in that city, say in the year 1985, as an attempt to look ahead at how bad will carbon monoxide be at ground level in that city, grid by grid, square mile by square mile, 15 years from now. This is being used in an attempt to compute back to what sort of standards do we need now at the tailpipe, to say, preclude hazardous situations 15 years from now.

Dr. LANDAU. I think what we are saying is that, taking the population as a whole, there is a greater residential exposure as you have more cars, so that the population not only directly adjacent to the freeway but a little farther away and farther and farther away from the freeway is being exposed to increasingly elevated levels of carbon monoxide as the numbers of cars and car usage increase within the city.

Mr. CARPENTER. Increasingly elevated, but far lower than these values reported in the National In-Car Test?

Dr. LANDAU. Yes. I think these background values—the residential exposure would have to be lower than these in-car values pretty much by definition. I would like to quote a statement from the Swedish Medical Air Quality Guides, which may have some relevance. It says:

> It is to be expected that persons especially sensitive to anoxia, those suffering from diseases of the heart and lungs, for example, are also sensitive to exposure to low concentrations of carbon monoxide.

Then it says:

> With respect to the effect mechanism of carbon monoxide, it may be questioned whether any threshold value exists for persons sensitive to anoxia. In any case, no investigations have been carried out which show where such a threshold level is to be set.

I think what we are saying, then, is that we cannot accept an industrial standard for the general population. Further, we are not certain, as the Swedish experience indicates, we are not certain as to what is the proper level for persons who have deficiencies, certain kinds of deficiency in the terms of the oxygen-carrying capacities of the blood, to be able to make a judgment as to what threshold level is at which these people will be affected.

Certainly there is every indication that this level will have to be substantially lower than the accepted industrial levels and certainly, probably very definitely, lower than the levels that would be found in cars.

Mr. AUERBACH. Dick, do you have further questions on carbon monoxide?

Mr. CARPENTER. Yes, I do, and they are related not to carbon monoxide per se but to the question which Mr. Daddario asked. Dr. Middleton answered to the effect that the rapid promulgation of exhaust emission restrictions was not going on in the dark, that you were following the lead of California, which had, in fact, followed this same sequential process of criteria to standards to emission controls.

My question is related to that answer, in which I have been unable to ascertain as yet how California did arrive at the progressive reduction of carbon monoxide to these 30 and 120 parts per million standards.

Dr. MIDDLETON. Let me just generally say that the emission standards for motor vehicles in California were reached based on the belief that air quality in the early 1940's was satisfactory. And projections then