MIND CONTROL

the top-secret weapons of the future are here. don't be frightened. don't bother to run

article **By LARRY COLLINS**

PICTURE THIS:

A crowd of Iranian crazies, driven berserk by yet another ayatollah's bloodthirsty speeches, is pouring down Tehran's Avenue General Zahedi toward the newly reopened U.S. embassy. From his fifth-floor window, the Ambassador watches the mob swing into the Takhte-jamshid and come charging up to the gate. Oh, my God, he thinks, it's hostage-taking time again.

"Sergeant!" he shouts to the head of his Marine guard.

"Sir!"

"Get that machine the Pentagon sent us in here right away. This is as good a time as any to see if the damn thing works!"

Two Marines roll in a device that resembles an oversized refrigerator and push it up to the window. The sergeant adjusts a number of dials that focus the device's aperture like a wide-angle lens on the gate, which by now the leaders of the mob are trying to tear off its hinges. Behind them, several hundred fanatics are screaming in glee, savoring the moment when they'll be inside the embassy, tearing the place apart, making a bonfire of the furniture, expressing their admiration for the Great Satan by defecating on his carpets and urinating on the portrait of his vicar on earth, the President of the United States.

"Turn it on," the Ambassador orders.

Nothing happens. There is no noise, no explosion, no flashing lights, nothing. Then, suddenly, two of the leaders of the mob who've just finished ripping down the gate stop and double up in evident discomfort. First one, then another, they begin to vomit their breakfasts onto the pavement. Within minutes, the Takhte-jamshid is carpeted with ailing rioters retching their little hearts out, their hostility oozing out of their systems along with virtually everything else.

Sounds crazy, doesn't it?

Well, it's not. In fact, that very scenario has already been contemplated in a top-secret research project, code-named Operation Sleeping Beauty, sponsored by the Reagan Administration. Sleeping Beauty represents just one corner of an entirely new, top-secret and potentially terrifying form of weaponry, the use of electromagnetics to disrupt the functioning of the body's central nervous system. Can artificially generated electromagnetic fields be used, for example, to unhinge a man's mind? To paralyze his capacities to reason or react to danger? To mess up his sensory system, throwing him into a rage or a state of panic or lethargic indifference by some remote electromagnetic means beyond his control? Ultimately, could focused beams of high-powered radio-frequency waves be used as weapons to kill by literally frying the neurons, the cells of the brain?

All that sounds right off the wall, like the daydreaming of some Dr. Strangelove in the Pentagon who has tumbled into a time warp and is playing around in a Buck Rogers Thirties comic strip: "*Bam!*" "*Zowie!*" Buck's stun ray strikes again.

Unfortunately, given the dizzying pace at which technology and brain science are moving as the century draws to a close, what might read like a list of impossibly foolish notions is already scientific reality or dangerously close to becoming so. The Department of Defense, in its most recent annual review of Soviet military power, declared that the Soviets already have the capability to produce radio-frequency weapons that can "disorient" personnel half a mile away. If the Soviets can do that, does anyone out there think our saviors in the Pentagon aren't working like hell to develop a similar or superior capacity?

Sleeping Beauty was meant to explore the possibility that this kind of far-out weaponry could be used in the struggle against terrorists or hostage takers. Suppose a group of Palestinian terrorists hijack a Pan Am plane and threaten to blow it up along with its passengers on someone's runway? Might there be some way, Sleeping Beauty asked, to use an electromagnetic field to "effect perceptual distortion in the hijackers' brains"? Zap the bastards, in other words, discombobulate them long enough to allow the SWAT team to storm the plane and free the hostages?

Or what about a group of Red Army–faction crazies in Hamburg, holed up in some building with a crude nuclear device they're threatening to blow up if the West German government doesn't agree to hang all its arms manufacturers from sour-apple trees? Could you "incapacitate" them swiftly, silently with electromagnetics? Give them heart attacks, for example, by distorting their myocardial rhythms from a distance with a well-focused electrical beam? Train an invisible electromagnetic pulse on them that could pierce, undetected and undiminished, the walls of their hide-out?

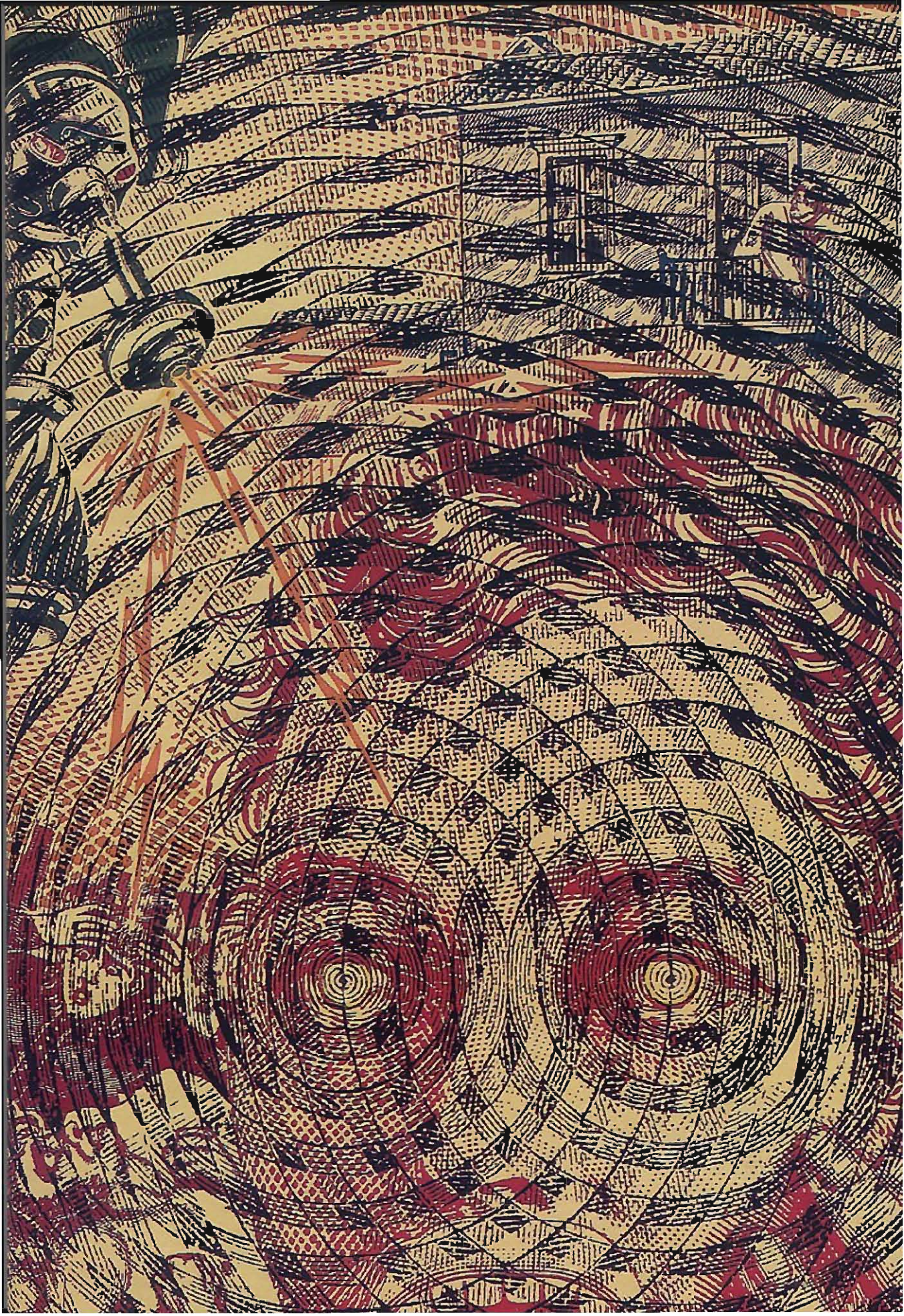
Or how about that rampaging mob on the streets of Tehran? Is there some kind of electromagnetic device you could use to produce physiological changes in its members, make them lose in a swift and definitive manner their appetite for aggression?

To the people in law enforcement and the military who have to deal with hostage and terrorist situations, those perspectives are seductive, indeed. The beauty of it all, they argue, is that its consequences are not irreversible. "After all," says one of the Navy scientists who worked on the project, "it's not like having a couple of bullet holes punched into you by a guy with an Uzi. Presumably, once the effects of those electromagnetic fields wear off, you're back to normal."

Well, the operative word there is presumably. In fact, nobody really knows whether being exposed to electromagnetic fields of the sort envisaged by Sleeping Beauty will produce harmful side effects such as making your hair fall out, leaving you impotent or giving you cancer. That concern is compounded by the fact that what's contemplated in, say, the Pan Am plane scenario is not a beam focused with laserlike precision on a hijacker's head but an electromagnetic field that spreads out in a V from its generator. Everyone inside the arms of the V is going to be zapped along with the hijackers—the pilot, the crew and the good folks back in the cabin.

Still, there were at least some serious steps made to get the answers to the questions Sleeping Beauty raised. They involved our hypothetical mob in Tehran. The Navy asked Dr. Michael Persinger, an American-born neurophysiologist who runs the Environmental Psychophysiology Lab at Laurentian University in Sudbury, Ontario, to see if he could come up with some ideas for an electromagnetic weapon that would basically dampen a *(continued on page 204)*

ILLUSTRATION BY JOHN CRAIG



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Nothing, Dr. Persinger thought, diminishes a man's appetite for aggression quite as much as a little fit of vomiting. So he asked himself, How could I get our rioters to york up their dinners from a distance—without having to feed them a lot of bad oysters?

His answer was to look at the MAST cells in our brains. They release that cold remedy, histamine, into our bodies. In humans and rats, those cells happen to be in an area of the brain that, if overdosed with histamine, will produce an instant fit of nausea. So could he find a way to set off a few of the cells from a distance electromagnetically, dumping a load of histamine into the area around them? Then, wouldn't everybody get sick and want to go home?

The logical first step for Persinger was to see if he could find a field that would produce the effect he was looking for in rats. Guess what? He found it.

Using what are called time-varying fields of low intensity in the extremely low-frequency range from one to ten hertz, Persinger was consistently able to make a cage of rats sick. Now, animals are not people and Persinger's power source was only a couple of feet away from the rats' cage. Still, the implications of what he did are disturbing, indeed. It is the conviction of both Persinger and the Navy scientists who studied his data that if you can produce that effect in rats, you almost certainly can produce it in human beings. The question is how to get from point A to point B without violating one of the most rigorous commandments of Government ethics—thou shalt not conduct experiments like that on human beings.

No one, for the moment, is saying. The test results have disappeared into someone's bureaucratic IN box and the usual veil of silence has been drawn over the project. However, given those first results, it is hard to imagine they're sitting around gathering dust somewhere.

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The notion that an electromagnetic current or an electromagnetic field could be used to influence or alter behavior is neither new nor revolutionary. It goes back to work done a quarter of a century ago by three pioneering brain scientists, Dr. Wilder Penfield, a Canadian; Dr. Jóse Delgado, professor of physiology at Yale University Medical School; and Dr. W. Ross Adey, an Australian-born physiologist at the Brain Research Institute of UCLA.

Dr. Penfield experimented with the implantation of electrodes into the cortices of the brains of patients undergoing surgery for epilepsy and found that he could stimulate near-total recall of long-forgotten memories. The brain, in other words, was a kind of massive information storage bank. Dr. Adey placed tiny transmitters in the brains of cats and chimpanzees that could broadcast the electrical activity going on in their brains to a nearby receiver. The receiver, in turn, was used to broadcast signals back to the radio in the animals' brains that modified their behavior on order.

Dr. Delgado developed a procedure for implanting gold, platinum and stainless-steel electrodes into precise areas of the brains of animals and humans. By sending a tiny electric current into the selected area, he could make a cat screeching mad, a monkey lethargic or set a human being to reflexively jerking one of his arms up and down. In his most famous experiment, he planted 21 electrodes into the area of a fighting bull's brain that controlled its motor activity. Delgado would then send the bull a signal that would turn it into a pussycat. Switch off the signal and the bull was ready to tear into anyone who went near it.

Much of Delgado's work was indirectly financed by the CIA through one of those fake charitable foundations the agency likes to employ to keep its interest in a project secret and spare scientists the indignity of being associated with spooks.

Inspired by Delgado's work, the agency set out on a research program of its own under the direction of Dr. Ivor Browning, now a futurologist in New Mexico. Dr. Browning's job was to develop ways to control animals' behavior by implanting electrodes in the "sweet spot" of their brains, an area in the hypothalamus that, when stimulated, will produce a sense of euphoria as intensely satisfying as that you'd get from a couple of full-bore orgasms going off simultaneously.

He was remarkably successful. On one occasion, he wired up a donkey with an antenna and a receiver-amplifier that picked up a five-micro-amp transmission and sent a little electric zing into the donkey's sweet spot, giving it a jolt of instant happiness. Using it, Browning and his associates sent the donkey up a 2000-foot mountain in New Mexico and back to the spot from which it had started, employing the old Pavlovian technique of reward and punishment. When the donkey was on course, it was happy time. Wander off it and the signal stopped.

"You've never seen a donkey so eager to keep on course in your whole life," Browning chortles, recalling the experiment.

The same technique was used by the agency, this time to a practical purpose, in Paris. A trained pigeon flew to the window ledge of a K.G.B. safe house, where it obligingly deposited a tiny listening device that for months allowed the agency to eavesdrop on conversations inside. Wire up a bear, sew a small nuclear device in its belly, one agency prankster suggested, then send it ambling into the Kremlin to put an end to the Cold War.

The clear implication of Browning's work was that if those experiments could be carried out successfully with animals, then, presumably, they could work on humans, too. A recommendation to do that, using as guinea pigs non-Americans or prisoners, went up to the White House but was turned down on ethical grounds.

What was more worrying, however, was the conviction of the scientists such as Delgado that if you could do these things by sending a direct electric current into the brain, eventually you ought to be able to do them from outside the brain with a very precise electromagnetic field. As Delgado points out, everything that happens to us from elation to aggression must be related to a series of electrochemical events in our brains. Can electromagnetic fields generated outside the brain somehow worm their way past our skull's remarkable natural shielding and trigger off those processes themselves?

People in the intelligence community began asking the same questions in the early Sixties when the Soviets were bombarding the U.S. embassy in Moscow with low-intensity microwaves. No official in Government has ever come up—publicly, at least—with the definitive explanation of what the Soviets were trying to do. There were three theories. First was the idea that the K.G.B. was activating its bugs in the embassy. The second, and most likely, held that they were trying to jam supersecret U.S. listening devices in the embassy that were allowing the National Security Agency to pick up all sorts of secret Kremlin conversations. The third suggested that the microwaves were somehow meant to affect the brains of the diplomats inside the embassy and alter their behavior. That is the least likely of the three theories, but it was and is still seriously debated by U.S. scientists pondering the problem.

One of the reasons that question still concerns them is that a lot of the radiation being aimed at the embassy was way down in the frequency spectrum, under 100 hertz, in what is called the extremely low frequency—ELF—area. That's intriguing, because it just so happens that the major power spectrum of the human brain, and, indeed, every biological system we've been able to study, operates in that ELF range. Could those ELF fields somehow have been getting into our diplomats' brains and messing them up?

No way, the conventional scientific establishment assured us for years. Those ELF

waves are nonthermal and nonionizing, which to us laymen means that they carry very little energy or heat. How could they possibly have an effect on anything, right? Well, as it now turns out, that's another of those bold scientific dicta about which people are beginning to have second thoughts. We have the U.S. Navy to thank for that.

One of the most fetching characteristics of those ELF waves is that they will penetrate sea water to great depths. Ho, ho, said the Navy, here's the way to communicate with our submerged nuclear submarines. (Communicate is a big word. About all those waves can, in fact, do is set off a reassuring buzz in the submarine's receivers that tells the captain all's still well with the world.) Booming the signals out, however, requires a huge power source. To do it, the Navy put together something called Project Sanguine, which was basically designed to form a massive underground power grid by burying 6000 miles of electric cables in northern Wisconsin and Michigan's Upper Peninsula.

Suddenly, once it started operating, the residents up there discovered that they would sometimes get an electric shock turning on the water faucet or an unfriendly jolt of electricity brushing up against a previously neighborly barbed-wire fence. Gee whiz, they asked the Government, could all this electricity be bad for us?

Nah, the Navy kept assuring them, there's nothing at all to be concerned about. To make their point, they periodically trotted out bodies of experts to give the locals a reassuring stroke of scientific jargon.

By the mid-Seventies, however, an active minority of scientists were no longer ready to accept those reassurances. The Soviets, in a rare public paper on the subject, revealed that sailors working close to their own ELF generators were showing an abnormal incidence of psychiatric problems, disorders of the central nervous system and stress-related symptoms. Were those ELF fields the cause?

Adey and his associates in California discovered that ELF-modulated fields could alter the pattern of animals' brain waves. They found that by employing precise externally generated electrical fields on monkeys, they could get the monkeys' brains to fall into phase with their field, entrain them, in other words, into a predetermined pattern. Think, for a moment, about the implications of that for mind control. Most important, Adey demonstrated that human cells in a culture in his lab could detect and respond to the passage of weak ELF fields. If the cells in your liver can do that, then why not the neurons of your brain? Because that charming ability of ELF waves to get through virtually anything will, as it happens, allow them to pass through the natural protective barrier the bone of our skulls provides our brains.

Why not, indeed? says Dr. Elizabeth Rauscher, who runs the Technic Research Lab in San Leandro, California, across the bay from San Francisco. Dr. Rauscher looks and sometimes talks like a relic of the Haight-Ashbury days. Nevertheless, there is the diploma of a doctor of nuclear physics on her office wall.

"Official policy remains that ELF has no significant effect, positive or negative. Well, that's a false policy," Rauscher asserts with an air of calm authority. She has reason for that superior air. Hers is probably the only lab in the U.S. that is actively experimenting on human subjects with ELF fields. Her subjects are all volunteers who know exactly what they're letting themselves in for.

"We have played with the effects of several different frequencies," she says. In general, the effects they produce wear off quickly, her studies have shown. She notes, however, "I've found one that produces nausea [in its subject] for more than an hour." Remember our Iranian friends storming the Tehran embassy?

One of her frequencies she calls "the marijuana frequency. It gets us all laughing."

"Give me the money and three months," Rauscher swears, "and I'll be able to affect the behavior of eighty percent of the people in this town without their knowing it. Make them happy—or at least they'll think they're happy. Or aggressive."

And our Soviet friends? Have they got a Dr. Rauscher out there someplace working with this stuff? They aren't saying. We do know, however, that they have been exploring the possible links between behavior and ELF fields for years. And last May, the CIA learned that the K.G.B. subjects people undergoing interrogation to an electromagnetic field that makes them highly agitated, close to panic and, therefore, more likely to break down during interrogation. Clearly, the prisoner being interrogated has no idea of what's happening to him. The CIA has no technical information explaining how they do it. But it would be a very good bet that the fields they're using involve ELF frequencies.

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All this ELF work is, basically, one on one—how to mess up the behavior of one carefully selected individual. But how about using these things as weapons? On the battlefield? Are we really ready for Buck Rogers' zap gun as an infantry weapon?

When the Government wanted to look into why the Soviets were bombarding the embassy in Moscow with microwaves, it handed the job over to DARPA, the Defense Advanced Research Projects Agency. DARPA is engaged in pursuing the whole

problem of developing electromagnetic weaponry. That is an area so tightly guarded in Washington today that even the code names of its projects are classified top secret. The guru behind it, Dr. Jack Vorona, a high-level official at the Department of Defense, is a man so secretive he probably doesn't even return President Bush's telephone calls.

The first public indication that the U.S. military was contemplating the possibility of these electromagnetic weapons didn't come until 1982, despite the fact that the subject had been under active discussion for at least a decade. It was squirreled away in a few paragraphs of the U.S. Air Force's annual review of biotechnology. Studies—the review didn't say by whom—indicated that "specifically generated radio-frequency radiation (RFR) fields may pose powerful and revolutionary antipersonnel military threats." Loosely translated, that means you might be able to zap somebody from a distance with a radio beam. The human brain, the review pointed out, "is an electrically mediated organ" and, therefore, there was a "serious probability" that external electromagnetic fields "can be disruptive to purposeful behavior." Then the review dropped the clanger. There was every likelihood, it concluded, that you could develop "a rapidly scanning RFR system" that would have "stun or kill capability over a large area."

Two years later, in March 1984, Captain Paul E. Tyler, a Navy doctor, presented a paper at the Air University Center for Aerospace Doctrine, Research and Education at Maxwell Air Force Base in Alabama asking how electromagnetics might be employed on the battlefield. It was a subject Captain Tyler was well prepared to address. At the time, he was running the Navy's Radiation Lab, set up to study the effects of radiation on humans. He had also run herd on the Navy's efforts to quell all those doubts the people in Wisconsin and Michigan had about the ELF radiation the Sanguine transmitters were tossing off.

Yes, Tyler revealed in a 180-degree turn from the Navy's stand in the ELF controversy, "specific biological effects can be achieved" with electromagnetic fields if you know just what kinds of fields to employ. That technology could be used, he acknowledged, "in many military or quasi-military situations." Then he tossed out a phrase that set the bells ringing in every combat officer in the room. "The ability of individuals to function [on the battlefield]," he declared, "could be degraded to such a point that they would be combat ineffective."

Combat ineffective? A platoon of elite Red Army troops zonked out of their minds by electromagnetic beams while the tanks of the Big Red One go rumbling by? This may be Dream Wars we're talking about here, but can anyone imagine the enthusiasm an image like that can produce in a gung-ho Infantry officer?

Exactly what are these electromagnetic weapons Tyler was alluding to? Fundamentally, the concept is a kind of stun gun not so different—in theory, at least—from Buck Rogers' gun. The power source would be a transmitter that could hammer out a stream of very short, very high-powered bursts of microwave or millimeter-wave radiation. Their primary targets would be the silicon chips that are the brains behind most modern conventional arms, such as the M-1 tank and the F16 fighter.

The F16, for example, is an inherently unstable aircraft guided in flight by an elaborate network of computers and sensors. Fry those chips with a burst of high-powered energy, and the F16 could spin out of control. Going from the notion of burning out a tank or airplane's microchips to the idea of burning out those ultimate microchips, the neurons in our brains, does not require a prodigious leap of the imagination. It should come as no surprise, therefore, that such possibilities are on the drawing board. These were undoubtedly the sort of weapon Tyler was referring to in his paper. In fact, it is probably easier to develop a weapon for short-range battlefield use than it would be to develop one to knock out an F16 careening through the sky at 30,000 feet.

Dr. Jóse Delgado, who follows these things closely, is convinced that the Soviets already have a weapon that can kill by burning up vital brain cells at up to half a mile. At somewhat longer distances, the rays emitted by such a device would presumably produce disorienting effects on humans caught in their path.

The critical element in such weaponry is a device called a gyrotron, which uses magnetic fields to hammer out high-powered bursts of microwaves and millimeter waves of radiation. (These waves are at the opposite end of the spectrum from the ELF waves that concerned the folks in Wisconsin and Michigan. The shorter the wave, the more energy and information it can carry.)

Guess what? Experts in the field, including the experts in the Pentagon who annually review the state of play in technology, put the Soviets well ahead of us in developing gyrotrons.

The size of the power source is still a key imponderable, but there are those now convinced that one adapted for battlefield use could be carried around in a good-sized truck. That feeds into the notion of an RFR weapons battery that could "sweep" a battlefield at short range, killing enemy troops without devastating the landscape.

As if that prospect weren't scarifying enough, scientists at the Lawrence Livermore National Laboratory in Livermore, California, have looked at the possibilities of a "brain bomb." The idea would be to use a bomb that would generate primarily microwaves, which would affect the

functioning of the minds of people inside the bomb's impact area. The Soviets, too, have looked at the same theoretical possibility, though there is no evidence that either the U.S. or the U.S.S.R. has done any more than think about the possibility of such a device.

There is something particularly chilling in the notion of electromagnetic death, despite the fact that blowing people apart with high explosives, as we've been doing for generations, is probably much more painful and certainly more gruesome. Early last summer, the Soviet Union offered us a concrete indication of just how close we may be to those macabre horizons. Their action came, surprisingly, at the Strategic Arms Reduction Talks in Geneva.

To the astonishment of their U.S. counterparts, the Soviet delegation tabled a proposal for a U.S.-Soviet ban on the development, deployment and use of electromagnetic arms.

Why would the Soviets do a thing like that? Why would they offer to toss away their edge in a field in which it is widely acknowledged they are well ahead of us? After all, no one in Washington had even thought of putting forward such an idea.

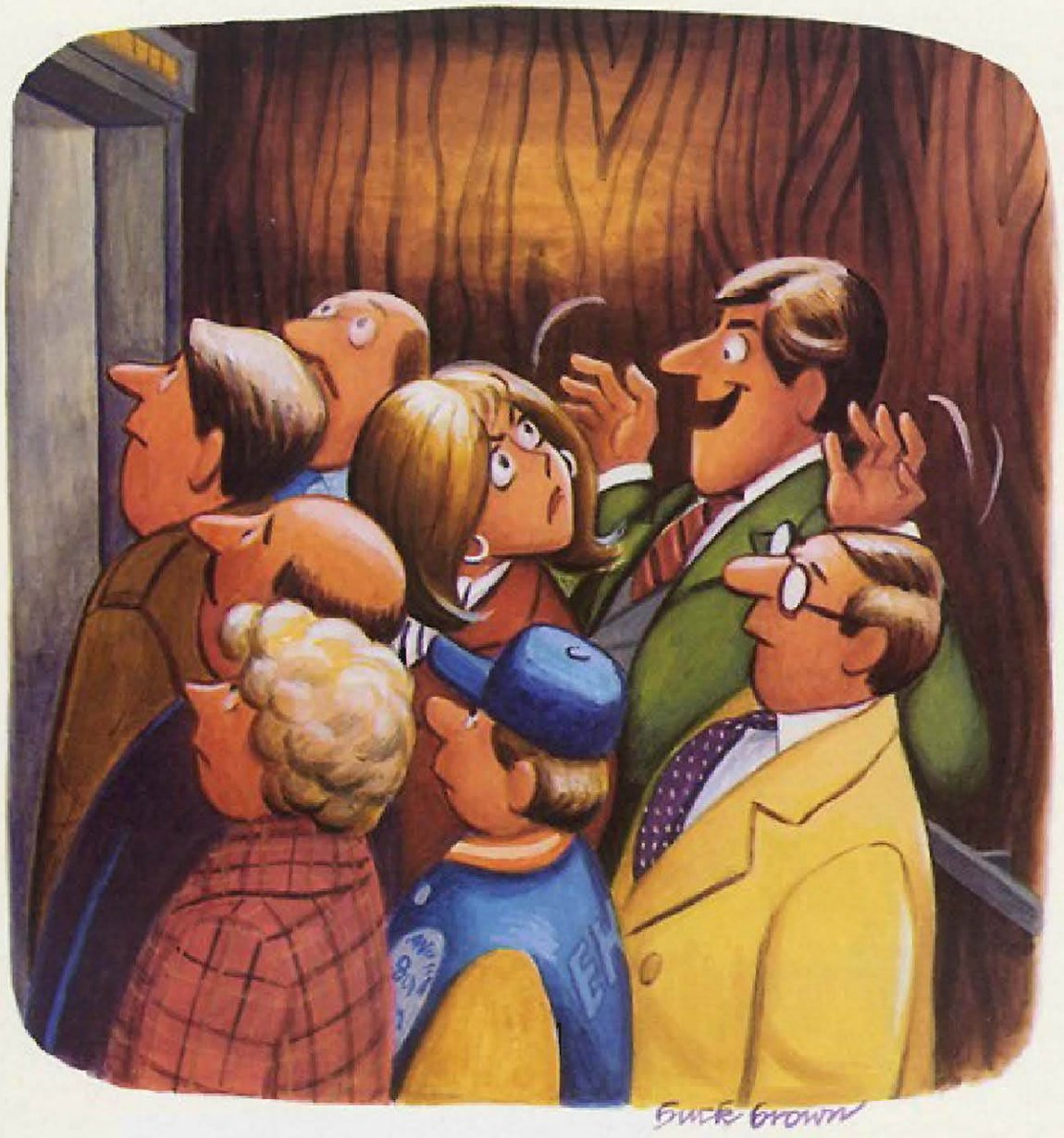
No one but the Soviets themselves knows the answer to that question. But might it be that in their research they have peered into the future and been horrified by what they have seen?

Sleeping Beauty, Buck Rogers' stun gun, a platoon of soldiers unhinged by some magic beam—it all sounds like science fiction. Today's science fiction, however, is often tomorrow's scientific reality. Early in this century, Santiago Ramón y Cajal, the great Spanish scientist, suggested that man's most transcendental achievement would be the conquest of his own brain. As the century closes, that conquest beckons from just beyond the horizon. It is a conquest full of promise, mystery and danger. For, as our knowledge increases of how that wondrous instrument the brain works, so, too, does our ability to influence it, modify it, eventually destroy it.

Is this the outline of some Faustian bargain with the gods of science? Must man learn to control the advances of wisdom lest his thirst for knowledge ultimately destroy him?

Who knows? One thing, however, is certain—what will come out of all this is going to make the impact that splitting the atom had upon our existence pale in comparison.

Welcome to the 21st Century.



"C'mon, lady; as long as there's no penetration. . . ."