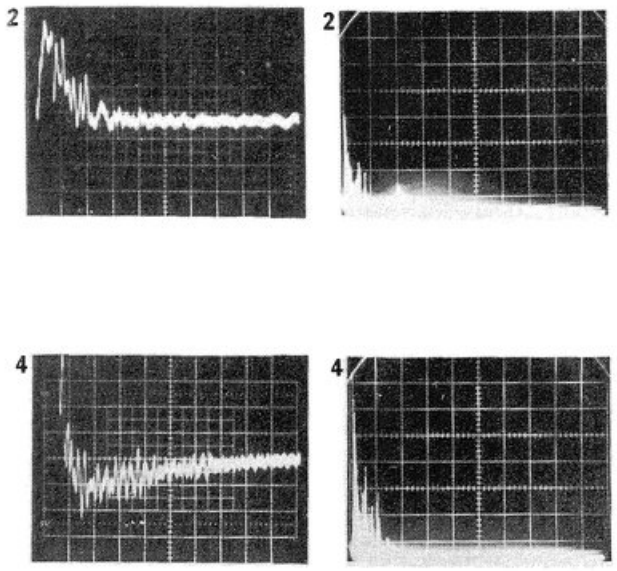

Fig. 5. Hydrophone response waveforms and spectra for rats irradiated with pulsed 2.450 GHz energy through an Elmed #3007 applicator. The spectrum traces used a center frequency of 500 kHz, a dispersion of 100 kHz/div, and a linear vertical display of 0.1–0.2 V/div. Horizontal scale factor for the hydrophone waveforms was 20 μs/div for rat 2, and 10 μs/div for rat 4. Vertical scale factors for the hydrophone waveforms were 100 μV/div for rat 2 and 20 V/div for rat 4.

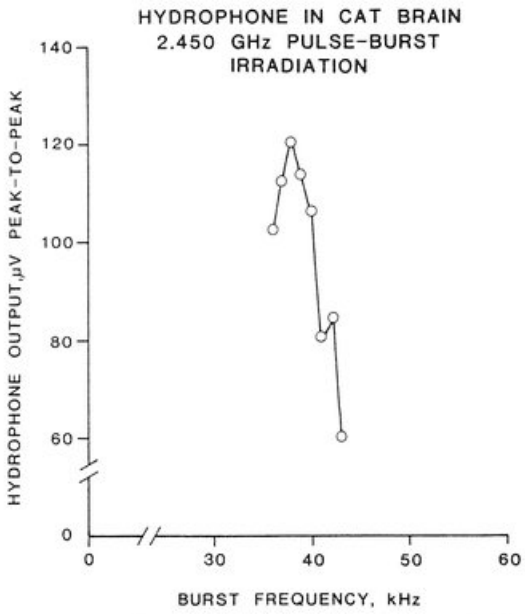

Fig. 6. "Tuning curve" results from cat brain implanted with hydrophone transducer. Four-pulse bursts of 2.450 GHz energy were used to irradiate the cat head by means of an Elmed #15 applicator. Interpulse spacings of each burst corresponded to the abscissa frequency values.

vibrations which do not exhibit one-to-one correspondence to the higher modes obtained through simple theoretical calculations. The hydrophone recordings from brains of irradiated rats, cats, and guinea pigs all show complex sequences of vibrational modes. They thus suggest that more than one single entity is involved in the acoustic activities of an irradiated head.

It would be reasonable to postulate that the skull, as a thin shell of closed spheroidal form, was a contributing source of the relatively high frequency vibrations. For example, it has been shown that frequencies on the order of those observed could be produced by the extensional or "breathing" modes of spheroids the size of a rat's skull [21], [22]. Thus, precise theoretical analyses are required to determine more about the excitation of microwave-induced vibrations in the head. This analysis should include the involvement of the brain, skull, and outer soft tissues. This is especially significant in that it would be extremely difficult to directly observe, in small animals, the skull's vibrations due to the applied electromagnetic pulses, because of the infinitesimally small displacements involved and because of ultra-small size requirements of an attached accelerometer.

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Opinions or conclusions contained in this report are those of the authors and do not necessarily reflect the views or the endorsement of the Navy Department.

The experiments reported herein were conducted according to the principles set forth in the "Guide for the Care and Use of Laboratory Animals," Institute of Laboratory Animal Resources, National Research Council, DHEW Publication No. (NIH) 78-23.

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