

XIV. MICROWAVE THERMOGRAPHY

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During the past year we have taken data at a frequency of 6 GHz on approximately 1000 patients at the Sagoff Breast Cancer Detection Clinic at Faulkner Hospital in Boston. The 6-GHz system has included a microprocessor and hard-copy unit so that the microwave data can be reduced as soon as the examination is over, and the copy of the reduced data becomes a part of the patients' records. The number of malignancies, confirmed by biopsy, was 35. Our best detection statistics have been derived by taking a linear combination of three quantities computed from the microwave data. These are: (1) the temperature difference between symmetrically opposite positions on the right and left breasts (nine such differences per patient); (2) the average temperature of the right breast minus the average for the left; and (3) the temperature of the hottest position minus the average temperature of that breast. Items (1) and (2) reveal right-left asymmetries, whereas (3) may indicate a region of anomalously high temperature. The results of computations (2) and (3) and the maximum difference in (1) are displayed on the CRT terminal at the conclusion of the examination and printed out on the paper copy. The results are a true positive detection rate of 0.85 and a true negative rate of 0.72. These are significantly better than our previous results but are not necessarily due to the higher frequency used.

The 3-GHz radiometer has been completely rebuilt and is currently in use at Faulkner Hospital with the 6-GHz radiometer and the microprocessor. The two frequency data will provide a measure of the temperature gradient within the breast as well

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as the temperature distributions. It is hoped that the additional information will lead to improved detection statistics.