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PAGE 59

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NORTHEAST EDITION—PAGE 113

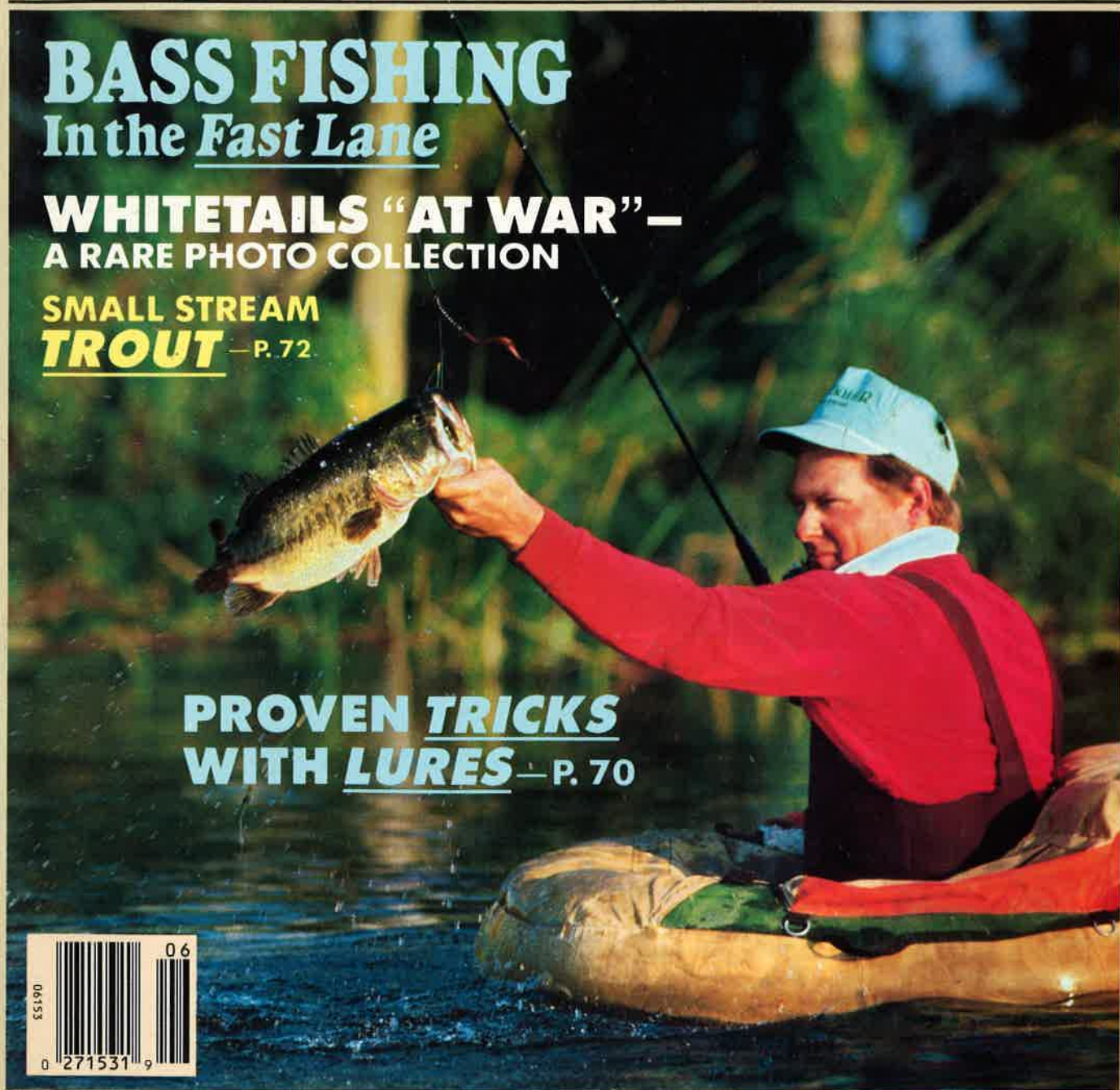
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**SMALL STREAM**  
**TROUT** — P. 72

**PROVEN TRICKS**  
**WITH LURES** — P. 70



# Conservation

How to learn if your home could be dangerous to your health.

## Household Hazards

BY GEORGE REIGER

**W**hen I was a little kid first learning about electricity, I used to eye with anxiety any electrical outlet. My concern was based on a shocking experience that occurred when I was three years of age: I probed an outlet with an apparently well-salivated screwdriver.

In later years I was not reassured to learn that electricity moves through wires much the way that water flows through pipes. If water frequently dribbled from faucets even after I turned them off, surely, I reasoned, electrons must dribble from outlets, or zap out, ricochet around the room, or do whatever else electrons do when given the least opportunity to escape their tentative bondage.

Now I find that my childhood fears were not entirely (pardon the pun) groundless. It's not the electrical current, however, that causes the mischief. Rather it's magnetic fields created by circulating electricity.

While some researchers such as the University of North Carolina's David Savitz have been studying the risks of living near power lines—"There is no solid evidence that you should be worried, even if you live *under* the power line, [but] from a public health perspective, there is a reason for concern," he has concluded with superb scientific ambiguity—others like Nancy Wertheimer of the University of Colorado Medical Center and physicist Ed Leeper examined the risks of sleeping on electric pads, heated waterbeds, and under electric blankets. They have found that if a pregnant woman uses an electric warmer, she is more likely to have a longer gestation period or suffer a miscarriage than her wool-blanket or down-comforter-warmed sister.

Heat is not the problem. Rather it's something known as Extremely Low Frequency (ELF for short) magnetic fields generated by the electricity flowing through the heating coils. And women are not the only ones who might be affected. Jerry Phillips, director of biochemical research at the Cancer Therapy and Research Center in San Antonio, Texas, has found that exposure to ELF fields also causes an abnormal increase in the growth of cancer cells, regardless of sex. Furthermore, these cells show a 60 to 70 percent greater

resistance to interference from the body's naturally occurring guardian cells. Finally, and most ominous of all, such changes appear to be permanent and are passed from one generation of cancer cells to the next.

Electric bed warmers are not the only household convenience under suspicion, of course. Despite their great and growing popularity, microwave ovens are still under investigation for a variety of ills from sterility to cancer. It is a fact of sexual history that the average number of sperm per cubic millimeter of an American male's semen has declined by 40 percent over the past sixty years. Microwave ovens haven't been around long enough to be a major factor in this trend, but it is certain that some combination of industrially generated ingredients can be held to blame.

Still, radio waves and magnetic fields may be the least of our concerns around the house. Microwave ovens and electric blankets are luxuries, after all, and hardly essential to the truly good life. If you're concerned about their use, you simply don't buy them in the first place.

Unfortunately, however, some risks go with the territory of living in any house, no matter how lean one's individual lifestyle. Take radon for example. It is a naturally occurring radioactive gas formed from the disintegration of radium in the soil.

Yet in a study at the Lawrence Berkeley (California) Laboratory (LBL), researchers found cancer risks posed by the inhalation of radon to be 100 to 1,000 times greater than those for many of the chemical hazards for which the Environmental Protection Agency (EPA) has already issued cautionary guidelines.

The study found that the average home tested in seventeen states in every major geographical region and in many major metropolitan areas had concentrations of 1.5 picocuries per liter (pCi/l) of radon in its air, a level which would pose a 0.3 percent increased risk of lung cancer mortality or roughly 10,000 additional lung cancer deaths per year in the United States. An estimated 4 million American homes have hazardous radon concentrations of more than four pCi/l, and 1 million homes have dangerous radon concentrations of eight pCi/l or greater. LBL physicist Anthony Nero says this is 50 to 100 percent more radiation than an

American uranium worker receives in an average year on the job.

Radon is colorless and odorless, and one of the most bewildering aspects of its threat is that radon may be nearly absent in a house located next door to another home whose radon buildup may be approaching dangerous levels.

One of the ironies of radon is that it accumulates best in houses with the best insulation. Drafty, poorly constructed homes are at smaller risk than snug, well-built homes. This fact particularly alarmed me, because a number of years ago, I restored the sturdily built, nineteenth-century farmhouse in which my family lives and in the process made sure that its floors, walls, and ceilings were well insulated to cut down on heating and cooling costs.

My first step, however, was not to panic and begin knocking out the walls to let in winter winds! Instead, I sent a \$12 check to the Radon Project, Department of Physics and Astronomy, University of Pittsburgh, Pittsburgh, Pa. 15260, to obtain a device that looks like a metallic hockey puck. Instructions with the puck tell you to remove a tab of tape on one end and expose the device to one week of ordinary activity in the most frequently used room in your home.

At the end of the week, I replaced the tape, sent the collector back to the University of Pittsburgh, and several weeks later received the good news that the radon I breathe every day is only 0.8 pCi/l, which means that, while there is still some small risk, I have no great mandate to move from an area of the country I have grown to love.

The radon test got me to thinking about my well water. Like most rural residents, I drink water that comes from the ground, and in my country, we depend on surface runoff, rather than aquifers, to convert rain to well water. Furthermore, only about 4 percent of all the rain we receive percolates through the soil to the depth of our wells; the rest quickly flows into the Atlantic or Chesapeake Bay.

Since the soil is sandy, any water-soluble chemical easily percolates down to well levels. Since farming is our most important local industry, I was concerned about agricultural residues—especially after learning that local farmers suffer abnormally high cancer rates,

possibly from the chemicals they are forced to use in modern agriculture.

I took water samples to our health department, but learned its laboratories are equipped to detect only microorganisms. This is important, of course, and the people of Pittsfield, Massachusetts, regretted, I'm sure, not having it done sooner when approximately 8,000 residents came down with diarrhea after the parasite *giardia* got into that town's water supply.

However, toxic chemicals are more difficult—hence, expensive—to detect, and their sinister implications are for me even more threatening than high coliform levels. Diarrhea is discomforting, to be sure, but lymphatic cancer will kill you. A simple filter can remove bacteria, but no household filter yet devised can do anything but complicate the presence of endrin or chlordane in one's drinking water.

I also wanted to know whether I had dangerous levels of such heavy metals as cadmium, mercury, and selenium in my water. Public service agencies are not usually concerned with such matters, although local health officials did caution the residents of Woodstock, New York, not to drink or cook with their water because of asbestos leaching from old water pipes.

By contrast, when public water supplies at Myrtle Beach, South Carolina, were discovered to have unusually high

sodium levels, an element linked to high blood pressure and heart disease, some public officials tried to suppress the report for fear it would have an adverse impact on tourism.

I contacted several water-conditioning companies, but soon learned these were incapable of testing for most of the chemicals that concerned me, and furthermore, their principal function is to sell water-conditioning kits to neutralize strange tasting or discolored water. Most water-conditioning companies check only for copper, lead, manganese, and sodium in the metals category; and chloride, fluoride, nitrate, sulfate, pH, hardness, and total solids in the inorganic chemicals and "other" categories.

Since I have never had any trouble with either the taste or color of my well water, I was not interested in the cosmetic treatment offered by water conditioners. Yet when I went back to my local health department, or talked with regional EPA officials, they estimated that tests for the eighty or so most common pollutants in well water would cost roughly \$1,000 per well. Even though this price may be modest considering the stakes, it is not something the average American family can easily afford—especially since Uncle Sam does not allow the expense of water testing to be a tax deductible health precaution.

There had to be a less expensive way to find out the chemical makeup of the

water my family drank every day, and persistent probing by my wife finally turned up the phone numbers of four laboratories that do such testing for under \$100.

In Pennsylvania, the phone number of Suburban Water Testing Laboratories is (800) 525-6464. (For out-of-staters, call [800] 433-6595.) If you live in New England, contact Water Test in New Hampshire at (800) 426-8378. If you live in the Southeast, W.E.T. in Florida, (305) 684-7713, may be your best bet. And in the Midwest, the number at the Ohio-based National Testing Laboratories is (216) 449-2525.

The reason to use a testing center near you is that the sooner your samples reach the laboratory, the more reliable are its results. Apparently there are no testing centers west of the Mississippi. This is probably because Westerners are so grateful for any water they get, they don't want to know what's in it once they've got it!

My wife and I decided to try the Ohio laboratory after we learned it had a special \$79 introductory price. We wrote Watercheck, Dept. FS, 6151 Wilson Mills Rd., Cleveland, Ohio 44143, and received an insulated container with four bottles to be filled with tap water, cooled with freezer packs supplied by the company, and returned to the laboratory within 48 hours. We carefully followed the instructions, and a couple of weeks later received a computerized re-

port that made my day, if not my life! Of eighty pollutants looked for, most could not be detected at all, and those few that were had levels well within the EPA's potable standards.

Unfortunately, even after getting a passing grade on a comprehensive water test, you cannot assume that your well-water quality will remain high. For one thing, laboratories test for pollutants only at levels of parts per million. The worry is that some of the most hazardous chemicals—dioxins, for example—are dangerous at levels of parts per billion, or even trillion, far beyond the capabilities of most modern analytical equipment.

The other reason for ongoing concern is that all environments are influenced by modern industry and are, therefore, always in a state of flux and suffer from inevitable degradation. As F. Jerome Tone, Watercheck's president, warns in a letter to his customers:

"Remember that ground water is always moving like a very slow river, and as it moves it dissolves or absorbs metals and chemicals from the soil through which it passes. Stay alert to the possibility of change caused by leaking buried chemical or gasoline storage tanks, fertilizers and pesticides if you live in a farming community, brine intrusion from oil and gas drilling, and even a drop in pH [indicating increased acidity] caused by acid rain.

"If you live near a landfill, it is

probably a good idea to have an analysis run every year or two to insure that no toxic substances are being leached out of the fill by rainfall and have found their way into your well."

Almost 40 percent of all Americans (97 percent of rural Americans) drink well water. If this means not having to taste chlorine, fluoride, and God knows

what other ingredients intentionally or accidentally introduced by man into the water supply, well water is a blessing. But when the wells are infiltrated by metals and chemicals unimagined by most public health officials, they are a curse and further proof that man has failed in his stewardship of the planet Earth.

#### WHAT YOU CAN DO

■ What can you do if your well is contaminated, or your house shows high radon levels? In some parts of the country—California and Florida, for example—bottled water is already common in homes, and supermarkets in more and more areas are carrying it on their shelves. If your well water is severely contaminated with pesticides and other toxic chemicals, however, it may not be safe even for bathing. That is why all private wells should be tested, along with suspicious municipal supplies. Finding alternative sources for bathing water may be a headache, but it would be nothing compared to the damage that exposure to certain dangerous chemicals could do to your family's health.

Where radon is concerned, the problem is more severe. If risky levels are discovered, there is not a lot you can do, short of hiring experienced contractors to try to reduce the amount of radon entering your house, or selling your home, which would not only be unethical (unless you informed the prospective buyer that the building was severely contaminated with radon), but it would also probably be illegal. Installing ventilation devices and getting regular medical checkups with a doctor who is aware of the high-risk factor you are living under would be a sensible precaution. Anyone contemplating buying a house or building a new one should have the building or property checked for radon before signing any contracts. This is the simplest and best insurance that your health will not be threatened by this naturally occurring, but harmful, gas.

For more information on radon and possible methods of reducing levels in your home, contact your State Health Department or your state Environmental Protection Agency office and ask for a copy of the booklets "A Citizen's Guide to Radon," and "Radon Reduction Methods—a Homeowner's Guide."

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