party and the New York-based Cellular Phone Taskforce (see *MWN*, S/O96; also p.8).

Hand-held telephones are not affected by the postponement. All cellular phones have in theory been subject to the new limits since they were adopted on August 1, 1996, and personal communications services (PCS) phones even before that. But the commission has been vague about how to show that phones are in compliance (see *MWN*, J/A96). At an FCC-sponsored meeting on February 4, researchers will discuss the best way to measure the energy that users absorb from a cellular phone.

This 'invitation-only' session is limited to those doing technical work in cellular phone dosimetry, said Dr. Robert Cleveland of the FCC's Office of Engineering & Technology (OET) in Washington. "We want to begin to get some consensus on what kind of protocols to use" in measuring specific absorption rates (SARs), Cleveland told *Microwave News*.

The draft of a technical bulletin on the new RF/MW rules, which the OET is circulating for comment, states only that compliance "can be demonstrated by either laboratory measurement techniques or by computational modeling." But Cleveland said that the February 4 meeting would try to get more specific, and would probably influence the bulletin's final form.

The technical bulletin, known as OET-65, was originally sched-

uled for release last November but should now be ready in March, according to Cleveland. "It won't be issued until the commission responds to all the issues raised in last fall's petitions for reconsideration of the new rules," he explained. "The December 23 order only dealt with the extension. A second order, dealing with the other issues, is expected out after mid-February." He added that OET-65 would probably come out a couple of weeks later.

Industry groups often cited the delay in OET-65 in their requests for an extension of the fixed transmitter rules, and almost all had asked that the extension run until one year after the bulletin's release. "We would like to have seen the effective date pushed back farther," PCIA spokesperson Sheldon Moss said in an interview, "but we're pleased that it's been extended." Moss said that the FCC has shown itself to be "flexible and open-minded."

The delay in implementing the antenna regulations does not affect the ban on state and local RF/MW radiation rules. Cleveland noted that the telecom act's preemption of state and local safety rules became effective when the act was signed into law in February 1996. Until the new rules take effect on September 1, Cleveland explained, most transmitters will continue to fall under the RF/MW standard adopted by the FCC in 1985—the 1982 ANSI standard. An exception is PCS antennas, which were made subject to the 1992 ANSI/IEEE standard in a 1994 commission decision.

Court Says "No Evidence" for Cell Phone Brain Tumor Lawsuit

A lawsuit charging that a Motorola cellular phone was responsible for a Georgia man's brain cancer has been dismissed by the state Court of Appeals. The November 25 decision held that Richard Ward did not have enough supporting evidence to warrant taking the case to a jury.

In response to Motorola's motion for dismissal, Ward's lawyer had submitted affidavits from two expert witnesses, Drs. Andrew Marino of Louisiana State University Medical Center in Shreveport and David Perlmutter, a neurologist at the Naples Rehabilitation Center in Naples, FL. But the three-judge panel objected that neither affidavit "explained a mechanism by which an electromagnetic field can cause cancer, set out any statistical correlation between EMF exposure and cancer, or otherwise explained how [each expert] reached his conclusion."

But even if such explanations had been provided, it would not have satisfied the court. The decision noted that Georgia courts had "recently considered another case in which it was alleged that EMFs caused cancer"—the *Jordan* power line-cancer case. The latest ruling in *Jordan* held that "the scientific evidence regarding whether EMFs cause harm of any kind is inconclusive," and the Court of Appeals ruled that this alone was reason enough to dismiss Ward's cellular phone lawsuit. Neither the appeal briefs nor the decision drew any clear distinction between power line EMFs and RF/MW radiation. (For other reasons, the appellate decision in *Jordan* set aside a jury verdict in favor of the utilities and ordered a retrial; see *MWN*, J/F96.)

"The decision was very ill reasoned," said Ward's lawyer, William Gray of Dennis, Corry, Porter & Gray in Atlanta. "There's no contention that Marino and Perlmutter weren't qualified. These

EC Plan for Wireless Research

The European Commission (EC) Expert Group on health effects of wireless phones has called for a five-year research program with a budget of 23.8 million Ecus—over 20 million U.S. dollars (see *MWN*, S/O95 and N/D95). Of this, about two-thirds would be spent on biological studies, and the rest on epidemiology.

The group's chair, Dr. Alastair McKinlay of the U.K.'s National Radiological Protection Board, has stressed the importance of independence from industry influence (see p.15). Leo Koolen, at the EC's headquarters in Brussels, Belgium, told *Microwave News* that the EC would respond to the expert group's report by the spring.

For reasons that remain unclear, the EC has been slow to release the report to the public.

guys could easily have explained their views on the scientific mechanism. But this decision makes the court act as the gatekeeper of scientific debate, and there's no precedent for that in Georgia."

The concept of the judge as "gatekeeper" of scientific evidence was central to the U.S. Supreme Court's *Daubert* decision, which was cited in the dismissal of David Reynard's original cellular phone lawsuit in federal court in Florida (see *MWN*, M/J95, S/O95 and M/J96). But *Daubert* is not part of Georgia law, and Motorola's brief made a point of stating that *Daubert* was not part of its argument.

"We think the *Ward* dismissal is a significant and important decision," said Motorola spokesperson Norman Sandler, "and we welcome the court's ruling." Sandler told *Microwave News*

that the *Ward* ruling confirms the message of *Reynard*: "We now have two cases that have been dismissed because they failed to submit enough credible scientific evidence to even move forward to trial. This exposes the hollowness of the claims advanced by these cases and others like them."

"It'll be unfortunate if one of these cases doesn't reach the point where it can educate a lot more people," commented Gray. "This is a very politically charged piece of litigation—probably even more so than tobacco, because of the level of public ignorance."

In late December, Gray asked the Georgia Supreme Court to consider an appeal. At press time, the state's high court had not yet responded. "If it's denied," said Gray, "it'll be difficult to go any further."

New Focus on Broadcast Radiation (continued from p.1)

expected. At greater distances from the tower, the leukemia rate declined steadily, until it reached background levels some eight kilometers away.

The London team did not make any RF/MW measurements, relying instead on a survey by the BBC, which showed that radiation levels generally declined with distance from the transmitter. The maximum radiation level found was 1.3 $\mu\text{W}/\text{cm}^2$ for TV, and 5.7 $\mu\text{W}/\text{cm}^2$ for FM, signals at a distance of 2.5 meters above the ground. Due to reflections from buildings and the ground, they found that, "There was considerable variability between different measurement points at any one distance from the transmitter," according to Dolk.

Dolk's study was prompted by reports of a cluster of leukemia and lymphoma cases near the tower (see *MWN*, S/O92). Dr. Mark Payne, a medical doctor in Birmingham who uncovered the cases years ago, told *Microwave News*: "I think my findings have been vindicated."

In an effort to put the Sutton Coldfield findings into perspective, Dolk also investigated the leukemia rates near 20 other antenna sites in the U.K. This study yielded results that were much less clear. They "at most give no more than very weak support to the Sutton Coldfield findings," Dolk wrote in a second paper published in the same issue of the *AJE*.

Meanwhile, an Australian study indicating a greater risk of leukemia among children living near four TV stations located on three broadcasting towers in Sydney has been published in the *Medical Journal of Australia* (see *MWN*, N/D95).

Dr. Bruce Hocking, an occupational medicine consultant based in Melbourne and the former chief medical officer at Australia Telecom (now called Telstra) reported that children living within four kilometers of the towers had a 50% greater incidence of leukemia and more than twice the expected mortality rate due to leukemia. For children and adults combined, there was a 25% increased incidence of leukemia. All three of these results are statistically significant.

Hocking's calculations showed that the maximum RF/MW power level from the TV stations near the three towers was 8 $\mu\text{W}/\text{cm}^2$ and declined to 0.2 $\mu\text{W}/\text{cm}^2$ at a distance of four kilometers. He did not make any actual measurements.

The U.K. and Australian studies add to a patchwork of previous work that points to a leukemia risk from broadcast radiation:

- In 1982, Dr. William Morton of the Oregon Health Sciences University in Portland found higher rates of leukemia and breast cancer near broadcast towers in Portland (see *MWN*, J/F82).
- Five years later, Dr. Bruce Anderson and Alden Henderson of the Hawaii Department of Health reported "significantly higher" leukemia rates in areas with broadcast towers in Honolulu as compared to areas without towers (see *MWN*, M/J87).
- Clusters of leukemia have also been reported next to two different U.S. Navy communications installations, one in Lualualei, Hawaii, and one in Thurso, Scotland (see *MWN*, M/J87 and S/O92).

In addition, two epidemiological studies of those who are exposed to RF/MW radiation show higher rates of leukemia:

- Dr. Stanislaw Szmigielski of the Center for Radiobiology and Radiation Safety in Warsaw, Poland, found that military personnel exposed to RF/MW radiation had higher rates of leukemia and lymphoma. For younger soldiers, the risks reached over eight times that expected and are highly significant (see *MWN*, M/J95).
- Dr. Samuel Milham Jr. reported a significant excess mortality rate due to acute myeloid leukemia, multiple myeloma and cer-

RF/MW Radiation and Cancer References

- Bruce Anderson and Alden Henderson, "Cancer Incidence in Census Tracts with Broadcasting Towers in Honolulu, Hawaii," Honolulu: Hawaii Department of Health, October 27, 1986.
- Ray Cartwright, "Cancer and TV Towers: Association but Not Causation," *Medical Journal of Australia*, 165, pp.599-600, December 1996.
- Helen Dolk et al., "Cancer Incidence Near Radio and Television Transmitters in Great Britain, Part I. Sutton Coldfield Transmitter," pp.1-9, and "Part II. All High-Power Transmitters," pp.10-17, *American Journal of Epidemiology*, 145, January 1, 1997.
- Bruce Hocking et al., "Cancer Incidence and Mortality and Proximity to TV Towers," *Medical Journal of Australia*, 165, pp.601-605, December 1996.
- Bruce Hocking, "A Protocol for Assessment of the Health Effects of RFR Products; Particularly Personal Communication Systems," *Radiation Protection in Australia*, 14, pp.43-45, April 1996.
- Samuel Milham Jr., "Increased Mortality in Amateur Radio Operators Due to Lymphatic and Hematopoietic Malignancies," *American Journal of Epidemiology*, 127, pp.50-54, January 1988.
- William Morton and David Phillips, "Radioemission Density and Cancer Epidemiology in the Portland Metropolitan Area," Research Triangle Park, NC: U.S. Environmental Protection Agency, June 1983.
- Stanislaw Szmigielski, "Cancer Morbidity in Subjects Occupationally Exposed to High-Frequency (Radiofrequency and Microwave) Electromagnetic Radiation," *Science of the Total Environment*, 180, pp.9-17, 1996.

New Focus on Broadcast Radiation

tain types of lymphoma among amateur radio operators (see *MWN*, N/D87 and J/F89).

“There are so many smoking guns linking RF to cancer that it’s high time that somebody took a systematic look at the subject,” Milham said in an interview from his office in Olympia, WA.

Dr. Ray Cartwright of the University of Leeds, U.K., took a more cautious position. In a commentary accompanying Hocking’s paper, he noted that while there is now some support for a link between RF/MW and leukemia, a “more complete knowledge of the causes of childhood leukemia is essential in order to go down the road from association to causation. In that regard we have taken only the first few steps of a very long journey.”

U.K. Advisory Panels Discount Cancer Risk

Radiation officials in the U.K. argued that the 20-tower study negated the Birmingham results and that there was no RF/MW cancer risk. In fact, they concluded that the issue was closed.

“Overall these data do not indicate that residence close to a radio/TV transmitting mast is associated with an increased risk of leukemia,” read a statement from the Committee on the Medical Aspects of Radiation in the Environment (COMARE), a long-standing government advisory panel. The committee found that there was no need for further epidemiological studies.

Similarly, the U.K.’s National Radiological Protection Board (NRPB) in Chilton stated that, “The results of these studies provide no justification for further epidemiological studies around such sites, nor do they have implications for the siting of existing or new transmitters.”

To buttress their arguments, COMARE and the NRPB noted that in the 20-tower study the incidence of non-Hodgkin’s lymphoma (NHL) *increased* with distance from the towers. “Such opposing trends clearly do not demonstrate a pattern that would be consistent with a particular effect produced by the Sutton Coldfield transmitter,” COMARE said.

“The apparently opposing trends with distance for leukemia

and NHL imply that the decreasing trend in leukemia risk with increasing distance may be due to chance,” Dr. Alastair McKinlay, the head of the NRPB’s non-ionizing radiation department, told *Microwave News*.

Most of the leukemia cases included in the 20-tower study were near a single tower at Crystal Palace in South London, which has nearly the same power output as Sutton Coldfield (4 MW), but which does not include a high-power FM transmitter. Dolk counted 62 adults with leukemia within two kilometers of the Crystal Palace tower, but only 17 cases at the same distance from the 19 other towers. Most of the towers are in sparsely populated areas.

Dolk did not observe the same decline in leukemia risk with distance from the Crystal Palace tower. But, when she categorized those towers which had either FM transmitters of greater than 250 kW or similarly powerful FM antennas and TV antennas, she found, in each case, a significant decrease in risk of leukemia with distance from the towers.

Because of the small number of cases, these relationships are not sturdy. “No clear interpretation seems possible as to whether the overall decline in risk with distance is associated specifically with TV or FM transmission or a combination of the two,” Dolk wrote in the *AJE*. “The results in the second paper do not point strongly to an effect of transmission...and certainly not to differences between frequencies,” she told *Microwave News*.

The two U.K. studies, which were released on Christmas Eve, attracted little attention from the British press. Indeed, Graham Brown, a BBC spokesperson, said in an interview that he had not even been contacted about the study.

The Australian study garnered much more attention—at least partly due to the intense controversy over the siting of cellular phone towers across the country and because the Australian government is considering relaxing its own RF/MW standards.

Hocking told the *Sydney Morning Herald* (December 10) that, “The research does not prove that radiofrequency caused the leukemia, but it does not reassure that mobile phone base stations are harmless.”

“MICROWAVE NEWS” FLASHBACK

Years 15 Ago

- A U.S. District Court judge in Los Angeles dismisses a charge brought against the government by Marine Sergeant George Watson, who claimed that his exposure to RF/MW radiation at the U.S. Embassy in Moscow caused his son’s birth defect.
- Dr. William Morton of the University of Oregon reports a significant association between extremely low levels of RF/MW radiation—possibly from TV towers—and lymphatic leukemia, adenocarcinoma of the uterus and breast cancer among Portland, OR, residents.

Years 10 Ago

- Dr. Stanislaw Szmigielski of the Center for Radiobiology and Radioprotection in Warsaw, Poland, releases preliminary results of a five-year study indicating a link between RF/MW radiation and cancer—especially leukemia and lymphatic cancers.
- Maryland officials protest the U.S. Navy’s decision to site the EMPRESS II on the Chesapeake Bay, contending that the electro-

magnetic pulse simulator could cause EMI to ships’ electronics, forcing Baltimore’s port to close for 20 days a year, and could also interfere with a nearby nuclear power plant.

- Writing in the *American Journal of Epidemiology*, Dr. Richard Stevens suggests that EMFs and/or light-at-night may be responsible for increased breast cancer rates in industrial countries.

Years 5 Ago

- Eight people living near Patrick AirForce Base, FL—seven within 400 yards of an air traffic control radar—between 1967 and 1983 are diagnosed with Hodgkin’s disease, according to a study by the state’s Department of Health and Rehabilitative Services.
- Two brain cancer victims from the same street in Guilford, CT—whose stories were reported by the *New Yorker*’s Paul Brodeur—sue Connecticut Light and Power. They charge that EMFs from power lines and from a substation caused their tumors.
- Wisconsin’s Public Service Commission orders state electric utilities to use technology that minimizes EMF emissions.

FROM THE FIELD

Motorola, Microwaves and DNA Breaks: “War-Gaming” the Lai-Singh Experiments

The following documents, recently obtained by Microwave News, provide a rare behind-the-scenes glimpse of how a large corporation responds to the results of scientific research. On December 13, 1994, Norman Sandler of Motorola's corporate communications department sent two memos to Michael Kehs of the Burson-Marsteller public relations firm in Washington. Sandler discussed how to respond to findings by Drs. Henry Lai and Narendra Singh of the University of Washington, Seattle, and enclosed an eight-page draft of an internal strategy paper on the Lai-Singh work.

Lai and Singh had found an increase in single-strand DNA breaks in the brain cells of rats after a single two-hour exposure to 2.45 GHz microwaves, at power levels considered safe according to current exposure standards. These results had not yet been published, but—as Motorola's strategy paper noted—they were about to be reported by Microwave News (see MWN, N/D94; also J/F95, M/A95, J/A95, N/D95, J/F96 and M/J96).

Below are the full text of one of the memos and excerpts from the internal strategy paper, which Sandler and Kehs were editing. “Rusty,” referred to in the memo, is Albert R. Brashear, a Motorola corporate vice president and director of corporate communications. Bob Weissshappel is an executive vice president, and manager of Motorola's Cellular Subscriber Group.

MEMORANDUM

To: Michael Kehs
From: Norm Sandler

Date: December 13, 1994
Re: Revision of Lai-Singh Materials

Rusty just had an animated telephone conversation with Bob Weissshappel, who was as insistent as ever about the prominent inclusion of the frequency differentiation argument in our materials. He also was adamant that we have a forceful one- or two-sentence portion of our standby statement that puts a damper on speculation arising from this research, as best we can.

I tried to do that in the latest proposed revision of the standby statement, but offer this new, somewhat strengthened version of the second paragraph for consideration:

“While this work raises some interesting questions about possible biological effects, it is our understanding that there are too many uncertainties—related to the methodology employed, the findings that have been reported and the science that underlies them—to draw any conclusions about its significance at this time. Without additional work in this field, there is absolutely no basis to determine whether the researchers found what they report finding—or that the results have anything at all to do with DNA damage or health risks, especially at the frequencies and power levels of wireless communication devices.”

In discussing the frequency differentiation issue, we should be able to say that Lai-Singh and Sarkar¹: • Were not conducted at cellular frequencies, so are of questionable relevance; • Run counter even to other studies performed at 2450 MHz, raising possible questions about the findings.

I can accept that as a logical way to raise and defend the frequency differentiation argument. Where I think we differ is in the prominence it should be given in our public statement(s). Maybe the construction proposed above, which hits the frequency/power level issue right off the bat without making a federal case out of it, will suffice.

I'm off to Dallas, but obviously am reachable if necessary. I'm hoping we can get this document revision out of the way and return to more pressing matters (at least in terms of long-term priorities). I think we have sufficiently war-gamed the Lai-Singh issue, assuming SAG² and CTIA³ have done their homework. We may want to run this by George Carlo⁴ and fill him in on the contacts we've made.

• • •

Excerpts from

Confidential Working Draft #3 — 12/13/94

Developments in Radiofrequency/DNA Research: Position Paper

Question and Response

How can Motorola downplay the significance of the Lai study when one of your own expert consultants is on record telling Microwave News that the results—if replicated—could throw previous notions of

RF safety into question?

It is not a question of downplaying the significance of the Lai study. In his comments to *Microwave News*, Dr. Sheppard⁵ raised the key question: Can this experiment be replicated and interpreted? We will have to wait and see. Until the results of follow-up studies are in, any conclusions about the significance of this study are pure speculation.

There is another reason to caution against jumping to drastic conclusions—the hypothesis doesn't square with human experience. If cellular radio signals could cause DNA damage, we would expect to see increased cancer rates among people exposed to RF energy. But there is no evidence to suggest this is the case.

What studies can you cite to prove RF energy doesn't affect DNA?

We have identified at least 18 published studies of animal and cell cultures exposed to electromagnetic fields (microwave frequencies, RF and ELF) that show no effect on DNA.

Action Planned

In addition to the response materials already prepared by the SAG (see attached copies), we will work with the SAG to identify appropriate experts to comment in general on the science of DNA research, in addition to any experts SAG may be able to recommend to publicly comment on one or both of these particular studies.

Media Strategy

It is not in the interest of Motorola to be out in front on this issue because the implications of this research—if any—are industrywide. Therefore, we suggest that the SAG be the primary media contact followed by the CTIA. It is critically important that third-party genetic experts, including respected authorities with no specific background in RF, be identified to speak on the following issues:

- Problems with the Lai-Singh and Sarkar studies.
- The health implications of DNA single-strand breaks.

We do not believe that Motorola should put anyone on camera. We must limit our corporate visibility and defer complex scientific issues to credible, qualified scientific experts. We have developed a list of independent experts in this field and are in the process of recruiting individuals willing and able to reassure the public on these matters. SAG will be prepared to release Munro⁶-Carlo memos, which touch on key points made in this material.

1. Dr. Soma Sarkar of the Institute of Nuclear Medicine and Allied Sciences in New Delhi, India, who had published related findings earlier in the year.
2. The Scientific Advisory Group, now known as Wireless Technology Research (WTR), based in Washington, DC.
3. Cellular Telecommunications Industry Association, based in Washington, DC.
4. Dr. George Carlo, chair of the SAG/WTR.
5. Dr. Asher Sheppard, a consultant based in Redlands, CA.
6. Dr. Ian Munro of CanTox in Mississauga, Canada, one of the three members of the SAG/WTR.

U.S. Air Force Looks to the Battlefields of the Future: Electromagnetic Fields That Might “Boggle the Mind”

In November 1994, the Secretary of the Air Force, Dr. Sheila Widnall, asked the Air Force's Scientific Advisory Board (SAB) to identify those technologies that will guarantee the air and space superiority of the U.S. in the 21st century. A number of meetings were held in the first half of 1995, resulting in the publication the following year of 15 volumes under the general title *New World Vistas: Air and Space Power for the 21st Century*.

The volume on directed energy weapons notes that, “U.S. R&D laboratories have made progress in the development of several key HPM [high-power microwave] weapon components, pointing toward an operational capability of such weapons in ten to twenty years.” Several sections of the Directed Energy Volume, including “RF Gunship” and “Computers and HPM,” consist of only the section title and the following sentence: “This section is included in the classified appendix.” A 16th volume, containing these and other classified materials, is not generally available.

Dr. Gene McCall, the director of the SAB, also asked all those who participated in the project “to write an anonymous, 1,000-word (or less) essay which looks 50 years out into the future.” He encouraged them to “stretch” their minds. “Don't be afraid to go ‘way out’ in your forecast,” he told them. The purpose of these essays, as the introduction to the resulting collection (the Ancillary volume) points out, is to generate “a moment of brilliance” which will one day “trigger a breakthrough.” Reprinted below is an excerpt from one essay, “Biological Process Control.”

Each of the volumes begins with the following disclaimer: “This report is a forecast of a potential future for the Air Force. This forecast does not necessarily imply future officially sanctioned programs, planning or policy.”

To order copies of *New World Vistas*, contact: Jerry Jekielek, AF/5B, 1180 Air Force Pentagon, Washington, DC 20330, (703) 697-4811, Fax: (703) 693-6262, E-mail: <jekielekg@af.pentagon.mil>.

For more on EMFs and HPM for mind-control and other weapons applications, see MWN, J1F87, N1D93, J1F96 and S1O96.

Looking 50 years into the future is extremely easy and, at the same time, exceedingly difficult. Easy, since I will not be around to catch the flak for being very wrong. Difficult, since it is really presumptuous to pretend that you have the vision to see the future. Nonetheless, you asked for it and here goes.

As we look forward to the future, it seems likely that this nation will be involved in multiple conflicts where our military forces increasingly will be placed in situations where the application of the full force capabilities of our military might cannot be applied. We will be involved intimately with hostile populations in situations where the application of nonlethal force will be the tactical or political preference. It appears likely that there are a number of physical agents that might actively, but largely benignly, interact or interfere with biological processes in an adversary in a manner that will provide our armed forces the tools to control these adversaries without extensive loss of life or property. These physical agents could include acoustic fields, optical fields, electromagnetic fields and combinations thereof. This paper will address only the prospect of physical regulation of biological processes using electromagnetic fields.

The literature regarding the interaction of biological processes with electromagnetic fields is growing at a rapid rate. Sources are becoming more available, biomedical instrumentation is improving so that the interactions between biological processes and physical fields can be examined with fewer artifacts and the principles underlying these interactions are becoming clearer and more amenable to theoretical prediction.

Prior to the mid-21st century, there will be a virtual explosion of knowledge in the field of neuroscience. We will have achieved a clear understanding of how the human brain works, how it really controls the various functions of the body and how it can be manipulated (both positively and negatively). One can envision the development of electromagnetic energy sources, the output of which can be pulsed, shaped and focused, that can couple with the human body in a fashion that will allow one to prevent voluntary muscular movements, control emotions (and thus actions), produce sleep, transmit suggestions, interfere with both short-term and long-term memory, produce an experience set and delete an experience set. This will open the door for the development of some novel capabilities that can be used in armed conflict, in terrorist/hostage situations and in training. New weapons that offer the opportunity of control of an adversary without resorting to a lethal solution or to collateral casualties can be developed around this concept.

This would offer significant improvements in the capabilities of our special operation forces. Initial experimentation should be focused on the interaction of electromagnetic energy and the neuromuscular junctions involved in voluntary muscle control. Theories need to be developed, modeled and tested in experimental preparations. Early testing using *in vitro* cell cultures of neural networks could provide a focus for more definitive intact animal testing. If successful, one could envision a weapon that would render an opponent incapable of taking any meaningful action involving any higher motor skills, (e.g. using weapons, operating tracking systems). The prospect of a weapon to accomplish this when targeted against an individual target is reasonable; the prospect of a weapon effective against a massed force would seem to be more remote. Use of such a device in an enclosed area against multiple targets (hostage situation) may be more difficult than an individual target system, but probably feasible.

It would also appear possible to create high fidelity speech in the human body, raising the possibility of covert suggestion and psychological direction. When a high power microwave pulse in the GHz range strikes the human body, a very small temperature perturbation occurs. This is associated with a sudden expansion of the slightly heated tissue. This expansion is fast enough to produce an acoustic wave. If a pulse stream is used, it should be possible to create an internal acoustic field in the 5-15 kHz range, which is audible. Thus it may be possible to “talk” to selected adversaries in a fashion that would be most disturbing to them.

In comparison to the discussion in the paragraphs above, the concept of imprinting an experience set is highly speculative, but nonetheless, highly exciting. Modern electromagnetic scattering theory raises the prospect that ultrashort pulse scattering through the human brain can result in reflected signals that can be used to construct a reliable estimate of the degree of central nervous system arousal. The concept behind this “remote EEG” is to scatter off of action potentials or ensembles of action potentials in major central nervous system tracts. Assuming we will understand how our skills are imprinted and recalled, it might be possible to take this concept one step further and duplicate the experience set in another individual. The prospect of providing a “been there-done that” knowledge base could provide a revolutionary change in our approach to specialized training. How this can be done or even if it can be done are significant unknowns. The impact of success would boggle the mind!

Clippings from All Over

The most subtle but poisonous effect of Bad Information is the decline of intelligent conversation. It used to be that you couldn't talk about religion and politics, but now you can't talk about religion, politics, UFOs, phonics, nutrition, the Kennedy assassination, O.J. Simpson, Shakespeare's true identity, proper child-rearing techniques, the significance of birth order and whether power lines give you cancer.

— Joel Achenbach, "Reality Check: You Can't Believe Everything You Read. But You'd Better Believe This," *Washington Post*, p.C18, December 4, 1996

"If you believe in God, Iridium is God manifesting himself through us."

— Raymond Leopold, chief technical officer of Iridium, Motorola's satellite-based wireless phone system, quoted by Quentin Hardy in "How a Wife's Question Led Motorola To Chase Global Cell Phone Plan," *Wall Street Journal*, p.A1, December 16, 1996

[W]hen the meeting was over and everyone had gone home, I was left feeling slightly disappointed and just a little frustrated. A few extra pieces of the jigsaw had been obtained, and although some parts were beginning to coalesce, the overall pattern remained as elusive as ever, tantalizingly out of reach.

— Dr. Zenon Sienkiewicz, a senior scientific officer at the U.K.'s National Radiological Protection Board (NRPB), "Plus Ça Change" (a report on the June 1996 Bioelectromagnetics Society meeting), *Radiological Protection Bulletin* (U.K.), p. 43, December 1996

Bob-o-links Sing Off-Key

The scientist Robert Adair
has knowledge of physics to spare.
He can wow one and all
about a bat and a ball,
but his biology leaves us in despair.

From baseball, the national sport,
to a role as a friend of the court.
I suggest that blind Justice
would do well to trust us.
Biology's not simple like tort.

There's another old Bob on the scene,
whose biology is even more lean.
This Bob is called Park,
and he's more in the dark,
and temperamentally far less serene.

These Bobs, like Ernie and Bert,
make comments that often divert.
Though with words Bobs are agile,
their biology is fragile,
and the truth they often pervert.

I wish Bobs would give it a rest,
and do what they surely do best.
No need for apology,
for not knowing biology,
in physics there is no contest.

We received the above poem from Dr. Martin Blank of Columbia University in New York City. Blank is the president-elect of the Bioelectromagnetics Society. He will take over as president in June.

"Washington is like a dead mackerel on the beach—it shines and it stinks."

— Joseph Dear, outgoing administrator of the Occupational Safety and Health Administration, quoted by Cindy Loose in "What So Proudly They Served," *Washington Post*, p.A1, January 16, 1997

Clearly it would be both arrogant and rash of physicists to argue that because we have not yet been able to think of a possible physical mechanism, it is impossible for there to be an effect.

— Drs. John Swanson, David Renew and Nigel Wilkinson, members of the EMF Team at the National Grid Co.'s Technology and Science Division Laboratories in Leatherhead, U.K., "Power Lines and Health," *Physics World* (U.K.), p.33, November 1996

The bottom line is that we need more objective information about EMFs and the public's health. As utility workers, we deserve to know the truth about EMF exposure.

— Hal Nixon, safety director at the Utility Workers Union of America (UWUA) Local 223, AFL-CIO in Dearborn, MI, "Safety Update: What Is the Truth About EMF Exposure?" *UWUA Local 223 Annunciator*, p.8, December 1996

THE NRC REPORT CONFIRMS DEGENERATIVE
SPINE DISEASE ATTACKS EMF SCIENTISTS

— Headline from cover story in *Network News*, newsletter of the EMR Alliance (based in New York City), Fall/Winter 1996-97

We are here faced with a situation familiar to the clinician looking at two X-ray views, one showing a suspicious lesion and another not. Is the difference due to artifact, masking of the lesion or quality of the film? The discrepancies in the magnetic field work are not likely to be resolved by yet more epidemiological observation in search of a biological mechanism. If we had a replicable laboratory mechanism for carcinogenesis operating at the field intensities of 50/60 Hz transmission and distribution lines...many doubters might be converted.

— Dr. David Ozonoff, Boston University School of Public Health, "Commentary: Fields of Controversy," *The Lancet* (U.K.), 349, p.74, January 11, 1997

A fundamental requirement of the funding mechanism is that industry and other funding bodies should be provided with the opportunity to contribute funding and materials in kind to the research program but should neither have, nor be seen to have, any influence over the choice of research studies funded, the conduct or the outcome of such studies or the publication of the results.

— Dr. Alastair McKinlay of the U.K.'s NRPB, "Possible Health Effects Related to the Use of Radiotelephones: Recommendations of a European Commission Expert Group," presented at the *International Seminar on Biological Effects of Nonthermal Pulsed and Amplitude-Modulated RF Electromagnetic Fields and Related Health Hazards*, Munich, Germany, November 20-22, 1996 (see p.10)

It is intriguing to speculate to what extent...stochastic resonance [is] widely exploited in biological systems to detect weak signals. This remains an open question....

— Drs. P. Jung and K. Wiesenfeld, Georgia Institute of Technology, Atlanta, "Too Quiet To Hear a Whisper: Add Some Noise, and Many Dynamic Systems Respond to Weak Signals More Strongly..." *Nature*, 385, p.291, January 23, 1997

CONFERENCES

1997 Conference Calendar (Part II)

Web site addresses are in italics.

February 22-26: **6th International Symposium on Environmental Concerns in Rights-of-Way Management**, Hilton Hotel, New Orleans, LA. Contact: Randy Williams, Environmental Management Energy Services Inc., L-ENT-5D, PO Box 61000, New Orleans, LA 70161, (504) 576-6274, Fax: (504) 576-4536.

March 3-5: **Wireless '97**, Moscone Convention Center, San Francisco, CA. Contact: Cellular Telecommunications Industry Association, 1250 Connecticut Ave., NW, Washington, DC 20036, (202) 785-2842 or (800) 463-4088, Fax: (202) 785-0721, <www.wireless97.com>.

April 10-11: **Medical Applications of Microwave and Radiofrequency Fields Meeting**, Hammersmith Hospital, London, U.K. Contact: Dr. Alan Preece, Medical Physics University Research Centre, University of Bristol, Horfield Rd., Bristol BS2 8ED, U.K., (44+117) 928-2469, Fax: (44+117) 928-2470, E-mail: <a.w.preece@bristol.ac.uk>.

April 17-18: **5th Nordic Workshop on the Biological Effects of Low Frequency Electromagnetic Fields**, Norwegian University of Science and Technology, Trondheim. Contact: Gunnhild Oftedal, Telenor HMS-Tjeneste Midt-Norge, N-7005 Trondheim, Norway, (47+73) 54.35.72, Fax: (47+73) 54.33.40, E-mail: <gunnhild.oftedal@trondheim.midtnorge.telenor.no>.

May 17-23: **1997 American Industrial Hygiene Conference & Exposition (AIHCE)**, Dallas, TX. Contact: AIHCE, 2700 Prosperity Ave., Suite 250, Fairfax, VA 22031, (703) 849-8888, Fax: (703) 207-3561, <www.aiha.org>.

May 19-21: **IEEE Instrumentation and Measurement Technology Conference (IMTC/97)**, Château Laurier Hotel, Ottawa, ONT, Canada. Contact: Prof. Wojtek Bok, IMTC/97 Conference Chair, University of Québec at Hull, P.O. Box 1250, Suite B, Hull, PQ J8X 3X7, Canada, (819) 773-1623, Fax: (819) 773-1683, E-mail: <bok@uqah.quebec.ca>.

June 4-5: **ICNIRP Symposium on the Biological Effects of Static and ELF Electric and Magnetic Fields and Related Health Risks**, Bologna, Italy. Contact: R. Matthes, Institut für Strahlenhygiene, Bundesamt für Strahlenschutz, Ingolstaedter Landstrasse 1, D-85764 Oberschleissheim, Germany, (49+89) 31603-288, Fax: (49+89) 31603-289, E-mail: <matthes@bfs.de>, <www.sz.shuttle.de/dm1001/icnirp.htm>.

June 7-11: **32nd Annual Meeting and Exposition of the Association for the Advancement of Medical Instrumentation (AAMI)**, Sheraton Hotel, Washington, DC. Contact: AAMI Education and Conferences Dept., 3330 Washington Blvd, Suite 400, Arlington, VA 22201, (703) 525-4890, Fax: (703) 276-0793.

June 8-13: **2nd World Congress for Electricity and Magnetism in Biology and Medicine**, Meeting of the BEMS, BES, SPRBM and EBEM, Bologna, Italy. Contact: Dr. William Wisecup, W/L Associates Ltd., 7519 Ridge Rd., Frederick, MD 21702, (301) 663-4252, Fax: (301) 371-8955, E-mail: <75230.1222@compuserve.com>.

June 11-13: **International Conference on Consumer Electronics**, Westin Hotel O'Hare, Rosemont, IL. Contact: Diane Williams, 67 Raspberry Patch Dr., Rochester, NY 14612, (716) 392-3862, Fax: (716) 392-4397, E-mail: <d.williams@ieee.org>, <www.ieee.org/ce/icce97/>.

June 12-14: **30th Annual Conference of the Society for Epidemiologic Research (SER)**, Convention Center, Edmonton, ALB, Canada. Contact: Sandy Adams, SER, 111 Market Pl., Suite 840, Baltimore, MD 21202, (410) 223-1626, Fax: (410) 223-1620, E-mail: <sadams@phnet.sph.jhu.edu>, <www.sph.jhu.edu/pubs/jepi>.

June 23-24: **Cellular Phones: Is There a Health Risk?**, Watergate Hotel, Washington, DC. Contact: Lara Timmerman, International Business Communications, 225 Turnpike Rd., Southboro, MA 01772, (508) 481-6400, ext.456, Fax: (508) 481-4473, E-mail: <ltimmerman@ibcusa.com>.

June 29-July 3: **42nd Annual Meeting of the Health Physics Society (HPS)**, San Antonio, TX. Contact: HPS, 1313 Dolley Madison Blvd., Suite 402, McLean, VA 22101, (703) 790-1745, Fax: (703) 790-2672, E-mail: <hpsburkmg@aol.com>.

July 13-17: **1st World Conference on Breast Cancer**, Kingston, ONT, Canada. Contact: Conference Office, 841 Princess St., Kingston, ONT K7L 1G7, Canada, (613) 549-1118, Fax: (613) 549-1146.

July 14-16: **32nd Microwave Power Symposium**, Château Laurier Hotel, Ottawa, ONT, Canada. Contact: International Microwave Power Institute, 10210 Leatherleaf Ct., Manassas, VA 20111, (703) 257-1415, Fax: (703) 257-0213, E-mail: <AssnCtr@idsonline.com>.

July 20-24: **1997 IEEE PES Summer Meeting**, Berlin, Germany. Contact: IEEE PES Executive Office, 445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855, (908) 562-3882, Fax: (908) 981-1769, E-mail: <soc.pe@ieee.org>, <www.ieee.org/power>.

August 4-7: **6th International Symposium on Recent Advances in Microwave Technology**, Beijing, China. Contact: Prof. Banmali Rawat, Dept. of Electrical Engineering, University of Nevada, Reno, NV 89557, (702) 784-1457, Fax: (702) 784-6627, E-mail: <rawat@ee.unr.edu>, <www.cs.unr.edu/~sushill/ismramt.html>.

August 18-22: **1997 IEEE EMC Symposium**, Convention Center, Austin, TX. Contact: Edwin Bronaugh, PO Box 80647, Austin, TX 78708, (512) 258-6687, Fax: (512) 258-6982, E-mail: <97.emc.symp@emctest.com>, <www.emctest.com/ieee97/>.

August 25-29: **International Symposium on High-Voltage Engineering**, Palais de Congrès, Montréal, PQ, Canada. Contact: Dr. F.A.M. Rizk, JpDL Multi Management Inc., 1410 Stanley, Suite 609, Montréal, PQ H3A 1P8, Canada, (514) 287-1070, Fax: (514) 287-1248, <www.ireq.ca/ish97>.

September 1-3: **10th International Conference on Electromagnetic Compatibility**, University of Warwick, Coventry, U.K. Contact: IEE, Savoy Pl., London WC2R 0BL, U.K., (44+171) 344-5473, Fax: (44+171) 240-8830, E-mail: <lhudson@iee.org.uk>.

September 8-11: **PERM-IT'97: Annual Conference of the Australian Radiation Protection Society**, Hilton Hotel, Adelaide, Australia. Contact: Plevin and Associates, PO Box 54, Burnside, South Australia 5066, (61+8) 8379-8222, Fax: (61+8) 8379-8177, E-mail: <plevin@camtech.net.au>, <www.camtech.net.au/~plevin/permit.html>.

September 9-13: **Microwave and High Frequency Heating Conference**, Fermo, Italy. Contact: Professor Alberto Breccia, United Institute of Chemical, Radiochemical and Metallurgic Sciences, University of Bologna, Via S. Donato 15, I-40127 Bologna, Italy, (39+51) 242-052, Fax: (39+51) 249-770.

October 14-16: **IEE RADAR '97**, International Conference Center, Edinburgh, U.K. Contact: IEE, Savoy Pl., London WC2R 0BL, U.K., (44+171) 344-5469, Fax: (44+171) 240-8830, E-mail: <conference@iee.org.uk>, cite RADAR '97 in your message.

October 22-23: **ICNIRP Symposium on Risk Perception, Risk Communication and Its Application to EMF Exposure**, Vienna, Austria. Contact: R. Matthes, see June 4 above.

October 26-29: **4th International Symposium on Biologically Closed Electric Circuits in Biomedicine**, Radisson Hotel South, Bloomington, MN. Contact: Dr. George O'Clock Jr., College of Science, Engineering and Technology, Mankato State University, PO Box 8400, MSU Box 215, Mankato, MN 56002, (507) 389-1410, Fax: (507) 389-1095, E-mail: <george_oclock@msl.mankato.msus.edu>.

October 30-November 2: **19th Annual International Conference of the IEEE/EMB Society**, Chicago Marriott Downtown, Chicago, IL. Contact: Meeting Management, 2603 Main St., Suite 690, Irvine, CA 92714, (714) 752-8205, Fax: (714) 752-7444, E-mail: <MeetingMgt@aol.com>, <www.eecs.uic.edu/~embs97>.

November 2-6: **DOE-EPRI Annual Review of Research on Biological Effects of Electric and Magnetic Fields from the Generation, Delivery and Use of Electricity**, Holiday Inn by the Bay, San Diego, CA. Contact: Dr. William Wisecup, see June 8 above.

November 11-13: **Transmission & Distribution World Expo '97**, World Congress Center, Atlanta, GA. Contact: Michael Eby, *Transmission & Distribution World*, 9800 Metcalf Ave., Overland Park, KS 66212, (913) 967-1782, Fax: (913) 967-1905.

Part I of the conference calendar appeared in our last issue, N/D96.

CANCER WATCH

Wearing RF Antennas... Going undercover may be even riskier than previously thought. Three members of an English surveillance unit in Northern Ireland have died of colon cancer in the last year, prompting concerns over the radio antennas that were strapped to the skin of their lower backs, according to the U.K. *Sunday Times* (January 19). Everything about the unit is top secret, but the *Times* estimated that it involves about 150 people. The detectives, who were part of the Royal Ulster Constabulary, were in their 30s, which is young to develop colon cancer. One policeman told the *Times* that, "It is a matter of personal preference where you wear the transmitter, but many people do put it at the small of their backs next to the colon because it is unlikely that anyone who brushes up against it will notice."

CELLULAR TELEPHONE INTERFERENCE

Pacemaker Studies Around the World... Dr. Vincenzo Barbaro of the Istituto Superiore di Sanità in Rome, Italy, examined EMI from analog phones to pacemakers and discovered—contrary to other reports—that many phones (10 out of 25) caused interference. His report appears in the October 1996 issue of *Pacing and Clinical Electrophysiology (PACE)*, in a special section on EMI from cellular phones to cardiac pacemakers and implantable defibrillators. Dr. Werner Irnich of the Justus-Liebig University in Giessen, Germany, found similar results with analog phones. Analog phones use continuous waves while those of digital models are pulsed. Irnich explained that, "If there were no pulsing during call organization (handshake with the base station before ringing), all mobile phone systems [using CW] would not harm a patient. In reality, there are broad pulses of varying duration [for] up to 3.5 seconds, which may influence an implant." Irnich endorsed a 20 cm separation distance for pacemakers and cellular phones, comparable to the six inches recommended by the FDA and WTR in the U.S. (see *MWN*, N/D96). However, Dr. Andreas Wilke of Marburg University in Germany concluded that although such EMI "appear[s] to be rare...pacemaker-dependent patients in particular should avoid the use of cellular phones." This advice is stricter than that given in the U.S. This issue of *PACE* also includes an overview of current research by Dr. David Hayes of the Mayo Clinic in Rochester, MN, Dr. Roger Carrillo of Mt. Sinai Medical Center in Miami and Gretchen Findlay and Martha Embrey of WTR in Washington, as well as papers by other researchers in Germany and Australia. Copies can be ordered for \$30.00 plus shipping from: Futura Publishing, PO Box 418, Armonk, NY 10504, (914) 273-1014, Fax: (914) 273-1015.

PEOPLE

Dr. **Ken Joyner**, formerly the manager of EMR and Environmental Safety at Telstra's Research Labs in Australia, has joined Motorola as the Asia Pacific regional program manager for electromagnetic energy. He will continue to be based in Australia....Dr. **John Zimbrick** has stepped down as the director of the National Academy of Sciences' (NAS) Board on Radiation Effects Research in Washington to become a professor of radiation biophysics in the School of Health Sciences at Purdue University in West Lafayette, IN. Zimbrick and Dr. **Larry Toburen**, who left

EMF Papers

A twice-monthly clipping service from **MICROWAVE NEWS**

All the information you need: key government documents, abstracts of new papers, press releases. Plus...assorted clips. Direct to you, twice a month.

\$100.00 per month. Three-month minimum. Sample packet \$25.00. Outside the U.S., please add \$15.00 per month for airmail postage.

**MICROWAVE NEWS • PO Box 1799 • Grand Central Station
New York, NY 10163 • (212) 517-2800 • Fax: (212) 734-0316**

Web site: <<http://www.microwavenews.com>>

E-mail: <mwn@pobox.com>

**MICRO
WAVE
NEWS**

A Report on Non-Ionizing Radiation

Four reprints from the pages of *Microwave News*:

- **EMF Litigation** (\$38.50)
- **Cellular Phones/Towers** (\$38.50)
- **EMFs & Breast Cancer** (\$38.50)
- **Police Radar** (\$38.50)

Also:

New! EMFs in the 90s: 1996 Update (\$12.50)

Complete sets of EMFS in the 90s (1990-1996) are also available for \$67.50 each.

Outside the U.S., add \$5.00 airmail postage for each publication.

Enclosed is my check for \$ _____

Prepaid Orders Only.

U.S. Funds or International Money Order, Please.

**MICROWAVE NEWS • PO Box 1799 • Grand Central Station
New York, NY 10163 • (212) 517-2800 • Fax: (212) 734-0316**

Web site: <<http://www.microwavenews.com>>

E-mail: <mwn@pobox.com>

A Resolution for 1997: Stay Ahead with Microwave News

Time after time,
Microwave News breaks the story:

Microwave News, July/August 1995

**“Draft NCRP Report Seeks
Strong Action To Curb EMFs”**

“Leak Links Power Lines to Cancer”

New Scientist (U.K.), October 7, 1995



Microwave News, July/August 1994

**“Digital Cellular Phones Can Disrupt
Implanted Pacemakers”**

**“Cellular Phones May Affect
Use of Pacemakers”**

Wall Street Journal, April 28, 1995



Microwave News, November/December 1995

**“Higher Leukemia Rates Among Those
Living Near Australian TV Towers”**

**“Living Near TV Towers a Leukemia
Risk for Children, Claims Researcher”**

Sydney Morning Herald (Australia), December 10, 1996

Subscribe Today!

— 1-Year Subscription (6 issues) — \$325.00
(Outside the U.S., \$350.00)

— 6-Month Trial Subscription — \$170.00
(Outside the U.S., \$180.00)

— Sample Issue — \$10.00

— Sets of Back Issues — \$95.00/Calendar Year
(Outside the U.S., \$100.00)

Sets available for 1981-1996

Five-Year Bound Volumes Also Available

Enclosed is my check for \$ _____

Prepaid Orders Only.

U.S. Funds or International Money Order, Please.

MICROWAVE NEWS • PO Box 1799 • Grand Central Station
New York, NY 10163 • (212) 517-2800 • Fax: (212) 734-0316

Web site: <<http://www.microwavenews.com>>

E-mail: <mwn@pobox.com>

the board to be a professor of physics at East Carolina University (see *MWN*, S/O95), were responsible for the recent NAS-NRC report on EMFs (see *MWN*, N/D96)...More changes in LeBoeuf, Lamb's EMF legal practice. A few months back, **Mark Warnquist** stepped out of the line of fire (see *MWN*, S/O96); now **Russell Yates** has left the firm's Denver office. **Robert Alessi**, the head litigator in LeBoeuf's Albany, NY, office, is the new head of the EMF practice. Alessi also serves as the environmental counsel to the New York Power Pool....**Dr. Peter Semm** of German Telekom, best known for his work on magnetic sensing and the pineal gland, has taken a leave of absence as associate editor of *Bioelectromagnetics* due to a series of health problems. **Dr. Raphael Lee** has joined the journal as associate editor, replacing **Dr. Roy Aaron**. Lee is the director of the Burn Center and the Electric Injury Research Program at the University of Chicago....At the end of 1996, **Dr. Jack Lee** retired from the Bonneville Power Administration in Portland, OR. His EMF responsibilities are now being shared by Deborah Malin in Fish and Wildlife and Rick Stearns in Transmission Engineering. Lee said he may do some consulting....**James Cunningham** has become the president of the Pennsylvania Electric Association in Harrisburg. Cunningham, previously with LILCO and with the NY Power Authority, was an early backer of what is now known as EMF RAPID, the federal research program (see *MWN*, M/A90)....**Jon Palfreman**, producer of "Currents of Fear," the controversial *Frontline* TV show on EMFs (see *MWN*, J/A95), has won an American Association for the Advancement of Science (AAAS) journalism award for "Breast Implants on Trial," also for PBS' *Frontline*. The AAAS publishes *Science* magazine.

RESOURCES

RF at-a-Glance...The U.K. National Radiological Protection Board (NRPB) has issued a pamphlet on *Radiowaves*, the latest in its "At-a-Glance" series. The NRPB maintains that the "only established biological effects" of RF radiation are due to heating. The current evidence of a link between RF exposure and cancer is "weak," the pamphlet states, adding that "no persuasive biological mechanism has been established for such an effect." The color pamphlet includes pictures of common types of RF transmitting antennas. Single copies of the pamphlet are available free from: Press and Public Relations, NRPB, Chilton, Didcot, Oxon. OX11 0RQ, U.K., (44+1235) 822744, Fax: (44+1235) 822746, E-mail: <pressoffice@nrpb.org.uk>. Previously, the NRPB has issued pamphlets on non-ionizing radiation (*MWN*, N/D91) and on electricity and EMFs (see *MWN*, J/F95).

Annotated Bibliography...Marija Hughes has released her third annotated compendium on EMF and RF/MW radiation health risks. The first two volumes addressed computer health hazards. This edition covers the whole range of non-ionizing radiation issues from 1973 through 1996 and features three different indexes: by author, by subject and by legal citation. It also includes a glossary. A copy of *Computers, Antennas, Cellular Telephones and Power Lines: Health Hazards* is available for \$35.00 with a personal check or \$50.00 with an institutional check from: Hughes Press, 2400 Virginia Ave., NW, Suite C501, Washington, DC 20037, (202) 293-2686.

VIEWS ON THE NEWS

Plus Ça Change... Why We're Running in Place

The recent NAS-NRC report on EMFs and childhood leukemia only considered, as a matter of policy, the results of studies that had been replicated. In many ways this is a reasonable procedure—but if the follow-up studies are never done, it creates a false impression.

When discussing the health effects of non-ionizing radiation, one hears—again and again—that “the results are murky,” or “the studies are contradictory.” It’s been said so often that it’s become a cliché. Studies with provocative results in this field are rarely followed up and often ignored. On the cover of this issue we report on two cases, from different ends of the spectrum, that fall into this unfortunate pattern.

Tower Shell Game

It’s a simple story. A doctor in Birmingham, U.K., found what he considered to be a cluster of leukemia cases near a tower with the most powerful radio and TV transmitters in England. The press picked up the story and a formal epidemiological study got under way.

Now, five years later, the study shows that the doctor was right. The incidence of leukemia was twice the expected rate. The cancer risk declined with distance from the tower, and a statistical analysis indicated that the odds of this happening by chance were one in a thousand.

What happened next? Was the doctor, who had been roasted for leveling false charges, toasted for his insight? Did radiation officials promise to get to the bottom of the matter?

Not exactly.

One reason it took five years to vindicate the doctor is that the Birmingham results were not released until a second study had been completed—one that looked at cancer rates near 20 other high-power transmitters in Britain. These latter findings did not mesh with the first set. As the team, from the London School of Hygiene and Tropical Medicine, dryly commented, the results “at most give no more than very weak support” for the observed leukemia cluster.

Why was it necessary to sit on the first study until the second was completed? One clue: all the results were released on Christmas Eve. If you want to bury a news story, there is no better time to give it to the press.* All the more so for a complicated science story like this one.

Two U.K. advisory radiation panels did their part to kill interest in the story. No further work was needed, they concluded.

But it seems premature to declare the case closed. There are enough differences among the 21 sites to rule out any hasty conclusions. After all, an Australian study published around the same

* Richard Smith, editor of the *British Medical Journal*, made a similar point in a commentary on the news coverage of a different epidemiological study that was also released just before Christmas. “It bodes ill for British democracy,” he wrote in the journal’s January 4, 1997, issue, “...that the press can be led so easily by the nose.”

time found excess childhood leukemia in the community near a TV antenna farm in Sydney. And an earlier study in Honolulu, Hawaii, also found excess cancer near radio and TV towers.

Some observers wonder why residents get worried when a communications company decides to put an antenna in their backyard. No further study of that question is needed.

The establishment’s lack of medical and scientific curiosity—if not moral responsibility—is astounding. It’s a fact that there are more leukemia cases the closer you get to the Birmingham tower, but no one seems too concerned about finding the cause.

Forgotten Dementia

Alzheimer’s disease affects about 4 million people in the U.S. today. Now, studies of Alzheimer’s patients in three countries—Finland, Sweden and the U.S.—have shown that people exposed to EMFs on the job are more likely to get the disease. Yet research on occupational EMFs and Alzheimer’s has received little funding or official support. “We’ve done this on a shoestring,” said Dr. Eugene Sobel, who was the first to make the link.

Every study so far has shown a connection, with statistically significant results pointing to a risk three to five times greater for those who’ve worked in jobs with medium or high EMF exposures. These are much higher risk ratios than those found in the association between childhood leukemia and wire codes. But the Alzheimer’s studies have not received a dime from U.S. groups that focus on EMF health effects research.

Why are the California, DOE, EPRI and RAPID EMF research programs so completely absent? Sobel’s findings were first announced two and a half years ago, yet Alzheimer’s disease doesn’t seem to be on their agendas.

After the *Los Angeles Times* ran an article about Sobel’s most recent work, he received a donation for Alzheimer’s research from a small upscale clothing manufacturer in L.A. “The owners are genuinely concerned about their employees,” Sobel told us, “which was nice to see.”

And it was nice that they knew how to act quickly—they heard news that concerned them and responded without delay. Unfortunately, the same cannot be said for the major funders of EMF health research. It’s time they started to pay attention to the Alzheimer’s connection.

MICROWAVE NEWS is published bimonthly. • ISSN 0275-6595 • PO Box 1799, Grand Central Station, New York, NY 10163 • (212) 517-2800; Fax: (212) 734-0316; E-mail: <mwn@pobox.com>; Web site: <<http://www.microwavenews.com>> • Editor and Publisher: Louis Slesin, PhD; Senior Editor: Peter Hogness; Associate Editor: Christopher Doherty; Copy Editors: Jim Feldman, Roy Thomas Jr.; Production Coordinator: Joe Mungiolli; Circulation Assistant: Diana Cooper • Subscriptions: \$325.00 per year (\$350.00 Canada & Foreign, U.S. funds only); Single copies: \$60.00 • Copyright © 1997 by Louis Slesin • Reproduction in any form is forbidden without written permission.

CLASSIFIEDS
