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California EMF Program To Issue Strongest Health Warning Yet

But Final Report Offers No Policy Advice

After spending more than \$7 million over the last eight years, the California Department of Health Services (DHS) will soon issue the strongest warning to date on the potential health risks from exposure to power-frequency electromagnetic fields (EMFs).

Drs. Raymond Neutra, Vincent DelPizzo and Geraldine Lee, who wrote the report, conclude that they "are inclined to believe" that EMFs are a cause of childhood leukemia, adult brain cancer, amyotrophic lateral sclerosis (ALS) and miscarriages. (See p.4 for their general conclusions.)

The final report of the EMF Program, which runs more than 500 pages including appendices, has not yet been released, but *Microwave News* has obtained a copy. It "is slowly working its way through the bureaucracy," said Neutra of the DHS, who led the program. He expects to submit it to the California Public Utilities Commission (PUC) "at the end of the summer."

"We lowered a few of the risk estimates, but overall the conclusions in the final report are very similar to those in the draft," said DelPizzo, who served as research director of the EMF program before retiring recently to Reno, NV.

The report does not include recommendations on how to protect against any of the identified health risks.

(continued on p.3)

Germany Promotes Low-SAR Phones, Endorses Precautionary Approach

The German government is promoting low-radiation mobile phones. A phone with a specific absorption rate (SAR) of 0.6 W/Kg or less, averaged over 10 g, can now be labeled as an environmentally friendly product.

This new SAR guideline is the strictest in the world—more than three times tougher than the one recommended by the International Commission on Non-Ionizing Radiation Protection (ICNIRP).

The introduction of a "Blue Angel" label (see illustration on p.8) is "a positive step for [the phone] industry and the consumer," the Federal Environment Ministry stated on June 14. The label is designed to help those who "have questions about possible health hazards from mobile phone radiation but do not want to do without such devices," the ministry explained.

The Federal Radiation Protection Office has also endorsed the new label. "Our goal is to minimize possible risks through precautionary policies," said Wolfram König, the head of the radiation office.

The new initiative will serve as an incentive for manufacturers to consider

(continued on p.8)

Conflicting EMF Breast Cancer Studies Resolved; Genetic Variability Is the Key, German Lab Reports

One of the most contentious—and nastiest—disputes over electromagnetic field (EMF) cancer risks may soon be resolved.

Members of Dr. Wolfgang Löscher's lab in Hannover, Germany, have shown that different substrains of the same strain of rats have very different responses to power-frequency EMFs.

In a presentation at the Bioelectromagnetics Society's (BEMS) annual meeting in Quebec City, Canada, on June 24, Dr. Maren Fedrowitz of the School of Veterinary Medicine in Hannover reported that two substrains of Sprague-Dawley rats had markedly different sensitivities to 50 Hz magnetic fields, as well as to DMBA, a known chemical carcinogen. One strain had significantly more DMBA-induced tumors than the other, which, for its part, had significantly enhanced growth of mammary tumors following EMF exposure.

Over the last decade, Löscher has conducted a large number of experiments showing that EMFs can promote the development of breast cancer in rats (see *MWN*, J/A93, J/F95 and S/O99). But these findings have been challenged by some American scientists.

Dr. Gary Boorman of the National Institute of Environmental Health Sciences (NIEHS) in Research Triangle Park, NC, has been Löscher's leading critic. After Drs. Larry Anderson and James Morris of the Battelle labs in Richland, WA, were unable to repeat the German experiments, Boorman, who had arranged for their replication effort under the congressionally mandated research program known as EMF RAPID, made it clear that he had no confidence in Löscher's work (see *MWN*, M/A98).

Relations between Löscher and the NIEHS deteriorated as the institute dismissed the German work in favor of Battelle's. Boorman and Dr. Jerry Williams of Johns Hopkins University in Baltimore publicly disparaged Löscher's studies as

being fundamentally flawed. Löscher responded with accusations that Boorman was waging a dirty tricks campaign against him (see *MWN*, N/D98).

In its final report to the U.S. Congress, the NIEHS tried to put the issue to rest by concluding that there is "strong evidence" that EMFs do not promote breast cancer (see *MWN*, J/A99 and S/O99). This report was largely written by Dr. Christopher Portier. Portier was later promoted to associate director of the National Toxicology Program, which is administered by the NIEHS.

But, at the same time, Löscher and Anderson began working together to see if they could explain the divergent results. They later published a joint paper citing genetic variability as one of a number of possible hypotheses. "The data from the two labs suggest that the rats used in the Battelle study might be more sensitive to the carcinogenic effect of DMBA than the European rats, but possibly less sensitive to any influence of magnetic field exposure," they wrote in the September 2000 issue of *Environ-*

mental Health Perspectives (see *MWN*, S/O00).

The new work "seems to go a long way to resolving the differences," Anderson said after Fedrowitz's presentation in Quebec. "It supports my and Wolfgang's suspicions about what was going on," he said in a later interview.

The lack of animal data to support the epidemiological evidence has cast doubt on the EMF-cancer link. "It would have been nice to have these results during the IARC deliberations," Anderson said, prompting Dr. Bernard Veyret of the University of Bordeaux to comment publicly, "This was a key element in the IARC decision."

Both Anderson and Veyret were members of the International Agency for Research on Cancer (IARC) panel that last summer unanimously concluded that EMFs are possible human carcinogens, largely based on epidemiological evidence (see *MWN*, J/A01). The panel might have classified EMFs as a "probable" or "known" human carcinogen with supporting animal data.

Löscher told *Microwave News* that he is now planning to repeat the DMBA breast cancer study using the same substrain of Sprague-Dawley rats used by Battelle.

More support for the significance of genetic makeup comes from a set of cellular experiments carried out by Dr. Anna Wobus's group at the Institute for Plant Genetics and Agricultural Research in Gatersleben, Germany.

Wobus's group found that 50 Hz fields caused changes in the expression of a number of different genes, Dr. Franz Adlkofer of the VERUM Foundation in Munich said at the BEMS meeting. "The genetic background may determine whether or not stem cells respond to ELF EMFs," he said. Wobus is part of the EC's REFLEX research group, which is coordinated by Adlkofer.

Adlkofer has previously reported that Wobus has found that RF/MW radiation at an SAR of 1.5 W/Kg could affect a number of different genes—but only in those cells that were p53 deficient (see *MWN*, N/D01). Wild type cells did not respond, however. He calls the p53 tumor suppressor gene "the guardian of the genome."

More generally, these two new sets of German findings may finally explain why so many biological experiments with electromagnetic radiation yield contradictory results. The inability of different labs to repeat studies has led many skeptics to dismiss the whole field of non-ionizing radiation health research. Some call them Cheshire cat effects, after the now-you-see-it-now-you-don't apparition in *Alice in Wonderland*.

Years ago, a multi-lab international effort called the Henhouse Project, sponsored by the U.S. Office of Naval Research, showed that pulsed magnetic fields could upset the development of eggs from some strains of chickens but not those from other strains (see *MWN*, M/A88).



DR. MAREN FEDROWITZ IS WORKING WITH PROF. WOLFGANG LÖSCHER



"This supports our suspicions"
—Dr. Larry Anderson

Kaiser Miscarriage Study: A Chorus of Skeptics

Dr. De-Kun Li's critics are on the march. His epidemiological study linking miscarriage to EMF exposures above 16mG has become the target of skeptical, even hostile, criticism.

Sir Richard Doll attacked Li's study in a March 25 posting on the Web site of the U.K.'s National Radiological Protection Board (NRPB). Li's findings do not provide "worthwhile evidence of an increased risk," wrote Doll, adding that they probably do not "even justify further investigation." Drs. David Coggon and Anthony Swerdlow, members of NRPB's Advisory Group on Non-Ionizing Radiation (AGNIR), which Doll chairs, and NRPB's Dr. Colin Muirhead also signed the commentary.

Li and colleagues at Kaiser Permanente in Oakland, CA, have reported that pregnant women exposed even briefly to magnetic fields over 16mG face miscarriage risks up to six times greater than women with lower exposures (see *MWN*, M/J01 and J/F 02). In an accompanying commentary, Dr. David Savitz of the University of North Carolina, Chapel Hill, argued that Li's finding could be due to behavioral differences between women who are pregnant and women who are not.

Doll pointed to "severe limitations" in Li's study—specifically, possible selection bias and the absence of a dose-response trend—and cited Savitz's arguments with approval.

The U.K.'s Drs. Denis Henshaw and Mike O'Carroll immediately alerted Doll that Li had tested and refuted Savitz's hypothesis. Henshaw is a physics professor at the University of Bristol and Mike O'Carroll is an emeritus professor of applied mathematics who is now a leader of Revolt, a power line activist group.

Soon after, a more temperate version of the commentary appeared on the NRPB Web site—and this time, it was signed by Doll on behalf of the entire AGNIR. The group stated that the evidence for an increased risk was not "substantial"—rather than not "worthwhile"—and noted the response to Savitz from Li and Dr. Raymond Neutra of the California EMF project, which had sponsored the Kaiser study (see p.1).

In interviews with *Microwave News*, Li said that he felt the British commentary was "pretty hostile" and Neutra opined that, "Anything that is so controversial and contrary to people's assumptions triggers a critical response."

Though removed from the NRPB Web site, Doll's original comments have taken on a life of their own. Electric utilities in California circulated them and the BEMS newsletter published long excerpts in its March/April issue.

Even though Doll had toned down his comments, the NRPB continued to cast doubt on Li's results, echoing Savitz's original arguments. "Women who are more likely to have miscarriages... behave differently," NRPB spokesperson Dr. Michael Clark told BBC Radio's Alex Kirby on its *Costing the Earth* program aired on April 25.

On the same broadcast, Dr. John Swanson of the U.K.'s National Grid Co. was more cautious, however, arguing that Li's results deserve to be taken seriously and should be followed up. "As a responsible industry, we are prepared to test this result," he said.

In May, Savitz, Li and Neutra participated at an EPRI workshop. "My basic skepticism and uncertainty remain," Savitz told *Microwave News* after the workshop, which was described by Dr. Robert Kavet, EPRI's EMF manager, as an "internal business meeting" (see *MWN*, M/A02).

EPRI, which does research for the electric utility industry, states that it will "investigate whether sources of bias such as differential exposure misclassification and uncontrolled confounding have contributed to the associations" identified in the Kaiser miscarriage study. EPRI expects to have results ready for publication by the end of 2004, according to a project description posted on its Web site, <www.epri.com>.

In April, Neutra responded to Doll's criticisms in letters sent to the NRPB and to the editor of *Epidemiology*, where Li originally published his findings. The journal has declined to publish the response and the NRPB has not posted it on its Web site.

Neutra and Li sent a similar letter to the BEMS newsletter in May; Neutra displayed it on a poster board at the BEMS annual meeting. As of early August, the letter had not appeared in print.

California EMF Report (continued from p.1)

"At this stage, our role is to tell the PUC how certain we are that there is a problem and how serious we think the problem is," Neutra told *Microwave News*. "We are also laying out the pros and cons of different policy options, which the PUC can use if it holds regulatory hearings." Neutra said that PUC hearings have been requested.

DelPizzo sees no contradiction between the report's conclusions and its lack of policy advice. "People have a right to be warned," he said in an interview, "but whether a major effort to reduce EMFs is appropriate must still be decided."

Neutra, DelPizzo and Lee write that they see a greater probability of a health risk than do "the majority of the members of scientific committees convened to evaluate the scientific literature" by the U.S. NIEHS, the U.K. NRPB and IARC. Lab studies "might have failed to pick up a mechanism," the three researchers explain, and therefore they are unwilling to downplay the epidemiological evidence, which is central to their outlook.

To those who argue that EMFs in the home or workplace are too weak to cause health effects, they respond that such arguments "depend on assumptions about biological systems that may or may not be sophisticated enough to reflect reality and rule out an effect."

For Alzheimer's disease, male and female breast cancer, adult leukemia, heart disease and suicide, they conclude that the evidence is weaker but that a link to EMFs cannot be ruled out.

A draft of the report, dated April 2001, was released for comment last summer, and elicited numerous reactions both favorable and critical (see *MWN*, J/A01 and J/F02). In May 2002, the



DR. RAYMOND NEUTRA
LEADS THE CALIFORNIA
EMF PROGRAM

revised document won final approval from the program's 11-member Science Advisory Panel. Some panel members expressed reservations, however, arguing that the report's conclusions overstate the strength of the evidence pointing to health risks.

While the final version is very similar to last year's draft, the executive summary uses more general language to express the authors' degree of confidence. For example, the draft stated that:

It is "more than 50% possible" that EMFs at home or at work could cause a very small increased lifetime risk... As this phrase implies, there is a chance that EMFs have no effect at all [emphasis in original].

The final version states:

All three of the DHS scientists are inclined to believe that EMFs can cause some degree of increased risk...

It also lists the three authors' individual opinions on each type of health risk (see table below). The draft forced readers to guess who thinks what.

The final report is cautious about ways of reducing exposures, pointing to "uncertainty" over the "aspect of the 'EMF mixture,' if any," that should be mitigated (see box at right). It adds that individual decisions affecting exposures, such as choosing a home or jogging route, should balance the "uncertain" risks posed by EMFs against such "certain risks" as fire, flood or crime.

EMF mitigation measures are also discussed in the analysis of policy options accompanying the report. This appears to be generally unchanged from last year's draft. It concludes that "in-

An Evaluation of the Possible Risks from Electric and Magnetic Fields (EMFs) from Power Lines, Internal Wiring, Electrical Occupations and Appliances will be placed on the EMF program's Web site, <www.dhs.cahwnet.gov/ehib/emf>, when it is released to the public.

Putting Risks and Mitigation Strategies in Perspective

"There are ways to avoid...uncommon accumulated exposures by maintaining a distance from some appliances, changes in home wiring and plumbing and power lines. However, to put things in perspective, individual decisions about things like buying a house or choosing a jogging route should involve the consideration of certain risks, such as those from traffic, fire, flood and crime, as well as the uncertain comparable risks from EMFs."

"[E]pidemiological studies primarily implicate the magnetic fields or something closely correlated with them. Some researchers think that associated high- or low-frequency stray contact currents or charged air pollution particles are the true explanation rather than magnetic fields. The actions one would take to eliminate the field are not always the same as one would take to eliminate the currents or the charged particles.... This additional uncertainty about what aspect of the mixture might need to be mitigated will thus provide a challenge for policymakers."

Excerpts from the Executive Summary of the California EMF Report

expensive" measures to reduce EMFs—such as restringing power lines and changing wiring in homes and schools—can be justified on a cost-benefit basis.

Lee has also left the California health department. She is now with AstraZeneca, a large pharmaceutical company.

The California program is the last major effort in the U.S. on the health effects of EMFs. No other research is under way or planned at this time. In July, the PUC advised Neutra that the program can continue up to another year until it has spent its remaining \$100,000.

California EMF Report's Conclusions

- To one degree or another, all three of the DHS scientists are inclined to believe that EMFs can cause some degree of increased risk of childhood leukemia, adult brain cancer, Lou Gehrig's disease [ALS] and miscarriage.
- They strongly believe that EMFs do *not* increase the risk of birth defects or low birth weight.
- They strongly believe that EMFs are *not* universal carcinogens, since there are a number of cancer types that are not associated with EMF exposure.
- To one degree or another they are inclined to believe that EMFs

do *not* cause an increased risk of breast cancer, heart disease, Alzheimer's disease, depression or symptoms attributed by some to a sensitivity to EMFs.

However,

- All three scientists had judgments that were "close to the dividing line between believing and not believing" that EMFs cause some degree of increased risk of suicide,

Or

- For adult leukemia, two of the scientists are "close to the dividing line between believing and not believing" and one was "prone to believe" that EMFs cause some degree of increased risk.

The table below presents the individual estimates of the three EMF program scientists' "degree of certainty" (1-100) that EMFs increase the risk of each outcome. Several are lower than the estimates given in the draft report (see MWN, J/A01).

	childhood leukemia	adult leukemia	childhood brain cancer	adult brain cancer	female breast cancer	male breast cancer	miscarriage	ALS	Alzheimer's disease
Raymond Neutra	54	52	11	51	11	39	51	52	20
Vincent DelPizzo	95	85	45	80	49	45	56	55	40
Geraldine Lee	65	40	20	60	15	20	59	55	15

HIGHLIGHTS

Federal Judge in Newman Brain Tumor Suit Will Decide if Phones Must Be Sold with Headsets, May Also Hear Other Cancer Cases

Catherine Blake, the federal judge presiding over the *Newman* mobile phone–brain cancer lawsuit, will also decide the class-action cases that would force phone manufacturers to provide consumers with hands-free kits.

Industry lawyers are now asking that other brain cancer lawsuits filed around the country be moved to her Baltimore courtroom—which would put Blake in charge of essentially all U.S. litigation on mobile phones and health.

Blake will decide by “the end of the summer” whether to allow Dr. Christopher Newman’s case to be heard by a jury, a clerk working for Blake told *Microwave News* in early August. In February, Blake held a weeklong *Daubert* hearing on the scientific evidence linking mobile phone radiation to brain cancer (see p.7 and *MWN*, M/A02).

The headset suits were transferred to Blake last October 31 by the Judicial Panel on Multidistrict Litigation in Washington, which assigns cases in the federal court system. Motorola and the other defendants had requested that they be moved to federal court. On June 21, 2002, Blake denied motions filed by lawyers at the Peter Angelos firm in Baltimore, among others, to return the suits to the five state courts in which they were originally filed (see *MWN*, N/D00 and M/J01).

Demanding that manufacturers supply headsets with mobile phones is “a disguised attack on federal law in an area of national importance,” Blake writes, referring to the Telecommunications Act of 1996, which gives the Federal Communications Commission (FCC) sole authority to set exposure limits for wireless technology (see *MWN*, M/A96). Therefore, she ruled, a federal court should have jurisdiction.

If lawsuits to require headsets were successful in some states but not in others, Blake noted, the result would be a patchwork of state and local RF/MW safety requirements, contrary to the 1996 law.

While Blake only ruled on a procedural question, her decision offers hints on how she might decide the substantive issues in the headset cases.

For instance, Blake contends that any court deciding these cases “necessarily must evaluate” whether the FCC rules “adequately protect the public’s health.” On this point, Blake emphasizes that a federal appeals court upheld the FCC’s RF/MW guidelines two years ago after they were challenged by a coalition of activists (see *MWN*, M/A00). The similarities between that case and the headset lawsuits “cannot be ignored,” she writes.

Reviewing the appeals court’s decision, Blake endorses its finding that the FCC rules embody “carefully considered judgments” on the appropriate balance between health protection and the development of wireless technology.

Indeed, Blake argues that the plaintiffs chose to bring their lawsuits in state court because they recognized “the unlikelihood of success in federal court.”

Blake also writes that the FCC had “considered and rejected a headset requirement.” She refers to a statement on the joint FCC and Food and Drug Administration consumer information

Web site: “Since there are no known risks” from mobile phone radiation, “there is no reason to believe that hands-free kits reduce risks” (see *MWN*, M/J02). The defense pointed this language out to Blake in a May 6 letter.

The multidistrict litigation panel will also decide whether to transfer to Blake the other personal injury lawsuits alleging that phone radiation causes brain cancer. In a July 3 filing with the panel, defense lawyers argued that the cases belong in Blake’s court because they also turn on health issues.

In late July, the panel issued a conditional order to transfer the cases. The plaintiffs’ lawyers can challenge this order, and several of them have told *Microwave News* that they will do so (see box below). The panel could hold a hearing on the matter at its next meeting, which is scheduled for September.

Jeffrey Morganroth of Morganroth & Morganroth in Detroit, who represents plaintiffs in six separate brain tumor lawsuits now before Judge Thomas Penfield Jackson of the federal district court in Washington, says that the defendants broke an agreement not to file any further motions until Jackson has decided whether to return these lawsuits to the District of Columbia court where they were originally filed (see *MWN*, N/D01 and M/A02). Defense attorneys counter that their request is not covered by the agreement, which Jackson had sanctioned.

Brain Tumor Lawsuits: New and Renewed

On May 30, lawyers for Brian Barrett revived his lawsuit against Nokia, BellSouth Mobility and the CTIA, which charges that his brain tumor was caused by mobile phone radiation. Barrett first sued early last year, but his attorneys at Weinstock & Scavo in Atlanta withdrew the suit “without prejudice” last December (see *MWN*, J/F01 and N/D01).

“We believe that recent developments in the science strengthen our case,” explained Richard Capriola of Weinstock & Scavo. He pointed to Dr. Lennart Hardell’s testimony in the *Newman* case and the fact that Hardell’s epidemiological study linking phone use to brain cancer has been accepted for publication (see p.7 and *MWN*, M/A02 and M/J02).

Two weeks later, on June 14, Andrew Horn filed a complaint against Motorola, Verizon and others in Texas state court in San Antonio. Horn, a 24-year-old Houston resident, contends that his brain cancer is due to his use of his Motorola phone. He is represented by Patrick Haines of the Lanier law firm in Houston.

At the defendants’ request, both cases have been moved to U.S. federal court. They might end up being heard by Judge Catherine Blake in Baltimore (see story above). Both Capriola and Haines told *Microwave News* that they will seek to return them to state courts.

«Eye on Europe»

Germany's research effort on mobile phone EMFs is getting under way. The **Federal Radiation Protection Office** (known as BfS) is "in the process of awarding grants," Dr. **Anne Dehos** of BfS' Institute for Radiation Hygiene told *Microwave News*. But she declined to say which proposals were selected until all the contracts have been finalized. Last summer, the government announced the four-year, €8.5 million (\$8.5 million) effort (see *MWN*, J/A01, see also J/F02). Among those who have been funded is Dr. **Alexander Lerchl**, a professor of biology at the International University Bremen. Lerchl has received three grants, with a total budget of approximately €800,000. In two different experiments, leukemia-prone mice will receive lifetime exposures to 900 MHz GSM (0.4 W/Kg) or 50 Hz magnetic fields (10 mG, 1 G, 10 G). The animals will be exposed 24 hours a day. In his third study, Lerchl will investigate the effects of 900 MHz signals on isolated hamster pineal glands.

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The **French** government report, *Mobile Telephones, Base Stations and Health: Current State of Knowledge and Recommendations*, is now available in English. Written by a panel chaired by Dr. Denis Zmirou (it is known as the **Zmirou Report**) and released last year, the 250-page report was translated by **MCL** in London for the **GSM Association**. Zmirou's committee recommended a precautionary approach to the use of mobile phones and asked manufacturers to reduce exposures "to the lowest possible level compatible with service quality" (see *MWN*, J/F01). It is available free on MCL's Web site, <www.mcluk.org>.

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BUWAL, the **Swiss** environment agency, has settled on a compromise, if somewhat complex, plan on how to apply its exposure limits to closely spaced base station antennas. The new scheme is more lenient than the one used in **Zurich**, but stricter than the approach favored by the wireless industry. Zurich has been treating telecom antennas within 100 meters of each other as a single source when applying the national precautionary limits of 4 V/m at 900 MHz (6 V/m at 1800 MHz). (In the past, we have incorrectly stated that BUWAL had issued a similar proposal, when it had only stated that antennas "in close proximity"—not within 100 m—should be treated as a single source; see *MWN*, S/O01 and M/A02.) BUWAL's new administrative guidelines, issued on June 28, advise local officials to treat antennas located on the same rooftop as a single source. In all other situations, both an antenna's distance from neighboring antennas and the transmitter power of nearby antennas should be taken into account. For example, for low-power antennas such as those commonly used in urban areas, antennas as close as a few meters from each other would be considered as separate sources, provided they are on different buildings. **SICTA**, the Swiss wireless industry lobby, had asked that antennas be considered as separate sources as long as they do not belong to the same network. "From now on," SICTA contends, "antennas in urban areas can only be operated

at low power levels," requiring more antennas and imposing "high additional costs." Nevertheless, the trade group has accepted the rules because they will bring legal certainty and because BUWAL, at the same time, abandoned a proposal to include additional safety factors to compensate for measurement uncertainties. Zurich and other local governments are not bound by the new advice, but BUWAL warned that more or less stringent rules might be challenged in court as unreasonable. The guidelines are available, in German only, at <www.buwal.ch>; they will soon be translated into French and Italian.

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COST281, the European group that encourages scientific cooperation on research on the potential health effects of mobile

Four Swedish Professors Assert Phones Are Safe

Once again, professors at the Karolinska Institute have written to a leading Swedish newspaper to try to convince the public that mobile phones are safe.

MOBILE PHONES ARE NOT DANGEROUS ran the headline in the July 18 *Dagens Nyheter* (*Today's News*). Phone radiation does not entail any cancer or genetic risks, wrote three researchers from the Karolinska and a fourth from Stockholm University.*

One of the four, Dr. Magnus Ingelman-Sundberg, also signed a letter last year that attacked Swedish scientists for making public statements about health risks associated with mobile phones (see *MWN*, S/O01). He is vice chair of the Karolinska's Institute of Environmental Medicine, where Drs. Anders Ahlbom and Maria Feychting are leading the Swedish component of IARC's mobile phone cancer study (see p.7 and *MWN*, J/F98 and M/A00).

The four researchers advised that occasional alarming reports about mobile phone cancer risks should be ignored.

On August 7, *Dagens Nyheter* ran a response from Jan Åberg, who lives in Trollhättan and teaches classes on electrical safety. "We may be facing an environmental catastrophe, if we do not apply the precautionary principle" he wrote. Åberg also wonders how the four professors can be so certain that they are right given that they don't do research in the field.

* Drs. Björn Cedervall, Magnus Ingelman-Sundberg and Hans Wiksell, all of the Karolinska Institute in Stockholm, and Dr. Robert Nilsson of Stockholm University. Cedervall is associate professor of medical radiation physics in the department of oncology and pathology. Ingelman-Sundberg is professor of molecular toxicology at the Institute of Environmental Medicine. Wiksell is adjunct professor on the clinical applications of electromagnetic energy in the department of urology. Dr. Robert Nilsson is with the department of genetic and cellular toxicology at Stockholm University.

phones, will hold its next meeting at the Royal Society in **London**, November 12-13. It will host a seminar on *Subtle Temperature Effects of RF EMFs*. Details are still being worked out; for more information contact Gerd Friedrich of the FGF, the German mobile phone industry group, at <info@fgf.de>.

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Germany has launched its own Internet database on **telecom antennas**, but access will be limited to authorized government officials. In contrast, similar sites in Switzerland and the U.K. are open to all (see *MWN*, M/J02). Only officials involved in planning, zoning or health care can use the German Web site. They can obtain a lot of detailed information, including locations, frequencies, output powers and antenna patterns. Even for these officials, however, access is limited to the specific areas for which they are responsible. The Regulatory Agency for Telecommunications and Post in Bonn maintains a database covering 51,000 sites, including those for mobile phones, radio and TV. Military and intelligence facilities are excluded. While the public cannot use the site, officials are allowed, at their discretion, to pass information along to others. In announcing the launch of the database on June 20, Matthias Kurth, the agency head, called it "a further step toward making the sometimes controversial discussion of antenna siting more substantive." More information is available, in German, at <www.regtp.de>.

NCRP Revives Committee on RF/MW Health Effects

The National Council on Radiation Protection and Measurements (NCRP) is reviving its committee on the biological effects of radiofrequency and microwave (RF/MW) radiation. The NCRP's board of directors disbanded the panel last year because its work was proceeding too slowly (see *MWN*, S/O01).

"I have been asked to chair a reconstituted committee," Dr. James Lin told *Microwave News*. Lin, of the University of Illinois in Chicago, was the original chair of the committee, which was first set up seven years ago to review the health effects literature and to recommend exposure guidelines (see *MWN*, S/O95).

"The board asked Jim to tell us what has been done and what needs to be done," said Ron Petersen, NCRP's vice president for non-ionizing radiation and a member of its board of directors. Petersen is a consultant based in Bedminster, NJ.

Lin said that he will recommend a slate of candidates for membership. The list will be presented to the NCRP's board of directors at its next meeting, which will be held September 11-12 at the council's offices in Bethesda, MD. Lin declined to reveal who he would like to invite to serve on his committee.

"The goal is to make a unique contribution," said Dr. Tom Tenforde, the newly installed president of the NCRP. The board suggested a number of important areas for the committee to focus on, he added, including a "critical analysis of other existing guidelines" and ways to communicate its findings to the public.

"We have some ideas on possible funding sources," Tenforde said.

« Wireless Notes »

Drs. **Lennart Hardell** and **Kjell Hansson Mild**'s paper on the incidence of brain tumors among users of cell phones is now scheduled for publication in the August issue of the *European Journal of Cancer Prevention*, Mild told *Microwave News*. The paper, which is at the heart of the New-man brain tumor lawsuit, had originally been expected to appear in the journal's June issue (see *MWN*, M/A02).

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ICNIRP's committee on **epidemiology**, chaired by Dr. **Anders Ahlbom** of the Karolinska Institute in Stockholm, has started working on a new review of the epidemiological literature on RF/MW health effects. "We are planning to focus on methodology," Ahlbom told *Microwave News*, explaining that this should help the interpretation of upcoming and future studies. He plans to complete the review by next summer. Dr. **Leeka Kheifets** of the WHO's EMF project and Dr. **Patricia Buffler** of the University of California, Berkeley, joined the committee in March.

«« »»

IEEE's Committee on Man and Radiation, known as **COMAR**, also is questioning the efficacy of devices that claim to protect users of mobile phones. "Independent tests on a number of such devices show them to be ineffective," according to a COMAR statement published in the May/June issue of the *IEEE Engineering in Medicine and Biology Magazine*. COMAR endorses the use of hands-free kits to move handsets away from the body for those who wish to reduce their exposures "for whatever reason." In addition, it advises that digital phones usually entail lower exposures than older analog models because the digital sets use less power. Earlier this year, the Federal Trade Commission took legal action against a number of companies that market **phone shields** for making false claims (see *MWN*, M/A02). The primary authors of the COMAR statement are Dr. **C.K. Chou** of Motorola, Dr. **Ken Foster** of the University of Pennsylvania and Prof. **Pere Riu** of the Technical University of Catalonia in Barcelona. The statement is also available on the Internet at <www.seas.upenn.edu/~kfoster/protective.htm>.

«« »»

Disney and **Motorola** are teaming up to tap the 6-to-12-year-old consumer electronics market. They will roll out the first products—a **two-way radio** and a 2.45 GHz **cordless phone**—in the fall, with others to follow next year. Motorola states that the walkie-talkies will have a range of up to two miles. And in late July, Disney announced that it is launching a service which will allow customers in Taiwan to download images of Mickey, Donald and Goofy onto their phone screens. In 2000, Disney pledged not to license its characters for use on cell phones "until there is reliable evidence establishing the absence of any [health] risk." Disney recently reaffirmed this commitment to *Microwave News* (see *MWN*, N/D00 and M/J02).

WHO's Brundtland Backs Repacholi's EMF Project

In recent months, Dr. Gro Harlem Brundtland, the director-general of the World Health Organization (WHO), has repeatedly spoken out in favor of a precautionary approach to the use of mobile phones, while the WHO's International EMF Project has demurred.

Brundtland is expressing "her personal views" and "she is not questioning the existing WHO position," Jon Liden, Brundtland's communications advisor, told *Microwave News*. Her remarks "do not constitute in any way a change in WHO's recommendations or position or amount to any conflict on this issue with the organization," he stated.

Drs. Michael Repacholi and Leeka Khefeits, who manage the EMF program in Geneva, have taken the position that more research is needed and that those who are concerned about possible radiation risks should limit their calls and use hands-free sets (see *MWN*, M/J02, also J/A00). But that is as far as they are willing to go. Repacholi argues against applying precautionary poli-

cies to mobile phones (Germany has just done so however; see p.1) and against limiting the use of phones by children.

At a July 1 press conference in Oslo held in connection with the conference of the International Union Against Cancer, Brundtland said: "I would be cautious about letting children use mobile phones for hours every day because we don't know enough about the damage." Her comments were picked up by newspapers and television networks all over the world.

She made similar remarks in an interview with the Norwegian press in March (*MWN*, M/A02). These were later picked up by Swedish but not by English language newspapers.

In July, when the story did spread further, the Mobile Manufacturers Forum (MMF), an industry trade group with close ties to the project, issued a statement endorsing the views of the project. "Brundtland's statements are her personal opinion and are certainly inconsistent with [the] official position of the WHO," the MMF stated.

With respect to power-frequency EMFs, the project last year shifted its opinion and endorsed a policy of prudent avoidance, while still rejecting the application of the precautionary principle (see *MWN*, S/O01).

Germany Promotes Low-SAR Phones (continued from p.1)

the precautionary principle when developing future generations of mobile phones, predicts Gerd Billen, who chairs the committee that oversees the ministry's label program. The panel has 13 members from government, industry and labor, consumer and environmental groups.

The environment ministry and the radiation protection office are urging manufacturers to apply for the label.

Phone makers, however, immediately dismissed the initiative as "inappropriate and nonsensical." BITKOM, a trade association whose members include Motorola, Nokia, Siemens and Sony Ericsson, stated that the initiative "lacks any scientific basis." The

label implies that phone radiation is harmful and that there is a greater health risk from those phones that do not meet the new SAR requirement—but any mobile phone is safe if it meets ICNIRP's 2.0 W/Kg guideline, BITKOM stated.

Manufacturers have opposed labels for low-radiation phones since Jürgen Trittin, the German environment minister, first proposed them last year (see *MWN*, J/A01). Most phones sold in Europe include SAR information inside their packaging.

The Blue Angel Web site* states that the ICNIRP limit protects against established health hazards. But, it adds, in light of the precautionary principle, minimizing exposure is appropriate because of "indications of harmful health effects" at lower levels. According to the radiation protection office, 15% of the phone

models marketed in Germany have SARs of 0.6 W/Kg or less.

The Blue Angel label is controlled by the environment ministry and is administered by the German Institute for Quality Assurance and Certification (known as RAL) in Saint Augustine, near Bonn. The oversight panel selects the product categories for which Blue Angel labels can be offered and approves the requirements for each category.

Labels may be displayed on scores of environmentally friendly products—for example, heaters that meet standards for energy efficiency and paper products with a high percentage of recycled fibers.

To be certified as environmentally friendly, phones must also meet requirements for recycling.

TCO'01 Mobile Phones, the certification standard launched last year by the Swedish white-collar union, TCO, specifies a maximum SAR of 0.8 W/Kg (see *MWN*, J/F01). TCO also requires that phones meet other criteria, including a standard for "telephone communication power." The German label requires only that a phone's performance be "adequate."

The federal radiation office's endorsement of this new SAR limit may portend major implications for the harmonization of radiation standards. The office has been closely associated with ICNIRP for many years. Dr. Jürgen Bernhardt, who retired in 2000 after a long career at the office's Institute for Radiation Hygiene, is a former chair of ICNIRP and is currently its vice chair. The office's Rüdiger Matthes is ICNIRP's scientific secretary, and Dr. Jutta Brix, a biologist there, is a consulting member of the commission.



*Go to <www.blauer-engel.de>. Portions of the site are in English.

IEEE RF/MW Exposure Limits: Revise or Stand Pat?

The Risk Assessment Working Group (RAWG) of the IEEE's International Committee on Electromagnetic Safety (ICES), better known as SCC-28, is still trying to reach consensus on how to revise its RF/MW radiation exposure standard (see MWN, J/F02).

The current standard, designated C95.1, has two sets of limits based on a maximum specific absorption rate (SAR) of 0.4 W/Kg for workers and 0.08 W/Kg for the general population. ICES applies these two tiers to what it calls "controlled" and "uncontrolled" environments, respectively.

These limits are based on the view that there is no "reliable evidence of hazardous effects" below a whole-body average SAR of 4 W/Kg. A safety factor of ten was then added for controlled environments, with an additional safety factor of five for uncontrolled exposures.

Reprinted below are excerpts from e-mails, obtained by Microwave News, which have been exchanged within the RAWG.

"I have no doubt that 0.4 W/Kg is entirely safe for everyone regardless of exposure duration, and that this value could well be chosen for a lower or only tier MPE."

—**Dr. Marvin Ziskin**
Temple University Medical School, Philadelphia

"I too believe that 0.4 W/Kg is safe for all, in all possible circumstances."

—**Captain Greg Gorsuch**,
Bureau of Medicine and Surgery, U.S. Navy, Washington

"There is a lot of talk about 4 W/Kg being a threshold for a nonhazardous effect, somehow tending to minimize the importance of the finding since we are presumably trying to set a standard to protect against adverse biological effects. Let me remind all of us that the 'threshold' discussed may be 'nonhazardous' in the context of the very short duration exposures used in determining it. But...most of the researchers who have developed these data agree that this threshold would turn into a really hazardous threshold *if* the exposure had been longer...So, sometimes, I sense that we are sort of talking like the 4 W/Kg figure is no big deal, but we know better."

—**Richard Tell, Richard Tell Associates Inc.**,
North Las Vegas, NV, and chair, RAWG

"Practically speaking, I think that you are going to be stuck with a two-tier approach with limits more or less similar to ICNIRP...If the level was 0.4 W/Kg for both public and occupational, the standard would instantly be dismissed in favor of ICNIRP. If the limit was 0.08 W/Kg for both occupational and public, people would applaud—but then you would soon be facing proposals for a new tier at 0.01 W/Kg for the general public."

—**Dr. Kenneth Foster, University of Pennsylvania, Philadelphia**

"I do not like the concept of stating a level (0.4, 0.08) and then trying to come up with a rationale for that number. This is crazy and logically backwards....If we cannot find a better rationale than the current one, which is weak, then let's not change the current standard. Don't grasp at straws. This is too important."

—**Dr. Mays Swicord, Motorola, Plantation, FL**

"Right now, the ICES approach to RF standards is not that differ-

ent from the approach taken by ICNIRP...However, if ICES takes a significant departure from C95.1 and from ICNIRP, the struggle for international harmonization will be set back enormously....I believe that standards harmonization is good....My opinion is similar to that [of] Mays Swicord."

—**Dr. Michael Murphy, U.S. Air Force Research Lab, Brooks AFB, San Antonio**

"We are obsessed by our own definition of 'science.' This standard is a lot more than science whether we like it or not. There have always been politics and sociology in the setting of MPE limits. Where do you think the lower public MPEs come from? Not quite the tooth fairy."

—**James Hatfield, Hatfield & Dawson Consulting Engineers, Seattle**

"When government does make a decision about risk for the public (e.g., pollution laws), I think they generally try to be more conservative than we in OSHA would be for healthy worker populations. That is why I still advocate at least two tiers if we want our standard to address all populations, including infants and the elderly."

—**Robert Curtis, Occupational Safety and Health Administration (OSHA), Salt Lake City**

"A standard would be 'extremely conservative' if it protected to an extreme degree. In my judgment, a factor of 10...is not 'extreme.'"

—**Dr. Asher Sheppard, Asher Sheppard Consulting, Redlands, CA**

"I think the term 'extremely conservative' is actually a fair description for the 0.4 W/Kg whole-body-average SAR limit. I've come to this conclusion by comparing the 0.4 W/Kg heat load to other sources of heating that are routinely accepted by the community without any qualms, including for example: increasing the ambient air temperature by a few degrees; stepping out into the sunshine; hugging your children; and almost any form of physical exertion, including tapping out these words on my computer."

—**Dr. Vitas Anderson, EME Australia Ltd., Melbourne**

"I don't support the use of ALARA in RF standards. ALARA implies that lower levels are safer than higher, such as in the stochastic hazard of ionizing radiation [IR]. There is no analogy with RF, there are good reasons to believe that there are true thresholds with RF below which there is no effect at all even across a large population. Using ALARA in RF weakens its importance in IR. We have deliberately removed it from the Australian and NZ standards for that reason."

—**Dr. David Black, Enviromedix IT Medicine, Auckland, New Zealand**

"C95 standards don't have to be perfect, but must be protective, enforceable and practical."

—**Dr. Aviva Brecher, U.S. Department of Transportation, Cambridge, MA**

Abbreviations:

ALARA: as low as reasonably achievable

ICNIRP: International Commission on Non-Ionizing Radiation Protection

MPE: maximum permissible exposure

The Talk of BEMS: Divergent Mobile Phone Studies in the International Spotlight

It's not often that two papers presented at the BEMS annual meeting* command international media attention. But that's what happened this year with two studies that have very different implications for the safety of mobile phones.

CELL PHONES SAFE, U.S. STUDY FINDS was the headline in the June 26 *Globe and Mail*, a national Canadian newspaper. Two days later, the *Financial Times* warned ALARM BELLS RING FOR MOBILE PHONE MAKERS, echoing an item that had run a week earlier in the *Wall Street Journal*, as well as many other news outlets, both in the U.S. and Europe (see box, p.11, and p.13).

The *FT* and the *Journal* were referring to the work of Dr. Dariusz Leszczynski of the Finnish Radiation and Nuclear Safety Authority, known as STUK, in Helsinki. He has shown that mobile phone signals can change the way a large number of different genes are expressed. This may help resolve the ongoing controversies over microwave radiation links to cancer and leakage through the blood-brain barrier.

The *Globe and Mail* story was about a study carried out by Dr. Joseph Roti Roti in which rats were exposed for two years to two different types of mobile phone signals— analog and CDMA. He found that the rats showed no increase in spontaneous brain tumors or other types of cancer.

Roti Roti, who is at Washington University in St. Louis, exposed rats to an average SAR of 1.25 W/Kg for four hours a day, except on weekends and holidays. "We tried to mimic a high level of exposure that humans might experience," he said.

The fact that either of these two studies was headline news is a story in itself. STUK had not alerted the press and Leszczynski had already published his results weeks earlier in *Differentiation* (see *MWN*, M/J02). Indeed, Leszczynski had presented much of the data at last year's BEMS meeting (see *MWN*, J/A01).

Coverage of Leszczynski's work took off after a BBC reporter, on a hunt for the latest scoop on mobile phones and health, was directed to him.



"I have convinced myself that this is real"
—Dr. Dariusz Leszczynski

There is no mystery about how the Roti Roti study got into the news. His media office issued a press release, as it turned out, on the same day that CNN ran a detailed story on Leszczynski's work. Roti Roti says that Motorola, which sponsored his study, did not ask him to send out a press release—nor did the company ask him to help counter the publicity generated by Leszczynski's findings. It came about, he explains, due to a series of serendipitous events.

In his press release, Roti Roti stated that, "As far as I can tell from the work so far, the greatest hazard with cell phones is driving a car while talking on one."

Leszczynski's work "should be followed up," Roti Roti told *Microwave News*, adding that he would be asking Motorola for the funds to do so himself. "It certainly raises an interest scientifically." Nevertheless, Roti Roti concluded, "I have no reason to believe that cell phones are not safe."

Leszczynski argues that his and Roti Roti's results are not necessarily contradictory. "I'm not saying mobile phone radiation can cause tumors; rather, that it might help damaged cells develop." But Leszczynski does question whether Roti Roti's rats were exposed to real-world conditions. They lived in a "very special protected environment," he said, pointing out that they did not encounter chemicals or other types of radiation.

Others at BEMS voiced similar concerns about the utility of



"I have no reason to believe that cell phones are not safe"
—Dr. Joseph Roti Roti

Iridium Signal: No Effect on Cancer Rates in Rats

A second, two-year animal exposure study, also reported at the BEMS meeting, showed that the 1.6GHz radiation emitted by Motorola's Iridium phones did not increase brain cancer in rats.

"There is no evidence of increased tumors in the exposed animals," said Dr. Larry Anderson of the Battelle labs in Richland, WA. Indeed, he added, there is no suggestion of any toxic effect.

A group of 36 pregnant Fischer-344 rats was exposed in the far field for two hours a day, seven days a week at an SAR of 0.16 W/Kg. The exposures continued until the offspring were 23 days old. The Battelle team then selected three groups of 90 males and 90 females from the 720 offspring: These were exposed for two hours, five days a week in the near field over the next two years. The rats were placed in tubes in a carousel configuration, resulting in SARs in the brain of approximately 0.16 W/Kg and 1.6 W/Kg. The third group served as controls.

The Iridium satellite phone service went bankrupt in August 1999 after Motorola had invested more than \$5 billion in the project. The Iridium system is still in limited operation; it is now being marketed to specialized users.

Anderson told *Microwave News* that he would soon submit his final report to Motorola and would then prepare a paper for publication. (See also p.2.)

* 24th Annual Meeting of the Bioelectromagnetics Society (BEMS), June 23-27, 2002, Quebec City, Canada.

† *EMF Science Review Symposium: Breakout Group Reports for Clinical and In Vivo Laboratory Findings*, April 6-9, 1998, Phoenix, AZ, NIEHS Publication No.98-4400. It is available on the EMF RAPID Web site, <www.niehs.nih.gov/emfrapid>. (See also p.2.)

two-year bioassays, the type of brain cancer study Motorola commissioned from both Roti Roti and Battelle (see box on p.10). "Rats are not a particularly good model for brain cancer," said Dr. Gregory Lotz of the National Institute for Occupational Safety and Health in Cincinnati. He pointed to a report[†] from a symposium held under the EMF RAPID program, which concluded that the statistical power of animal studies may be limited by the rats' low incidence of spontaneous brain tumors.

Leszczynski's work has its critics too. For instance, it has been suggested that his exposure system may not adequately control the temperature of the exposed cells—that is, the effects he observes may be a thermal response rather than a result of the electromagnetic signal. To help resolve this possibility, Dr. Niels Kuster's group at IT'IS in Zurich built Leszczynski a new exposure system (see *MWN*, M/J02).

In Quebec City, Leszczynski told *Microwave News* that he had run the experiment three times with Kuster's new equipment and had gotten similar results. "It's reassuring," he said. "It's enough to give me some peace of mind that I'm going in the right direction."

"I have convinced myself that this is real," he added. "Mobile phone radiation triggers a stress response in the cell—it's nothing unusual."

At the BEMS meeting, Dr. Franz Adlkofer of the VERUM Foundation in Munich bemoaned the fact that nothing had yet been done to test the possible effects of 3G mobile phone technology. Adlkofer, who coordinates the REFLEX project in which Leszczynski participates, said that, "This is gross negligence" given the hundreds of billions of euros that have been spent on the launch of 3G.

BEMS Journal To Publish IEEE Literature Reviews

BEMS will publish the literature reviews generated by the IEEE's International Committee on Electromagnetic Safety (ICES), also known as SCC-28. They will appear in a supplement to *Bioelectromagnetics*, the society's journal.

The U.S. Air Force will pay for the cost of the supplement, approximately \$15,000, according to Dr. Ben Greenebaum, the editor of *Bioelectromagnetics*.

"I am optimistic that the issue will appear in the first half of 2003," Greenebaum told *Microwave News*. "My feeling is that if the basic premises get out there in black and white, it will be a basis for public discussion."

Dr. Asher Sheppard, the immediate past president of BEMS, compared the move to ICNIRP's publishing the rationales for its standards in *Health Physics*. "The papers will be thoroughly reviewed. The society is not taking sides," said Sheppard, a consultant based in Redlands, CA, who is a member of the journal's editorial board.

More than a dozen "white papers" have been or are in the process of being drafted—most of them by Motorola and Air Force staffers. Copies can be downloaded from the subcommittee's Web site, <grouper.ieee.org/groups/scc28/sc4/main.html>.

Assessing the Leszczynski Study

"I don't think anyone can say whether there are or are not safety problems."

—Dr. Dariusz Leszczynski, Finnish Radiation and Nuclear Safety Authority, Helsinki, quoted by Gautam Naik, "Human Cells May Be Affected by Mobile Phone Radiation," *Wall Street Journal*, June 20, 2002

"If the blood-brain barrier is even temporarily affected by mobile phone radiation, it might have long-term health effects."

—Leszczynski, quoted by Duncan Graham-Rowe, "Phone Safety Debate Reignites," *New Scientist*, June 29, 2002

"At the moment, there is no scientific support for introducing any sort of limitation either on the use of mobile phones or setting new safety limits."

—Leszczynski, quoted in "Fresh Fears over Mobile Phones," *BBC News (U.K.)*, June 19, 2002

"I advocate [a precautionary approach] even more strongly now than two years ago, because of the evidence that has been coming out since then....I don't care if it's nonthermal or thermal, what I'm worried about is whether there are effects."

—Sir William Stewart, chair, U.K. Independent Expert Group on Mobile Phones, *New Scientist*, June 29, 2002

"It's difficult for me to believe that nonthermal effects exist."

—Dr. Mays Swicord, Motorola, Plantation, FL, *New Scientist*, June 29, 2002

"This is good work, and another part of the jigsaw, but the Stewart group was well aware of the possibility of biological effects. You can't go straight from a biological effect to a health effect. It's a big leap."

—Dr. Michael Clark, NPRB, Chilton, U.K., in "Mobile Phone Radiation 'Harms Brain Barrier,'" *The Times (U.K.)*, June 19, 2002

"If repeated in the intact body, it has horrific implications."

—Dr. Alan Preece, University of Bristol, U.K., quoted by J. Pickrell, "Cell Phone Buzz," *Science News*, June 29, 2002

"The implications here for health are zero."

—Dr. Michael Repacholi, World Health Organization, Geneva, *New Scientist*, June 29, 2002

"You cannot look at one study in isolation. You need to look at all studies in their totality."

—Jo-Anne Basile, CTIA, Washington, "Finnish Study Concludes Radiation Disrupts Cell Activity," *RCR Wireless News*, June 24, 2002

"Everyone has been working on this for years, but nothing has stood up."

—Dr. Garth Price, Telstra, Australia, quoted by Garry Barker, "Health Peril Played Down," *The Age (Australia)*, June 21, 2002

FROM THE FIELD

Meeting Notes

• The health effects meeting in **Catania in Sicily**, originally scheduled for July, will now be held in September. Among those on the preliminary program are Drs. Carl Blackman, Martin Blank, Settimo Grimaldi, Lennart Hardell, Henry Lai, Wolfgang Löscher, Fiorenzo Marinelli, Kjell Hansson Mild, Paolo Perfetti, Elihu Richter, Stanislaw Szmigielski and Mikhail Zhadin, as well as members of the organizing committee—Drs. **Livio Giuliani**, **Michael Kundi** and **Wilhelm Mosgoeller**. The main goal of the meeting, which is being arranged by Italy's National Institute for Prevention and Work Safety, is to have "a critical discussion of the evidence in the different research fields and a discussion of the possibilities to include this evidence in a comprehensive risk assessment." The invitation notes criticisms of **ICNIRP** for its failure to include a variety of epidemiological and other health studies in its exposure guidelines.

• Even though the Electricity Supply Association of Australia's (**ESAA**) August 9 workshop is advertised as being about power-frequency EMFs, a preliminary program suggested that the results of the replication of the "Repacholi" mobile phone cancer study would be released (see *MWN*, M/J97 and S/O98). But this is not to be. The Australian government, which is funding the experiment, has barred Dr. **Tim Kuchel** of the Institute of Medical and Veterinary Science in Adelaide from discussing his findings prior to publication, the ESAA told us. Kuchel did not respond to a query as to when he will reveal the results, but sources told *Microwave News* that the paper has been submitted.

• The proceedings of the international symposium on **Light, Endocrine Systems and Cancer: Facts and Research Perspectives**, held last May 2-3 at the University of Cologne, have been published in *Neuroendocrinology Letters*. The journal is offering a

New/Revised Listings

August 9: **Electricity Supply Association of Australia Scientific Workshop 2002: Standard Setting for Power-Frequency EMF**, Melbourne, Australia. Contact: Carmel Pannowitch, ESAA, PO Box 1823Q, Melbourne, VIC 3001, Australia, (61+39) 670-1014, Fax: (61+39) 670-1069, E-mail: <pannowitch@esaa.com.au>.

September 13-14: **EMF Scientific and Legal Issues: Theory and Evidence of EMF Biological and Health Effects**, Catania, Sicily, Italy. Contact: Dr. Livio Giuliani, E-mail: <l-giuliani@libero.it>, Dr. Michael Kundi, E-mail: <michael.kundi@univie.ac.at>, Dr. Wilhelm Mosgoeller, E-mail: <wilhelm.mosgoeller@univie.ac.at>; or Eva Marsalek, Tel./Fax: (43+02243) 87366, E-mail: <eva.marsalek@utanet.at>. Originally scheduled for July 5-6.

discount price of \$49.50, instead of the regular \$64.00. Go to <www.nel.edu/Press/Light-Endocrine-Cancer.htm>. In addition to the papers presented at the meeting, there are also four evaluations—by Drs. **Charles Poole**, **Christopher Portier**, **Till Roenbeberg & Robert Lucas** and **Vladimir Anisimov & Johnni Hansen**. Poole, an epidemiologist at the University of North Carolina, Chapel Hill, predicts that this research area will soon be transformed into one associated with "big-time, managed science" and that then, "Researchers on light at night and cancer will quickly find what they have been seeking: the darkness at the end of the tunnel." In his comments, NIEHS' Portier has only one footnote—to "I Got Rhythm," the Gershwin song from the 1930 Broadway show *Girl Crazy*. These evaluations, as well as the abstracts of the papers, can also be downloaded at no charge from the university's Web site, <www.uni-koeln.de/symposium2002>.

"MICROWAVE NEWS" FLASHBACK

Years 20 Ago

- The eighth unexplained cluster of adverse pregnancies among VDT operators is reported—at Surrey Memorial Hospital in Vancouver, Canada.
- In a letter to the *New England Journal of Medicine*, Dr. Samuel Milham publishes the first epidemiological link between leukemia and occupational exposure to EMFs.
- The ANSI RF/MW exposure standard is "pro-industry," says Dr. Nicholas Steneck of the University of Michigan in a paper presented at the annual meeting of the Bioelectromagnetics Society.

Years 10 Ago

- Dr. Keith Florig of Resources for the Future in Washington argues in *Science* that the U.S. could "justify" spending on the order of \$10 billion a year on EMF mitigation and that the need for a federal research program is "particularly acute."

- ELF EMFs can block melatonin's ability to control the growth of breast cancer cells, Dr. Robert Liburdy reports at an international conference on EMFs in biology and medicine.
- In Disney's new film, *Honey, I Blew Up the Kid*, power line and RF/MW radiation stimulate the "kid" to grow and grow and grow.

Years 5 Ago

- The National Cancer Institute dismisses any association between childhood leukemia and living near power lines. An accompanying editorial advises against "wasting" any more money on EMF research.
- The NAS-NRC questions the validity of a Michigan Tech University report that ELF EMFs enhance tree growth. Later, committee members say they are not so sure about the basis of their criticism.
- Swiss Re warns that EMF litigation could threaten the entire insurance industry. Its electrosmog report notes that a shift in public attitudes on acceptable risks could cause juries to favor plaintiffs.

Across the Spectrum

“More studies that directly investigate the effects of mobile phone use in the human population are urgently needed....With an estimated 1.6 billion mobile phone users worldwide by the end of 2005, even a small association of mobile phone use with brain cancer could have massive implications, for mobile phone users and the industry alike.”

—Editorial, “The Million Dollar Question,”
Lancet Neurology, p.201, August 2002

“Certainly everyone is entitled to have their opinion, but what really matters is science. The independent, peer-reviewed science all indicates that there is no health risk.”

—Marc Choma, director of communications, Canadian Wireless Telecommunications Association, Ottawa, referring to Dr. Gro Harlem Brundtland’s concerns over mobile phone health risks, quoted by Heather Sokoloff, “WHO Chief Gives Warning Despite Lack of Proof of Health Risks,” *National Post* (Canada), July 2, 2002 (see p.8)

Alice Stewart, who has died aged 95, achieved worldwide fame and changed medical practice through her tenacious investigations....Stewart showed a clear connection between leukemia before the age of 10 and

the mother’s exposure to x-rays during early pregnancy....But it was aggressively opposed by many physicists and radiobiologists, by the committees of the International Commission for Radiation Protection...

—Anthony Tucker, obituary for Dr. Alice Stewart,
The Guardian (U.K.), June 28, 2002

“The cost will be huge and hard to imagine.”

—Dr. C.K. Chou, Motorola, Plantation, FL, commenting on a Chinese proposal to adopt a 1 W/Kg SAR standard for mobile phones (see *MWN*, M/J02), quoted by Hou Mingjuan, “Phone Radiation Rule Under Fire,” *China Online*, <www.chinaonline.com>, June 20, 2002; Mingjuan identifies Chou as a “science adviser” to the Mobile Manufacturers Forum (MMF), see <www.mmfa.org>

“So now there’s kind of a passing of the baton.”

—Jo-Anne Basile, vice president for external and industry relations, Cellular Telecommunications and Internet Association, Washington, commenting on the Leszczynski study and the “drying up” of RF/MW research in the U.S. as the effort has increased in Europe, interviewed by Steve Young, *Lou Dobbs Moneyline*, CNN, June 25, 2002 (see p.10)

Letters to the Editor

More Reasons Children May Be at Risk

June 25, 2002

To the Editor:

I read with great interest your report on the Rome meeting on the possible risks of mobile phones to children (*MWN*, M/J02). My institute at the University of Vienna and Physicians for a Healthy Environment (a nongovernmental organization) have produced an information booklet on *Mobile Phones and Children*, sponsored by the Austrian Green Party. It discourages the use of mobiles by children.

The arguments are similar to those that have been put forward by others. In addition, however, it relies on a fact that has not been previously stressed and, to my surprise, appears not to have been discussed in Rome. A child’s skull is not only thinner and surely has different dielectric properties because it has more blood vessels—it also contains many more stem cells which can form blood cells.

Hence, if RF/MW radiation has an influence on the development of cancer, its effects will be greater in children for two reasons. First, the most vulnerable cells are only millimeters from the antenna. (To my knowledge, nobody has calculated the SAR within the bone marrow of the skull.) And second, the earlier in life a malign transformation occurs, the more likely it will result in a clinical malignancy.

Prof. Michael Kundi
Institute of Environmental Health, University of Vienna
Kinderspitalgasse 15, A-1095 Vienna, Austria
<michael.kundi@univie.ac.at>

Holding Firm Seven Years Later

June 14, 2002

To the Editor:

Dr. Robert Adair’s ongoing dispute with Drs. Richard Albanese and Kurt Oughstun over the Air Force’s PAVE PAWS radar [see *MWN*,

M/A02 and M/J02] reminds me of another controversy over non-ionizing radiation.

In 1995, Adair and 13 other scientists including six Nobel laureates filed an amicus brief in the *Covalt* case. In *Covalt v. SDG&E*, the Covalt family sued the San Diego electric utility for lost property values and potential health effects due to elevated EMF levels from nearby power lines [see *MWN*, N/D95, also M/A95 and S/O96]. The brief swayed the court with false arguments that EMFs are not a risk factor for cancer.

Since then, several major changes have taken place. Most notably, in June 2001 the International Agency for Research on Cancer (IARC) unanimously voted to classify EMFs as a Category 2B carcinogen, that is, a possible human carcinogen. At about the same time, the California Department of Health Services (DHS) reached a similar conclusion in a draft report based on a five-year investigation of possible EMF health effects [see *MWN*, J/A01].

It is time for Adair and the others to retract this brief. Their ultimately incorrect scientific opinion about EMF health risks carried much weight before the California courts and in the court of public opinion. If Adair is indeed a good scientist, he will recognize that consensus has been reached, and that it differs from the view offered in the *Covalt* brief. If Adair will not revisit his opinion, I will never believe anything *he* says again.

Cindy Sage
Sage Associates
1396 Danielson Rd., Santa Barbara, CA 93108
<sage@silcom.com>

Dr. Robert Adair offered the following response:

June 19, 2002

To the Editor:

Ms. Sage vs. six Nobel laureates (two in medicine)? I judge it no-contest. And the conclusions expressed in their amicus curiae are not challenged by statements of “not impossible” by less eminent groups.

Robert Adair, PhD
Department of Physics, Yale University, New Haven, CT 06520
<adair@hepmail.physics.yale.edu>

Hot New Papers

Roger Santini et al., "Symptoms Experienced by Users of Digital Cellular Phones: A Study of a French Engineering School," *Electromagnetic Biology and Medicine*, 21, pp.81-88, 2002.

"A survey study, using a questionnaire, was conducted in 161 students and workers in a French engineering school on symptoms experienced during use of digital cellular phones. A significant increase in concentration difficulties ($p < 0.05$) was reported by users of 1800 MHz (DCS) cellular phones compared to users of 900 MHz (GSM) cellular phones. In users of cellular phones, women significantly ($p < 0.05$) complained more often of sleep disturbance than men. The use of both cellular phones and VDT significantly ($p < 0.05$) increased concentration difficulties. Digital cellular phone users also significantly ($p < 0.05$) more often complained of discomfort, warmth and pricking of the ear during phone conversations as a function of calling duration per day and number of calls per day."

Reprints: Dr. R. Santini, National Institute of Applied Sciences, Villeurbanne, France, E-mail: <roger.santini@free.fr>.

J. Van de Kamer and J. Lagendijk, "Computation of High-Resolution SAR Distributions in a Head Due to a Radiating Dipole Antenna Representing a Hand-Held Mobile Phone," *Physics in Medicine and Biology*, 47, pp.1827-1835, May 21, 2002.

"SAR distributions in a healthy female adult head as a result of a radiating vertical dipole antenna (frequency 915 MHz) representing a hand-held mobile phone have been computed for three different resolutions: 2 mm, 1 mm and 0.4 mm....For an effectively transmitted power of 0.25 W, the maximum averaged SAR values in both cubic- and arbitrary-shaped volumes are, respectively, about 1.72 and 2.55 W/Kg for 1 g and 0.98 and 1.73 W/Kg for 10 g of tissue. These numbers do not vary much (<8%) for the different resolutions, indicating that SAR computations at a resolution of 2 mm are sufficiently accurate to describe the large-scale distribution. However, considering the detailed SAR pattern in the head, large differences may occur if high-resolution computations are performed rather than low-resolution ones. These deviations are caused by both increased modeling accuracy and improved anatomical description in higher resolution simulations. For example, the SAR profile across a boundary between tissues with high dielectric contrast is much more accurately described at higher resolutions....Thus, for strongly inhomogeneous regions high-resolution SAR modeling is an absolute necessity."

Reprints: Dr. Jeroen Van de Kamer, University Medical Center Utrecht, The Netherlands, E-mail: <jeroen@radth.med.uu.nl>.

V.N. Binhi and A.V. Savin, "Molecular Gyroscopes and Biological Effects of Weak Extremely-Low-Frequency Magnetic Fields," *Statistical, Nonlinear and Soft Matter Physics (Physical Review E)*, 65, 051912 (10pp.), May 2002.

"The molecular interfering gyroscope is a challenger for solving the kT problem as a probable mechanism of magnetobiological effects [MBEs]. ...The role of molecular gyroscopes could probably be played by short sections of polypeptides and nucleic acids built inside globular proteins or in cavities between associated globules. In this respect, it is interesting to look at the Watson-Crick pairs of nitrous bases (adenine-thymine and guanine-cytosine) that bind the DNA strands into a double helix as well as some other hydrogen-bound complexes of nitrous bases. ...Generally speaking, the fact that the molecular gyroscope model gives a physically consistent explanation of MBEs proves indirectly its real grounds. Further studies should verify whether this conclusion is cor-

Vatican Radio Linked to Leukemia

Paola Michelozzi et al., "Adult and Childhood Leukemia near a High-Power Radio Station in Rome, Italy," *American Journal of Epidemiology*, 155, pp.1096-1103, June 15, 2002.

"Vatican Radio is a very powerful station located in a northern suburb of Rome, Italy. In the 10 km area around the station, with 49,656 residents (in 1991), leukemia mortality among adults (aged >14 years; 40 cases) in 1987-1998 and childhood leukemia incidence (eight cases) in 1987-1999 were evaluated. The risk of childhood leukemia was higher than expected for the distance up to 6 km from the radio station (standardized incidence rate=2.2, 95% confidence interval: 1.0, 4.1), and there was a significant decline in risk with increasing distance both for male mortality ($p=0.03$) and for childhood leukemia ($p=0.036$)....The results of the study show an excess within 2 km of the radio station and a decline in risk with distance from the site both for leukemia mortality among male adults and for leukemia incidence among children. However, the number of cases is small, and the excess mortality from leukemia was found only among men, whereas no significant increase was observed among women."

See *MWN*, M/A01, M/J01, S/O01 and M/J02.

Reprints: Dr. P. Michelozzi, Department of Epidemiology, Lazio, Italy, E-mail: <salute@asplazio.it>.

rect. In any case, today, the interfering molecular gyroscope is a single available mechanism to give explanations that would be physically transparent and generally agreeable with experiments."

See also new books, *MWN*, M/J02, and <www.biomagneti.com>.

Reprints: Dr. V.N. Binhi, Russian Academy of Sciences, Moscow, E-mail: <Binhi@biomagneti.com>.

Allan Smith et al., "Arsenic Epidemiology and Drinking Water Standards," *Science*, 296, pp.2145-2146, June 21, 2002.

"In conclusion, when there is such direct human epidemiological evidence that a substance causes cancer, we should focus on margins of safety, avoiding extensive statistical manipulations of data and excessive debate about potential uncertainties. Prudent public health decisions should not wait until there is proof of serious cancer risks at low exposure."

Reprints: Dr. Allan Smith, University of California, Berkeley, School of Public Health, E-mail: <ahsmith@uclink4.berkeley.edu>.

Reba Goodman and Martin Blank, "Insights into Electromagnetic Interaction Mechanisms," *Journal of Cellular Physiology*, 192, pp.16-22, July 2002.

"Low-frequency (<300 Hz) EMFs induce biological changes that include effects ranging from increased enzyme reaction rates to increased transcript levels for specific genes. The induction of stress gene HSP70 expression by exposure to EMFs provides insight into how EMFs interact with cells and tissues....Biological studies with *in vitro* model systems have focused, in general, on the nature of the signal transduction pathways involved in response to EMFs. It is likely, however, that

EMFs also interact directly with electrons in DNA to stimulate biosynthesis. Identification of an EMF-sensitive DNA sequence in the HSP70 promoter, points to the application of EMFs in two biomedical applications: cytoprotection and gene therapy. EMF induction of the stress protein hsp70 may also provide a useful biomarker for establishing a science-based safety standard for the design of cell phones and their transmission towers....Our finding that weak EMFs can stimulate the synthesis of stress proteins indicates that cells view EMFs as potentially harmful, rather than benign. In that sense, cellular studies have provid-

Review of 18 Mobile Phone Cognitive and Sleep Studies

Denise Hamblin and Andrew Wood, "Effects of Mobile Phone Emissions on Human Brain Activity and Sleep Variables," *International Journal of Radiation Biology*, 78, pp.659-669, August 1, 2002.

"Direct comparison of the 18 studies of human brain responses to mobile phone emissions is difficult because of differing experimental protocols....Since most evidence is that RF energy at these levels does not lead to significant heating of tissue, many investigators have suggested more subtle alterations in calcium binding to membranes, permeability of the blood-brain barrier, nervous system information processing, neurotransmitters and learning processes. These effects have been suggested to originate from modified, and perhaps adapted, intercellular processes and communication due to EMFs interacting with the cell membrane surface of glycoproteins. On the other hand, some investigators believe that even a slight temperature increase in brain tissue may underlie a mechanism by which GSM-type signals may improve blood flow, hence exciting neural activity and synaptic transmission and affecting brain function. One area that may hold implications for the studies reviewed is combined exposure with other coexisting frequencies....As concomitant EMF exposures may hold implications for the results of studies under current review, it is of paramount importance that they are considered....It is difficult, if not impossible, to extrapolate to long-term effects of cumulative exposure. As many of the acute effects observed in the studies reviewed here appear transitory, restricted and reversible, the possibility of cumulative effects seems unlikely. Long-term studies are required to completely address the concerns of public health....The most consistent finding in this area has been the enhancement of alpha power as seen in EEG recordings and during cognitive tasks. These findings are confined to the experimental arrangements under which they were observed, but do demonstrate that mobile phone emissions could have an effect on human brain activity and sleep variables both during and after exposures at one extreme of normal phone use."

See also: C. Cook, A. Thomas and F. Prato, "Human Electrophysiological and Cognitive Effects of Exposure to ELF Magnetic and ELF Modulated RF and Microwave Fields: A Review of Recent Studies," *Bioelectromagnetics*, 23, pp.144-157, February 2002. Reprints: Dr. A. Wood, Swinburne University of Technology, Melbourne, Australia, E-mail: <awood@swin.edu.au>.

ed important evidence to complement the epidemiological studies. The results of those cellular studies have also pointed to a molecular mechanism, thereby neutralizing a frequent argument in this controversy....The EMF-induced stress response offers a more reliable and realistic biological criterion for establishing cell phone safety standards than tissue heating."

See also: Goodman-Blank "hot paper," *MWN*, N/D99.

Reprints: Dr. Reba Goodman, Columbia University Health Sciences, New York, NY, E-mail: <rmg5@columbia.edu>. At press time, a pdf is available free from the journal's Web site: <www.interscience.wiley.com/jpages/0021-9541>.

Chung-Yi Li, Pei-Chun Chen, Fung-Chang Sung and Ruey-Shiung Lin, "Residential Exposure to Power-Frequency Magnetic Field and Sleep Disorders Among Women in an Urban Community of Northern Taiwan," *Sleep*, 25, pp.422-426, June 15, 2002.

"The [difficulty initiating sleep] prevalence was significantly associated with bedroom magnetic field exposure of ≥ 2 mG (odds ratio (OR): 1.20, 95% confidence interval (CI)=1.02-1.40). The [difficulty maintaining sleep] prevalence was significantly higher for women with background exposure of ≥ 2 mG (OR: 1.28, 95% CI=1.04-1.56)."

Reprints: Dr. Ruey Lin, National Taiwan University College of Public Health, Taipei, E-mail: <linrs@episerv.cph.ntu.edu.tw>.

Tongzhang Zheng et al., "Occupation and Risk of Non-Hodgkin's Lymphoma [NHL] and Chronic Lymphocytic Leukemia [CLL]," *Journal of Occupational and Environmental Medicine*, 44, pp.469-474, May 2002.

"We analyzed data from two population-based, case-control studies of NHL performed in Kansas and Nebraska. A total of 555 incident NHL cases, 56 CLL cases and 2,380 population-based controls were included in the analysis. Information on occupation and other confounding factors was collected through telephone interviews. Study pathologists reviewed slides of tumor tissues in all cases....A significantly increased risk of NHL was also observed among metalworking machinery and equipment workers, fabricators, assemblers, welders and solderers.... Our study also found an increased risk for male electrical and electronic equipment repairers who had worked at their job for 10 or more years (OR: 2.8, 95% CI=0.9-8.3) and also among women (OR: 5.6, 95% CI=0.9-34.7). An increased risk of NHL for all major histological types was also observed for telephone communication industry workers, with a significant association for small lymphocytic NHL and CLL. A potential association between exposure to electromagnetic fields and NHL risk has been proposed by several investigators, although the hypothesis continues to be widely debated..."

See also: Fabbro-Peray and Cano "Hot Papers," *MWN* J/A01 and S/O01, respectively.

Reprints: Dr. Tongzhang Zheng, Yale University School of Public Health, New Haven, CT, E-mail: <tongzhang.zheng@yale.edu>.

K. Vangelova, M. Israel and S.Mihaylov, "The Effect of Low-Level Radio-frequency Electromagnetic Radiation on the Excretion Rates of Stress Hormones in Operators During 24-Hour Shifts," *Central European Journal of Public Health*, 10, pp.24-28, June 2002.

"Twelve male operators at a satellite station for TV communications and space research were studied during 24-hour shifts....[O]ur data indicate considerable effect of 24-hour occupational exposure of RF EM radiation on stress hormones. The low-level exposure evoked pronounced stress reaction with changes in the circadian rhythm. The variability of catecholamines secretion increased under the RF exposure."

Reprints: Dr. Katia Vangelova, National Center of Hygiene, Medical Ecology and Nutrition, Sofia, Bulgaria, E-mail: <KatiaVangelova@yahoo.com>.

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NAS-NRC Measurement Advice...In a July 22 letter to the U.S. Air Force (USAF), Dr. Frank Barnes, chair of the National Academy of Sciences-National Research Council (NAS-NRC) panel that is charged with assessing potential health effects of RF radiation from the PAVE PAWS radar on Cape Cod, recommends the types of measurements to be carried out. For instance, Barnes wants to see "a comparison of waveforms from a radar utilizing a reflector antenna and waveforms similar to PAVE PAWS." Barnes is at the University of Colorado, Boulder. The letter is on the Web site of the National Academy Press, <www.nap.edu>. (For more on the PAVE PAWS controversy, see *MWN*, S/OO0 and M/A02, and the items below.)

STANDARDS

Current Limits Questioned...Writing in *IEEE Spectrum*, a magazine that rarely runs criticisms of IEEE standards, Raymond Kasevich calls for RF/MW radiation exposure limits to be revised "using all of the available results and information—not just the data that fit previously held assumptions." He would like the work of Drs. Richard Albanese, Henry Lai and Dariusz Leszczynski to be taken into account (see item below and p.10). "The telecommunications industry, which is in deep denial, needs to face reality," he writes. Kasevich, chief scientist of CS Medical Technologies in Great Barrington, MA, offers his opinion in the magazine's August issue.

IEEE Says No to Brillouin Precursors...The subcommittee of ICES (SCC-28) revising the IEEE RF/MW exposure standard has moved not to include Brillouin precursors in its deliberations—thus dismissing the work of Drs. Richard Albanese and Kurt Oughstun, who have suggested that Brillouin precursors created by the PAVE PAWS radar could pose a health risk (see *MWN*, M/A02 and M/J02). The panel made the decision at a meeting on June 29 in Quebec City following the BEMS conference, in response to a motion from Raytheon's Arthur Varanelli, which was seconded by Dr. Eleanor Adair, who recently retired from the U.S. Air Force. The motion stated that there is no "evidence in the peer-reviewed scientific literature supporting Brillouin precursors as being biologically important at RF frequencies." Dr. John Osephchuk, formerly of Raytheon and past chair of SCC-28, said that the issue is "99% politics and 1% science."

PEOPLE

Professor **Shoogo Ueno** of the Biomedical Engineering Department at the University of Tokyo is the new president-elect of the Bioelectromagnetics Society (BEMS). He will take over from the current president, Dr. **Frank Prato** of the University of Western Ontario in London, Canada, at BEMS' next annual meeting, to be held in Maui, Hawaii, in June 2003. Ueno is also the chair of Japan's Committee to Promote Research on the Possible Biological Effects of EMF....Dr. **Ken Foster** has written a biographical paper about his mentor Dr. **Herman Schwan**, with special emphasis on his scientific work. Foster is in the bioengineering department at the University of Pennsylvania in Philadelphia, the department that Schwan was instrumental in establishing in

1973. "Herman P. Schwan: A Scientist and Pioneer in Biomedical Engineering" appears in the *Annual Review of Biomedical Engineering*, 4, pp.1-27, 2002. The article features a full-page picture of Schwan, but due to an editing error, he is identified as Foster....Dr. **Gunnhild Oftedal** has joined the faculty of technology at Sør-Trøndelag University College in Trondheim, Norway. Oftedal, who collaborated with Dr. **Kjell Hansson Mild** on the Scandinavian mobile phone-headache study (see *MWN*, M/J98), says that she plans to continue to work on EMF issues in cooperation with Prof. **Anders Johnsson** at the Norwegian University of Technology, also in Trondheim, where she used to work.

ANTENNAS & DIPLOMACY

Cyprus Shifts Stance... On July 3, Cyprus' foreign and environment ministers asked the British military not to proceed with plans for two new antennas to be used for intelligence-gathering at the U.K. military base there. They warned that the 320-foot towers—and a huge wire net connecting them—would "seriously harm the environment" on the Mediterranean island by damaging a marsh that is internationally recognized as a wild-life habitat. The British countered that its base is not in the protected area and rejected as "unrealistic" a Cyprus government proposal to relocate the towers, according to the July 3 *Cyprus Mail*. Previously, government officials had rebuffed public and parliamentary opposition to the project based on health concerns (see *MWN*, J/A01 and S/O01). Clashes between British military police and some of those protesting the towers have continued. The member of parliament who was arrested last year for scaling one of the existing towers, thereby sparking a riot, was arrested again. This time, he entered the construction site, climbed a bulldozer and refused to come down.

SOLAR POWER SATELLITES

Plants Growing in the Beam... NASA is once again investigating space solar power (SSP)—a plan to collect solar energy with satellites and beam it down to Earth with 2.45 GHz or 5.8 GHz microwaves (see *MWN*, S/O01). Dr. Jay Skiles of the NASA Ames Research Center near San Jose, CA, is investigating whether microwaves will interfere with plants growing near the 100 km² (39-square-mile) ground-based receiving antenna (known as a rectenna). The power density at the center of such a receiving array would reach 23 mW/cm², according to one estimate, dropping to 1 mW/cm² at the edge of the rectenna and 100 μW/cm² at the protective fence. In an experiment that ended in early June, Skiles exposed alfalfa plants to 2.45 GHz radiation at power densities of 0.1-4 mW/cm² and monitored the levels of chlorophyll, as well as of carbon dioxide and oxygen, in the air. Preliminary results will be reported later this summer, he told *Microwave News*. This was essentially a pilot study, Skiles said. "Now we are set to move ahead with plants growing in real-world conditions." He expects to begin these experiments at both 2.45 GHz and 5.8 GHz this summer...Earlier this year, NASA, the National Science Foundation and EPRI issued a request for proposals on "impacts of microwaves on living and nonliving systems," among other topics related to SSP (<www.nsf.gov/pubsys/ods/getpub.cfm?nsf02098>). The deadline for proposals was June 15.

Cell Towers

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Edited by **B. Blake Levitt** with chapters contributed by: Carl Blackman, EPA; Robert Cleveland, FCC; Albert Manville, F&WS; Henry Lai and Andrew Marino, among others



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MICROWAVE WEAPONS

Military Plans Unfolding...In recent weeks, David Fulghum of *Aviation Week* has been a font of information on high-power microwave (HPM) weapons—some of it a bit contradictory. On July 22, he quoted Mike Booen, head of Raytheon Electronic Systems' directed energy programs, predicting that HPMs would be operational within four to five years. But then in the August 5 issue, Fulghum reported that microwave weapons would probably be used in the much-talked-about war against Iraq. In between, on July 29, *Aviation Week* announced that the U.K.'s defense ministry has successfully tested a prototype HPM weapon and that Germany is considering developing one too.

ALTERNATIVE MARKETING

Magazine Plugs Shields...In its June issue, *Alternative Medicine* features an eight-page spread on EMF dangers which is followed by an "informal study" of devices "designed to neutralize" the "harmful effects" associated with EMF exposures. Tests of the Teslar watch and two pendants, the QLink and the Bio-Electric Shield, yielded "impressive" results: When wearing the devices, a volunteer had no change in heart rate during a mobile phone call, but without the gadgets her pulse sped up while using the phone, according to the tester, Larry Trivieri. "Who would have thought it," he concludes, "those darned things seem to work!" We should note that the articles are flanked by ads for the BioElectric Shield, the QLink and the Teslar watch. The Bio-Electric Shield received extensive free publicity in 1998 when several U.K. newspapers claimed that Cherie Blair, Prime Minister Tony Blair's wife, was wearing the device and that Hillary Clinton had recommended it to her (see *MWN*, S/O98).

Keeping Current: Follow-Up on the News

◆ The use of electric blankets did not lead to an increased risk of endometrial cancer, according to Jane McElroy and coworkers at the University of Wisconsin, Madison. Their paper is in the August 1 issue of the *American Journal of Epidemiology* (156, pp.262-267, 2002). Previously, she reported no electric blanket link to breast cancer (see *MWN*, N/D01).

◆ Germany's Federal Radiation Protection Office is dismissing a Japanese researcher's prediction that ICNIRP limits could be exceeded if many mobile phones are used in an enclosed space, such as a train car or elevator (see *MWN*, M/J02). Dr. Tsuyoshi Hondou's calculations are "based on unrealistic assumptions," the agency stated in July on its Web site, <www.bfs.de>.

◆ Dr. Nancy Wertheimer and Ed Leeper offer some ideas to explain the contradictory results obtained in two Canadian EMF studies on childhood leukemia. See: "Potential Motion-Related Bias in the Worn Dosimeter Measurements of Two Childhood Leukemia Studies," which appears in the July issue of *Bioelectromagnetics* (23, pp.390-397, 2002).

◆ In Lancashire and North Yorkshire, where police are testing

the TETRA system before installing it throughout the U.K., officers are blaming the new digital radios for headache, nausea and other symptoms, according to a survey reported in the July 18 *Daily Telegraph*. The Police Federation, the employee group that did the survey, contends that its members are being used as "guinea pigs" (see *MWN*, S/O01 and N/D01).

◆ Radiation from nearby telecom transmitters was not responsible for a cancer cluster among children at an elementary school in Valladolid, Spain, according to an expert inquiry commissioned by the health council of Castile and León (see *MWN*, J/F 02). Nevertheless, the commission's report, released on May 23, recommends that the antennas be removed.

◆ Two Minneapolis suburbs have dropped their opposition to Xcel's planned upgrade of a power line from 115 kV to 230 kV. Sunfish Lake and Mendota Heights had cited health concerns in voting to block the project earlier this year, but they decided to settle with the utility after state courts ruled against them and Xcel threatened to sue (see *MWN*, M/A02 and M/J02). The Power Line Task Force is vowing to continue to fight the upgrade.

VIEWS ON THE NEWS

How To Do Science: Löscher Teaches Americans a Lesson

We should all thank Germany's Wolfgang Löscher for reminding us what science is really about: Testing ideas until you understand what is going on.

Ten years ago, Löscher and Meike Mevissen began publishing a series of papers that upset the prevailing paradigm by showing that relatively weak magnetic fields can promote breast cancer in laboratory animals.

This is important. Evidence of an EMF effect on animals is the missing link. With it, the epidemiological evidence pointing to a cancer risk would be much more credible.

NIEHS' Gary Boorman asked Battelle's Larry Anderson to repeat Löscher's work. His first two experiments went awry. A third attempt found no effect.

Boorman dismissed Löscher's work as flawed and went on to wage a campaign to discredit Löscher, even resorting to dirty tricks.

Instead of turning tail as so many others have done when confronted by an angry EMF establishment, Löscher went back to the lab and ran more experiments. He collaborated with Anderson and together they explored why their results disagreed.

Now, four years later, Löscher thinks he has the answer. As his postdoc Maren Fedrowitz explained at the June BEMS meet-

Dr. Li's Chorus of Critics

Last year when we first reported De-Kun Li's innovative study linking miscarriages to a new metric—maximum magnetic field exposure—we predicted that it would not soon be followed up (see *MWN*, M/J01). But we never dreamt that it would be attacked so fiercely.

Sir Richard Doll and his NRPB colleagues called the results essentially worthless and said that they do not warrant a second look (see p.3). The electric utility industry and BEMS wasted no time before circulating Doll's harsh opinion. At EPRI, Rob Kavet lip-synchs Li's critics when not prevaricating about his own activities.

Much too much protesting is going on, which suggests only one thing: Li is on to something after all.

ing: Animals with different genetic makeups respond differently to EMFs (see p.2).

EMF research is plagued with unreplicated results because there is never enough money, persistence and curiosity to resolve apparent contradictions. The significance of genetic variability emerged in the Henhouse Project 15 years ago, but it was ignored because it, too, challenged the orthodoxy.

Löscher has shown us that EMF enigmas can be explained—if one behaves like a scientist.

Motorola's Junkyard Dog

It was an ugly scene. Motorola's Joe Morrissey came to the microphone after Dariusz Leszczynski's talk at the BEMS meeting and asked if he had read the epidemiological and animal studies showing that mobile phone radiation has no health effects. If so, he wondered, why was Leszczynski speculating about microwave-induced cancer risks and leakage through the blood-brain barrier (see p.10).

"Are you aware of these studies?" Morrissey demanded to know. There was a moment of stunned silence before Leszczynski responded that of course he was. "I should have answered, 'Yes, I can read,'" he later told us.

Motorola is the single most important force in bioelectromagnetics today. It is the largest sponsor of health research, both on its own and through the Mobile Manufacturers Forum, and it controls key positions on standard-setting committees and professional societies such as BEMS. Motorola has a big say about what papers are published, what standards are adopted and what meetings are held—it even decides what news is sent to BEMS members.

But as the Morrissey episode illustrates, there is more than science on Motorola's agenda. The company has never shied away from spinning research results. Remember how its PR people "war-gamed" the Lai-Singh results? (See *MWN*, J/F97.)

Too often, Motorola takes the position that experimental results from labs it sponsors are always right and that conflicting

findings must be wrong. Henry Lai and N.P. Singh saw DNA breaks in rat brains following microwave exposure, but Joe Roti Roti did not. Motorola says you have to believe Roti Roti.

Whether discouraging China from adopting a tough new SAR standard or pushing for looser microwave exposure limits in the U.S. or arguing that putative nonthermal effects must be due to heating, Mays Swicord, C.K. Chou and Joe Elder want us to believe that their opinions are based on science and only on science.

It's a tough sell. Morrissey is their attack dog and his nasty performance at the BEMS meeting tells us a lot about Motorola's real agenda: to discredit any data that could hurt the market for mobile phones.

By the way, we wonder whether Morrissey is aware of Ross Adey's animal study showing that digital phone radiation can protect against cancer. He should be. Motorola sponsored it.

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