magazine articles or in antinoise campaigns there was little certainty as to the reality of these effects or as to how much noise or what kind of noise was needed to produce them.

Turning now to the specific findings of our survey, I quote from the conclusions of the first section of the report, entitled "Noise and Behavior."

This survey shows that nearly all industrial and laboratory experiments which report that noise adversely affects work output are open to criticism because of poor experimentation and uncontrolled factors. (By "work" is meant any mental and motor tasks not involving communication by speech.) On the other hand, experiments carried out with proper control of all pertinent factors reveal that steady or expected noises do not adversely affect psychomotor activity to any significant extent. As a matter of fact, there is some evidence that noise may "insulate" a person from intermittent distractions in his environment so that on some tasks, such as aiming a gun, performance is better in noise than in quiet.

The general ineffectiveness of noise on work output and on psycho-motor performance can be largely explained by a psychological and physiological adaptation and perhaps by an increase in effort on the part of the subjects. About 50% of subjects exposed for long periods to intense, and particularly to high-frequency noise, feel that exposure to such noise makes them more irritable than normal. Some comfort is gained by preventing steady noises from exceeding 90 db [2] re .0002 dyne/cm [2] at the position of the listener. Most persons exposed to intense noise as high as 120 db re .0002 dyne/cm [2] as a matter of course in their work apparently become indifferent to it.

Although steady-state noises appear to have little real effect on work output, it will have an adverse effect upon communication by speech or other auditory signals, and it has been experimentally demonstrated that the "annoyance value" of a noise is related to its spectrum. Noises containing the higher frequencies of sound are more annoying than those of predominantly low frequencies.

Probably most of the experiments conducted on this problem did not reflect the full impact of noise on the performance of the office and industrial worker in that the studies were primarily confined to non-auditory work not involving communication, whereas communication is required in most occupations. Thus, noise absorption and reduction should lead to greater efficiency and comfort of the office and industrial worker, although most of the experimental results so far have been negative or inconclusive.

The conclusions of the second section, entitled the "Deafening Effects of Noise," are more positive, but we do not yet know enough to do more than make a good guess as to the "probable" safe maximum intensity, namely, 85 decibels above .0002 dyne/cm.[2] This figure does not refer, however, to the familiar over-all intensity of a noise but to its separate components, that is, to the noise in "critical bands." Of course, this important concept of the critical band is explained in the body of the report. A critical band is about 50 cycles wide from 100 to 700 cycles per second (cps) and is about 10 per cent of its central frequency at frequencies above 1,000 cps. A critical band corresponds anatomically to a distance of about half a millimeter on the basilar membrane or a little less than 2 per cent of the total length of the basilar membrane. Such a segment of the sense organ acts as a unit in many ways. It integrates the sound energy delivered within a "critical band" of frequencies so

2. "90 db re .0002 dyne/cm [2]" is a measure of acoustic sound pressure. It specifies a "level" 90 decibels above the standard reference level (.0002 dyne/cm [2]) recently adopted by the American Standards Association. Many of the early studies of noise and its effects on man are very difficult to interpret because no such standard reference level had been adopted at the time. Ninety decibels above standard reference is about the level of an average "noisy" factory or the loudest orchestral music. One hundred and twenty decibels is the level fairly near a (piston-type) airplane engine where the loudest speech cannot be heard.