Wave of the Future

Robert P. Crease's article "Images of conflict; MEG vs. EEG" (News & Comment, 26 July, p. 374) leaves a number of relevant issues unaddressed. For example the relative sensitivities of magnetoencephalography (MEG) and electroencephalography (EEG) for human sinusoidal signals and naturally occurring physiologic signals may be different. Indirect evidence for this was found by Smith *et al.* (*1*), who reported spike artifacts in EEG at the edges of rectangular current pulses, which led to significant distortions. This suggests that EEG may produce distortions from any rapidly varying source. Such effects also must be investigated with MEG, because physiologic transients (such as epileptic spikes) are not sinusoidal.

The beauty of MEG is that it can do much that EEG cannot do. For example, MEG can be used to noninvasively study direct current (DC) shifts that are necessarily obscured in surface EEG by fluctuations at the electrode-skin interface. Our group has used DC-MEG to detect the spreading cortical depression (SCD) of Leao (*2*), and we have found strong indications that SCD may be an underlying event in migraine headache (*3*). At the Eighth International Conference on Biomagnetism (18 to 24 August), we reported DC-MEG observation of slow shifts in anoxia and hypercapnia, which suggests that MEG will be clinically useful for such conditions as stroke, asphyxia, and head trauma.

At the Second International Conference on Biomagnetism (Grenoble, 1978), David Cohen told those of us who were then using biomagnetic techniques to study the heart [magnetocardiography (MCG)] that there was little to be learned that could not be learned from electrocardiography, but that the future was in using those techniques to study the brain (MEG). Shortly after this, MCG was shown to be useful for fetal monitoring, and high-resolution MCG proved useful for studying atrial-ventricular conduction pathways. The present controversy may be a case of history repeating itself (*4*).

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REFERENCE AND NOTES

1. D. B. Smith *et al.*, *Neurology* **35**, 1702 (1985).
2. A. R. Gardner-Medwin *et al.*, *Brain Res.* **540**, 153 (1991).
3. G. L. Barkley *et al.*, *Headache* **30**, 428 (1990).
4. We note that David Cohen is referred to as a "former physicist." We can only surmise that his association with the medical world has branded him thus.