MICRO WAVE NEWS

Vol. XXI No. 2 A Report on Non-Ionizing Radiation March/April 2001

INSIDE...

Microwave Weapon Unveiled; Burning Pain To Control Crowds

The U.S. Air Force (USAF) has developed a millimeter wave weapon for crowd control. This "revolutionary" technology provides an alternative to using deadly force, said Marine Corps Col. George Fenton, the director of the Joint Non-Lethal Weapons Program, at a March 1 Pentagon briefing.

Military officials disclosed that the weapon—which they call "active denial technology"—can send a "narrow beam of energy...hundreds of yards away" and that it "penetrates less than 1/64 of an inch into the skin, quickly heating up only the skin's surface."

Although the Pentagon has finally confirmed rumors and speculation that have been circulating for more than 20 years, many key details about the microwave weapon are still under wraps. The frequency of the radiation, the power output of the millimeter wave source and the weapon's range all remain secret.

But William Arkin, a senior military advisor to Human Rights Watch, said that the transmitter operates at 95 GHz with a 100 kW source. "I have a copy of the contract" for the weapon system, he told *Microwave News*. Arkin, who is based in South Pomfret, VT, estimates that its range is approximately 200 meters, based on "back-of-the-envelope calculations."

The USAF maintains that the heat-induced pain is "identical" to that "experienced by briefly touching an ordinary light bulb." Tests on human volun-

(continued on p.10)

U.K. Doll Panel Acknowledges Weak EMF–Cancer Association

A group of British scientists, led by Sir Richard Doll, has taken a small but significant step toward acknowledging the link between power frequency electromagnetic fields (EMFs) and childhood cancer. In a report released on March 6, the National Radiological Protection Board's (NRPB) advisory group on non-ionizing radiation concludes that "some epidemiological evidence" points to "a small risk of leukemia in children" from EMF exposures.

This assessment goes beyond previous statements by the Doll panel. Its 1992 report found "no firm evidence" of a link, and follow-ups issued in 1993 and 1994 continued to express skepticism over the cancer connection (see *MWN*, M/A92, N/D93 and J/A94).

Now, Doll and his colleagues point to many recent "large and well-conducted" studies, which provide "better evidence than was available in the past." Taken together, they write, these studies "suggest that relatively heavy average exposures of 0.4 μT [4 mG] or more are associated with a doubling of the risk of leukemia in children under 15 years of age."

(continued on p.2)

The new outlook was also prompted by recent analyses in which pooled data from these epidemiological studies point to an increased risk, according to Professor Colin Blakemore of Oxford University, a member of the Doll panel. He cited the work of an international team led by Dr. Anders Ahlbom of the Karolinska Insitute in Stockholm (see *MWN*, S/O00). "It is correct and responsible to acknowledge this result," Blakemore told *Microwave News.*

But the Doll group stops short of concluding that a causal link has been conclusively established.

"We have no plausible explanation of how radiation of this sort could cause cancer and no evidence from animals or laboratory studies," Doll said at a March 6 press conference in London. Doll is internationally known for his research linking cigarette smoking to lung cancer and heart disease (see also p.11).

The epidemiological evidence on its own is currently "not strong enough to justify a firm conclusion that [EMFs] cause leukemia in children," the Doll panel states.

The U.S. National Institute of Environmental Health Sciences (NIEHS) reached a similar finding in its 1999 report on EMF health risks (see *MWN*, J/A99). It concluded that the evidence for an EMF–cancer link was "weak" overall but saw a "fairly consistent pattern" of an increased risk of childhood leukemia.

The NIEHS differed from the U.K. advisory panel, however, in stating that EMF-exposed workers ran a greater risk of developing leukemia. In contrast, the Doll group concluded that the evidence on occupational exposures and cancer—primarily leukemia and brain cancer—is "conflicting." The group also found "no reason to believe" that residential EMFs increase cancer risk in adults. (See box at right for the report's main conclusions.)

The Doll group emphasizes that the elevated risk is evident only for "prolonged" exposures above 4 mG, which it calls "intense" (see p.19). In the U.K., only a "very few children, perhaps four in 1,000," fall in this range, the report states.

In its response to the report, the NRPB noted that only two of the approximately 500 cases of childhood leukemia diagnosed annually in the U.K. could be connected to EMFs. The advisory group report "provides no additional scientific evidence to require a change in exposure guidelines," the NRPB concluded.

"The risk to children in Britain is vanishingly small," Blakemore said. For his part, Doll—who is 88—told the *Independent* (March 7) that he would live next to a power line.

But Professor Denis Henshaw of the University of Bristol disputes the report's estimate of the EMF health risks. "We need to be looking at much more than leukemia," Henshaw told *Microwave News.* On March 5, the day before the Doll report was released, Henshaw issued his own risk analysis, which includes deaths due to lung cancer and other illnesses. It shows that power line EMFs may be responsible for as many as several hundred deaths each year in the U.K. (see table, p.3). These numbers are "comparable to the number killed on roads," Henshaw said.

Further research on EMFs and health is warranted, the Doll report states, in view of the "ubiquitous nature of power frequency EMF exposure." Priority should be given to replicating cellular studies that have shown positive results and to resolving existing uncertainties in areas such as gene expression and breast cancer in laboratory animals, the panel writes.

Conclusions of Doll Advisory Group Report

• In the absence of clear evidence of a carcinogenic effect in adults, or of a plausible explanation from experiments on animals or isolated cells, the epidemiological evidence is currently not strong enough to justify a firm conclusion that such fields cause leukemia in children. Unless, however, further research indicates that the finding is due to chance or some currently unrecognized artefact, the possibility remains that intense and prolonged exposures to magnetic fields can increase the risk of leukemia in children.

• Recent large and well-conducted studies have provided better evidence than was available in the past on the relationship between [50 Hz] magnetic field exposure and the risk of cancer.... They suggest that relatively heavy average exposures of 0.4 μT (4 mG) or more are associated with a doubling of the risk of leukemia in children under 15 years of age. The evidence is, however, not conclusive.

• Data on brain tumors....provide no comparable evidence of an association. There have been many fewer studies in adults. There is no reason to believe that residential exposure to EMFs is involved in the development of leukemia or brain tumors in adults.

• Although recently published studies of occupational exposure to EMFs and the risk of cancer are, in the main, methodologically sound, and some of them have considerable statistical power, causal relationships between such exposure and an increase in tumor incidence at any site are not established.

• At the cellular level, there is no clear evidence that exposure to [50 Hz] EMFs at levels that are likely to be encountered can affect biological processes. Studies are often contradictory and there is a lack of confirmation of positive results from different laboratories using the same experimental conditions.

• The most suggestive evidence of an effect of exposure to [50 Hz] magnetic fields on biological systems comes from three different areas: a) possible enhancement of genetic change caused by known genotoxic agents; b) effects on intracellular signaling, especially calcium flux; c) effects on specific gene expression.

• Those results that are claimed to demonstrate a positive effect of exposure to [50 Hz] magnetic fields tend to show only small changes, the biological consequences of which are not clear....Many of the positive effects reported involve exposure to time-averaged fields greater than 100 μT (1G) which are unlikely to be encountered in a domestic situation.

• Overall, no convincing evidence was seen from a review of a large number of animal studies to support the hypothesis that exposure to [50 Hz] EMFs increases the risk of cancer.

Blakemore said that more studies are "most certainly needed" to explore the possibility, suggested by Henshaw, that charged particles created by power lines could increase the inhalation of cancer-causing pollutants.

The Doll report concludes, however, that "nothing would seem to be gained" by additional epidemiological research on childhood cancer in Britain, given the limited exposures above 4 mG. But such studies "would be valuable" in countries where "greater

exposures to children occur frequently."

Britain's electric utilities welcomed the report. It confirms that "the vast majority of people in the U.K. are not at any risk," said Dr. John Swanson of the Electricity Association in London.

In contrast, Alasdair Philips, a consultant and activist based in Ely, Cambridgeshire, was critical of the report's "blinkered approach." Philips told *Microwave News* that the advisory group ignored "modern bioelectromagnetic insights that are changing the scientific paradigm."

The 179-page *Report of an Advisory Group on Non-Ionizing Radiation: ELF Electromagnetic Fields and the Risk of Cancer* is available for £33.00 including shipping. Contact the NRPB at: (44+123) 582-2742, Fax: (44+123) 582-2746, E-mail: <information@nrpb.org.uk>.

In addition to Doll and Blakemore, the members of the NRPB's Advisory Group on Non-Ionizing Radiation are: Drs. E. Grant, Microwave Consultants Ltd., London; D. Harnden, Wythenshawe Hospital, Manchester; J. Harrington, Institute of Occupational Health, Birmingham; T. Meade, Royal London School of Medicine; and A. Swerdlow, Institute of Cancer Research, London.

Henshaw's Risk Assessment for Living near Power Lines in the U.K.

Condition	Key Findings/ Risk Assessment	Predicted Excess Cases/yr
Childhood leukemia	RR=2>4 mG and 1.7>3 mG	2-8
Skin cancer	Radon aerosol theory	14
Lung cancer	Corona ion theory	250-400
Other illnesses	Corona ion theory	>1,000
Suicide		60
Mild depression	Small increase	<9,000

For details, go to:
<www.phy.bris.ac.uk/research/track_analysis/riskdoc.htm>.

Sir Richard Doll Talks About EMFs, Mobile Phones and Cancer

On March 7, Sir Richard Doll was interviewed on the Kim Hill Program *on Radio New Zealand. Excerpts appear below.*

RD: We have issued a report, which is the result of a review of all the research that's been carried out in recent years, in which we confirm what has been suspected by many people for a long time, that there is a possibility of a risk, but we say quite clearly in the report that it has not been proven. The experimental studies on cells [and] on animals provide no support at all for the idea that this radiation...could cause cancer and the human data that we have are open to a variety of interpretations. It does suggest the possibility of a risk from what are, relatively speaking, high doses and there is the possibility that it might double the risk in children, double the risk of leukemia, but it's far from established....All we can say is that we can't dismiss it....

KH: When you say high doses...what does that mean?...

RD: Well, I have to put that in technical terms, which is 0.4 μT [4 mG], and we have found that doses of this sort are not limited to very close proximity to power lines, and when I'm talking about close proximity I'm talking about 20-30 meters, that sort of distance, not 100 meters or further...but we have found that three quarters of the children who are exposed to such levels are nowhere near power lines. That's due to radiation from electricity but through peculiar wiring....

KH: What will [your advisory group] be doing now?...

RD: ...We continue in existence and we shall keep an eye on the situation, and if it changes we shall report to that effect, but in the next two or three years we're going to concentrate on the possible effects of mobile phones.

KH: ...In relation to the pylons and the power lines then, if there is some risk for some people, what would that be?...

RD: The only thing for which there is any real evidence is an increased risk of leukemia in children, not of other types of cancer, and not in adults. And the estimate that we would make in this country from knowledge of the number of children exposed to such levels is that it might add two cases of leukemia a year to the 500 that occur normally and of those two, they would probably not be as a result of...proximity to the power lines but one in every two years might be from proximity to... power lines, the others being from increased exposure...from radiation produced by the wiring locally....

KH: Do you ever think that that issue, the link between smoking and lung cancer, has fed a deep suspicion on the part of the public to all kinds of denials on the part of big business in terms of health?...

RD: ...I think it would be quite wrong because the evidence in relation to smoking was just in a different plane altogether to what we have now. We were talking about from the very beginning, evidence that you increase the risk twentyfold. Now, it's very difficult to do this artifici-

Doll et al. vs. U.K. Sunday Times

PYLONS ARE CANCER RISK—OFFICIAL: TOP SCIENTISTS ESTABLISH LINK. That was the headline on the front page of the U.K. *Sunday Times* (March 4) announcing the impending release of the Doll report. But science reporter Jonathan Leake had got it wrong and in the process alienated key members of the British radiation community.

Leake predicted that Sir Richard Doll would "warn that children living near electricity power lines are at an increased risk from leukemia." He didn't. "The *Sunday Times* nearly always gets things wrong and it has in this case," Doll told Radio New Zealand.

Dr. Colin Blakemore, who was quoted by Leake suggesting that new power lines be put underground to reduce EMF exposures, told *Microwave News* that the piece was "at the very least misleading," explaining that statements attributed to him were "a conflation of a number of unrelated comments."

The daily *Times* has had its own troubles getting the facts straight. On February 5, the newpaper reported that the committee overseeing the U.K. Department of Health's £7 million research program on mobile phone safety (see p.8) would include Roger Coghill—a somewhat surprising choice given his iconoclastic views. Coghill had been invited to attend a workshop hosted by the committee, not to join it.

ally...if the agent isn't actually a cause of the disease. Here we're talking about, at the most, a twofold increase and it's much, much more difficult to be certain that that is the reality than it is when you see something that is a twentyfold increase. So the two situations are just not comparable....

KH: It seems a kind of ironic commentary on society that you can still carry on buying cigarettes and smoking them and nevertheless there are huge headlines and huge concentration attached to a tiny, according to you and other people, link between...power lines and cancer....

RD: ...I agree that the concern that people express is disproportionate....The fact is that people do get concerned with very small risks... and ignore large ones.

KH: Now as you say, you're going to start looking at the evidence against mobile phones, against and for presumably, then this is another hot issue. People are deeply suspicious of mobile phones.

RD: They are indeed.

KH: If there is a risk of mobile phones, is it the same kind of risk that might attach to power cables?

RD: It's very difficult to say because they've not been in use long enough and there really isn't the suggestive evidence in the case of mobile phones that there is in the case of the passage of electricity. There's no human evidence...I say this quite confidently...there is no human evidence at all at the present moment to suggest that there is any serious disease produced by the use of mobile phones....

Electrification Led to Jump in Childhood Cancer, Says Milham

Up to 60% of all childhood leukemia is due to residential electrification and therefore preventable, according to a new analysis by Dr. Samuel Milham Jr. and Eric Ossiander of the Washington State Department of Health in Olympia.

"The most remarkable feature of childhood leukemia has been the development of a childhood peak of incidence at ages two through four," they write in a paper to be published soon in *Medical Hypotheses.* "Worldwide, the emergence of this peak tracks electrification. Even today, places without electrification do not show this peak."

"It happened in the U.K and then in the U.S.," Milham told *Microwave News.* "It happened in Japan, but it still has not happened in parts of Africa."

The mortality rate of childhood leukemia grew from approximately 2 cases per 100,000 in the 1920s to 6-8 cases per 100,000 in the 1950s-1960s (see figure 1).

For 1928-1932, Milham found that, for those states which were 75% or more electrified, the rate of leukemia among children under five increased with age, while for the other states, the rate decreased. By 1949-1951, all states showed the leukemia peak, with the peak being greatest in those states with the highest level of electrification (see figure 2).

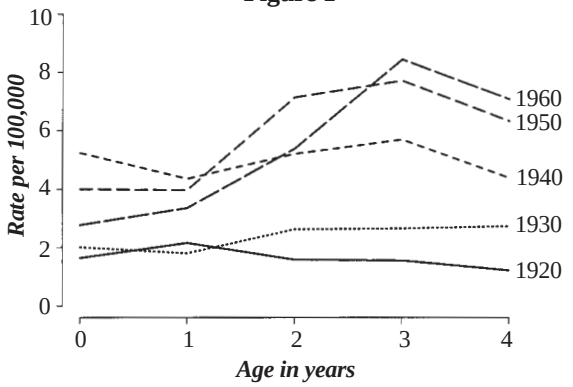
Milham's hypothesis runs counter to theories that an infectious agent or population mixing is responsible for childhood leukemia (see, for example, the March 17 issue of the *Lancet*, p.858). Milham points out that the childhood peak became apparent among Arabs in the Gaza Strip after it was seen among neighboring Israelis even though the two populations were in constant contact. He attributes the difference to the delay in the electrification of the Arab communities.

In the early 1990s, Drs. David Jackson and Robert Adair, both physicists, posited that EMFs could not be responsible for childhood leukemia because cancer rates have not kept pace with electricity consumption (see *MWN*, M/J92). But this argument has been rebuffed by many epidemiologists, including Drs. Nancy Wertheimer (see *MWN*, J/A92), Anders Ahlbom (see *MWN*, N/D 92) and David Savitz (see *MWN*, J/F93)—though Dr. Dimitrios Trichopoulos has spoken in favor of it (see *MWN*, J/F91).

Dr. Allen Kraut of the University of Manitoba, Winnipeg, found an association between rates of childhood leukemia and residential electricity consumption in Canada (see *MWN*, S/O94).

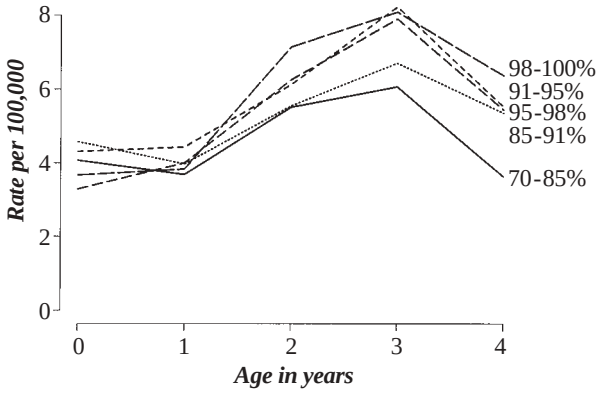
Milham was the first epidemiologist to link electrical occupations to leukemia (see *MWN*, J/A82).

Figure 1



Childhood leukemia mortality for U.S. whites by single years of age, 0-4, 1920, 1930, 1940, 1950 and 1960.

Figure 2



Childhood leukemia mortality rates in all U.S. states, 1949-51, by percent residential electrification and age at death. (States were grouped by quintile of percent of homes with electric service and rates were computed for each quintile.)

Nighttime Exposure: Key Factor For Childhood Cancer Risk

The link between childhood leukemia and magnetic fields is stronger for nighttime exposures than for fields averaged over 24 hours, according to a new study by researchers at the University of Mainz and the Technical University of Braunschweig, both in Germany. For both indices of exposure, the risk was highest for children under the age of five.

"While the association between childhood leukemia and magnetic fields was weak on the basis of median magnetic fields, it was pronounced based on exposure at night," write Dr. Joachim Schüz and coworkers in the March 1 issue of the *International Journal of Cancer (91,* pp.728-735, 2001).

"In general, our results correspond very well to the two recent meta-analyses by the teams led by Dr. Anders Ahlbom and by Dr. Sander Greenland," Schüz of the University of Mainz told *Microwave News* (see p.2 and *MWN,* S/O00).

For children exposed to 2 mG (0.2 μT) or more, averaged over 24 hours, the odds ratio (OR) for leukemia was 1.55, and for 4 mG or more the OR was 5.81; neither of these estimates is statistically significant, however. For average exposures between 10 pm and 6 am, the OR for leukemia was 3.21 for 2 mG or more, and 5.53 for 4 mG or more—both of these latter risk estimates are statistically significant.

Among past studies, only that by the National Cancer Institute (NCI) looked at magnetic field risks for exposures at night. The NCI team saw a "slightly higher" childhood leukemia risk for high nighttime exposures than for those over a 24-hour period (see *MWN,* J/A00).

When the German researchers limited their analysis to children four years old or younger, the OR for nighttime exposures above 2 mG was 4.48, which is significant. For those exposed to 4 mG or more at night, the OR jumped to 14.9, which, while significant, has a very wide confidence interval due to the small number of cases.

The increased risk among young children mirrors that found in Canada by Dr. Lois Green of the University of Toronto (see *MWN,* J/A99). The NCI "could not confirm" the association among young children seen in an earlier German study. That study, carried out by the same research group, covered only Lower Saxony and Berlin (see *MWN,* J/A97 and S/O97).

The results of the new study, which includes 514 children with leukemia and 1,301 controls from across all of what was formerly West Germany, are similar to those of the earlier study. When the two data sets were combined, Schüz observed "a clear dose-response relationship" for nighttime exposures.

Schüz cautioned that the strength of his results is tempered by the relatively low participation rate and the long interval between diagnoses and field measurements. The team also notes that in Germany only a small number of children are exposed to 2 mG or more—less than one fifth the number in the U.S.

Nevertheless, the German team, which includes Dr. Jörg Michaelis in Mainz as well as Drs. Karl Brinkmann and Jan-Peter Grigat in Braunschweig, recommends a precautionary policy of reducing unnecessary exposures.

The same German group has also investigated the risk of leukemia from residential 16 2/3 Hz magnetic fields from railroad electrical systems—the first to do so. The group observed a "moderate, but statistically nonsignificant association" based on "few exposed subjects." These results appear in the March issue of the *British Journal of Cancer (84,* pp.697-699, 2001).

Late last year, Schüz's team published results of its survey of residential EMF exposures at both 50 Hz and 16 2/3 Hz, in *Radiation and Environmental Biophysics (39,* pp.233-240, 2000).

Five Years Later, EPA Releases Draft EMF Cancer Report

The Environmental Protection Agency (EPA) has released its draft assessment of the cancer risk posed by EMFs, more than five years after the agency stopped working on it.

The draft report, dated September 8, 1995, finds that:

> [T]here is a consistent association between childhood leukemia and perhaps brain cancer and surrogates of prolonged magnetic field exposures in residences that has been observed in several studies. It is not likely a chance occurrence or an artifact of the way the studies were carried out, since it has been observed in different studies, countries and time periods and with different study designs.

The 1995 draft was released to Senator Russell Feingold (D-WI) on January 18. Feingold had made inquiries about the report last November on behalf of a constituent, David Stetzer of Blair, WI.

The EPA also sent a copy of the draft to *Microwave News.* Dr. Robert McGaughy, who was in charge of the report at the agency's National Center for Environmental Assessment in Washington, said that there are no plans to distribute it to the public.

In her cover letter to Feingold, Dr. Norine Noonan, the then assistant administrator for research and development, explained that the report had been shelved because the agency's effort had been "overtaken by events." Noonan pointed to the congressionally mandated EMF RAPID research program (see *MWN,* S/O 92 and J/A99) and the report by the National Academy of Sciences on EMFs (see *MWN,* N/D96)—both of which were under way in 1995.

Noonan assured Feingold that, "The agency was not coerced by the electric utility sector to stop working on [the] report."

The EPA began assessing the potential carcinogenicity of electromagnetic radiation in 1986. McGaughy and his team decided to classify EMFs as "probable human carcinogens" in 1990, but they were overruled by EPA managers (*MWN,* M/J90). During the next five years, work on the report continued intermittently.

In 1996, when word leaked out that the EPA had indefinitely stopped work on the report, McGaughy said that the link was stronger than in 1990 (see *MWN,* J/F96). Two years later, a copy of the 1994 draft was sent to *Microwave News,* which published its conclusions (see *MWN,* J/F98).

At press time, it was not clear what action, if any, Feingold would now take. An assistant said that the senator's staff was too busy working on campaign finance reform—the McCain-Feingold bill—to address the EMF issue.

« Wireless Notes »

The **FDA** does not have enough money to monitor the health impacts of cell phones and many other radiation-emitting devices. So says Dr. **David Feigal**, the director of the Center for Devices and Radiological Health (**CDRH**). Because of the need to transfer funds and personnel over the past 20 years, the radiological health program "cannot adequately do its job under the law," Feigal wrote in the CDRH's annual report for fiscal year 2000. Feigal also warns that the "situation is worsening." The center's precarious financial situation could explain why Feigal was evasive when **Larry King** asked him last summer whether there is enough money being spent on cell phone health research (see *MWN*, S/O00). The report, which is available on the Web at <www.fda. gov/cdrh/annual/fy2000/annualreport-2000.html>, includes an outline of the center's work on mobile phones.

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At the end of March, a draft of the **General Accounting Office** (GAO) report on mobile phone safety was being reviewed at the **FCC** and the **FDA**, according to sources at the GAO, the investigative arm of Congress. The report will be ready to be sent to Congress by the first week of May and will be available to the public soon afterwards. The investigation was requested by Sen. **Joseph Lieberman** (D-CT) in 1999; last year Rep. **Edward Markey** (D-MA) expressed interest in seeing an advance copy of the report (see *MWN*, N/D99 and N/D00).

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The **U.K. Labor government** is facing challenges on the siting of mobile phone towers. On February 8, **Archie Norman**, a Conservative Party MP from Kent who is the Tory shadow minister for the environment, wrote to local authorities urging them to prohibit construction of new towers on public property, including schools. The Labor government "has consistently failed to address the problem of monster masts invading our countryside," Norman stated. The conservatives want to revise the planning guidelines for base stations to take environmental and safety concerns into account. Such a change could have a significant impact. Plans for 3G service call for 100,000 new towers in addition to the 40,000 already in use for GSM service, according to a telecom industry analyst cited in the February 10 *New Scientist*. Last May, the independent inquiry led by Sir William Stewart recommended that local officials keep radiation from base station antennas to "the lowest practical levels" in public areas (see *MWN*, M/J00). The Labor government has been sending mixed signals on the issue. In a letter to the London *Times* (February 4), Minister for Housing and Planning **Nick Raynsford** wrote that the government "welcomed the Stewart report" and "accepted its recommended precautionary approach"; the Department of Health greeted the Stewart report with a similar statement. In late January, however, Raynsford told the House of Commons that as long as exposures do not exceed the guidelines set by ICNIRP, local authorities should not take further precautions (see *MWN*, J/F01). Ultimately, the courts may decide whether communities can adopt precautionary rules on antennas. Up to now, the government has been able to override local siting decisions it disagrees with, but this may change. Late last year, a British court held that the review process contradicts the European Convention on Human Rights because the government effectively decides whether its own policy was correctly applied. The government is appealing the decision to the House of Lords.

Italian Minister Confronts Vatican over Radio Radiation

Italian environmental officials have threatened to turn off the electricity feeding the Vatican's radio transmitters in Santa Maria de Galeria, outside Rome, unless the Holy See complies with Italy's strict RF/MW exposure limits.

A possible cancer cluster in nearby Cesano has heightened public concern about "electrosmog." Local health officials have reportedly identified eight cases of leukemia among children living within 6 kilometers (approximately 4 miles) of the transmitters—nearly double the rate in Rome. Overall cancer rates in the area are also said to be elevated.

According to the BBC (March 16), radiation levels near the facility are up to 18 V/m (85 μW/cm^2), well above the 6 V/m limit (see *MWN*, J/F00).

But the Vatican contends that the dozens of antennas, which broadcast the Pope's messages around the world in 35 languages, are not bound by the Italian standard because they are in Vatican, not Italian, territory. Willer Bordon, Italy's environment minister, has rejected this argument. "If someone threw something out of an embassy window, like a fridge," he told Reuters (March 16), "you would do everything you could to protect people underneath."

The Vatican Information Service has stated that it favors the less-stringent ICNIRP standard, which it calls "authoritative." Charges are pending against Vatican Radio's director, who is a priest, and its chief engineer. (See also p.14.)

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Does using a cell phone make you quick-witted or are those who can think quickly more likely to use a cell phone? That is the chicken-or-egg dilemma posed by a new study from **Hong Kong**. Dr. **Tatia Lee** and colleagues at Hong Kong Polytechnic University tested 72 teenagers, 37 of whom used GSM mobile phones. They found that users did better on one of three tests that measure human attention. Lee speculates that this might be another indication of an EMF-induced enhancement of cognitive function, as reported by Finnish, German and U.K. researchers using simulated mobile phone exposures (see *MWN*, M/A99 and M/A00). Writing in the March 26 issue of *NeuroReport (12*, pp.729-731, 2001), Lee and coworkers note that they used teenagers as subjects because "it would be almost impossible" to identify an older study group given the popularity of mobile phones in Hong Kong....Meanwhile, new experiments on the effects of human performance during and after exposure to mobile

phone radiation will soon get under way in **Australia**. The National Health and Medical Research Council (NHMRC) has awarded Dr. **Andrew Wood** of Swinburne University of Technology in Victoria A$213,570 (approximately US$107,000) for a three-year study that will include monitoring the quality of sleep of human volunteers. A second NHMRC study will give Dr. **Paul Mitchell** of the University of Sydney A$309,005 (US$155,000) to examine the long-term consequences of mobile phone use on vision, eye disease and hearing.

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Following a series of six public hearings over the last year, the **Australian Senate** committee investigating mobile phone health issues is scheduled to issue its final report by March 29. Among the items learned by committee members on questioning witnesses at their last hearing, held in Canberra on March 2, are: (1) the Mobile Manufacturers Forum (**MMF**) has allocated a little more than 3 million euros (US$2.8 million) for health research this year, out of a total MMF annual budget of 3.9 million euros (US$3.6 million), according to **Michael Milligan**, the secretary general of the MMF; (2) Dr. **John Moulder** of the Medical College of Wisconsin in Milwaukee earned approximately 8-10% of his income as a consultant to the telecom industry—when "averaged over the last couple of years"; and (3) the results of the replication of the **Adelaide mouse study** should be ready in June 2002. Dr. **Mays Swicord** of Motorola, who testified as a member of the MMF panel, said that exposures should be completed this June and that it would take a year to do the pathological analysis and to write the final report. The original experiment showed a 2.4-fold increase in lymphoma among the exposed mice (see *MWN*, M/J97). A complete copy of the 100-page transcript is available at <www.aph.gov.au/hansard/senate/commttee/comsen.htm>. (For past coverage of the senate inquiry, see *MWN*, J/F00, S/O00 and N/D00.)

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On March 5, **Qwest Communications** International Inc. recalled 11,000 mobile phones made by **Kyocera Wireless** Corp. that can exceed FCC emission standards. Kyocera's QCP-3035 model phone, which went on sale in December, can violate federal safety limits when used in analog mode outside of digital service areas. Kyocera assured Qwest and its customers that the phones "do not create a health or safety issue." Sony Electronics recalled 60,000 phones in December 1998 that also emitted too much radiation (see *MWN*, J/F99).

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Mobile phones sold in **Maryland** could be required to carry a **warning label** noting possible radiation health risks, if a bill now before the state's legislature is passed. Introduced on February 9 by Delegate **Peter Franchot** (D-Takoma Park), HB1054 would require this WARNING: "Some studies have linked cellular telephone radiation to a higher risk of brain cancer, particularly in children 16 years and younger. Use of a headset or speaker phone reduces this risk." For details of the bill, go to: <mlis.state.md.us/2001rs/billfile/hb1054.htm>.

Mobile Phone Health Effects? Medical Case Reports

A Nodule on the Salivary Gland

Two English surgeons have reported a small mass on the salivary gland of a 39-year-old male telephone engineer who was a regular user of a mobile phone. Drs. Clifford Pereira and Michael Edwards of Friarage Hospital in Northallerton claim that this is only the 21st case of nodular fasciitis in the parotid (salivary) gland to be reported in the world medical literature.

The engineer used a mobile phone, on average, for one hour a day for the last four years (an analog model for three years and a digital phone for the most recent year). The nodule grew on his right side. "Being left-handed, he usually held the phone to his right ear to enable him to write with his left hand," the doctors write.

Nodular fasciitis is a benign growth that can be surgically removed. The condition is associated with physical trauma 40% of the time, but there was no such history in this case.

Writing in the November issue of the *Journal of Laryngology & Otology (114*, pp.886-887, 2000), Pereira and Edwards recommend that, "A history of use of mobile phones should...become part of routine history taking for head and neck lesions."

Lesion in the Mouth

A British dentist is asking whether a "suspicious lesion" in the mouth of one of his patients could be connected to his use of a cellular phone. Dr. D.G. Watt of Kirkby Stephen raises this question in a letter in the September 9 issue of the *British Dental Journal (189*, p.237, 2000).

The patient observed that the condition "typically clears up when he is away from work or using a conventional telephone," according to Watt, and the pain was more severe on the right side of the patient's mouth—the side where he held the phone. A biopsy at Newcastle Dental Hospital diagnosed the lesion as a case of mild atrophic lichen planus—an inflammatory disease caused by an immune system reaction, whose causes are not well understood.

Watt asks other dentists to report whether they have "observed any possible connection between pathology and mobile telephones."

Cellular Phone Ear

An old disease is recurring in a new setting, according to Dr. Mervyn Elgart of George Washington University Medical Center in Washington.

A condition called chondrodermatitis nodularis chronicus anthelicis, a nodule on the ear, which was once caused by the large earpieces used by telephone operators and by the wimples worn by nuns, is now being reported by cell phone users who press their phones tightly to their ears.

Elgart made this observation in a letter published in the December issue of *Archives of Dermatology (136*, p.1568, 2001).

Danish Epidemiological Study Finds No Cell Phone Cancer Risk

An epidemiological study of users of mobile phones in Denmark has found "no support" for an association with brain cancer, leukemia or salivary gland cancer.

"We now have three studies and they all point in the same direction," Dr. Christoffer Johansen of the Danish Cancer Society in Copenhagen told *Microwave News.* "The hypothesis that there is a cancer risk is weakened by these studies." Johansen, who led the Danish-American study team, was referring to the recently published brain tumor studies by the National Cancer Institute (NCI) and the American Health Foundation (AHF) (see *MWN*, J/F01).

Nevertheless, Johansen stressed that, "This is not the final verdict," adding that he plans to monitor Danish cell phone users in the future to see if there are any long-term effects. Johansen observed that none of the published epidemiological studies have addressed other adverse health outcomes—he specifically pointed to Alzheimer's disease and ALS, better known as Lou Gehrig's disease.

A second study may be difficult, however. "There is no money for a follow-up study—in fact, we still have a deficit on the published study because the industry has refused to pay its bill," Johansen said.

"The issue is not closed, but if there was something large we would have picked it up," said Dr. John Boice Jr., one of the coauthors of the Danish study. He went on to point out that "it is always hard to rule out small effects from low-level exposures." Boice is with the International Epidemiology Institute in Rockville, MD, and was previously at the NCI.

Like the participants in the earlier NCI and AHF studies, most of the Danish subjects had used mobile phones for only a short time. While the study population included all mobile phone users from 1982 through 1995, 92% began using phones in 1991or later and approximately 70% had signed up for phone service in 1994-1995.

Writing in the February 7 issue of the *Journal of the National Cancer Institute (93,* pp.203-207, 2001), Johansen and coworkers note that if RF/MW exposure does in fact act as a cancer promoter, then "the intense recent use, as currently experienced by large numbers in our cohort, might be of more importance than latency or long-term use considerations."

They highlight the need for better exposure assessment in future studies. For instance, the researchers were unable to estimate the amount of time subscribers used their phones. "There was some information on outgoing calls in the data set, but we could not use it because it was too imprecise," Johansen said. There were no data on incoming calls because in Denmark these are paid for by those initiating the call.

In an accompanying editorial, Dr. Robert Park of the American Physical Society calls the Danish database "rock-solid," and says that it makes it "difficult to take issue with the report's conclusion." (See also p.19.)

Johansen's team identified essentially all users of cell phones in Denmark between 1982 and 1995 and then crosslinked them with cancer registry data. Among the more than 420,000 members of the cohort, the overall average use was 3.1 years—3.5 years for subscribers to the analog system and 1.9 years for the digital (GSM) system.

The standard incidence ratios (SIRs) and confidence intervals (CIs) were: 0.89 (0.86-0.92) for all types of cancer; 0.95 (0.81-1.12) for cancer of the brain or nervous system; 0.97 (0.78-1.21) for leukemia; and 0.72 (0.29-1.49) for tumors of the salivary glands.

Children's Use of Phones: Opposing Views

Drs. Christoffer Johansen and John Boice, two of the coauthors of the Danish epidemiological study, have different views on whether children should use mobile phones.

"We did not include children in our study and they may have a different risk—their brains are still developing and their skulls are thinner," Johansen said in an interview. "Until we know more, children should make only short calls that are necessary." He added that many European scientists share his position.

Boice disagrees. "If there really is a health hazard, then all segments of society should be protected," he told *Microwave News.*

U.K. Plans Broad Research Program on Phones and Health

The U.K. Department of Health (DOH) is seeking a wide-ranging effort on mobile phones and health, from dosimetry to epidemiology to *in vivo* and *in vitro* exposure studies.

The request for proposals issued in early February listed the £7 million ($10 million) program's priorities. These are based on the recommendations of the Independent Expert Group on Mobile Phones. That panel, led by Sir William Stewart, called for government-sponsored studies to address the phone safety issue in a report released last May (see *MWN*, M/J00).

Stewart is also chairing the oversight committee for the DOH program. At its first meeting, held in London on February 9 and not open to the public, the committee highlighted the need for studies on pulse modulation effects and on phone radiation effects on DNA, according to a synopsis on the DOH Web site.

Researchers had to submit letters of interest by March 30. The DOH will invite some applicants to prepare detailed proposals by mid-June. Proposals for epidemiological studies will be handled on an extended timetable.

Only U.K. researchers can receive grants, although projects that involve international collaboration can be funded. The program costs are being paid on a 50:50 basis by government and industry.

The request for proposals, along with comments on specific research needs, is posted on the Internet at: <www.doh.gov.uk/mobilephones/research>. The DOH plans to issue a second call for proposals later this year.

Australia Drops Flat Limit in Draft RF/MW Standard

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) is proposing public and occupational limits for RF/MW radiation exposures based on the ICNIRP standard to replace its stricter, frequency-independent standard.

According to the draft released for public comment on March 5, the proposed limits are similar to ICNIRP's because ARPANSA "was not able to identify reasons why this standard should differ substantially from ICNIRP." Australia is following New Zealand, which also had a "flat" standard and has already adopted ICNIRP-based limits (see *MWN*, M/J99, S/O99 and J/F01).

As a precautionary measure, ARPANSA's draft states that it is "generally sensible to minimize exposure which is unnecessary," provided that this can be done at "modest expense" and "does not introduce other risks."

Australia has had a flat RF/MW limit since 1985 (see *MWN*, M/A86). In 1999, after long and frequently divisive debate, Standards Australia, a private body, failed to adopt a proposed standard with ICNIRP-based limits (see *MWN*, M/J99). ARPANSA then stepped in and formed an expert group to develop new guidelines for the 3 kHz-300 GHz range (see *MWN*, S/O00).

Like the ICNIRP standard, ARPANSA's proposed guidelines are designed only to protect against thermal injuries and nerve stimulation due to RF/MW radiation. According to the draft, there are "insufficient data to establish" any health hazard from low-level exposures, although "it cannot be unequivocally stated that such effects do not exist."

While both the ARPANSA proposal and the earlier flat standard are based on a whole-body average SAR of 4.0 W/Kg, they specify different limits. For example, the new standard would set a public exposure limit of 450 $\mu W/cm^2$ at 900 MHz, the frequency used by Australia's GSM mobile phone system, compared to the 200 $\mu W/cm^2$ flat limit.

Unlike the ICNIRP standard, the ARPANSA draft also specifies limits for "instantaneous" peaks—1 μs for frequencies above 100 kHz. These are some 1,000 times higher than the limits for levels averaged over six minutes.

The deadline for public comments on the draft is May 11. A copy can be requested from ARPANSA by phoning (61+3) 9433-2339, and a PDF version is available on the Internet at <www.health.gov.au/arpansa/pubs/d_rf_prot_stnd.pdf>.

SAR Search: Same Phone, Different Exposures at 900 MHz and 1800 MHz

A dual-mode mobile phone can have a much higher specific absorption rate (SAR) at 1800 MHz than at 900 MHz, and vice versa, according to measurements released by the Swedish Radiation Protection Institute in Stockholm, known as SSI.

For instance, an Ericsson model T28c phone was found to have a maximum SAR, averaged over 10 g, of 1.7 W/Kg at 1800 MHz, but only 0.66 W/Kg at 900 MHz (see table at right). Conversely, a Motorola model V.3688 had more than double the SAR at 900 MHz that it had at 1800 MHz. (The SARs are accurate within ±25%, according to SSI.)

These measurements, the first to be made public for dual-mode mobile phones, were carried out for the SSI by the Institute for Mobile and Satellite Radio Technology (IMST) in Kamp-Lintfort, Germany. The phones were bought in various retail stores—they were not obtained directly from the manufacturers—SSI's Gert Anger told *Microwave News*.

"These measurements are the first part of a more detailed study," Anger said. IMST has also measured the radiated power at some distance from the phones in order to find out if there is a relationship between a phone's SAR and its ability to communicate with a nearby tower. Those results are in the process of being evaluated, he said, and will be published in a few months.

The phones were tested—under European Specification ES 59005, published by CENELEC in 1998—while operating at their maximum power level. The maximum pulse power of the GSM phones is 2 W at 900 MHz and 1 W at 1800 MHz; the maximum for DECT cordless phones is 0.125 W. The maximum average powers are 0.25 W, 0.125 W and 0.01 W, respectively.

The SAR data, which were released by the SSI on February 23, are posted on the SSI Web site, <www.ssi.se>. The press release and background information are in Swedish.

Phones in Sweden: Maximum SARs

Maker	Model	SAR (W/Kg) 900 MHz	SAR (W/Kg) 1800 MHz
Alcatel	One touch easy db	0.71	0.39
Ericsson	A1018s	0.56	0.76
Ericsson	A2618s	0.54	0.52
Ericsson	R310s	0.69	0.42
Ericsson	T20s	0.84	0.57
Ericsson	T28c	0.66	1.7
Motorola	T2288 EGSM	0.49	0.42
Motorola	Timeport L-ser	0.59	0.75
Motorola	V.3688	0.93	0.41
NEC	DB1400	0.81	0.89
Nokia	3210	0.63	0.25
Nokia	3310	0.67	0.34
Nokia	5110	0.63	–
Nokia	6210	0.72	0.47
Panasonic	EB-GD92	0.59	0.17
Philips	Savvy	0.55	0.33
Samsung	SGH-A100	0.69	0.43
Siemens	M35i	0.79	0.25
Siemens	S25	0.71	0.91
Sony	CMD-Z5	0.84	0.85
Ericsson	Cordl. Phone DECT	–	0.094
Samsung	SP-R5200 DECT	–	0.013

teers, the USAF stated, showed that, "Other than minor skin tenderness due to repeated exposure to the beam, there are no lasting effects."

Indeed, in its press release, the Marine Corps calls the microwave signal "a harmless energy beam."

In a review paper on the effects of millimeter waves published last year in *Health Physics*, a research group from Brooks Air Force Base (AFB) in San Antonio concluded that "irradiation of both the eyes and the skin are, for the most part, self-limiting in that the exposure will be sensed and avoided before thermal injury is incurred" (see *MWN*, J/F00). The Brooks team noted that "95% of the temperature increase produced by exposure to 94 GHz RF energy will occur in the first 1.2 mm of the skin."

"We've done a lot of research on this technology and have shown there are no harmful health effects," stated Dr. Michael Murphy, the director of the directed energy bioeffects division at Brooks, in the March 1 USAF press release.

Others are not so sure. Dr. Ross Adey, who was at the University of California, Riverside, until his retirement last year, dismisses the Brooks team's claims as "a bunch of crap."

Dr. Edward Elson, the former chief of the department of microwave research at the Walter Reed Army Institute of Research in Washington, was more circumspect. "I did an extensive review of the literature a few years ago and concluded that you don't get a perception of pain until some damage has been done," he said in an interview with *Microwave News*.

Elson went on to say that the U.S. Army had considered developing a microwave weapon in the 1970s. "We decided that it was a bad idea which wasn't worth the effort." The air force and the marines "are playing with fire," he said. "They will be on dangerous ground if they deploy this against the public." Elson predicted that those alleging injuries would file lawsuits and a legal quagmire would ensue.

Many press reports have stated that the microwave weapon will be ready for deployment in 2009. But Major David Andersen of the Marine Corps' division of public affairs said that the timing is "anyone's guess," given that the acquisition process has not yet begun.

PENTAGON "CONCEPT" OF VEHICLE-MOUNTED WEAPON.

The first official public disclosure of a microwave weapon for crowd control came in 1976 with the release of a classified Defense Intelligence Agency (DIA) report. The DIA cited a 1972 army study, which stated: "It is possible to field a truck-portable microwave barrier system that will completely immobilize personnel in the open with present-day technology and equipment."*

Over the ensuing 25 years, many have speculated about what a microwave weapon would look like and what it could do—and some have gotten close. For instance, in a July 7, 1997, special report on "Wonder Weapons," *U.S. News & World Report* featured a drawing of a tank-mounted system that is very similar to the computer-generated model released by the Pentagon, in which the microwave transmitter is mounted on a humvee (see left). *U.S. News* noted that prototypes of a microwave weapon which can discomfort or cook the enemy "reportedly exist and are ready for testing."

Military officials estimate that approximately $40 million has been spent on this technology over the last ten years. Elson believes that this figure is "unrealistically low."

The *Marine Corps Times* broke the news about what it called a "people zapper" on February 23 and its story may have prompted the military to stage its briefing earlier than first planned.

But, according to Dr. Clay Easterly of the Oak Ridge National Lab in Oak Ridge, TN, the declassification of the microwave weapon was already in progress. Easterly is a member of a National Academy of Sciences–National Research Council committee that is in the midst of assessing non-lethal weapons for the Pentagon. At the committee's February 1-2 meeting, Easterly told *Microwave News*, Fenton of the Marine Corps had said that the microwave weapon would soon be made public.

Raytheon AET in Rancho Cucamonga, CA, is the systems integrator for the millimeter wave weapon. San Antonio's Veridian Engineering, which has close ties to the USAF radiation program at nearby Brooks AFB, is doing the biological effects research.

*The DIA report was released to Barton Reppert, who was then working for the Associated Press. Paul Brodeur included excerpts of the report in *The Zapping of America*, published in 1977 by Norton.

Military Briefs

• The Air Force is investigating a cluster of amyotrophic lateral sclerosis (ALS), better known as Lou Gehrig's disease, among current and former employees of Kelly Air Force Base (AFB) in San Antonio. The cluster was first reported last October, and by late February the local ALS association had identified 66 cases of the rare neurodegenerative condition, according to the *Houston Chronicle* (February 22). The Air Force says that it hopes to complete the study, led by Lt. Col. Kenneth Cox of nearby Brooks AFB, later this year. In 1993 there was a cluster of eight ALS cases—many times the expected number—among residents of a community next to Patrick AFB in Florida (see *MWN*, J/F92 and M/J93). That cluster was never followed up.

• The Navy's Surface Warfare Engineering Facility (SWEF) in Port Hueneme, CA, does not expose the public to RF/MW radiation above ANSI/IEEE exposure guidelines either on land or at sea, according to a report released on January 18. The navy did the survey in response to public concerns over the planned expansion of SWEF, which already includes 15 powerful radars and is adjacent to a public beach and a residential neighborhood (see *MWN*, N/D99). The navy provoked fresh controversy, however, by refusing to allow a civilian expert to take part in the study (see *MWN*, M/J00). Copies of the report are available at no cost from: Office of Public Affairs, Naval Surface Warfare Center, 4363 Missile Way, Port Hueneme, CA 93043, (805) 228-6150.

Hot New Papers

Marina Pollán, Per Gustavsson and Birgitta Floderus, "Breast Cancer, Occupation and Exposure to Electromagnetic Fields Among Swedish Men," ***American Journal of Industrial Medicine, 39,*** **pp.276-285, March 2001.**

"A marked and consistent excess risk was found for machinery repairers. Increased relative risks based on few cases were also noted for librarians/archivists/curators, bank employees, nonspecified clerical workers, metal processing workers, tanners/fur dressers, policemen and custom surveillance officials. The relative risk among subjects with an estimated ELF EMF exposure above the first quartile (0.12 μT [1.2 mG]) was 1.31 (95% confidence interval=0.94-1.81), without a clear exposure-response pattern....An indication of an exposure-response relationship was only found among those exposed to levels over 0.2 μT less than one-third of the working day, that is, the group more intermittently exposed. The relative risks associated with ELF EMF exposure were slightly higher among workers younger than 65, consistent with previous observations....The application of the job-exposure matrix of ELF EMF did not yield clear evidence of an association, although an exposure-response relationship was found for workers with indications of an intermittent exposure, suggesting that short but high exposures, or large fluctuations in exposure, may be associated with an increased risk. The results do not speak against an association, since several of the occupations showing an increased incidence are characterized by a high exposure to ELF EMF." (See also *MWN*, M/J94 and S/O95.)

Lee Caplan, Elinor Schoenfeld, Erin O'Leary and Cristina Leske, "Breast Cancer and Electromagnetic Fields—A Review," ***Annals of Epidemiology, 10,*** **pp.31-44, January 2000.**

"Regarding breast cancer...the role of EMFs as a potential environmental risk factor has not been adequately explored. The few studies dealing with occupational exposure to EMFs and breast cancer have suggested a possible relationship. Although the handful of studies that evaluated residential exposure to EMFs have not shown any consistent link to breast cancer, the limitations in assessing long-term exposures do not allow any firm conclusions. Furthermore, the EMF–breast cancer link through melatonin is not only biologically plausible, but has been repeatedly verified in laboratory settings. Even though the oncogenic mechanism through which EMFs might operate is unclear, a number of plausible mechanisms involving melatonin are being entertained; these should not be dismissed simply because current knowledge does not allow us to classify EMFs as initiator or promoter, following the traditional two-stage model for carcinogenesis....Considering the incomplete knowledge of breast cancer risk factors and the importance of the disease as a public health problem, it seems justified to follow available leads; the ever-increasing amounts of EMFs in our environment should only bolster the argument. Therefore, research into a potential EMF–breast cancer link is certainly warranted, and the possibility of an association should not be discounted."

H. Huuskonen, V. Saastamoinen, H. Komulainen, J. Laitinen and J. Juutilainen, "Effects of Low-Frequency Magnetic Fields on Implantation in Rats," ***Reproductive Toxicology, 15,*** **pp.49-59, January 2001.**

"Pregnant Wistar rats were exposed to [50 Hz sinusoidal] magnetic rms field strengths of 10 or 100 A/m (13 μT or 130 μT [130 mG or 1.3 G]) or sham-exposed (controls) from day 0 of pregnancy for 24 h/day and killed during light and dark periods between 70 h and 176 h after ovulation. MFs did not influence the mean total number of implantations. The nocturnal mean serum melatonin concentration decreased by 34 and 38% at 10 and 100 A/m, respectively....In both MF-exposure groups, small but statistically significant changes in uterine ER [estrogen receptor] and PgR [progesterone receptor] densities took place during implantation. However, interpretation of the possible implications remains difficult."

Konstantina Nikita et al., "A Study of Uncertainties in Modeling Antenna Performance and Power Absorption in the Head of a Cellular Phone User," ***IEEE Transactions on Microwave Theory and Techniques, 48,*** **pp.2676-2685, December 2000.**

"A set of finite-difference time-domain (FDTD) numerical experiments modeling canonical representations of the human head/cellular phone interaction has been performed in order to investigate the effect of specific simulation details (e.g., antenna numerical representation and absorbing boundary conditions) on computed results....In evaluating the peak SAR averaged over 10 g of tissue, the related uncertainty can be of the order of 30%, while the corresponding uncertainty in assessing the 1-cell SAR_{max} value can be of the order of 40%-60%, even for well-defined canonical cases."

Ole Raaschou-Nielsen, Ole Hertel, Birthe Thomsen and Jørgen Olsen, "Air Pollution from Traffic at the Residence of Children with Cancer," ***American Journal of Epidemiology, 153,*** **pp.433-443, March 1, 2001.**

"The authors enrolled 1,989 children reported to the Danish Cancer Registry with a diagnosis of leukemia, tumor of the central nervous system, or malignant lymphoma during 1968-1991 and 5,506 control children....Average concentrations of benzene and nitrogen dioxide (indicators of traffic-related air pollution) were calculated for the relevant period, and exposures to air pollution during pregnancy and during childhood were calculated separately. The risks of leukemia, central nervous system tumors, and all selected cancers combined were not linked to exposure to benzene or nitrogen dioxide during either period. The risk of lymphomas increased by 25% (p for trend=0.06) and 51% (p for trend=0.05) for a doubling of the concentration of benzene and nitrogen dioxide, respectively, during the pregnancy. The association was

Did Sir Richard Doll Yield to Industry Pressure on Asbestos?

Barry Castleman, "Re: Doll's 1955 Study on Cancer from Asbestos," Commentary, ***American Journal of Industrial Medicine, 39,*** **pp.237-240, February 2001.**

Using a mix of historical research and detective work, Castleman seeks to explain why Sir Richard Doll changed the conclusion of his 1955 landmark paper on the risk of lung cancer from asbestos. At issue was whether a British asbestos exposure regulation, adopted in 1932, had or had not reduced workers' cancer risk. In a draft of the paper, Doll wrote that there were insufficient data to answer the question. But he changed his mind and the published paper stated that the risk had decreased. Castleman finds little support for this finding. He also describes how a major asbestos company campaigned to block publication of the paper, threatened legal action and directly pressured Doll to withdraw the paper. Nevertheless, Doll denies that the change was prompted by industry pressure. Castleman profited from a number of exchanges with Doll before communication between them broke down. Sir Richard is the chair of the Advisory Group on Non-Ionizing Radiation of the U.K.'s National Radiological Protection Board, which released a report on EMFs from power lines in March (see p.1 and p.19).

restricted to Hodgkin's disease....The concentrations of benzene estimated in this study were similar to those found outdoors in the United States."

Joachim Schüz and Simon Mann, "A Discussion of Potential Exposure Metrics for Use in Epidemiological Studies on Human Exposure to Radiowaves from Mobile Phone Base Stations," *Journal of Exposure Analysis and Environmental Epidemiology, 10,* pp.600-605, November/December 2000.

"We conducted a feasibility study to investigate if either short-term measurements of electric field strength, calculations of electric field strength or distance from nearby mobile phone base stations could be used to develop a metric reflecting an individual's exposure to radiowaves. With electric field strengths in the range of 0.012-0.343 V/m, radiowaves from mobile phone base stations were found to give a material contribution to total exposure; however, stronger signals were frequently measured from other sources such as broadcast radio and television transmitters. ...The complex propagation characteristics affecting the beams from base station antennas include shielding effects and multiple reflections from house walls and other buildings. These factors, combined with the presence of other environmental sources of radiowaves, cause distance from a base station to be a poor proxy for exposure to radiowaves indoors....[T]here is little evidence that presently justifies epidemiological studies being restricted to adverse effects of radiowaves from mobile phone base stations while neglecting radiowaves at other frequencies produced by different transmitters."

R. Shahidian, R. Mullins and J. Sisken, "Calcium Spiking Activity and Baseline Calcium Levels in ROS 17/2.8 Cells Exposed to Extremely-Low-Frequency Electromagnetic Fields (ELF EMF)," *International Journal of Radiation Biology, 77,* pp.241-248, February 2001.

"Cells were exposed to magnetic fields at various frequencies (16, 60, 120, 180) and at flux densities ranging from 3 to 717 G....[T]he present experiments have not been able to demonstrate any significant positive or negative effects of any of the fields studied on either average calcium levels or calcium spiking activity...under any of the conditions tested. Thus, the data presented provide no evidence to support the hypothesis that weak ELF EMF can alter intracellular calcium levels. If ELF EMF can alter calcium regulation in ROS 17/2.8 cells, the effect must either be extremely small, on the order of 5% or less, or occur under experimental conditions not tested in this work."

Bruce Hocking, "Microwave Sickness [MWS]: A Reappraisal," *Occupational Medicine, 51,* pp.66-69, February 2001.

"MWS has been a disputed condition. The syndrome involves the nervous system and includes fatigue, headaches, dysaesthesia and various autonomic effects....This paper describes the early reports of the syndrome from Eastern Europe and notes the skepticism expressed about them in the West, before considering comprehensive recent reports by Western specialists and a possible neurological basis for the condition. It is concluded that MWS is a medical entity which should be recognized as a possible risk for radiofrequency radiation workers."

Royal Society of Canada Panel on Wireless Health Risks

The report of the expert panel convened by the Royal Society of Canada (RSC) on "Potential Health Risks of RF Fields from Wireless Telecommunication Devices" has been published in the January issue of the *Journal of Toxicology and Environmental Health Part B: Critical Reviews (4,* pp.1-143, 2001). The report was first issued in the spring of 1999 (see *MWN*, M/J99). The RSC is still making the report available as a PDF file at no charge on its Web site, <www.rsc.ca>.

The expert panel recently updated its review and it appears in the same issue of the journal (pp.145-159). The update includes a synopsis of papers published after the original report. The panel does not, however, update its overall assessment of the status of the research findings.

Details on how to order this issue of the journal are on the Taylor & Francis Web site, <www.tandf.co.uk/journals>.

On the Internet

German Database of Bioeffects Research

The Research Center for Environmental Compatibility of Electromagnetic Fields (known as FEMU) at Germany's Aachen Institute of Technology has established an interactive database of published papers on EMFs and health. The site, <**wbldb.femu.rwth-aachen.de**>, is accessible to all at no cost. The database of more than 4,200 papers can be searched by key word and frequency range as well as by author and journal. Each citation includes a link to the study abstract archived by the U.S. National Library of Medicine on its own Web site, <**www.ncbi.nlm.nih.gov/PubMed**>. Studies are annotated with comments on their strengths and weaknesses, with space provided for the original author to respond. The database continues to grow and, according to FEMU's Frank Klubertz, the current plan is to include more than 10,000 individual papers. Among the topics covered are cancer, sleep, melatonin and electrosensitivity. Epidemiological studies are in the process of being added to the database, Dr. Joachim Schüz of the University of Mainz told *Microwave News.* Schüz is one of the project's 13 German and Austrian advisors. The site can be operated in either German or English, but most of the papers are in English. Conceived by Aachen's Dr. Jiri Silny in the early 1990s, the project is sponsored by the German government and a number of private groups, including the Research Association for Radio Applications (known by its German acronym, FGF).

Microwaves and DNA at Penn State

A survey of the long-running controversy over the possible effects of microwaves on DNA has been placed on the Web site of the Aerobiological Engineering program at Pennsylvania State University. "We were studying whether microwaves could kill airborne bacteria, as a means of disinfecting airstreams," Wally Kowalski, a doctoral candidate, told *Microwave News.* In his paper, *DNA and the Microwave Effect*, which includes an extensive list of references, Kowalski suggests that microwaves may promote DNA breaks by increasing the concentration of free radicals. This mechanism is similar to those proposed, and disputed, by others. Go to: <**www.engr.psu.edu/ae/wjk/mwaves.html**>. (For some of the early debate on DNA effects, see *MWN,* My84 and J/A87.)

2001 Conference Calendar

New Listings

November 4-8: **2001 Annual Conference of the International Society of Exposure Analysis (ISEA): Exposure Analysis—An Integral Part of Disease Prevention,** Charleston, SC. Contact: ISEA 2001, Office of CME, Medical University of South Carolina, PO Box 250189, Charleston, SC 29425, (843) 876-1925, Fax: (843) 876-1931, Web: <www.ISEAweb.org>.

November 28-30: **7th IEE International Conference on AC-DC Power Transmission,** London. Contact: ACDC01 Secretariat, Event Services, Institution of Electrical Engineers (IEE), Savoy Pl., London WC2R 0BL, U.K., (44+207) 344-5471, Fax: (44+207) 240-8830, E-mail: <acdc01@iee.org.uk>, Web: <www.iee.org.uk/Conf/ACDC>.

Major Upcoming Meetings

(For a complete list, see MWN, *N/D00 and J/F01.)*

April 30-May 4: **1st International Seminar: Measurements and Criteria for Standards Harmonization in the Field of EMF Exposure,** Varna, Bulgaria. Contact: Dr. Michel Israel, National Center of Hygiene, 15 Dimiter Nestorov St., Sofia 1431, Bulgaria, (359+2) 596-154, Fax: (359+2) 958-1277, E-mail: <M.Israel@nch.aster.net>, Web: <www.who.int/peh-emf/meetings.htm>.

May 20-23: **2nd International Symposium on Nonthermal Medical/Biological Treatments Using Electromagnetic Fields and Ionized Gases (ElectroMed 2001),** Renaissance Portsmouth Hotel, Portsmouth, VA. Contact: Nell Reece, Eastern Virginia Medical School, (757) 668-6406, Fax: (757) 668-6476, E-mail: <electromed2001@ece.odu.edu>, Web: <www.ece.odu.edu/electromed2001>.

June 10-14: **23rd Annual Meeting of the Bioelectromagnetics Society (BEMS),** Radisson Hotel, St. Paul, MN. Contact: Dr. John Male, 2412 Cobblestone Way, Frederick, MD 21702, (301) 663-4252, Fax: (301) 694-4948, E-mail: <BEMSoffice@aol.com> and <bems@delasallecenter.org>, Web: <www.bioelectromagnetics.org>.

June 10-14: **2001 American Radiation Safety Conference & Exposition (46th Annual Meeting of the Health Physics Society),** Convention Center, Cleveland, OH. Contact: HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101, E-mail: <dave@npc-link.com>, Web: <www.hps.org/nochps>.

July 15-19: **2001 IEEE PES Summer Meeting,** Vancouver, Canada. Contact: Yakout Mansour, B.C. Hydro, 6911 Southpoint Dr., Burnaby, BC V3N 4X8, Canada, (604) 473-2730, Fax: (604) 473-2731, E-mail: <yakout.mansour@bchydro.bc.ca>, Web: <www.ieee-spm2001.org>.

August 13-17: **2001 IEEE Electromagnetic Compatibility (EMC) Symposium International Rendezvous,** Montreal, Canada. Contact: 2001 IEEE EMC Symposium Secretariat, JPdL Destination Management, 1555 Peel, Ste. 500, Montreal, PQ H3A 3L8 Canada, (514) 287-1070, Fax: (514) 287-1248, E-mail: <emc2001@jpdl.com>, Web: <www.2001emcmtl.org>.

September 6-8: **5th International Congress of the European Bioelectromagnetics Association (EBEA),** Marina Congress Center, Helsinki, Finland. Contact: Solveig Borg, Finnish Institute of Occupational Health, Topeliuksenkatu 41 aA, FIN-00250 Helsinki, Finland, (358+9) 4747-2900, Fax: (358+9) 241-3804, E-mail: <solveig.borg@occuphealth.fi>, Web: <www.occuphealth.fi/e/project/ebea2001>.

October 22-24: **WHO/EMF Biological Effects and Standards Harmonization Regional Meeting,** South Korea. Web: <who.int/peh-emf/meetings.htm>. (Being finalized.)

October 25-28: **23rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society,** Convention Center, Istanbul, Turkey. Contact: Dr. Yorgo Istefanopulos, Institute of Biomedical Engineering, Bogazici University, 80815 Bebek-Istanbul, Turkey, (90+212) 263-1540, Fax: (90+212) 257-5030, E-mail: <istef@boun.edu.tr>, Web: <embc2001istanbul.bme.boun.edu.tr>.

Meeting Notes

• A small group of researchers were invited to a seminar on ***Microwaves and Behavior*** in Paris on January 15 that was sponsored by the Mobile Manufacturers Forum (MMF).

• In each of the last two years, an international seminar has been held in China. The proceedings of ***Electromagnetic Fields and Biological Effects***, held in Xi'an October 23-26, 2000, are on the Web site maintained by Professor Zhao-Jin Cao, <www.emfhealth.com>. The 72 papers, which are available in both English and Chinese, cover a wide range of research topics as well as standards development and measurements. A number of the 13 papers from the May 4-5, 1999, seminar that was held in Beijing are also on the site, and more will be added in the future. Print copies of the 1999 and 2000 proceedings are available for US$10 and US$20, respectively, to cover postage and handling. Order from Cao, who is with the Institute of Environmental Health Monitoring within China's Ministry of Health, at <caozj@emfhealth.com>.

• The proceedings of an international workshop on ***Clinical and Physiological Investigations of People Highly Exposed to Electromagnetic Fields***, held in St. Petersburg, Russia, October 16-17, 2000, are available at no charge. Among the topics covered in the 15 papers are mobile phones, electrical hypersensitivity and clinical investigations of workers exposed to radar, radio transmitters and electric railroads. Go to: <www.niwl.se/arb/2001-03.html>. For a print copy (ask for Arbetslivsrapport 2001:03) contact: National Institute for Working Life, Publication Service, SE-11279 Stockholm, Sweden, E-mail: <forlag@niwl.se>.

• EPRI is sponsoring a ***Seminar on Electric Power Facilities and the Global Positioning System*** (GPS), which addresses the possible risks of EMI. The seminar will be taught by Michael Silva of Enertech Consultants in Campbell, CA, and will be held in May and June at four utility sites across the U.S., as well as at the EPRI campus in Palo Alto, CA. The agenda and details on the registration fee are available at <www.enertech.net/gpsseminar>. For more information, contact Enertech at (408) 866-7266. (See also p.16.)

• A set of three videotapes recorded at ***Cell Towers Forum, State of Science/State of the Law***, held last December, is available for $90.00. Contact the Berkshire-Litchfield Environmental Council, Box 552, Lakeville, CT 06039, (860) 435-2004 (see *MWN*, S/O00).

• In January 1999, the California EMF Program sponsored a by-invitation ***Workshop on EMF Epidemiology***. The papers presented have been published in a supplement (No.5) to *Bioelectromagnetics* (2001). Each of the 11 papers—some of which have been updated—includes a brief synopsis of the discussion that followed its presentation at the meeting. Among the authors are: Ahlbom, DelPizzo, Erren, Kheifets, Neutra, Poole, Savitz, Shaw and Wartenberg.

Across the Spectrum

A bowl of cornflakes can kill you—not to mention a ham sandwich or a T-bone steak. Getting vaccinated can kill you. Flying economy class can kill you, and business class isn't much better. The rubber duckie in your bathtub can kill you (and your children). And put down that cell phone, before it kills you!

—T.R. Reid, "European Health Reports Create 'Culture of Fear'," *Washington Post,* p.A1, March 1, 2001

[T]he unique contingencies of history, not the laws of physics, set many properties of complex biological systems.

—Dr. Stephen Jay Gould, professor of zoology, Harvard University, Cambridge, MA, and past president, American Association for the Advancement of Science, "Humbled by the Genome's Mysteries," *New York Times,* Op-Ed, p.A15, February 19, 2001

"To say we need another ten years of research means we will go precisely down the BSE route."

—Prof. Denis Henshaw, University of Bristol, U.K., on the report on power frequency EMFs and cancer by the U.K. Advisory Group on Non-Ionizing Radiation, quoted by Anjana Ahuja, "Live and Extremely Dangerous," *The Times* (U.K.), Section 2, p.10, March 12, 2001 (see p.1)

"We've gone from NIMBY (not-in-my-backyard) to NOPE, for not-on-planet-earth."

—David Owens, executive vice president, Edison Electric Institute, Washington, quoted by John Fialka, "Energy Industry Officials Urge President To Offer Incentives for Meeting Demand," *Wall Street Journal,* p.A8, February 22, 2001

"The seeds of what has grown in California have been sown over the United States as a whole by our failure to keep up with our (transmission) infrastructure over the past decade."

—Karl Stahlkopf, vice president, EPRI, Palo Alto, CA, quoted by Peter Behr in "Shortage of Power Lines Develops," *Washington Post,* p.A1, February 20, 2001

The Furor over Vatican Radio

"It's the grandmother of all radio stations."

—Sean Lovett, head of English-language programming, Vatican Radio, quoted by Ellen Hale, "Italian Official, the Vatican Clash over Antennas," *USA Today,* p.10A, March 27, 2001

ASSASSIN WAVES

—Sign at protest, Cesano, Italy, in photo accompanying "The Land of Sick Children and the Antenna in the Form of the Cross," *La Repubblica* (Italy), p.11, March 14, 2001

"It is contrary to morality to form unjust accusations and, without foundation, create serious alarm amongst the population."

—Father Federico Lombardi, head of Italian-language programing, Vatican Radio, quoted by Paddy Agnew, "Local Health Concern over Vatican Radio Masts," *Irish Times* (Republic of Ireland), March 14, 2001

"There is no evidence at all that radio frequencies cause cancer and other illnesses—a link that our citizens and even ministers are taking for granted."

—Dr. Paolo Vecchia, National Institute of Health, Rome, and ICNIRP member, quoted by Yaroslav Trofimov, "Italians Say Potent Vatican Radio Tower Emits Radiation That Poses Cancer Risk," *Wall Street Journal,* p.7A, March 27, 2001

"Ministers must not be more or less zealous. Rather...they must respect the constitution and the laws."

—Willer Bordon, Minister of the Environment, letter to the editor, *Corriere della Sera* (Italy), p.15, March 22, 2001

VATICAN RADIATION? BODY SNATCHERS? THIS IS ITALY?

—Headline, *New York Times,* p.A4, March 20, 2001

(See p.6.)

"MICROWAVE NEWS" FLASHBACK

Years 20 Ago

• In a letter to the *New England Journal of Medicine,* Dr. Hylar Friedman of the Army Medical Center in El Paso, TX, reports a link between microwave exposure and polycythemia, a rare blood disorder that is associated with an increased risk of leukemia.

• A workers' compensation board upholds a claim that Sam Yannon died from long-term exposure to RF radiation while he worked for New York Telephone on the 87th floor of the Empire State Building.

• The Secretary of the Navy recommends to the Secretary of Defense that the U.S. Navy's ELF communications system be scrapped.

Years 10 Ago

• NIOSH sparks controversy by absolving ELF EMFs in its study of miscarriage risks among telephone operators who used CRT VDTs even though those in the control group, who used other types of displays, had similar ELF EMF exposures.

• Prompted by "growing concerns" about EMFs, ten U.S. lawyers create the Electromagnetic Radiation Case Evaluation Team, a legal service that investigates cases for trial lawyers.

• A police officer in San Francisco sues Kustom Signals, contending that microwaves from a traffic radar gun caused him to develop melanoma in his neck.

Years 5 Ago

• EPA's Dr. Carl Blackman repeats an experiment by Dr. Robert Liburdy in which very weak magnetic fields inhibited melatonin's ability to slow the growth of human breast cancer cells.

• The telecom act, which includes a ban on state and local agencies setting RF/MW standards for mobile phone antennas that are stricter than those adopted by the FCC, is signed into law.

• British scientists show that radon decay products, which are known carcinogens, are attracted to high-voltage power lines. They argue that this may explain the apparent power line–cancer link.

"It's no different to someone asking your opinion on whether the brothel

MEDICAL APPLICATIONS

New Way To "Cook" Prostate Tumors... Microwaves have been used to shrink enlarged prostate glands for some time (see *MWN*, M/J96). Now low-frequency magnetic fields are being harnessed to treat prostate cancer. The ThermoTherapy system, developed by Ablation Technologies Inc. in San Diego, is nearing approval for clinical use in Europe and the U.S. Magnetic metal rods 1.4 cm long and 1 mm in diameter are inserted into the tumor. The patient is then exposed to a 50 kHz CW field at 50 G, which causes the rods to heat up. The heat—at least 46˚C and as high as 70˚C—kills the cancer cells. The heating mechanism is the same as that used in induction cooking, according to Dr. Robert Tucker, a pathologist at the University of Iowa who helped develop the therapy. "This is old technology," he said in an interview. "What we've done is to develop heating elements that can be put inside the body and left there." Because the rods stay in the body, patients can return for more treatments—which last about an hour—if their cancers return. The rods are also thermally self-regulating: Above a specific point, known as the Curie temperature, the metal is no longer magnetic and the external field will not induce a current. The controlled temperature, along with the placement of the rods in a circular array to focus the heat within the tumor, keeps damage to surrounding tissue to a minimum, Tucker said. In contrast, microwave treatment for enlarged prostates has caused serious burns in a number of patients, as the FDA noted last year (see *MWN*, N/D00). The 50 kHz frequency used in the new therapy was chosen to minimize the adverse effects of radiation exposure. "Above 200 kHz, you can have direct heating of the tissue by the field," Tucker explained, adding that fields below 50 kHz can cause nerve stimulation. Ablation Technologies is sponsoring clinical trials in San Francisco, Berlin, Germany, and Santiago, Chile. Tucker, who is a member of Ablation's board of directors, said that the treatment has been "highly effective" in these trials. He expects the therapy to be approved for use in Europe in the next few months, and said that FDA approval for more limited use in the U.S. could come within a year. Tucker noted that although the technique has so far been used only for prostate cancer, it is potentially effective for many other types of solid tumors. The prostate cancer therapy is described in a paper by Tucker and coauthors in the *Journal of Endourology (14*, pp.511-517, August 2000).

PEOPLE

Dr. **Frank Barnes** of the University of Colorado, Boulder, has been elected to the National Academy of Engineering in Washington. Barnes, the current president of the Bioelectromagnetics Society, was cited for "fundamental research on biological effects of EMFs, surgical procedures and contributions to telecommunications education."...In mid-March, Dr. **Joe Elder**, a longtime staffer at the EPA's health effects lab in Research Triangle Park, NC, retired and joined Motorola in Plantation, FL. Elder takes over as director of biological research from Dr. **Mays Swicord**, who himself joined Motorola when he retired from FDA's Center for Devices and Radiological Health in Rockville, MD (see *MWN*, J/A95). Swicord is now the director of EME Programs at the Florida Electromagnetic Research Lab. Dr. **Q. Bal-**

zano, the director of the lab, retired from Motorola in February (see *MWN*, M/J00)....**Peter Harrison** of Nokia in the U.K. has stepped down as the chair of the cell phone industry's Mobile Manufacturers Forum (MMF). At the MMF's general assembly held in Kyoto, Japan, on February 28, **Jeffrey Suff** of Matsushita Communication Industrial Ltd., best known for its Panasonic brand products, was elected the new chair. Suff is based in Thatcham, west of London....Dr. **Stanley Sussman** has moved up another notch in EPRI's corporate ladder. Sussman, who used to run the electric utility group's EMF research program (see *MWN*, S/O91) and later EPRI's environment division (see *MWN*, J/F 96), has been appointed vice president of EPRI's environment product sector. EPRI is based in Palo Alto, CA....Dr. **Gerri Lee**, one of the original members of the California EMF Project, has joined Hoffmann–La Roche, the pharmaceutical giant, in Palo Alto, CA....**Vitas Anderson** has set up his own consulting firm, EME Australia Pty. Ltd. in Frankston, a suburb of Melbourne. Previously, Anderson was the project leader of the EME Safety Research group at the Telstra Research Labs in Clayton, which is also near Melbourne....Dr. **Kelly Gibney** has retired from BC Hydro. **Gregory Quan**, an occupational hygienist, is now tracking EMF issues for the Canadian utility in Burnaby....Dr. **John Graham** of the Center for Risk Analysis at the Harvard School of Public Health in Boston, who worked with George Carlo and EPRI on cell phones and EMFs, respectively, has been nominated for a senior regulatory post at the Office of Management and Budget in the new Bush administration. The appointment has been controversial, but he is expected to be confirmed by the Senate....**Robert Silliman**, a well-known RF engineer, consultant and antenna designer who was based in Washington, died on February 11 at the age of 87.

ULTRAWIDEBAND EMI

NTIA Report Sees Interference Ahead... Ultrawideband devices hold great promise for wireless and radar applications—for instance, the technology can be used to detect buried land mines, see through walls and facilitate high-speed broadband access to the Internet. Gregory Rohde, who recently stepped down as the head of the National Telecommunications and Information Administration (NTIA), went so far as to call UWB "one of the most promising technologies of our time." But a new NTIA report finds that there is a real threat of interference to many widely used electronic systems. The federal agency concludes that the use of UWB devices below 3.1 GHz will be "quite challenging." NTIA's findings may complicate an FCC proposal, issued last May, to allow UWB devices to operate on an unlicensed basis. (The NTIA performs many of the same functions as the FCC: It coordinates the government's use of the spectrum while the FCC regulates the private sector.) UWB devices send out narrow pulses with very wide bandwidths, that is, the signal is spread out over a band of frequencies, with only a small amount of energy at any specific frequency. NTIA measurements, which are detailed in the new report, lead the agency to warn that UWB emission levels in the 960-1610 MHz band would have to be reduced a hundredfold (20 dB) from the levels proposed by the FCC. A number of different aviation radar systems might be placed at risk. "We don't see how we can accommodate UWB

below 3 GHz," NTIA's Lawrence Brunson told *Microwave News*. Brunson, one of the authors of the UWB report, said that "NTIA definitely wants to accommodate UWB, but we also want to be realistic." He said that the NTIA and the FCC will work together to find a solution to the EMI problem over the next few months. The NTIA tests showed that interference could occur over much greater distances when UWB devices are outdoors at a height of 30 meters. When asked for an example of such a case, Brunson, who is based in Washington, cited a local area network UWB transmitter placed next to a window on a high floor of an office building. In addition, there is the problem of multiple UWB devices operating near each other. Some models have been put forward to discount such an EMI threat, but the NTIA counters that these were based on "unrealistic" assumptions, which led to "misleading conclusions." John Reed, a senior engineer at the FCC in Washington, declined to comment on the NTIA report. He said that the commission had a target date for completing its final rules on licensing UWB devices by the end of the summer but conceded that might be optimistic. The report, *Assessment of Compatibility Between Ultrawideband Devices and Selected Federal Systems* (No.01-43), is available on the NTIA Web site at: <www.ntia.doc.gov/osmhome/reports.html>. Also available at this site is a second UWB report, *Assessment of Compatibility Between Ultrawideband Systems and Global Positioning System (GPS) Receivers* (No.01-45), released on March 9, which indicates that some EMI to GPS is possible under current FCC rules. In addition, the NTIA has released two background reports, *The Temporal and Spectral Characteristics of Ultrawideband Signals* (No.01-383) and *Measurements to Determine Potential Interference to GPS Receivers from Ultrawideband Transmission Systems* (No.01-384). Both can be downloaded from <www.its.bldrdoc.gov/pub/ntia-rpt>. All four reports are PDF files....*Aviation Week* (February 5) notes that the development of UWB technology was slowed in the 1980s because it could be used to detect stealth aircraft like the B-2 bomber.

RF/MW MEASUREMENTS

New Products... Narda Safety Test Solutions in Hauppauge, NY, is offering a new personal RF/MW exposure monitor, the Nardalert XT. The belt-worn device covers the spectrum from 100 kHz to 100 GHz, and sounds an alarm when radiation levels approach or exceed the exposure limit chosen by the user, according to Narda. It can store data with "selectable" averaging intervals. Narda, which acquired Wandel & Goltermann, the German meter maker, last year, is itself a subsidiary of L-3 Communications. The new monitor, which costs $1,400, can be configured for IEEE, ICNIRP or NATO as well as several other standards. For more information, contact Robert Johnson at (631) 231-1700, E-mail: <nardasts@L-3com.com>, Web: <www. narda-sts.com>....Manufacturers and test labs can fine-tune their equipment for measuring radiation leakage from microwave ovens with the updated calibration system from Holaday Industries Inc. in Eden Prairie, MN. Holaday, which was acquired last summer by ESCO Technologies Inc. in St. Louis, sells the HI-2790B for $29,900. More details are available from Beverly Gores at (952), 934-4920, Fax: (952), 934-3604, E-mail: <info@ holadayinc.com>, Web: <www.holadayinc.com>.

As We Go To Press

FDA Sets Mobile Phone Epidemiology Meeting

The FDA has announced that there will be a public meeting April 18-19 in Cincinnati to address epidemiologic research needs related to the safety of wireless phones.

The FDA will assemble "national and international scientific experts," according to a notice published in the *Federal Register* on March 27 (p.16678). At press time, Dr. Russell Owen of FDA's Center for Devices and Radiological Health told *Microwave News* that the list of attendees had not yet been set. He added that the meeting was being held in Cincinnati to facilitate the participation of experts from NIOSH, which is located there.

The meeting is part of the Cooperative Research and Development Agreement (CRADA) between the FDA and the CTIA (see *MWN*, N/D99 and J/A00). A similar public meeting was held last summer on possible genetic effects (see *MWN*, S/O00).

For more information contact Owen at: (301) 443-7118.

Keeping Current: Follow-Up on the News

◆ The next meeting of the IEEE SCC-34 subcommittee, which is developing a standard for measuring SARs from mobile phones, is scheduled for April 10-11 in Washington. E-mail traffic among the members of the subcommittee indicates that a number of issues still need to be resolved. (See also *MWN*, J/F01.) Meanwhile, CENELEC, the European standards group, will release its SAR measurement standard soon.

◆ The editors of *USA Today* think lawyers are "racing ahead of the facts" in filing lawsuits blaming cell phones for brain tumors. The editorial and an opposing view by Joanne Suder, who is working on a number of such cases, appeared in the February 26 issue of the newspaper.

◆ The U.K.'s EMF Biological Research Trust is seeking proposals that focus on proteomics—that is, on the effects of power frequency fields on cellular proteins. The trust, which is funded by the National Grid, wants to compare the effects of EMFs with those of "established agents which produce cellular stress responses." Short applications from U.K.-based researchers were due by March 31. Further details are in an ad that ran in the back pages of the March 1 issue of *Nature*.

◆ Sweden's Drs. Lennart Hardell and Kjell Hansson Mild exchange views on cell phones and brain tumors with the U.S.' Dr. Kenneth Rothman in the March 24 *Lancet* (pp.960-961).

◆ The April issue of *Radiation Research* features two animal exposure studies on: (1) the effects of CW and pulsed radiation on brain tumors and other cancers in rats by Dr. Bernard Zook of George Washington University in Washington *(155,* pp.572-583, 2001); and (2) the effects of the Iridium signal on the stress response in mice by Dr. Ross Adey's group at the University of California, Riverside, which has now disbanded *(155,* pp.584-592, 2001). Neither set of experiments showed any significant effects; both were sponsored by Motorola. A third animal study was published in the February issue: An Air Force team from Brooks AFB found no effect of ultrawideband radiation on mammary tumors in mice *(155,* pp.369-377, 2001).

◆ On March 19, the IEEE's SCC-28 changed its name to the International Committee on Electromagnetic Safety. The move is in line with the IEEE's desire to extend its reach overseas and with the SCC-28's eagerness to be perceived as an alternative to ICNIRP.

◆ The Swedish-Norwegian team that studied mobile phone use and the prevalence of headaches has published its second set of results. They are in the February issue of *Occupational Medicine (51,* pp.25-35, 2001). For more on the first paper, see *MWN*, J/A00; for a report on the overall findings, see *MWN*, M/J98.

◆ The IEEE's Committee on Man and Radiation (COMAR) has issued a "Technical Information Statement" on human exposures to RF/MW radiation from wireless phones. See the January/February 2001 issue of the *IEEE Engineering in Medicine and Biology Magazine*, or go to: <www.seas.upenn.edu:x8080/~kfoster/comar.htm>.

◆ Five years ago, Dr. Carl Blackman reported that he, like Dr. Robert Liburdy before him, had showed that a 12 mG, 60 Hz magnetic field could block melatonin's ability to inhibit the growth of human breast cancer cells (see p.14). Blackman's findings have now been published in the February issue of *Bioelectromagnetics, (22,* pp.122-128, 2001).

◆ The Electromagnetic Energy Association is holding a conference on the *Precautionary Principle and EMFs* on May 4 in Baltimore. The keynote speaker is Ford Rowan, a crisis management consultant. For more information, call Melissa Forburger at (202) 452-1070 or go to <www.elecenergy.com>.

VIEWS ON THE NEWS

A New Theory of Relativity

Sir Richard Doll and his advisory panel have conceded that there does indeed appear to be a childhood cancer risk above 4 mG (0.4 μT) (see p.1). This puts them in the epidemiological mainstream. But, at the same time, they are trying to suggest that the risk has little relevance to the real world. Using tactics that George Orwell would find all too familiar, Doll portrays a weak magnetic field as exceptionally strong.

The Doll panel calls 4 mG an "intense" and "relatively heavy" exposure, which is "seldom encountered in the U.K."

Let's put 4 mG into perspective. The U.K. NRPB's standard for exposure to 50 Hz fields is 16 G. That is *4,000 times* higher than the possible leukemia threshold. This means that British children may be continuously exposed to 15,999 mG. We wonder if there is anyone in the bioelectromagnetics community who would knowingly allow their children—or indeed themselves—to be exposed to even 100 mG on a regular basis. (The ICNIRP guideline is 1,000 mG.)

After reviewing the Doll report, the NRPB said that it saw no reason to change its exposure limit.

Rough calculations indicate that some 50,000 children in the U.K. are exposed to, on average, more than 4 mG. In the U.S., where there are more people and power frequency fields are higher, hundreds of thousands of children are exposed to more than 4 mG. One survey showed that as many as 12 million Americans could be exposed to average magnetic fields of more than 4 mG (see *MWN*, M/J98).

The risk of leukemia may or may not turn out to be small (see p.4), but a central part of the message is getting lost. If a 4 mG field can play a role in the development of cancer, what else can it do?

Weapons Development and Public Health Should Not Mix

The Pentagon's new microwave weapon has been brought to you by the U.S. Air Force and Raytheon (see p.1). These are the same organizations that control the IEEE's SCC-28 committee that writes the standard for exposures to RF and microwaves.

Dr. John Osepchuk, the chair of SCC-28, worked for Raytheon for most of his professional career. And three of the other five members of the SCC-28 executive committee work either at Brooks Air Force Base or for Raytheon.

In the 1980s, during the last major revision of the IEEE standard, Osepchuk was among those who argued for doubling the limit, from 5 to 10 mW/cm^2, for frequencies above 3 GHz (see *MWN*, J/A86). The rationale—which we never understood—was to make it consistent with the infrared standard all the way up at 300 GHz. This change, though challenged, was adopted.

At the time it appeared to be somewhat of an academic concern, given the paucity of radiation sources above 30 GHz. But few were privy to the designs of military contractors. The loosening of the IEEE standard must have facilitated the development of the military's new zapper at 95 GHz.

It seems obvious, but it's worth repeating: Health standards should be written by medical and public health professionals, not those who make weapons for the military-industrial complex.

Open Letter to Robert Park

We at *Microwave News* are not "fear merchants," as you allege in an editorial in the *Journal of the National Cancer Institute (JNCI)*. Nor have we ever claimed that "cell phones are linked to cancer."

We are forced to write this open letter because you have refused to answer our messages, both by e-mail and by phone.

Rebecca Chasan, the executive editor of *JNCI*, has also refused to come to the phone. So we were unable to ask her why she picked you, a lobbyist for the American Physical Society, to comment on an epidemiological study of mobile phone users (see p.8). An odd choice for a cancer journal, though consistent with NCI's doggedly wrongheaded approach to EMF issues.

If you had done your homework and read our editorials, you would know that our position is that there is ample evidence to suggest that mobile phone radiation is biologically active. With a billion people now using hand-held devices, it is vital to resolve the health question as quickly as possible. *(Microwave News* commentaries are available to all at no cost on our Web site.)

Ours is the majority view. Your assertion that the safety of mobile phones has been fully established is belied by the large research programs that are under way across Europe.

You end your editorial by stating: "The scientific community has a responsibility to put all the evidence into perspective for the public." On this we can agree. We are left to wonder why you ignore research data that do not conform to your ideological agenda.

The following quote from a fellow physicist, Richard Feynman, may be more persuasive than anything we could say:

> [Y]ou should not fool the layman when you're talking as a scientist....I'm talking about a specific, extra type of integrity that is not lying, but bending over backwards to show how you're maybe wrong, that you ought to do when acting as a scientist. This is our responsibility as scientists, certainly to other scientists, and I think to laymen.*

* *The Pleasure of Finding Things Out: The Best Short Works of Richard P. Feynman* (Cambridge, MA: Perseus Books, 1999), p.212.

MICROWAVE NEWS is published bimonthly. • ISSN 0275-6595 • PO Box 1799, Grand Central Station, New York, NY 10163 • (212) 517-2800; Fax: (212) 734-0316; E-mail: <mwn@pobox.com>; Web: <www.microwavenews.com> • Editor and Publisher: Louis Slesin, PhD; Managing Editor: Douglas Barnes, PhD; Consulting Editor: Jon Swan; Copy Editor: Roy Thomas Jr.; Intern: Danielle Catalano • Subscriptions: $325.00 per year ($350.00 Canada & Foreign, U.S. funds only); Single copies: $60.00 •