

LETTER

REPLY TO: COMMENTS ON VARIABLES IN RESEARCH INVOLVING
ELECTROMAGNETIC BIOEFFECTS

I welcome Prof. Parkinson's apparent support of my position that a greater level of accuracy is desirable in such research, along with an understanding of the potential range of variables. However, I am disappointed by the lack of specific proposals in his letter. Rather than addressing the problem of the specifics of such research, he seems to be propounding his opinion that biological scientists are grossly ignorant of even the most basic aspects of physics. It would appear that he has reached the conclusion that all reports of bioeffects of electromagnetic fields (as authored by biomedical scientists) are erroneous because classical physical theory prohibits any such interaction. It is interesting to note his statements in support of his views; "...magnetic fields per se are usually of little importance at normal biological temperatures." It would appear that Prof. Parkinson is unaware of the now well-established fact that living organisms possess organs and mechanisms that permit the detection of Earth-strength levels of magnetic fields, and that they derive important physiological information therefrom (1). It is unfortunate that these functions do not fit the preconceived views of the physicist, however, it would not appear to be scientifically appropriate to deny the existence of these mechanisms rather than to expand the concepts of the range of functions available to living organisms. As to Prof. Parkinson's statement, "Further, a changing magnetic field is of interest only in that it induces an electric field," I must refer him to the excellent paper of Liboff (a physicist, by the way) in which he clearly

presents evidence for the magnetic field being the primary effector of the observed effect on cellular DNA (2).

In brief, Prof. Parkinson has chosen a simple paper concerning the mechanics of research in electromagnetic bioeffects as a single point upon which to base an attack upon all of the corpus of knowledge gathered in this area over the past several decades. It is, in my opinion, unfortunate that he has chosen to base this attack upon dogma alone. The history of science is replete with similar actions that have been proven wrong. While some of the reports of bioeffects in the literature may be erroneous or contradictory, an appropriate scientific response would seem to be to analyze these reports in an attempt to reconcile differences, to point out errors in technique and to suggest ways to improve the techniques utilized.

To function effectively in a new interdisciplinary field, those directly involved must be willing to learn about fields other than their own. I would respectfully suggest that Prof. Parkinson, having come from a distinguished career in nuclear physics, take the time to learn the corpus of knowledge available in biology, rather than to place himself in the unfortunate position of saying, "it cannot be so because physical theory says it cannot be so." To quote William Gilbert from his *DE MAGNETE*, published in 1600, what is needed are "trustworthy experiments and demonstrated arguments" rather than "the probable guesses and opinions of the ordinary professors of philosophy." It was in that spirit that "Variables in Research Involving Electromagnetic Fields" was written.

REFERENCES

- (1) Becker, R.O.: A Theory of the Interaction between DC and ELF Electromagnetic Fields and Living Organisms, *J. Bioelectricity* 4, 133-140, 1985.
- (2) Liboff, A., et al.: Time-Varying Magnetic Fields: Effect on DNA Synthesis, *Science* 223, 818-820, 1984.