PARTIZANIST DISCRIMINATION IN CALIFORNIA FAVORS ELECTRIC POWER COMPANIES

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EDITORIAL

The California Public Utilities Commission (PUC) sent a report to the California legislature (Potential Health Effects of Electric and Magnetic Fields from Electric Power Facilities, September, 1989), in which it concluded that powerline electromagnetic fields (EMFs) did not cause cancer or other medical problems, and that exposure standards were unwarranted. The whole argument rests on a set of false assumptions. First is the assumption that there is such a thing as a cause of disease. There isn't. A cause is a condition "that effectively and inevitably calls forth an issue" (1). Moreover, "it should be obvious" that the condition is the "immediate agent in the production of an effect" (1). The core meaning of cause is conveyed by the philosophical efficient cause or the legal proximate cause. Correct usage of cause allows a little weakening in the timing and inevitability of the relationship between the "condition" and the "issue"—but not too much. Suppose, for example, that 100 lawyers were dropped off the roof of a 10-story building. We expect a high mortality, and we could conclude that falling from the top of a 10-story building caused lawyers to die; cause would be appropriate even if only 99 of the lawyers died. Suppose 100 other lawyers were dropped off the roof of a 3-story building, and only 50% died immediately. We could conclude that a 3-story fall can cause lawyers to die, and we could even estimate the probability of the event. Clearly, death was caused not only by the fall itself—because not every falling lawyer died—but, additionally, by unascertained "conditions" in the way the lawyers fell. Perhaps there was a higher mortality among the lawyers that landed on their heads, or among the wealthy lawyers (because wealth was correlated with a death-promoting characteristic such as poor physical health). Replicates of the second experiment aimed at more precisely defining the cause of death would be worthwhile, but replicates of the first study would probably be a waste of lawyers. Consider the fate of the lawyers who survived. Many of them spent a long time in surgical intensive care units, where they were maintained supine and fed via a plastic tube; iatrogenic infections and multiple organ failure were common. Twenty years later, it was found that the incidence of leukemia among the survivors was twice that of a control group. Can we say that the fall caused cancer? Surely not, if cause has its correct meaning. The California legislature seems to have understood this point: The law that ordered the PUC study speaks of the possibility that EMFs may be "associated" or "related" to disease—pointedly, it does not use “cause.” The second false assumption is that until someone shows that EMF disease is subserved by a specific molecular mechanism that can be thwarted by changes in powerline design, the appropriate regulatory action is to do nothing. The appropriate action is that which is fair and nondiscriminatory—molecular mechanisms are irrelevant to the issue. We do not understand the molecular mechanism of memory, digestion, or life, and yet we do not ignore their reality. We do not understand the molecular mechanism of cancer induction by cigarettes, asbestos, or ionizing radiation, and yet we do not fail to regulate them. Courts routinely make decisions on the basis of less-than-perfect information, and there is no legal, logical or scientific principle that compels non-action in the presence of uncertainty. Any decision has its potential down side. If design changes are made and EMF exposure ultimately turns out to be non-hazardous, then money will have been wasted. But failure to act

coupled with the reality of EMF health risks means that some luckless subjects would have developed disease that could have been avoided. The right and responsibility to decide rests with the people because, in a democracy, social policy is determined by the people, not by a technically specialized commission in the executive branch of government. The PUC—which is not a representative body-has arbitrarily chosen to discriminate in favor of a partizan group (utility companies) over the interests of all others.

The third false assumption is that the environmental hazard posed by EMFs "is not testable by scientific methods." It is—if one has the heart, brains, and money. The stressor hypothesis of EMF-induced disease holds that the EMFs result in conformational changes in membrane-bound electrogenic proteins which alter the local membrane potential resulting, ultimately, in the propagation of a signal along a pathway projecting to the thalamus. The afferent signal triggers multiple efferent signals to the immune, endocrine, and central nervous systems. Continuous activation of these pathways (chronic EMF exposure) increases the probability for disease (compared to non-continuous activation) via decreased efficiency of immune surveillance. Each aspect of the hypothesis is directly testable. The effect of EMFs on membrane potentials and proteins can be studied using patch-clamp techniques. The existence of simultaneous afferent and efferent signals in the central nervous system as a consequence of EMF exposure can be proved or disproved using spectral analysis of the electroencephalogram. Promotion of an immune-system deficit can be studied by measuring the effects of EMF exposure on the functional and kinetic properties of natural killer cells. The disease exacerbating effects of chronic EMF exposure can be studied in animal tumor models in which typical endpoints (mean survival time, extent of metastases, threshold, innoculum) are studied as a function of field exposure.

Like the conclusion reached by Zeno denying the reality of motion, the PUC's conclusions are logical consequences of its assumptions. What accounts for the PUC's subtle fallacies? PUCs arose as a legislative response to the problem of siting powerlines and setting rates. Prior to their emergence, local governments enacted myriad inconsistent regulations regarding powerlines, and no system of checks-and-balances existed to restrain monopolistic greed. When the EMF health issue appeared in the 1970, most states assigned jurisdiction of the problem to their PUCs. Unfortunately, the PUCs possessed no expertise or tradition in dealing with health-related issues. Even worse, since a revolving door frequently existed between the PUCs and the industry, individual commission members and staff showed little interest in taking remedial steps.

The issue of EMF health risks belongs squarely within the jurisdiction of the state agency concerned with other environmental pollutants-not within the purview of the PUC or the Health Department (which is usually geared to study infectious disease). The choice regarding discrimination on the basis of partizan status should be made by the legislature, and then implemented by an executive agency having the requisite mandate, resources, and independence from the polluter.

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