

MICRO WAVE NEWS

Vol. XXI No. 6

A Report on Non-Ionizing Radiation

November/December 2001

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Headaches from Mobile Phones: French Scientist Offers Mechanism

Dr. Pierre Aubineau thinks he knows why so many cell phone users are getting headaches.

In addition to looking at what the radiation may be doing inside the brain, Aubineau, the director of research at the University of Bordeaux’s National Center for Scientific Research, is focusing on the dura mater and the other membranes that surround the brain—these are collectively known as the meninges. He has shown that when rats are exposed to GSM radiation, the dura mater becomes inflamed. Aubineau points to a theory—advanced by Dr. Michael Moskowitz of Harvard Medical School in Boston—that such an inflammation in humans would lead to a severe headache.

When the skulls of the exposed rats were opened, Aubineau and his collaborator Dr. Fatma Töre found that proteins had leaked out of the local blood vessels into the meninges and into the brain.

“The proteins act as irritants,” Aubineau told *Microwave News*. “They cause inflammation and edema, which can bring on a headache.”

These new findings, which were first reported at the European Bioelectromagnetics Association meeting in Helsinki in early September, could, if confirmed, explain why mobile phone users are more likely to complain of headaches—as reported in many epidemiological surveys carried out around the

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Memo from Brussels

European Mobile Phone Projects Renew Debate Over Low-Level Effects

Now that the European mobile phone research program is well under way, old arguments over the existence of low-level radiation effects are taking center stage. The gulf between the two sides was much in evidence at a *Workshop on EMFs, Mobile Telephony and Health* held in Brussels on October 29.

Radiation effects “can no longer be denied,” said Prof. Franz Adlkofer of the Foundation for Behavior and Environment in Munich. Adlkofer is coordinating the European Commission’s (EC) REFLEX project on *in vitro* experiments. On the other hand, France’s Dr. Bernard Veyret and Finland’s Dr. Jukka Juutilainen, who are in charge of two other projects, PERFORM—B and CEM-FEC, respectively, do not believe the case for any significant effects has been made. (For a list of projects and their participants, see p.4 and *MWN*, M/A00.)

Take, for instance, their different opinions over genetic changes. At the workshop, Veyret said that DNA breaks are “very unlikely.” Juutilainen agreed: “It seems very unlikely that there are direct genotoxic effects.” Veyret is at the

(continued on p.5)

« Power Line Talk »

The U.K.'s National Radiological Protection Board (NRPB) has initiated a formal inquiry into Dr. **Denis Henshaw's** hypothesis that charged particles near power lines are responsible for childhood leukemia and other ailments. The move represents a sharp change in outlook: Five years ago, the NRPB dismissed his ideas as "implausible" and "purely speculative" (see *MWN*, M/A96). Henshaw, a physicist at the University of Bristol, posits that pollutants pick up an electric charge near high-voltage power lines, making them more likely to be deposited on the skin and in the lungs (see *MWN*, J/F00). For instance, he estimates that electric fields could be responsible for as many as 400 lung cancer cases a year in the U.K. (see *MWN*, M/A01). NRPB's newly established five-member panel will advise what kinds of research are needed to evaluate Henshaw's hypothesis, according to the board's Dr. **Michael Clark**. Dr. **Lawrie Challis**, an emeritus professor of physics at the University of Nottingham, will chair the group. The other panel members are Drs. Adrian Bailey of the University of Southampton and William Gellately of the University of Surrey, as well as Dr. Michael Bailey and Jon Miles of the NRPB staff. The panel, which held its first meeting in September, will report to NRPB's Advisory Group on Non-Ionizing Radiation (AGNIR), chaired by Sir **Richard Doll** (see p.3). AGNIR itself will decide if the epidemiological and experimental evidence supports Henshaw's ideas. In its report on EMFs and cancer released earlier this year, the Doll group broke with NRPB's previous skepticism and called for more research on the Henshaw hypothesis (see *MWN*, M/A01). "I am very pleased," Henshaw told *Microwave News*. But he expressed disappointment that there is no one on the panel who is an authority on air pollution.

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Drs. **De-Kun Li's** and **Gerri Lee's** studies on EMFs and miscarriages will appear in the January issue of *Epidemiology*. Both found a higher risk of spontaneous abortions among women who had been exposed to magnetic fields in excess of 14-16 mG (see *MWN*, M/J01). Li's paper, originally scheduled for the November issue, was delayed to allow Dr. **David Savitz** of the University of North Carolina, Chapel Hill, to write an accompanying editorial. This will be Savitz's third editorial on EMFs in recent months—and his last for a while, he told us. Li said that his and Dr. **Raymond Neutra's** response to Savitz is slated for the March issue of *Epidemiology*. The studies by Li, who is with Kaiser Permanente, and Lee, who recently joined AstraZeneca, were sponsored by the California EMF Program, which is headed by Neutra (see *MWN*, J/A01). Some see Li and Lee's use of a metric that captures *maximum* magnetic field exposures, rather than the usual reliance on time-weighted averages, as a breakthrough.

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Women who use **electric blankets** or mattress covers do not have an elevated risk of developing **breast cancer**, according to a new study by **Jane McElroy** of the University of Wisconsin, Madi-

Defense Names Experts in NSA Brain Tumor Case

Tydings & Rosenberg, the Baltimore law firm that is representing Electro-Matic Products Co. against claims by two former National Security Agency (NSA) workers with brain tumors, has named its expert witnesses. Tommy Grimes and Thomas van Meter are charging that they developed cancer after using the company's degaussing equipment, which emits strong magnetic fields.

Those expected to testify for the defense are:

- Dr. Darrell Bigner, Duke University, Durham, NC
- Dr. Peter Burger, Johns Hopkins University, Baltimore
- Dr. Dan Bracken, T. Dan Bracken Inc., Portland, OR
- Dr. Philip Cole, University of Alabama, Birmingham
- Dr. David McCormick, IIT Research Institute, Chicago
- Dr. Kim McKinze, Oakland, CA
- Dr. John Moulder, Medical College of Wisconsin, Milwaukee
- Dr. Robert Patterson, Temple University, Philadelphia
- Dr. Joseph Roti Roti, Washington University, St. Louis
- Dr. Vijayalaxmi, University of Texas Health Science Center, San Antonio
- Dr. Steven Walter, McMaster University, Hamilton, ON, Canada.

The law firm of Peter Angelos in Baltimore, which is representing Grimes and van Meter, has already announced its experts (see *MWN*, J/F01; also p.8 and M/A00). The case is being heard in Maryland state court.

The deadline for pretrial motions is in mid-December, according to Harold Walter of Tydings & Rosenberg. He told *Microwave News* that he plans to file a motion but declined to give any details. Earlier this year he said that he planned to ask the court to dismiss the charges.

son, which appears in the November issue of *Epidemiology* (12, pp.613-617, 2001). Her results are the latest to point away from an association between electric blankets and breast cancer (see *MWN*, S/O91, J/F95, S/O98 and J/A00)—leading some to close the book on such a link. In an accompanying editorial (pp.598-600), Dr. **Leslie Bernstein** of the University of Southern California in Los Angeles writes that, "It is unlikely that future studies will alter the weight of the current evidence." McElroy's team asked 1,949 women with breast cancer and 2,498 controls to complete a questionnaire covering a number of known and suspected risk factors for breast cancer. All the cases and controls were between 50 and 79 years old—93% were postmenopausal. McElroy found that current users had a statistically significant *reduced* risk of breast cancer compared to those who had never used such electrical devices. But she discounts this potential protective effect as "unlikely."

Working at Night Emerges as Breast Cancer Risk

Two new studies point to a small, but significant, increase in breast cancer among women who work the night shift. These findings lend new support to the hypothesis that exposure to light at night (LAN), which can suppress melatonin levels, is a risk factor for breast cancer.

Dr. Scott Davis and Dana Mirick of the Fred Hutchinson Cancer Research Center in Seattle and Dr. Richard Stevens of the University of Connecticut, Farmington, found that breast cancer risk increased by 14% for each night a week a woman did not sleep through the night. Those who worked the graveyard shift at least once in the ten years before diagnosis had a 60% higher rate of breast cancer. Their results, based on 763 women with breast cancer and 741 controls, appear in the October 17 issue of the *Journal of the National Cancer Institute (JNCI)*, 93, pp.1557-1562, 2001).

There was no association between breast cancer risk and the number of times a subject got up and turned on the light, the amount of time a light was on during the night or the ambient light level in the subject's bedroom.

In the same issue of *JNCI* (pp.1563-1568), a team at Harvard Medical School in Boston, MA, led by Dr. Eva Schernhammer,

report that postmenopausal nurses who had regularly worked on rotating night shifts for 30 or more years were 36% more likely to develop breast cancer, a significant increase. There was a 66% increase among premenopausal women with at least 20 years of nighttime shift work, and a 34% increase with 15 years or more—but these estimates are based on small numbers of cases.

In an accompanying editorial (pp.1513-1515), Dr. Johnni Hansen of the Danish Cancer Society in Copenhagen notes that these and the previous epidemiological studies on breast cancer, which used various indirect measures of LAN, “consistently point to an increased risk.”

There is an “urgent need” for more research on the relationship between LAN, night work and “cancers that may be influenced by melatonin,” Hansen concludes.

Stevens first suggested 15 years ago that exposures to LAN and/or electromagnetic fields (EMFs) could promote breast cancer by depressing melatonin levels (see *MWN*, J/F87). Stevens, Davis and Mirick have previously reported lower melatonin levels among women living in homes with elevated levels of EMFs (see *MWN*, N/D97 and S/O01). A second paper, on breast cancer and EMFs, will be published next year in the *American Journal of Epidemiology*.

The possible links between light, hormones and cancer will be addressed at a symposium at the University of Cologne, Germany, May 2-3 (see p.14).

Electrical Worker Data Point to ALS Risk, U.K. Doll Panel Says

Exposure to power-frequency EMFs is “unlikely” to cause Parkinson's disease, but employment in electrical occupations may be associated with amyotrophic lateral sclerosis (ALS), according to an analysis released by the National Radiological Protection Board (NRPB) on November 8. The NRPB's Advisory Group on Non-Ionizing Radiation (AGNIR), chaired by Sir Richard Doll, could neither confirm nor exclude an EMF link to Alzheimer's disease (see box at right).

A number of epidemiological studies have linked electrical work to ALS—widely known as Lou Gehrig's disease. The Doll panel places the greatest confidence in the 1986 study by Drs. Dennis Deapen and Brian Henderson, both of the University of Southern California (USC) in Los Angeles: They reported a close to fourfold greater risk of ALS among those in electrical occupations (see *MWN*, S/O86). This association is supported in six of the eight published EMF-ALS studies (for some examples, see *MWN*, N/D95, J/F97 and M/J97).

Like others before them, members of the Doll panel caution that it is very hard to untangle the roles of EMFs and electric shocks. For instance, Dr. Cristoffer Johansen of the Danish Cancer Society in Copenhagen, who found a higher than expected rate of ALS among Danish utility workers, could not come up with a suitable metric to separate these two types of exposure (see *MWN*, J/A98; also S/O00).

The Doll group found the EMF-Alzheimer's association dif-

icult to assess given some of the conflicting findings among the various completed studies (see *MWN*, J/A94, J/F97, M/J97 and S/O00). Very few studies have investigated an EMF connection to Parkinson's.

In general, the Doll panel's conclusions are similar to those reached in the draft report of the California EMF Program. The California team found an EMF-ALS association to be probable and a link to Alzheimer's to be possible (see *MWN*, J/A01).

Main Findings of U.K. Report on Neurodegenerative Disease

“There is no good ground for thinking that exposure to extremely-low-frequency electromagnetic fields can cause Parkinson's disease and only very weak evidence to suggest that it could cause Alzheimer's disease. The evidence that people employed in electrical occupations have an increased risk of developing amyotrophic lateral sclerosis is substantially stronger, but this could be because they run an increased risk of having an electric shock rather than any effect of long-term exposure to the fields *per se*.”

From *ELF Electromagnetic Fields and Neurodegenerative Disease (Documents of the NRPB, 12 (4)*, pp.3-24, 2001). Copies are available for £11 (approximately US\$15.75) from the NRPB Information Office, Chilton, Didcot, OXON OX11 0RQ, U.K., (44+1235) 822742, Fax: (44+1235) 822746, E-mail: <information@nrpb.org.uk>. The report's main conclusions and recommendations are available free of charge at the NRPB's Web site, <www.nrpb.org.uk>. (See also p.17.)

HIGHLIGHTS

« Eye on Europe »

The EC's **Scientific Committee on Toxicity, Ecotoxicity and the Environment** (CSTEE) does not believe that the existing data on carcinogenic and other nonthermal effects justify adopting exposure standards that differ from those of **ICNIRP**. Two years ago, the EU's Council of Ministers endorsed the ICNIRP standard (see *MWN*, J/A99). With respect to ELFEMFs, the committee agrees with the IARC committee that there is "limited" evidence of carcinogenicity, which falls short of "being considered causal." It also found that reports that certain people are hypersensitive to EMFs "require confirmation" and do not provide a basis for tighter limits. CSTEE's 13-page *Opinion on Possible Effects of EMF, RF and MW Radiation on Human Health* is available at: <europa.eu.int/comm/food/fs/sc/sct/out128_en.pdf>.

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The first animal cancer studies under **PERFORM-A**, one of the EC's mobile phone research projects, are under way (see *MWN*, M/A00). **RBM** in Ivrea, **Italy**, began exposing half of the animals in its repeat of the **Australian Pim1** transgenic mouse experiment (also known as the Repacholi study) at the end of October. The exposure of the other half is scheduled to begin in early December. During the first week of November, power was turned on in the 900 MHz and 1.8 GHz, two-year mouse bioassays at the **Fraunhofer** institute in Hannover, **Germany**. The experimental setups for the three rat studies are nearing completion at **IT'IS** in Zurich. They are slated to get under way early next year.

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The **COST281** committee on the potential health implications of mobile telecom systems has issued a scathing critique of Dr. **Gerard Hyland's** report to the European Parliament. COST281 concludes that Hyland's report, which points to health risks from low-level electromagnetic radiation, is "unbalanced, uncritical and suffers from a narrow selection of partly outdated literature and arbitrary postulates." The committee also states that "Hyland fails to base his conclusions on sound scientific data." The report was not unanimous. A number of reviewers asked Dr. **Norbert Leitgeb**, the chair of COST281, not to release it in its present form. The critique is at: <www.cost281.org/activities.php>. Hyland's report is on the Web site of **Caroline Lucas**, a U.K. member of the European Parliament: <www.carolinelucasmep.org.uk>. (For more on the low-level effects debate, see p.1.)

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The **U.K. Department of Health** (DOH) has yet to reveal who has won **grants** for mobile phone **research**. The DOH announced that there was an "urgent need for further research" when the Stewart panel issued its report in May 2000 (see *MWN*, M/J00). But those who applied for money are still waiting. The DOH told *Microwave News* that the list of awards will be released when the contract negotiations have been completed.

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Austrian mobile phone operators are signaling that they want to renegotiate their 3G licenses unless they get relief from the

PERFORM-B Under Way: Three Replication Experiments

Six European labs, working in pairs, are trying to repeat or put to rest three experimental findings. The two-year, \$2.4 million project, under the leadership of France's Dr. Bernard Veyret at the University of Bordeaux, is being funded in part by the Mobile Manufacturers Forum and the GSM Alliance and in part by government agencies in each of the participating countries. Dr. Niels Kuster of IT'IS in Zurich will handle the dosimetry for the six experiments with the assistance of Dr. Theodoros Samaras of the Aristotle University of Thessaloniki in Greece, under a \$650,000 contract.

Ornithine Decarboxylase (ODC) Activity in Vitro

Dr. Bernard Billaudel of the University of Bordeaux and Dr. Jonne Naarala of the University of Kuopio, Finland, will each receive \$250,000 to repeat Dr. Ted Litovitz's experiment showing varying effects on ODC activity depending on the modulation of the 835 MHz carrier wave (*Bioelectromagnetics*, 18, pp. 132-141, 1997).

Sister Chromatid Exchange (SCE) in Vitro

Dr. Carmela Marino at the ENEA in Rome, Italy, and Dr. David Lloyd of the NRPB, in Chilton, U.K., will receive \$325,000 and \$220,000, respectively, to repeat Drs. Annemarie Maes and Luc Verschaeve's GSM genotoxicological study (*Mutation Research*, 393, pp.151-156, 1997). (See *MWN*, N/D96.)

Behavioral Performance in Vivo

Dr. Zenon Sienkiewicz at the NRPB and Dr. Jean-Christophe Cassel of the University Louis Pasteur in Strasbourg, France, will receive \$230,000 and \$465,000, respectively, to repeat Dr. Henry Lai's experiment on the performance of rats in a radial arm maze (*Bioelectromagnetics*, 15, pp. 95-104, 1994). Sienkiewicz will use mice and Cassel rats. (See also *MWN*, M/J00.)

This project is known as PERFORM-B. It was originally part of a package of proposals submitted to the European Commission by the mobile phone industry (see *MWN*, J/A99). Only the project on animal studies, PERFORM-A, was funded, however (see item at left and *MWN*, M/A00).

strict limits for emissions from mobile phone towers adopted in **Salzburg** (see *MWN*, J/A00). The government "should not take money for licenses and then prevent the networks from being built," Kurt Lüscher of Telefonica told Austria's financial daily, *Wirtschafts Blatt* (November 8). In a September 25 letter, the federal government advised the carriers to take their complaints to court, explaining that, while it can set guidelines, it lacks the authority to fix exposure limits.

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A storm is brewing in **France** in what may soon become known as the *Affaire Santini*. In November, Dr. **Roger Santini** of the National Institute of Applied Sciences in Lyons was accused of using stolen letterhead—he denies it. Santini and those rallying to his side say that he is being maligned because of a study pointing to health risks from mobile phone towers. Santini is the author of *Téléphones Cellulaires: Danger? Stay tuned.*

University of Bordeaux; Juutilainen is at the University of Kuopio.

But in his review of the REFLEX studies completed to date, Adlkofer pointed to the work of Prof. Rudolf Tauber at the Free University of Berlin, who has shown single- and double-strand DNA breaks in HL-60 cells following a 24-hour exposure to 1.8 GHz radiation at 1.3 W/Kg. These “impressive” effects are not due to an increase in temperature, Adlkofer told *Microwave News*.

Adlkofer also cited the work of STUK’s Dr. Dariusz Leszczynski in Helsinki, which shows microwave-induced changes in gene expression (see *MWN*, J/A01; also p.15). By the end of the REFLEX project, Adlkofer said, “I am sure we will have shown effects on gene expression.”

Adlkofer then turned to Dr. Anna Wobus’s experiments at the Institute for Plant Genetics and Agricultural Research in Gatersleben, Germany, which show that radiation effects are dependent on the genetic makeup of the biological target. She saw no effect with wild-type cells, he said, but there was a clear effect when the cells lacked certain genes.

“Genetic background might be decisive,” Adlkofer concluded, noting that millions of people have damaged genes.

Veyret, who is also a member of the REFLEX project, allows that some of these studies may alter the bioeffects landscape. He called Leszczynski’s work on gene expression a “rather important finding.” Veyret is also collaborating with Dr. Pierre Aubineau, whose new experimental results suggest why users of mobile phones get headaches (see p.1). In Brussels, Veyret cautioned that the new headache finding “must be confirmed.”

Adlkofer is not yet convinced that the effects being reported necessarily point to a health risk. “I do not claim that there is a

health hazard,” he said. “But we do have a key to go forward and plan our future work.”

“I was very skeptical at the start,” Adlkofer added. “With a high probability, I thought it wouldn’t be worth continuing.”

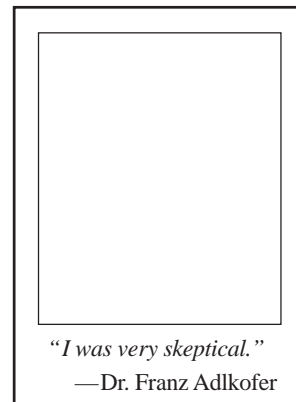
Near the end of the workshop, Adlkofer said he was “astonished” that his team has found any effects at all, given the very ambiguous results of animal and epidemiological studies. At which point, Dr. Joe Elder chimed in, “So am I.” Elder recently left the U.S. Environmental Protection Agency to join Motorola. “If you ask me if they are true,” Adlkofer replied, “I am convinced that there are changes in gene expression.”

“You can say something about their significance, given the animal studies,” countered Elder.

Adlkofer gives a great deal of credit to the EC for sponsoring mobile phone research and is skeptical that the industry is interested in getting to the bottom of the problem. “Without the EC, we could not have done this,” he said. “We are responsible only to science.”

Many experiments remain to be done, and the controversy is a long way from being settled.

The meeting was arranged by the EC and COST281 (see p.4). Some of the presentations are available at <www.cost281.org>, though, at press time, Adlkofer’s was not among them.



Children Could Be at Risk from Antitheft Devices, Gandhi Says

Small children may face health risks from the magnetic fields produced by antitheft systems, according to Dr. Om Gandhi of the University of Utah, Salt Lake City. He warns that the induced currents in a child’s brain and spinal cord could be several times greater than in an adult and could exceed safety limits designed to protect central nervous system tissue.

Gandhi argues that because children are smaller, their heads pass closer to the system’s strongest fields, which are at waist level for adults. For a security gate operating at 30kHz with a field of 150 μ T (1.5 G), he calculates a maximum induced current of 98.9 mA/m² in the brain of a five-year-old and 64.6 mA/m² in that of a ten-year-old—both in excess of the 60 mA/m² limit set by ICNIRP. In an adult’s brain, this same gate would induce a current of 17.6 mA/m².

Gandhi and his postdoc, Dr. Gang Kang, present these calculations in the November issue of *Physics in Medicine and Biology* (*PMB*, 46, pp.2759-2771, 2001). But in an interview with *Microwave News*, Gandhi emphasized that the estimates—which are based on computer models—should be interpreted as pointing to a potential problem rather than an actual hazard.

Gandhi said that he has “no way of knowing” the intensity of

the fields produced by actual antitheft systems and that the assumptions in his model “may or may not be correct.” The calculations, he said, are for a hypothetical device with “typical” design parameters—a strategy chosen to protect the proprietary interests of the manufacturers. Nevertheless, in the published paper, Gandhi writes that ICNIRP’s limits for magnetic fields “may often be exceeded for most of the [antitheft] devices.”

The findings drew the attention of the U.K. press in early October when the Institute of Physics in London, which publishes *PMB*, called on those who make antitheft systems to “limit the strength of their magnetic fields.”

Sensormatic Electronics Corp. in Boca Raton, FL, which makes acousto-magnetic systems that operate at 58 kHz, stated that all its products “comply with applicable worldwide regulatory standards,” including ICNIRP’s.

John Davies, senior vice-president for research and development at Checkpoint Systems Inc. in Thorofare, NJ, said that most of his company’s products operate at 8.2 MHz and use “a much lower power level” than the equipment modeled by Gandhi. Davies explained that the signals used must be kept low in order to insure compatibility with other electronic equipment in stores.

Previously, concerns have been raised on the possibility that antitheft systems can cause interference with implanted cardiac pacemakers (see *MWN*, S/O97 and N/D98).

world (see box at right).

In addition, the French results could help settle the often contentious controversy over whether microwaves can increase the permeability of the blood-brain barrier. “We see leakage through the blood-brain barrier,” Aubineau said.

Drs. Leif Salford and Bertil Persson at Sweden’s Lund University, for instance, have long contended that very low levels of microwaves can cause chemicals to leak through the barrier (see *MWN*, J/A92). Others, like Dr. Stanley Rapoport of the U.S. National Institute of Aging, argue that these and similar studies are “flawed” (see box, p.10).

“This is not a repeat of the Salford study,” pointed out Dr. Bernard Veyret, who is also at the University of Bordeaux and is collaborating with Aubineau. He said that the Bordeaux study is “more relevant to cell phones” than the Salford-Persson work.

Aubineau and Töre exposed the heads of rats to 900MHz GSM radiation with a loop antenna for two hours. They have run three experiments—with average specific absorption rates (SARs) in the brain of 2 W/Kg, 0.5 W/Kg and 0.15 W/Kg. They point out that exposures in the dura, which is closer to the skull, are higher. For instance, at 0.5 W/Kg, it would be approximately 4 W/Kg in the dura.

“I would be surprised if this is a heat effect,” Aubineau said. “It is possible at 2 W/Kg, but unlikely at 0.5 W/Kg.” But Aubineau concedes that he does not yet have any temperature measurements. These will be carried out early next year, he said.

“The effect is clearly not due to stress, because you can see the same result with anesthetized animals,” he added.

“At 0.5 W/Kg, we saw much more leakage in the dura than in the brain,” Aubineau said, noting that, while it was clear that chemicals were passing through the blood-brain barrier at 2 W/Kg, only a little leakage was observed at 0.5 W/Kg. The experiment at 0.15 W/Kg was completed at the end of November and the results are not yet available.

Aubineau warned that if there are changes in the barrier at

very low SARs, they could lead to a major health impact. “Even a small break in the blood-brain barrier can start bad things,” he said.

“I was very surprised to find an effect at such low power levels,” Aubineau said. “When I started, I had a negative opinion and I thought that I would see nothing. But now I’m really interested and I’m planning to do many other experiments.”

The work in Aubineau’s lab is part of the two-year, \$1.6 million COMOBIO research program, sponsored by the National Network for Telecommunications Research, which is now coming to a close. (COMOBIO is short for Communications Mobile et Biologie.) Veyret is optimistic that the French government will sponsor a continuation effort, known as COMOBIO+. In the interim, Veyret said, France Telecom and Bouygues Telecom

Young Phone Users in Ukraine Report More Headaches

Young women are more likely to complain of headaches and fatigue after using a mobile phone, according to a soon-to-be published survey in the Ukraine.

Dr. Victoria Datsenko of the Marzeyev Institute of Hygiene and Medical Ecology in Kiev found that phone users in their 20s and 30s had significantly more central nervous system (CNS) symptoms, compared to controls. The rate was 4.4 times higher among those in their 20s. Women in these two age groups were more likely to have complaints than men. Overall, those who used mobile phones were close to twice as likely to report CNS symptoms, a significant increase over nonusers.

“We cannot explain the difference between the young and the old or between women and men,” Datsenko told *Microwave News*. Her study is based on interviews with 759 subjects (407 cases and 352 controls).

A Nordic Mobile Telephone (NMT) system, operating at 450MHz, was introduced in the Ukraine in 1993. GSM service began two years later. Datsenko said that among those who had used mobile phones for two years or more, NMT users had significantly more CNS symptoms than those with GSM phones.

A Scandinavian study of NMT and GSM phone users also found that symptoms were more common among those under 40. “In general, younger people complain about more symptoms than older people,” Dr. Gunnhild Oftedal, of the Norwegian University of Science and Technology in Trondheim, told *Microwave News* (see *MWN*, M/J98 and J/A00).

In the Ukrainian study, exposures were estimated with power-density measurements rather than with specific absorption rates. NMT phones entailed much higher radiation levels than GSM phones: 316-1,000 $\mu\text{W}/\text{cm}^2$ and 20-159 $\mu\text{W}/\text{cm}^2$, respectively.

Datsenko presented her results at the 13th Conference of the International Society of Environmental Epidemiology in Garmisch-Partenkirchen, Germany, on September 4. Her paper will appear in *Environment and Health*, a peer-reviewed Ukrainian journal. It will be in Ukrainian with an abstract in English and in Russian.

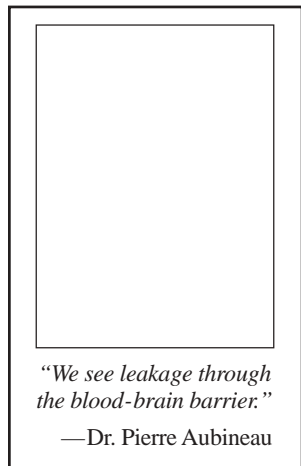
For other reports on mobile phones and headaches, see *MWN*, N/D95, N/D96, M/J97, M/J98, N/D98 and J/A00.

are providing bridge funding.

A meeting will be held in Paris on December 21 at which the participants of the COMOBIO program will present the results of their work.

Aubineau and Veyret were members of the committee that prepared a report on mobile phones and base stations for the French government. The report, which was released earlier this year, called for a precautionary approach toward possible health risks (see *MWN*, J/F01).

Some of Aubineau’s results, as well as those of the other seven projects, are posted on the COMOBIO Web site. Go to: <www.tsi.enst.fr/comobio/resultats/SP6.html>.



High-Profile Criminal Lawyer Takes on Wireless Industry

Criminal defense attorney Mayer Morganroth of Morganroth & Morganroth in Detroit is taking on most of the leading players in the wireless industry. On November 15, Morganroth filed a \$1.5 billion lawsuit on behalf of Michael Murray, a 34-year-old Motorola technician with a brain tumor.

Many more cases are planned. "We will file ten more lawsuits by the end of February," said Sheldon Miller of Lopatin, Miller in Detroit, who is working with Morganroth. These could later be consolidated into a class action, according to Jeffrey Morganroth, Mayer's son.

A flurry of personal injury suits was also predicted last year by Joanne Suder of Baltimore, another member of Murray's legal team, when she filed an \$800 million lawsuit on behalf of Dr. Christopher Newman (see *MWN*, S/O00). But this was the only mobile phone case her firm initiated. The Newman case is now being handled by Peter Angelos in Baltimore (see p.8). Angelos has no connection to the Murray lawsuit.

In addition to Motorola, Qualcomm and the Cellular Telecommunications and Internet Association (CTIA), the complaint cites the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE) as defendants.

ANSI tailored its RF/MW guidelines to ensure that mobile phones "would be excluded from any testing, compliance or monitoring," according to Murray's complaint, which was filed in Washington, DC. ANSI has recognized the IEEE guidelines as national standards.

Jeffrey Morganroth told *Microwave News* that his firm may file what he called a "public interest" suit against the federal health agencies, including the EPA, FCC and FDA. The objective, he said, would be to force the government to regulate the health risks posed by the wireless industry.

Mayer Morganroth is confident that he can show a link between phone radiation and brain tumors. He told the *Financial Times* (November 14) that, "The experts that are knowledgeable, who have really done the investigations and are independent, are of the solid and firm conviction that cell phones cause brain cancer." In an interview with *Microwave News*, Jeffrey Morganroth said that, "among researchers with no ties to the industry, there is a consensus that mobile phone radiation is harmful."

The wireless industry is unimpressed. "We don't feel the Murray case has introduced any new issues," said Motorola's Norm Sandler. And Tom Watson of Watson & Renner in Washington, who represents the Cingular Wireless group, asserted that, "There is no reliable scientific basis for the plaintiff's position."

Although Mayer Morganroth—working with Miller—won a \$19 million verdict in a copyright infringement lawsuit against 20th Century Fox last March, he is best known for his work in criminal cases. He has defended Dr. Jack Kevorkian against charges of assisted suicide, political extremist Lyndon LaRouche against charges of tax evasion and car-maker John DeLorean against charges of drug-trafficking.

According to the complaint, Murray has been permanently disabled by the malignant glioma, which was surgically removed

Million-Dollar Payday for Lawyers in Invasion of Privacy Suit

A Chicago judge has approved close to \$1.5 million in fees and expenses to lawyers who brought an invasion of privacy suit on behalf of millions of cell phone users. The class action suit, *Busse v. Motorola*, filed in 1996, alleges that an epidemiological study sponsored by Wireless Technology Research (WTR) collected personal information without the users' consent (see *MWN*, J/F96, M/J97 and M/A99).

WTR's insurance company is paying \$1.4 million to walk away from the case—the remains of a \$2 million policy. The judge granted Dr. George Carlo, WTR's chair, \$250,000 to set up a voluntary registry of health complaints from cell phone users. Carlo also receives \$150,000 to cover any future litigation costs. Most of the balance will go to Ben Barnow and Alan Goldberg of Barnow & Goldberg and to William Harte, all of whom practice in Chicago. They will still be owed \$500,000 after the insurance money is paid out.

The partial settlement, signed by Judge Stephen Schiller on November 26, covers only the actions of WTR and Carlo. The other defendants, including Motorola, the CTIA and Epidemiology Resources, which ran the study, had contested the settlement proposal and are waiting for the court to rule on their motion to dismiss the case (see *MWN*, J/A01). Norm Sandler of Motorola called the arrangement between Carlo and the *Busse* lawyers an "outrageous, creative way to divide up the insurance money."

Carlo said that he will use the \$250,000 to start the registry and will then seek matching funds from other sources to keep it going. It will be run by the Safe Wireless Initiative, part of his Science and Public Policy Institute.

At the last moment, two epidemiologists tried to derail the settlement. On October 16, Dr. Joshua Muscat of the American Health Foundation in Valhalla, NY, and Dr. Faith Davis of the University of Illinois, Chicago, petitioned Judge Schiller to reject Carlo's voluntary registry. Muscat said that it would have "no scientific value" and Davis called it "fundamentally flawed." Davis was until last year the research director of the U.S. Central Brain Tumor Registry.

But a month later, Muscat and Davis withdrew their petitions. Muscat was hazy as to why he had changed his mind, saying only that he did so after reading Carlo's description of the registry. Nevertheless, he maintained that "I cannot see how it can possibly work as an early warning system."

in November 1999. He bought a Motorola StarTac phone in 1993 and a Qualcomm phone in 1996. Murray, who lives in Chicago, also tested wireless phones in his job at Motorola. The fact that Murray works for Motorola is not cited in the complaint. He filed for workers' compensation last year. This claim is still pending.

The complaint also charges that the wireless industry made false claims regarding the safety of phones, conspired to "conceal and suppress" information on possible risks and manipulated RF health research. "Researchers who discovered adverse effects," the complaint states, "lost their funding, were fired, found their reputation damaged and had their work denigrated."

« Wireless Notes »

Another researcher has discovered an intriguing RF/MW effect only to find that there is no money to follow it up. Dr. **Pamela Sykes** of Flinders University in Adelaide, **Australia**, has not abandoned all hope, but she is clearly frustrated after being denied support both this year and last. In the November issue of *Radiation Research*, Sykes reports on what she calls a “surprising” observation: Mice exposed to 4 W/Kg GSM radiation for 25 days had fewer changes than expected in their **DNA**—or, more precisely, fewer spontaneous intrachromosomal recombinations (see p.12; also *MWN*, N/D00). This may not be, as it might first appear, a beneficial effect because, Sykes points out in her paper, some proven genotoxic agents can also cause reductions in DNA rearrangements. This project was part of the Australian research program on mobile phone safety administered by the National Health and Medical Research Council (NHMRC) (see *MWN*, N/D96 and J/A98). Sykes told *Microwave News* that when she asked for an extension, the review committee turned her down in part because her results were “inconclusive” due to the small number of mice used in the experiment. In fact, Sykes had wanted the grant renewal in order to be able to repeat the study with a larger number of animals. The committee also explained that her finding of a decrease in recombinations did not support her original hypothesis. “Although it may be interesting, from a perspective of scientific curiosity, to further explore the phenomena...is, however, unfortunately outside [our] scope,” the committee wrote, suggesting that Sykes apply to the NHMRC for a grant not specifically tied to RF/MW effects. She did, but once again came up empty-handed. According to Sykes, the NHMRC panel wrote back saying that, while it “recognized the great potential significance” of her results, it considered them “somewhat counterintuitive.” Sykes finds this statement—like much of the rest of this story—“amazing.”

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Dr. **Om Gandhi** has been making headlines in England telling the press that **children** absorb twice as much radiation from cell phones as adults. CHILDREN AT HIGHER RISK OF MOBILE PHONE RADIATION ran the headline in the November 18 U.K. *Sunday Times*. Gandhi first raised such concerns back in 1996, and at this year’s annual meeting of the Bioelectromagnetics Society (BEMS) in St. Paul, MN, he presented computer simulations which showed that the 1g SARs are up to 50% higher for children’s heads relative to those of adults. When he got back to Salt Lake City, Gandhi did some more calculations and this fall he submitted his results for publication. “For children, the telephone is closer to the brain, the skull is thinner and therefore the penetration is greater,” Gandhi told *Microwave News*. (Gandhi also has a new paper that addresses the risk of antitheft systems to children; see p.5.) Mobile phone radiation risks to children have been a particularly sensitive subject in England ever since a high-level committee chaired by Sir William Stewart recommended that children under 16 years old be discouraged from using mobile phones (see *MWN*, M/J00). Gandhi’s new paper is sure to rekindle a long-running dispute with Dr. **Niels Kuster** of IT’IS in Zurich. In a paper pub-

lished in the February 1998 issue of *Health Physics*, Kuster and his then-doctoral student, Dr. **Frank Schönborn**, presented their own computer models showing that the SARs for children are within the variation of those for adults. (Schönborn now works at VIAG Interkom, a German mobile phone service provider.) Kuster told *Microwave News* that he is astonished that this issue is back in the news. “The physics suggests and our study demonstrates that there is no significant difference in exposure between adults and children—nor is there any greater penetration in children’s brains.” Kuster stressed that the fact that SARs go up as the phone gets closer to the head has been known since 1992. The dispute over the risk to children may have some immediate consequences because the IEEE SCC-34 committee developing a protocol for testing mobile phones is using Kuster’s models. Gandhi says that the current proposal may not be conservative enough. “I am not being alarmist,” Gandhi said. “I’m just trying to be thorough.”

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In November, Dr. **Lennart Hardell** of Sweden’s Örebro University flew to Baltimore to give testimony on behalf of Dr. **Christopher Newman**, who blames **Motorola**, **Verizon** and others for his brain cancer (see *MWN*, S/O00). Hardell is the last expert for Newman to be deposed (see *MWN*, J/A01). Those slated to testify for the defense include Dr. **Richard Bockman** of Cornell medical school, Dr. **Christopher Davis** of the University of Maryland, Dr. **Paul Doetsch** of Emory medical school, Drs. **Fred Hochberg** and **David Louis** of Harvard medical school, Dr. **Mark Israel** of Dartmouth medical school, Dr. **John Laterra** of Johns Hopkins medical school, Dr. **Martin Meltz** of the University of Texas, Dr. **Mark Nelson** of the University of Vermont medical school and Dr. **Stanley Rapoport** of the National Institute of Aging (see p.10). On February 25, federal Judge **Catherine Blake** will open a hearing in Baltimore to decide what scientific evidence and which expert opinions are admissible under standards set by the U.S. Supreme Court in its 1993 *Daubert* ruling. The Daubert hearing prompted a three-page article in the November 16 issue of *Science*, which revealed that Dr. **Allan Frey**, a consultant based in Potomac, MD, is serving as science advisor to Newman’s lawyers, the **Peter Angelos** law firm in Baltimore. Meanwhile, the class-action lawsuits to force manufacturers to provide hands-free sets with all mobile phones (see *MWN*, M/J01) have been consolidated, and they, too, will be heard by Judge Blake.

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Long before the wireless revolution, the **CIA** tried to spy on the Russians using a cat with an implanted transmitter. The tail served as an antenna. The November 4 U.K. *Daily Telegraph* reports on **Project Acoustic Kitty**, which is said to have cost more than \$15 million. The cat paid the ultimate price in its first trial outing. As soon as it was released from its van, a taxi ran over it. “There they were, sitting in the van with all those dials and the cat was dead,” said former CIA officer Victor Marchetti, the co-author of the classic book, *The CIA and the Cult of Intelligence*.

NAS–NRC To Evaluate Health Impact of PAVE PAWS Signals

The U.S. Air Force (USAF) has asked the National Academy of Sciences–National Research Council (NAS–NRC) to evaluate the possible health impacts of radiation from PAVE PAWS radars.

Under the \$1 million, two-year contract, an NAS–NRC committee will decide if data on continuous and pulsed radiofrequency and microwave (RF/MW) radiation can be used to predict the biological effects of high-power, phased array radars. If so, the NAS–NRC committee will offer its opinion as to whether PAVE PAWS radars—like the one on Cape Cod, MA—present a risk to public health. If the data are insufficient, the committee will recommend studies that can help determine the risk.

Drs. Rick Jostes and Evan Douple, the codirectors of the study at the NAS–NRC Board on Radiation Effects Research, are collecting names of possible committee members. “We are shooting for releasing a roster in December,” Jostes told *Microwave News*. He declined to reveal the names of any of those under consideration, saying only that they have received some 125 nominations from various sources.

Since 1997, the U.S. Congress has required the NAS to offer the public the opportunity to comment on candidates for study committees. Their names, with brief biographies, are posted on the NAS Web site for 20 days before a final selection is made.

The USAF set up the committee in response to a request by Sen. Edward Kennedy (D-MA) (see *MWN*, J/F01). Kennedy, in turn, is responding to pressure from Cape Cod residents who suspect that the radar plays a role in the higher than expected rates of cancer among residents of the Cape.

The dispute between the USAF and local communities has been simmering for more than 20 years—it began even before the radar became operational in 1980. But the citizens’ concerns took on new urgency last year when Dr. Richard Albanese, a USAF physician at Brooks AFB in San Antonio, went public with charges that the biological effects of phased array radiation have never been adequately studied. “This lack of testing makes me nervous indeed,” Albanese wrote to the Massachusetts Department of Public Health (see *MWN*, S/O00).

Sharon and Richard Judge of Sandwich, MA, are leading the campaign to move the radar to “a more appropriate location, away from population centers.” They have asked the Air Force to declassify Albanese’s technical papers and to make them available to the NAS–NRC committee.

The Judges point out that much of the Air Force’s Electromagnetic Health and Safety Program at Brooks AFB is secret, available only to those with security clearances. “We want the committee and the public to have access to the work of Albanese and his team,” Sharon Judge told *Microwave News*.

Jostes said that any classified data will be available to some members of the committee. “There are people in the RF community who have clearances,” he noted, adding that Douple himself has access to classified information.

In August, Douple and Jostes got a taste of the often harsh controversy over the radar at the annual, by-invitation-only Mich-

Standards Watch

- **Korea’s** new radiation health standards, which take effect on January 1, 2002, are a mix of those recommended by ICNIRP and the IEEE SCC-28. The **Korean Electromagnetic Engineering Society (KEES)** had adopted the ICNIRP SAR and exposure standards in 1999, but last year the **Ministry of Information and Communication (MIC)** decided to follow the 1.6 W/Kg SAR standard set by SCC-28 and used by the U.S. FCC. While MIC did adopt ICNIRP’s two-tier exposure standard, it left out the guidelines for contact and induced currents and those for pulsed fields. The Korean SAR test method is based on the protocols developed by CENELEC and the IEEE SCC-34, according to Dr. Nam Kim of Chungbuk National University. By the end of the year, SARs for all phones on the Korean market will be made publicly available.

- The **Japanese** Ministry of Public Management, Home Affairs, Posts and Telecommunications (**MPHPT**) will begin enforcing a 2 W/Kg SAR limit for 800 MHz and 1.5 GHz mobile phones on June 1, 2002. The ICNIRP-based limit, which is averaged over 10 g, was adopted on June 1 of this year. Tetsuya Yamano, the assistant director of MPHPT’s Electromagnetic Environment Division, said that the new Japanese SAR test method is very similar to the protocol recently adopted by CENELEC (see *MWN*, J/A01).

- In Australia, as of January 1, 2002, *all* portable sources of RF/MW radiation used by the public must comply with a 1.6 W/Kg, averaged over 1 g, SAR limit. Mobile, cordless and satellite phones are already covered, but the new rules, adopted by the **Australian Communications Authority (ACA)** in Canberra, will ensure that all other devices with “integral antennas” also meet this SAR standard. The new rules are formally known as the *Radiocommunications (Electromagnetic Radiation—Human Exposure) Standard 2001*. Meanwhile, the interim “flat,” or frequency-independent, RF/MW exposure standard is on the way out in favor of looser limits. In March, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) proposed a standard that closely follows the ICNIRP guidelines (see *MWN*, M/A01; also S/O99). ARPANSA has also prepared a draft regulatory impact statement (available at <www.arpansa.gov.au/dr_imp.htm>; comments were due November 23). The statement, which includes a useful recap of the somewhat tortuous history of RF/MW standards in Australia and **New Zealand**, outlines the pros and cons of the various regulatory options—but not the possibility of keeping the interim flat standard. If the proposed standard is adopted, the SAR limit for mobile phones would rise to 2.0 W/Kg, averaged over 10 g. Approval could come as soon as early next year, Dr. John Loy, CEO of ARPANSA, told *Microwave News*. Chris Zombolas of EMC Technologies Ltd. in Melbourne, a leading testing lab, considers this to be too optimistic, however. He predicts that the process will not be complete until late next year. If and when it is approved, the ACA will adopt the new limits, making them legally binding.

HIGHLIGHTS

aelson conference in Montana. At a session on PAVE PAWS, Dr. John Leonowich of the Battelle Labs in Richland, WA, gave a talk titled "The PAVE PAWS Controversy: A Threat to Real Bioelectromagnetics Science." Dr. Robert Adair of Yale University in New Haven, CT, later spoke on "Voodoo Science Countered: Radiation from PAVE PAWS" (see also *MWN*, J/F01).

Jostes pointed out that last summer he and Douple also met with the Judges to learn about their concerns. "We want to hear a variety of viewpoints," he said.

Meanwhile, in November the USAF released parts of its plan

to characterize PAVE PAWS signals in the time domain. These are available at <www.pavepaws.org/health_&_safety.htm>.

This is the second time the NAS–NRC has investigated PAVE PAWS radiation. In 1979, it issued separate reports on the health and the engineering aspects of the radar. The health panel was chaired by Dr. Stephen Cleary of Virginia Commonwealth University in Richmond.

The Cape Cod PAVE PAWS radar operates at 420-450 MHz with a peak power of more than 600 kW and is designed to detect missiles at distances of thousands of miles.

FROM THE FIELD

What Do You Think of Nonthermal Effects? And Other IEEE SCC-28 Multiple Choice Questions

Members of the IEEE's SCC-28 Revision Working Group were asked to complete the following questionnaire prior to a telephone conference call held on November 9. For more on the working group's current proposal to revise the ANSI/IEEE RF/MW exposure standard, see *MWN*, S/O01.

1. **The RF safety standard should:** (a) be based on science only; (b) also include sociopolitical considerations; (c) should include other considerations (specify).
2. **The RF safety standard should be derived from:** (a) database–peer

Studies Showing RF/MW-Induced BBB Leakage Called "Flawed"

Dr. Stanley Rapoport, chief of the Brain Physiology and Metabolism Section at the National Institute of Aging in Bethesda, MD, offered the following opinion in an affidavit for the defense in *Newman v. Motorola et al.* Dr. Christopher Newman alleges that his brain tumor was caused by mobile phone use (see p.8 and *MWN*, S/O00, N/D00 and J/F01):

"It is my opinion that radiofrequency radiation (RFR) in the frequency ranges and power densities of wireless phones does not increase permeability of the blood-brain barrier [BBB]. It is also my opinion that there is no reasonably accepted mechanism by which an increase in the permeability of the BBB can cause brain cancer....The scientific literature regarding the effects of RFR on the permeability of the BBB is consistently negative. The few positive studies...are methodologically flawed."

In his October 17 affidavit, Rapoport wrote that he has spent nearly 40 years doing research on the BBB and is the author of *Blood-Brain Barrier in Physiology and Medicine* (New York: Raven Press, 1976). Rapoport's fee is \$400 per hour, with a maximum of \$2,000 per day. (See also p.1.)

reviewed publications; (b) possible effects proposed by some scientists; (c) precautionary principle; (d) media comments and demands.

3. **The RF safety standard should be based on:** (a) any biological effects reported in the literature; (b) established biological effects not necessarily adverse to health; (c) established adverse health effects; (d) others (specify).
4. **The safety factors are needed to cover** (check applicable items): (a) uncertainty in database; (b) uncertainty in measurement; (c) people with different RF sensitivity, including unhealthy people; (d) different exposure time; (e) environmental factors; (f) other factors (specify).
5. **If there is a threshold of adverse effect, what do you think the safety factor should be, based on our current knowledge?** (a) 2; (b) 3; (c) 5; (d) 10; (e) 20; (f) 50; (g) 100; (h) 1000; (i) others, such as _____.
6. **What do you think of the nonthermal effects?** (a) I don't believe any nonthermal effect; (b) No nonthermal effect has been established (no independently repeatable nonthermal RF effect); (c) I think some nonthermal effects are true; (d) None of the nonthermal effects are proven adverse to health; (e) Some nonthermal effects are adverse to health (specify); (f) For the above question, how do you know that the effects are nonthermal? Explain; (g) Nonthermal effects should be used for RF safety standard setting; (h) Nonthermal effects cannot be used for RF safety standard setting.
7. **Do you agree that thermal effect is the only established adverse effect for the RF range (except neurostimulation by RF fields and currents for low-frequency RF)?** (a) Yes; (b) No (explain why not).
8. **If thermal effect is the only established adverse effect, do you think temperature is more suitable than SAR for determining the basic restriction limits?** (a) Yes; (b) No (explain).
9. **Do you agree that microwave hearing effect is an adverse effect?** (a) Yes; Why? (b) No. Why? (c) other options, such as _____.
10. **Do you agree that the microwave hearing threshold should be used for setting the limit for pulsed fields?** (a) Yes; (b) No; (c) other options, such as _____.
11. **Should include synergistic action with other factors, such as drugs and X-ray?** (a) Yes; (b) No. Why not?

More on the Closing Down of NCRP's RF/MW Panel When Was Motorola's C.K. Chou Asked To Step Down? Chou and Lin Respond

October 26, 2001

To the Editor:

The S/O01 *Microwave News* (p.11 and p.19) mentions my activity regarding NCRP Scientific Committee 89-5. I would like to provide some clarifying information for you and your readers.

In your editorial, you write that, "In January 2000, two years after he joined Motorola, Chou finally conceded the obvious: He had a conflict of interest. When Chou put this in writing, Lin felt he had no choice but to ask him to resign. Work on the report stopped while Chou resisted leaving the committee and Petersen refused to force the issue."

On the contrary, I know the following to be true: In 1995, when I first served as vice-chair of SC 89-5 and was working at the City of Hope National Medical Center, I was responsible for writing Chapter 2, "Exposure Assessment and Dosimetry," and Chapter 7, "Microwave Effects on the Nervous System Including Special Senses." When I began working for Motorola in April 1998, I anticipated a possible perception of a conflict of interest by others and offered to resign from SC 89-5, as well as many other committees. I was asked twice (April 1998 and June 1999) to remain on the committee by both NCRP President Charles Meinhold and SC 89-5 Chair Jim Lin. Therefore, I stayed on the committee. In January 2000, Lin reorganized the committee and invited me to remain as a member. I signed the agreement but indicated that I would finish only Chapter 2, not Chapter 7. I felt it would be more appropriate for someone outside industry to write this chapter—again, because of the potential that others may perceive a conflict of interest. This was accepted and I was appointed a member of SC 89-5. I then heard nothing until June 2001 when Lin informed me that it would be better for me to resign. I sent in my resignation on June 21. I had no reservation at all about resigning because that was what I had wanted to do in April 1998.

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On receiving Dr. Chou's letter, *Microwave News* offered Dr. Lin, the chair of the National Council on Radiation Protection and Measurements SC 89-5, the opportunity to respond.

November 9, 2001

To the Editor:

To the best of my knowledge, the report on p.11 of your S/O01 issue is factual. The decision of the NCRP board of directors that prompted this report is unfortunate and disconcerting.

C.K. Chou's letter to the editor states that, "In January 2000...I signed the agreement [to serve as a member of NCRP 89-5] but indicated that I would finish only Chapter 2, not Chapter 7....I then heard nothing until June 2001..."

Here are some additional facts:

In January 1998, when Chou asked about his status on SC 89-5 after joining Motorola, I replied in writing that, "I would like you to remain on the committee. If at some point you feel the change will affect the committee's deliberations, please let me know immediately."

In January 2000, on my recommendation, NCRP President Charles Meinhold invited Chou to be a member of the reconstituted SC 89-5. Chou's written, one-sentence response stated that "Due to conflict of interest, [I] will only complete Chapter 2, and let others finish Chapter 7." (Chapter 2 is on exposure assessment and dosimetry, and Chapter 7 is on effects on the nervous system.)

In February 2000, I wrote to Meinhold stating that, "The conflict could, potentially, compromise the committee's deliberation on recommendations for exposure criteria. I would, therefore, withdraw my recommendation for Dr. Chou's membership on SC 89-5."

Starting from shortly thereafter, records of correspondence show that Ron Petersen, NCRP vice-president in charge of non-ionizing radiation, was in discussions with Chou concerning his membership on the committee.

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12. *The RF safety standard should be:* (a) one tier; (b) two tiers; (c) other options, such as _____.

13. *What do you think should be the basis for local SAR limit?* (a) eye damage; (b) testis damage; (c) brain damage; (d) skin damage; (e) others, such as _____.

14. *For peak SAR tissue averaging, do you agree that IEEE should change the averaging mass to 10 g?* (a) Agree; (b) Disagree. Why not?

15. *Are the MPEs [maximum permissible exposures] in the draft C95.1 acceptable to you?* (a) Yes; (b) No. Why not?

16. *Is the peak SAR limit in the draft C95.1 acceptable to you?* (a) Yes; (b) No. Why not?

17. *See the 14-issue list below raised by the federal government Ra-*

diofrequency Interagency Working Group [see MWN, J/A99]. Any other issues which you think we should spend more time discussing in the telephone conference? (a) biological basis for local SAR limit; (b) selection of an adverse effect level; (c) acute and chronic exposures; (d) one-tier vs. two-tier guidelines; (e) controlled vs. uncontrolled (applicability of 2 IEEE exposure tiers); (f) uncertainty factors; (g) pulsed (intensity) or frequency-modulated RF radiation; (h) time averaging; (i) lack of peak (or ceiling) limits for induced and contact current; (j) criteria for preventing hazards caused by transient discharges; (k) limits for exposure at microwave frequencies; (l) replication/validation; (m) important health effects literature areas; (n) compatibility of RFR guidelines.

18. *Any other subjects that you think we should discuss?* (a) No, we have enough to talk about; (b) Yes. Please specify _____.

Hot New Papers

J. Björk et al., "Are Occupational, Hobby or Lifestyle Exposures Associated with Philadelphia Chromosome-Positive Chronic Myeloid Leukemia [Ph+CML]?" *Occupational and Environmental Medicine*, 58, pp.722-727, November 2001.

"A case-control study, comprising 255 Ph+CML patients from southern Sweden and matched controls, was conducted....[O]ccupational titles were obtained from national registries, and group level exposure—that is, the exposure proportion for each occupational title—was assessed with a job exposure matrix....The classification of EMF intensity was largely based on the average intensities for various occupational groups reported by Floderus et al. [*Int J Occup Environ Health*, 2, pp.226-238, 1996]....[T]he overall risk estimate and the risk estimate for long durations of exposure were both increased, whereas no trend with exposure intensity was indicated.... An association with long occupational exposure to EMFs was found (OR 2.3, 95% CI: 1.2 to 4.5)."

M. Crasson et al., "Daytime 50Hz Magnetic Field Exposure and Plasma Melatonin and Urinary 6-Sulfatoxymelatonin [6-OHMS] Concentration Profiles in Humans," *Journal of Pineal Research*, 31, pp.234-241, November 2001.

"A double-blind laboratory study was performed to evaluate daytime exposure effects of 100µT root mean square (rms) 50Hz MF. Three head exposure sessions of 30 min each were performed: sham, continuous and intermittent (15 s on/off cycles). MFs were presented to each subject in early or late afternoon (13:30 or 16:30hr). 21 healthy male volunteers (20-27 yr old) participated in these 3-weekly experimental conditions. Blood samples were drawn for serum melatonin measurement, hourly at night...under controlled environmental conditions. Urinary excretion of 6-OHMS, the main melatonin metabolite, was measured for a 17 hr period....There were no significant differences in either plasma melatonin or in 6-OHMS excretion profiles in the three experimental conditions. However, a tendency for a smaller increase of night-time urinary 6-OHMS after continuous MF exposure was found (p=0.08), particularly in men with the lower excretion rate of 6-OHMS... (p=0.07). We conclude that this study does not indicate that daytime acute MF exposure influences either melatonin secretion or 6-OHMS excretion. Inter-individual differences in pineal production of melatonin, however, have to be taken into account in further studies....It is, however, too early to conclude that pineal function in humans is unaffected by MF exposure before further examining the MF effect with different experimental and technical characteristics of exposure."

Patrick Mason et al., "Lack of Effect of 94 GHz Radiofrequency Radiation Exposure in an Animal Model of Skin Carcinogenesis," *Carcinogenesis*, 22, pp.1701-1708, October 2001.

"Because absorption of MMW [millimeter wavelength] energy occurs in the skin, it is to be expected that long-term detrimental health effects, if any, would most likely be manifest in the skin....There are three principal conclusions derived from this study. First, a single MMW exposure (1.0 W/cm² for 10s) that produces a 13-15°C increase in skin temperature does not promote the development of papillomas in DMBA-initiated SENCAR mice. Second, repeated MMW exposures (twice weekly for 12 weeks, 333 mW/cm²) that produce a 4-5°C increase in skin temperature failed to either promote or act synergistically with TPA to copromote the development of papillomas in this mouse model. Finally, repetitive exposure to MMW alone does not alter the expression of well-recognized early biomarkers and MMW exposure does not affect TPA-induced increases in these indices of epidermal hyperplasia....The experiments...address two potential scenarios [for] accidental overexposure. The first is a single accidental overexposure to a relatively

GSM Radiation Can Affect DNA Recombination in Mice

Pamela Sykes et al., "Effect of Exposure to 900MHz Radiofrequency Radiation [RFR] on Intrachromosomal Recombination in pKZ1 Mice," *Radiation Research*, 156, pp.495-502, November 2001.

"pKZ1 mice were exposed daily for 30 min to plane-wave fields of 900MHz [GSM radiation] for one, five or 25 days. Three days after the last exposure, spleen sections were screened for DNA inversion events. There was no significant difference between the control and treated groups in the one- and five-day exposure groups, but there was a significant reduction in inversions below the spontaneous frequency in the 25-day exposure groups....The data...provide the first evidence that pulsed RFR as emitted from digital mobile phones can affect intrachromosomal recombination. We observed a significant 40% reduction in somatic intrachromosomal recombination below the spontaneous frequency after 25 daily 30 min 4 W/Kg exposures. The numbers of animals in the treatment groups were small (n=10 or n=20)...repetition of this study with a larger number of animals/treatment group is required to confirm these observations....The detection of a reduction below the spontaneous inversion frequency in pKZ1 mice treated with RFR is surprising. However, we previously observed that a statistically significant reduction in somatic intrachromosomal recombination in spleen occurs with the pKZ1 mutagenesis model after the mice are exposed to a number of proven genotoxic agents.... There are a number of possible explanations....Somatic intrachromosomal recombination events already present could have been eliminated in response to RFR. This seems unlikely....If somatic intrachromosomal recombination, like other repair mechanisms, is dependent on proliferation, then recombination may be reduced owing to a reduction in proliferation. Although some studies indicate no effect of RFR on proliferations *in vitro*, RFR has been shown to increase and decrease proliferation of cytolytic T lymphocytes *in vitro*. RFR has also been shown to inhibit proliferation of cells of a human astrocytoma line. An effect of RFR on cell proliferation or the cell cycle could have a downstream effect on DNA recombination/repair and hence on genotoxicity....A decrease below the spontaneous somatic intrachromosomal recombination frequency may also occur if RFR has a direct effect on recombination repair enzymes....Whatever the mechanism for the reduction of somatic intrachromosomal recombination below the spontaneous frequency by exposure to RFR, the results of the present study suggest that RFR does have a direct or indirect biological effect on DNA recombination and hence on mutation frequency....If RFR is genotoxic, then it is likely to play some role in either the initiation or progression of cancer. It is also possible that individuals in the population who already possess mutations that make them prone to cancer may be more susceptible to the mutagenic effects of RFR." (See p.8 and MWN, N/D00.)

high power density of MMW....The second exposure scenario is that of repeated exposure to lower levels of MMW...Thus, there was no evidence that MMW exposure under these experimental conditions served as either a promoter or a copromoter in a well-accepted animal model of skin carcinogenesis."

(Some members of this USAF team wrote a review article on MMW surface heating last year; see *MWN*, J/F00. They have also worked on the USAF's millimeter wave crowd-control weapon—called active denial technology—which operates at 95 GHz; see *MWN*, M/A01).

A. McCurdy, L. Wijnberg, D. Loomis, D. Savitz and L. Nylander-French, "Exposure to Extremely-Low-Frequency Magnetic Fields Among Working Women and Homemakers," *Annals of Occupational Hygiene*, 45, pp.643-650, 2001.

"The 273 women who participated wore an integrating personal magnetic field exposure meter (AMEX 3-D) that measured their time-weighted average (TWA) exposure. A questionnaire was administered to determine the duration and frequency of electric appliance and machinery use. The geometric mean (GM) of the TWA exposure for employed women was 0.138 μ T (range 0.022-3.636 μ T) and for homemakers 0.113 μ T (range 0.022-0.403 μ T). Women working in manufacturing and industrial facilities had the highest exposure (GM 0.265 μ T, range 0.054-3.436 μ T), while nurses and health technicians (GM 0.134 μ T, range 0.032-0.285 μ T) and teachers and school administrators (GM 0.099 μ T, range 0.035-0.673 μ T) had the lowest exposures. Job titles, unless very limited in scope and/or environment, self-reported information about equipment use, potential exposure sources, time and distance, were not good predictors of magnetic field exposure. Furthermore, the results show that occupations previously observed to have increased risk of breast cancer, such as teachers, nurses, administrative support and housewives, did not have elevated average magnetic field exposures. Therefore, it is questionable whether exposure to power-frequency magnetic fields is the cause of the increased breast cancer risk seen in these occupations."

Yoram Wolf, Neta Adler and Daniel Hauben, "Exploding Microwaved Eggs—Revisited," *Burns*, 27, pp.853-855, December 2001.

"Careful review of the English language literature through a Medline search from 1966 to 2000 was performed, in search of burns caused by

New Books

Blake Levitt, ed., *Cell Towers: Wireless Convenience? Or Environmental Hazard?* 355pp., \$19.95, Markham, ON, Canada: Safe Goods/New Century Publishing, 2001.

The proceedings of a meeting held in Connecticut last year, with a number of useful documents appended.

James Collman, *Naturally Dangerous: Surprising Facts About Food, Health and the Environment*, 282pp., \$29.00, Sausalito, CA: University Science Books, 2001.

A Stanford chemistry professor brings a skeptic's eye to many of the public's health worries.

Dag Brune, Ragnar Hellborg, Bertil Persson and Rauno Pääkkönen, eds., *Radiation: At Home, Outdoors and in the Workplace*, 563pp., 110 Euros, \$95.00, Oslo, Norway: Scandinavian Science Publisher, 2001.

Covers the whole spectrum—with chapters on EMFs and mobile phones. Also includes a case study of the *Kvikk* birth defects cluster.

Steven Milloy, *Junk Science Judo: Self-Defense Against Health Scares & Scams*, 228pp., \$18.95, Washington: Cato Institute, 2001.

The maestro of junkscience.com offers 12 lessons on how to poke holes in studies that point to health risks.

exploding eggs....[A] total of 13 cases were analyzed. The average age of patients was 24.3 years (range, 7-49 years). All patients suffered from superficial burns of the mid and upper face, namely the forehead, periorbital region, dorsum of nose and malar areas. All patients with information available complained of ocular disturbances, and three suffered long-term decrease in visual acuity. Long-term skin complications were not reported. In summary, the clinical presentation of a facial injury from an exploding microwave-heated egg is relatively constant and mild."

"MICROWAVE NEWS" FLASHBACK

Years 20 Ago

- In a joint study, a British-American team finds elevated rates of suicide in locations with high EMF levels.
- At a meeting on RF/MW radiation and health, Dr. Samuel Koslov of the JHU Applied Physics Lab criticizes ANSI's draft standard as "a grotesque violation" of ALARA, which allows "considerable risk with little benefit to either the industry or military organizations."
- Clusters of miscarriages and birth defects among women who work with VDTs continue to emerge in the U.S. and Canada, casting doubt on government reassurances that the equipment is safe.

Years 10 Ago

- The IEEE approves a revision of ANSI's 1982 RF/MW radiation standard which, for the first time, requires stricter exposure limits for the public than for workers.

- After five years of grant proposals, Drs. Scott Davis of the Fred Hutchinson Cancer Research Center and Richard Stevens of Battelle Pacific Northwest Labs receive funding to investigate the possible link between light at night and female breast cancer.
- The Connecticut State Police bans the use of hand-held radar by officers as concern over a possible cancer link mounts.

Years 5 Ago

- The NAS-NRC concludes that there is "no conclusive and consistent evidence" that residential EMF exposure is a human health hazard. However, it does find a higher than expected incidence of leukemia among children who live near high-voltage power lines.
- To avoid EMI, active cell phones should be kept at least six inches from cardiac pacemakers, according to CTIA-WTR guidelines.
- Reports of headaches among users of mobile phones emerge in the U.S., after similar complaints have been reported in other countries.

2002 Conference Calendar (Part I)

Part II will appear in our next issue.

January 9-12: **International Union of Radio Science (URSI) National Radio Science Meeting**, University of Colorado, Boulder, CO. Contact for Commission K, Electromagnetics in Biology and Medicine: Dr. Frank Barnes, University of Colorado, Boulder, CO 80303, (303) 492-8225, E-mail: <frank.barnes@colorado.edu>, Web: <cires.colorado.edu/ursi>.

January 27-31: **IEEE Power Engineering Society (PES) Winter Meeting**, Hilton Hotel, New York, NY. Contact: Melvin Olken, 445 Hoes Ln., PO Box 1331, Piscataway, NJ 08855, (732) 562-3864, Fax: (732) 981-1769, E-mail: <m.olken@ieee.org>, Web: <www.ieee.org>.

January 29-February 1: **3rd RF Waipuna Meeting**, Waipuna Conference Center, Auckland, New Zealand. Contact: Dr. David Black, Enviromedix, Private Bag 24-904, Royal Oak, Auckland, New Zealand, (64+9) 625-0407, Fax: (64+9) 625-2292, E-mail: <david@enviromedix.co.nz>, Web: <www.enviromedix.co.nz/icoh>.

January 30-February 1: **21st Annual Scientific Conference of the Society for Physical Regulation in Biology and Medicine (SPRBM)**, Westgate Hotel, San Diego, CA. Contact: Gloria Parsley, 2412 Cobblestone Way, Frederick, MD 21702, (301) 663-4556, Fax: (301) 694-4948, E-mail: <gloriaparsley@aol.com>, Web: <www.sprbm.org>.

February 8: **Bioelectromagnetics Society (BEMS) Winter Workshop: Epidemiological Considerations in Electromagnetics**, Radisson Barcelo Hotel, Washington, DC. Contact: Ewa Czerska, CDRH, FDA, 9200 Corporate Blvd., Rockville, MD 20850, (301) 594-1212 ext.119, Fax: (301) 480-4224, E-mail: <emc@cdrh.fda.gov>, Web: <www.bioelectromagnetics.org>.

March 17-21: **41st Annual Meeting of the Society of Toxicology (SOT)**, Opryland Hotel, Nashville, TN. Contact: Clarissa Wilson, SOT, 1767 Business Center Dr., Ste. 302, Reston, VA 20190, (703) 438-3115, Fax: (703) 438-3113, E-mail: <clarissa@toxicology.org>, Web: <www.toxicology.org>.

March 18-20: **Wireless 2002**, Orange County Convention Center, Orlando, FL. Contact: Michele Solomon, Cellular Telecommunications and Internet Association, 1250 Connecticut Ave., NW, Ste. 800, Washington, DC 20036, (202) 736-3244, <msolomon@ctia.org>, Web: <www.ctiashow.com>.

April 6-11: **National Association of Broadcasters Annual Convention (NAB)**, Las Vegas, NV. Contact: Kristie Morris, NAB, 1771 N St., NW, Washington, DC 20036, (800) 342-2460 or (202) 429-4194, E-mail: <kmorris@nab.org>, Web: <www.nab.org>.

April 10-11: **38th Annual Meeting of the National Council on Radiation Protection and Measurements (NCRP)**, Crystal City Marriott, Arlington, VA. Contact: Laura Atwell, 7910 Woodmont Ave., Ste. 800, Bethesda, MD 20814, (301) 657-2652, Fax: (301) 907-8768, E-mail: <atwell@ncrp.com>, Web: <www.ncrp.com>.

April 12-19: **Annual American Occupational Health Conference**, Chicago, IL. Contact: American College of Occupational and Environmental Medicine, 1114 N. Arlington Heights Rd., Arlington Heights, IL 60004, (847) 818-1800, Fax: (847) 818-9286, Web: <www.acoem.org/courses/conf2.htm>.

April 15-17: **American Power Conference**, Downtown Marriott, Chicago, IL. Contact: AP Conference, 1421 S. Sheridan Rd., Tulsa, OK 74112, (918) 831-9160, Fax: (918) 831-9161, E-mail: <apc@pennwell.com>, Web: <www.apc-pennwell.com>.

April 22-25: **IEEE Radar Conference**, Hyatt Regency, Long Beach, CA. Contact: Dr. Thomas Miller, Raytheon Co., 2000 E. El Segundo Blvd., El Segundo, CA 90245, (310) 335-6402, Fax: (310) 335-6387, E-mail: <tmiller@west.raytheon.com>, Web: <www.ewh.ieee.org/r6/lac/radar02/index.html>.

April 27-May 2: **Annual Meeting of the Environmental Mutagen Society (EMS)**, Hilton Hotel, Anchorage, AK. Contact: Lawrence Loeb, Dept. of Pathology, University of Washington, PO Box 357705, Seattle, WA 98195, (206) 543-9360, Fax: (206) 543-3967, E-mail: <laloeb@u.washington.edu>, Web: <www.ems-us.org/meetings.html>.

April 28-May 2: **International Magnetics Conference (Intermag)**, RAI Con-

Meeting Notes

- There will be a non-ionizing radiation workshop in Vancouver at the May conference of the Canadian Radiation Protection Association (see also p.16).

- The abstracts of papers presented at September's meeting of the **Australasian Radiation Protection Society** are on its Web site, <www.arps.org.au/AbstractsARPS26.pdf>. Many of them are on ionizing radiation, but some are from the non-ionizing side of the spectrum. For instance, **Jill Wright** of the Queensland government's Division of Workplace Health and Safety reports on an exposure survey of operators of plastic welders and sealers. She found that the Australian limits for 10-400 MHz were exceeded in 78% of the workplaces. There were also presentations by Dr. Ken Joyner of Motorola, Ken Karapidis of ARPANSA and Dr. Alastair McKinlay of the U.K.'s NRPB, among others.

- **Dr. Linda de Jager** of Technikon Free State in South Africa is organizing a session on "Electromagnetics in Biology and Medicine" for the **PIERS** meeting to be held in Cambridge, MA, in June. Contact her at <ldejager@tofs.ac.za>.

ference Center, Amsterdam, The Netherlands. Contact: Courtesy Associates, (202) 973-8676, Fax: (202) 973-8722, E-mail: <intermag@courtesyassoc.com>, Web: <www.intermagconference.com>.

May 2-3: **International Symposium on Light, Endocrine Systems and Cancer**, University of Cologne, Germany. Contact: Dr. Thomas Erren, Institute and Polyclinic for Occupational and Social Medicine, University of Cologne, D-50924, Cologne, Germany, (49+221) 4785819, Fax: (49+221) 4785119, E-mail: <tim.erren@uni-koeln.de>, Web: <www.uni-koeln.de/symposium2002>.

May 5-8: **34th National Conference on Radiation Control**, Marriott Madison West, Middleton, WI. Contact: Lin Carigan, Conference of Radiation Control Program Directors, 205 Capital Ave., Frankfort, KY 40601, (502) 227-4543, Fax: (502) 227-4928, E-mail: <lcarigan@crpd.org>, Web: <www.crcpd.org>.

May 6-9: **Annual Conference of the Canadian Radiation Protection Association**, Empire Landmark Hotel, Vancouver, BC, Canada. Contact: Craig Smith, RSO, University of British Columbia, 2065 Wesbrook Mall, Vancouver V6T 1Z1, Canada, (604) 822-7052, Fax: (604) 822-8065, E-mail: <smith@safety.ubc.ca>, Web: <www.hse.ubc.ca/Vancouver/Newweb/VINDEX.html>.

May 18-24: **10th Scientific Meeting and Exhibition of the International Society for Magnetic Resonance in Medicine (ISMRM)**, Convention Center, Honolulu, HI. Contact: ISMRM, 2118 Milvia St., Berkeley, CA 94704, (510) 841-1899, Fax: (510) 841-2340, E-mail: <info@ismrm.org> or <smrt@ismrm.org>, Web: <www.ismrm.org/smrt>.

May 20-23: **IEEE Conference on Ultra Wideband Systems and Technologies**, Wyndham Inner Harbor, Baltimore, MD. Contact: Robert Fontana, 20300 Century Blvd., Germantown, MD 20874, (301) 528-1745, Fax: (301) 528-1749, E-mail: <rfontana@multispectral.com>, Web: <www.uwbst2002.com>.

May 21-23: **IEEE Instrumentation and Measurement Technology Conference**, Hilton Hotel, Anchorage, AK. Contact: Robert Myers, 799 N. Beverly Glen, Los Angeles, CA 90077, (310) 446-8280, Fax: (310) 446-8390, E-mail: <bob.myers@ieee.org>, Web: <www.ieee-imtc.org>.

May 21-24: **International Symposium & Technical Exhibition on Electromagnetic Compatibility**, Beijing, China. Contact: Prof. Liu Dayong, Chinese Institute of Electronics, PO Box 165, Beijing 100036, China, (86+10) 6828-3463, Fax: (86+10) 6828-3458, E-mail: <dylu@public.bta.net.cn>, Web:

<www.cie-china.org/emc2002>.

June 1-6: **American Industrial Hygiene Association Conference and Exposition**, San Diego, CA. Contact: AIHA, 2700 Prosperity Ave., Fairfax, VA 22031, (703) 849-8888, Fax: (703) 207-3561, Web: <www.aiha.org>.

June 2-7: **IEEE Microwave Theory and Techniques Society (MTT-S) International Microwave Symposium**, Washington State Trade and Convention Center, Seattle, WA. Contact: Donn Harvey, Metawave Communications, (425) 702-5816, E-mail: <d.harvey@ieee.org>, Web: <www.ims2002.org>.

June 4-8: **World Conference on Breast Cancer**, Victoria, BC, Canada. Contact: World Conference on Breast Cancer, 841 Princess St., Kingston, ON K7L 1G7, Canada, (613) 549-1118, Fax: (613) 549-1146, E-mail: <brcancer@kos.net>, Web: <www.worldbreastcancerconf.ca>.

June 16-20: **47th Annual Meeting of the Health Physics Society (HPS) and 2002 American Radiation Safety Conference and Exhibition (ARSCE)**, Convention Center, Tampa, FL. Contact: HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101, Web: <www.hps.org>.

June 16-21: **IEEE Antennas and Propagation Society (AP-S) International Symposium on Antennas and Propagation and USNC/URSI National Radio Science Meeting**, Hyatt Regency Hotel, San Antonio, TX. Contact: Prof. Robert Nevels, Dept. of Electrical Engineering, Texas A&M University, College Station, TX 77843, (979) 845-7591, Fax: (979) 845-6259, E-mail: <nevels@ee.tamu.edu>, Web: <www.ieeeaps.org/2002APSURSI>.

June 16-21: **Conference on Precision Electromagnetic Measurements (CPEM)**, Ottawa, Canada. Contact: CPEM 2002 Management Office, National Research Council Canada, Ottawa, ON K1A 0R6, Canada (613) 993-7271, Fax: (613) 993-7250, E-mail: <CPEM02@nrc.ca>, Web: <www.nrc.ca/confserv/cpem02>.

June 19-21: **35th Annual Meeting of the Society for Epidemiologic Research (SER)**, Marriott Resort & Spa, Palm Desert, CA. Contact: SER, PO Box 990, Clearfield, UT 84098, (801) 525-0231, Fax: (801) 587-1002, E-mail: <membership@epiresearch.org>, Web: <www.epiresearch.org/meeting/index.html>.

June 23-27: **24th Annual Meeting of the Bioelectromagnetics Society (BEMS)**, Loews le Concorde Hotel, Québec City, Canada. Contact: Gloria Parsley, BEMS, 2412 Cobblestone Way, Frederick, MD 21702, (301) 663-4252, Fax: (301) 694-4948, E-mail: <BEMSoffice@aol.com>, Web: <www.bioelectromagnetics.org>.

June 25-28: **16th International Wroclaw Symposium and Exhibition on Electromagnetic Compatibility**, Wroclaw, Poland. Contact: Dr. W. Segal, EMC Symposium, Box 2141, 51-645 Wroclaw 12, Poland, (48+71) 348-3051, Fax: (48+71) 372-8878, E-mail: <emc@il.wroc.pl>, Web: <www.emc.wroc.pl>.

July 1-5: **Progress in Electromagnetics Research Symposium (PIERS 2002)**, Cambridge, MA. Contact: Prof. J.A. Kong, Rm. 26-305, MIT, 77 Massachusetts Ave., Cambridge, MA 02139, Fax: (617) 258-8766, E-mail: <piers@ewt.mit.edu>, Web: <www.piers.org>.

Across the Spectrum

Science for the sake of science...is a costly anachronism. Its successor is science for profit.

—Daniel Greenberg, “At Any Cost: Money Is a Major Motivation in Science Today: Where Does that Leave Truth, Openness and Public Responsibility?” *New Scientist* (U.K.), p.50, October 13, 2001
Greenberg is the author of *Science, Money and Politics*, Chicago: University of Chicago Press, 2001, 540 pp.

“We as scientists do not trust NIEHS to conduct [a] study of cell phone safety based on its record.”

—Dr. Ross Adey, Loma Linda School of Medicine, CA, quoted by Becky Gillette, “Raising the Alarm: Concerns Linger About Electromagnetic Fields,” *E Magazine*, p.41, November/December 2001

[T]he publication of thousands of reports does not necessarily mean that the knowledge on this issue is sufficient to support the decision-making process, especially for microwave radiation emitted from mobile phones. ...[T]o use the volume of published scientific papers as the reason for not applying the precautionary principle seems premature. In my opinion, the inconclusive, commonly contradictory and anecdotal scientific evidence rather supports the use of the precautionary principle.

—Dr. Dariusz Leszczynski, Radiation and Nuclear Safety Authority (STUK), Helsinki, Finland, commenting on statements by WHO’s Dr. Michael Repacholi at the September EBEA meeting in Helsinki, *Lancet* (letter), p.1733, November 17, 2001 (see *MWN*, J/A01 and S/O01)

“[T]he certainty that the study’s results were unequivocally negative [has] eroded with the passage of time.”

—Dr. David Savitz, University of North Carolina, Chapel Hill, reply to a letter from Dr. Thomas Erren et al., *American Journal of Epidemiology*, 154, p.979, November 15, 2001; Savitz is referring to the National Cancer Institute’s 1997 study on EMFs and childhood leukemia (see *MWN*, J/A97 and M/J98)

Mobile Phones: One Is Not Enough

“[The phones] are all different. Like sneakers, bikes, motorcycles and cars—those things all take people places. But do sneakers do what a car does? Of course not. Does a bike? Do you want *one* of them? No. You need them all.”

—Frank Nuovo, designer of mobile phones for Nokia (looking at dozens of phones in a shop), explaining why he expects that most consumers will soon own several wireless devices, quoted by Michael Specter, “The Phone Guy: How Nokia Designed What May Be the Best-Selling Cellular Products on Earth,” *New Yorker*, p.72, November 26, 2001

The new era of toxicogenomics, made possible by advances in human genomics, promises to revolutionize the practice of public health as it relates to environmental health protection. Understanding human genetic variation and genomic reactions to specific environmental exposures will have a significant impact on our ability to uncover the causes of variations in response to environmental exposures.

—Drs. Kenneth Olden, director, and Janet Guthrie and Sheila Newton, Office of Planning, Policy and Evaluation, National Institute of Environmental Health Sciences, Research Triangle Park, NC, “A Bold New Direction for Environmental Health Research,” *American Journal of Public Health*, p.1966, December 2001

“This opens up a whole new area of research in magnetic sense.”

—Dr. Michael Walker, University of Auckland, New Zealand, on the discovery of a structure in the brains of Zambian mole rats that processes information on magnetic fields, quoted by Kathryn Brown, “Animal Magnetism Guides Migration,” *Science*, p.283, October 12, 2001 (see p.16)

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MAGNETORECEPTION

Reading the Earth's Magnetic Field... Several new papers present a fascinating picture of how animals glean information from their electromagnetic environment. In the November 1 issue of *Nature* (414, pp.35-36), Swedish researchers report that thrush nightingales can distinguish the ambient magnetic field in Scandinavia, at the start of their migration route, from that in northern Egypt, where they pause to build fat reserves before crossing the Sahara desert—a journey of up to 1,500 km. Dr. Thord Fransson of Stockholm University captured birds in Sweden and exposed them to a magnetic field that gradually shifted in intensity and direction until it matched that found in Egypt. On cue, the birds began eating and storing fat—their weight increased significantly compared to controls. Sea turtles can also use magnetic cues for successful migration. In the October 12 issue of *Science* (294, pp.364-366), Drs. Kenneth and Catherine Lohmann of the University of North Carolina, Chapel Hill, describe how loggerhead turtles can distinguish among the magnetic fields in widely separated parts of the Atlantic Ocean. The Lohmanns found that in the lab turtles adjusted the direction in which they moved according to the ambient magnetic fields. Neither the Swedish nor the U.S. groups attempt to explain how the animals can detect these variations in magnetic fields. But in the same issue of *Science* (pp.366-368), researchers from the Czech Republic and Germany suggest how Zambian mole rats can do it. Mole rats, which are blind, have already been shown to use a magnetic sense to position their nests. Now, the team led by Dr. Pavel Němec of Charles University in Prague has discovered how their brains process magnetic cues. By comparing brain activity of mole rats in different magnetic fields, they identified a cluster of cells in which, they believe, individual neurons “respond only to magnetic fields with a distinct range of polarity”—rather than to changes in polarity. While this is the first paper to show the processing of magnetic field information in the brain of a mammal, Němec told *Microwave News*, previous studies have looked at neural activity in fish and birds. “We cannot exclude the possibility that these neurons contain receptors,” he noted—but, he added, they are far from being able to identify them. (See p.15.)

PEOPLE

ICNIRP will consider who should replace Dr. **Ulf Bergqvist** at its annual meeting, to be held in May, Dr. **Alastair McKinlay**, the chair of ICNIRP, told *Microwave News*. Bergqvist, who had been a member of the commission since 1992, died in September. The meeting will be held in Vancouver in conjunction with the annual conference of the Canadian Radiation Protection Association (see p.14)...Dr. **Cristina Leske** of the State University of New York, Stony Brook, has been elected to the Institute of Medicine in Washington. Leske is working on an epidemiological study of breast cancer and EMFs (see *MWN*, S/O96)...Dr. **James Melius**, the director of the New York State Laborers Health and Safety Trust Fund and formerly a member of the RAPID program's National EMF Advisory Committee, has been appointed to the Advisory Board on Radiation and Worker Health by President Bush....Dr. **Daniel Wartenberg**, an epidemiologist at the Environmental and Occupational Health Sciences Institute in Pis-

cataway, NJ, ran for the New Jersey state senate on the Democratic line in November. He lost to the Republican incumbent, Walter Kavanaugh....Dr. **Stephen Perry** died on April 12. Perry, a general medical practitioner in central England, was the first to identify a possible link between power line EMFs and suicides (see *MWN*, D81). Perry collaborated with Drs. **Robert Becker** and **Andrew Marino** on many of his early studies. The association was largely discounted for a generation, but last year **Edwin van Wijngaarden** and Dr. **David Savitz** revived the issue when they reported that electrical workers had a higher than expected rate of suicide (see *MWN*, M/A00).

RAILROAD EMI

Report on EPRI Workshop...EPRI is launching a new initiative on an old problem: power line EMFs interfering with railroad signaling systems. For instance, EMI could cause crossing gates to close when no train is approaching—or, more dangerously, cause railway signals to display a green light instead of red. At a workshop in Pueblo, CO, August 21-22, 18 participants set priorities for research and laid the groundwork for future cooperation. According to EPRI, new technologies such as the global positioning system (GPS), mobile phone base stations collocated on pylons and flexible AC transmission systems (known as FACTS) “require a fresh look at this potential electromagnetic compatibility problem area.” EPRI, based in Palo Alto, CA, has prepared a report, *EPRI Railroad Communications and Signaling EMC Workshop: Minutes and Appendices*. Not surprisingly, it calls for more research: specifically, on the EMF environment in which signal equipment operates, on the field levels at which such devices are susceptible to interference and on potential problems posed by emerging technologies. EPRI sponsored the 1983 study by Dr. Allen Taflove, then at the IIT Research Institute in Chicago, which showed that railway signals could malfunction and display a “false clear” due to voltages induced by nearby power lines (see *MWN*, S83). The 178-page EPRI Report No. 1005197 can be purchased for \$2,500 from the EPRI Customer Fulfillment Center at (925) 609-9169.

TETRA

Signal Modulation...The U.K.’s NRPB has issued a technical note to clarify the nature of the signal used in the country’s new digital Terrestrial Trunked Radio (TETRA) communication system. Dr. S. Mann of the NRPB and Prof. L. Challis of the University of Nottingham conclude that—contrary to some earlier reports—the radiation from TETRA base stations is not pulsed. TETRA handsets and mobile terminals do pulse with a frequency of 17.64 Hz. (The carrier frequency is in either the 380-395 MHz or the 410-425 MHz band.) In late July, the AGNIR, chaired by Sir Richard Doll, issued a report concluding that the TETRA signals do not pose a health risk (see p.3 and *MWN*, J/A01). The technical note, *Power Modulation Spectra of Signals Used in TETRA*, has been appended to the AGNIR report, which is available at no charge on the NRPB’s Web site, <www.nrp.org.uk>. A print copy of the report will be available soon for £16.50 (approximately US\$23.50) from the NRPB; contact: <information@nrpb.org.uk>.

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As We Go to Press

Barrett Mobile Phone Brain Tumor Suit Withdrawn

The lawsuit on behalf of Brian Barrett of Atlanta, who blames mobile phone radiation for his brain cancer, has been withdrawn. Barrett sued Nokia, BellSouth Mobility and the CTIA last January 29 in Georgia state court (see *MWN*, J/F01).

Richard Capriola of Weinstock & Scavo in Atlanta, who is representing Barrett, faced a December 4 deadline for announcing his expert witnesses. According to a source familiar with the case, he instead moved to withdraw the suit “without prejudice,” leaving the door open for reviving it at a later date.

Capriola did not respond to repeated requests for comment.

U.K. Police Step Up Criticism of TETRA Phone System

The U.K.’s Police Federation is not satisfied with the government’s assurances that TETRA radios are safe, and is threatening to withdraw its support and to boycott the country’s new £2.5 billion national emergency communication system (see p.17 and *MWN*, S/O01).

Fred Broughton, the chair of the federation, said that, “We are still awaiting answers to a whole series of questions about the long-term health effects of TETRA technology,” the *Guardian* (November 28) reported. “We need the answers now.”

For more on the federation’s health concerns, see “Airwave: The Urgent Unanswered Questions,” in the December issue of *Police Magazine*, available at: <www.polfed.org/magazine>.

Keeping Current: Follow-Up on the News

◆ TCO Development, an offshoot of the Swedish white collar workers’ union, has completed its standard for mobile phones, “TCO’01.” To qualify for the TCO’01 label, a phone must have an SAR of 0.8W/Kg or less (averaged over 10g), and meet a number of environmental and ergonomic criteria (see *MWN*, J/F 01). A copy of the requirements and test methods is available in both Swedish and English at <www.tcodevelopment.com>. The site also has some tips for buying a cell phone.

◆ Germany’s Federal Radiation Protection Office has released a brochure summarizing its precautionary advice for mobile phones and base stations—including limiting the use of phones by children. The head of the office, Wolfram König, announced these policies last summer (see *MWN*, J/A01). The brochure is in German and is available at: <www.bfs.de/info/themen>.

◆ The Swedish Energy Authority is considering moving a 400 kV power line in Södra Sandbybor, near Lund, as requested by municipal officials, according to the November 13 *Sydsvenskan*, a daily newspaper in southern Sweden. Magnetic field levels are 75 mG under the line and homes are located 20-30 m away.

◆ The EMR Network has posted a copy of the draft revision of the SCC-28 RF/MW exposure standard on its Web site. Go to: <www.emrnetwork.org/regulation/regulations.htm>. (See also *MWN*, S/O01).

◆ Motorola’s Drs. Joe Morrissey, Mays Swicord and Q. Balzano will report on possible EMI from cell phones to medical devices in hospitals in the January 2002 issue of *Health Physics*.

◆ Ever wonder what happens when lightning strikes an airplane? (This is not a rare event.) *Scientific American* tells you on p.104 of its December issue; or go to <www.sciam.com/askexpert>.

◆ The next meeting of the SCC-34 subcommittee developing a protocol for measuring SARs from mobile phones will be held at Motorola’s offices in Plantation, FL, on January 14-15.

◆ We are not sure whether this is good news or bad: The Society for Psychological Research in the U.K. says that sightings of ghosts have fallen precipitously over the last 15 years, the *Sunday Express* reports. It blames the introduction of cell phones.

VIEWS ON THE NEWS

How Big Tobacco Defines Wireless and EMF Health Debates

Headlines that compare cell phones to tobacco may be provocative, but they are unfair. Even though cell phones are now more common than cigarettes, we still don't know if phones are dangerous.

What we do know is that many of the same people, using many of the same tactics, have been working to protect the interests of both the tobacco and wireless industries.

The tobacco industry promoted the concept of Good Epidemiology Practices, or GEP, "to shape the standards of scientific proof to make it impossible to 'prove' that secondhand smoke...is dangerous," according to a new analysis* by Elisa Ong and Stanton Glantz of the University of California, San Francisco.

In the mid-1990s, under a Philip Morris contract, James Tozzi of Federal Focus in Washington was encouraging the use of GEP, not only for tobacco smoke, but also for EMFs and other agents. In 1994 alone, the company paid Tozzi as much as \$610,000.

In 1993, the Cellular Telecommunications and Internet Association (CTIA) hired George Carlo to run its \$25 million cell phone health research program. Carlo, who had been a full-time consultant to the tobacco industry and had worked with Tozzi, turned to Tozzi to help draw up what would become the Wireless Technology Research's (WTR) agenda. The following year, Carlo again engaged Tozzi—this time to stage a symposium on cell towers.

Tozzi continued to work on GEP and in 1995 assembled a group of academics and consultants in London to hammer out the working principles for GEP. Carlo was among those invited, as was John Graham, then at the Harvard School of Public Health and now at the Office of Management and Budget.

Over the life of the cell phone program, Carlo paid Graham \$420,000 to give WTR a veneer of respectability.

Carlo was soon insisting that any epidemiological studies funded by WTR should be carried out in accordance with GEP.†

Ong and Glantz offer the following warning:

While every practicing scientist agrees that scientific work should be rigorously done, the scientific, public health and regulatory communities need to be more aware that the "sound science" and "GEP" movement is not simply an effort from within the profession to improve the quality of scientific discourse. This movement reflects sophisticated public relations campaigns controlled by industry executives and lawyers to manipulate the scientific standards of proof for the corporate interests of their clients.

Another element of Philip Morris' GEP strategy was to discredit any epidemiological finding with a relative risk of less

*Elisa Ong and Stanton Glantz, "Constructing 'Sound Science' and 'Good Epidemiology': Tobacco, Lawyers and Public Relations Firms," *American Journal of Public Health*, 91, pp.1749-1757, November 2001. Some of this same ground has been covered by Stewart Fist, the Australian journalist. Fist has posted some of his writings on his Web site, <www.electric-words.com>. Ong and Glantz have also described how the tobacco industry tried to subvert an IARC study on the cancer risk associated with secondhand smoke (see *MWN*, M/J00).

† See, for example, George Carlo et al., "Wireless Technology Research LLC's Public Health Paradigm Approach to Assessing and Managing Health Risks," *Human and Ecological Risk Assessment*, 3, p.10, 1997.

Our Wish List for 2002

Next year, we hope to learn:

- Why the federal agencies that are paid to protect the public from RF/MW radiation don't tell the IEEE SCC-28 committee currently drafting a new safety standard: "Don't bother us until you answer the 14 questions we asked you two years ago." (See *MWN*, J/A99.)
- Why there's been no news from Jack Sahl or EPRI on the EMF-heart disease link. Three years ago, with utility money in hand, Sahl set out to test the Sastre-Savitz hypothesis on heart rate variability. Sahl's last words to us were "We need to do this as quickly as possible." (See *MWN*, S/O98.)
- Why Russell Owen and his superiors at the FDA let the CTIA lead them around by their noses. Why does the agency let Tom Wheeler and George Carlo's long-running farce on mobile phone research continue?
- Why no one in the U.S. or in Europe is making a serious attempt to settle the controversy over whether microwaves can cause leakage through the blood-brain barrier. (Yes, we made this same wish two years ago. And no, we are not impressed with the U.S. Air Force's effort. See *MWN*, N/D99.)
- Why so many people who say that their only interest is promoting good science ignore the science that conflicts with their agendas.

than 2. This strategy was welcomed by the electric utility industry, which was seeking to prevent EMFs from being designated as possible human carcinogens. In his 1996 book, *Electric and Magnetic Fields: Invisible Risks*, the late Leonard Sagan of EPRI wrote wistfully: "To some epidemiologists, [a 2-3] level of increased risk is close to the 'noise level.'"

Later, when the CTIA was trying to convince the FDA to set up a cooperative research program—known as a CRADA—it turned to yet another tobacco lobbyist. As reported by *RCR Wireless News*, the CTIA hired Arthur Levine, an attorney at Arnold & Porter who represents Philip Morris, to negotiate the deal with the FDA.

So the next time you see a news story comparing the hazards of using a cell phone to those of smoking cigarettes, remember that the CTIA made that link years ago and has been following the tobacco playbook ever since.

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