

## 27. Physiology

### Academic and Research Staff

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### Graduate Students

*L.R. Carley, B. Howland, K.J. McLeod, A. Medina, G. Pratt*

In the year of 1981–82 our work was as usual divided among a variety of subjects.

J.Y. Lettvin and G.M. Plotkin, collaborating with Prof. Rose of Materials Science, brought out a new version of the origins of Caisson disease (compression sickness) with a list of nucleating events in the human body that generate bubbles in solutions that are supersaturated with gas.

E.R. Gruberg and J.Y. Lettvin successfully showed that the records of primary optic nerve fibers taken from frog tectum were not due to the terminals of the fibers but rather to non-linear responses of subjacent dendrite patches.

J.Y. Lettvin developed a new metal micro-electrode for which a tip of only 3 microns diameter exhibited a real component of its impedance  $< 20 \text{ K } \Omega$  at 2 KHz. This is better by an order of magnitude or more than the best metal electrodes to date. It allows for recording in the nervous system with very low noise.

G.M. Plotkin investigated mechanical shear of cancer cells as compared with normal cells and filed a patent on therapeutic applications of his results on two-port organs.

B. Howland and A. Medina developed a new eye chart to replace that of Snellen (that commonly used). Making use of spatial frequencies of black-and-white to be resolved against a gray background, they made a chart such that either the letters or figures could be read or they didn't appear at all. Thus, there was no guessing, as with Snellen charts and the measurement of visual performance is extremely crisp. A patent was filed.

B. Howland invented a simple and reliable way of controlling large three-phase motors by adjustment of frequency. The resulting saving of power can be considerable, and several were installed by the Physical Plant at M.I.T. The design won a prize. A patent has been filed.

L. Linden and J.Y. Lettvin finished a paper on a model for object color constancy in animal vision.

