pressure required for the deactivation of an imperfection), at $\sigma \simeq 10^3$ ergs/cm² and $p^* \cong 100$ kg/cm², one gets the reasonable value $r \sim 10^{-5}$ cm.

3. We also obtained data on the microhardness distribution. In a general case a change in microhardness in the region of the brass core in the course of a diffusion anneal may be due to two reasons, variation in the zinc concentration and the appearance of porosity. As shown by control tests, the first of these reasons hardly appears under these annealing conditions. This is demonstrated in particular by the fact that the microhardness in conditions where porosity is impossible due to pressure ($p \simeq 100$ atm), hardly changes at all with time although there is partial loss of the zinc (Fig. 2). This provides basis for the assumption that the change observed in the microhardness must be due to the presence of visible and, within the resolution range of the metallographic method, invisible pores.

Figure 3 gives the characteristics for the microhardness distribution along the radius of cylindrical specimens which had been annealed under a pressure of 1 and 100 atm. The maximum on curve 2 is due to the fact that porosity arises in the latter part of the annealing, not only in the brass itself, but also in the regions of copper adjacent to it. Here it must be emphasized that a reduction in microhardness is not only observed around visible pores, but also in regions which were found to be metallographically free of pores. This can be understood if it is assumed that diffusion porosity is also formed beyond the region where loss of zinc was detected. This conclusion is consistent with the earlier established fact [1] according to which the saturation of vacancies, which is decisive for the development of diffusion porosity, is of the order of magnitude $\Delta\xi/\xi \sim 10^{-2}$. This also agrees with data on the nucleation of diffusion pores, which was obtained in experiments with the low-angle scattering of X-rays [7].

The experiments described have thus not only confirmed that low pressures do influence the nucleation and development kinetics of diffusion porosity, in the form of exceedingly disperse pores, which causes a reduction in microhardness, does develop in regions where it cannot be detected metallographically.

Translated by V. Alford.

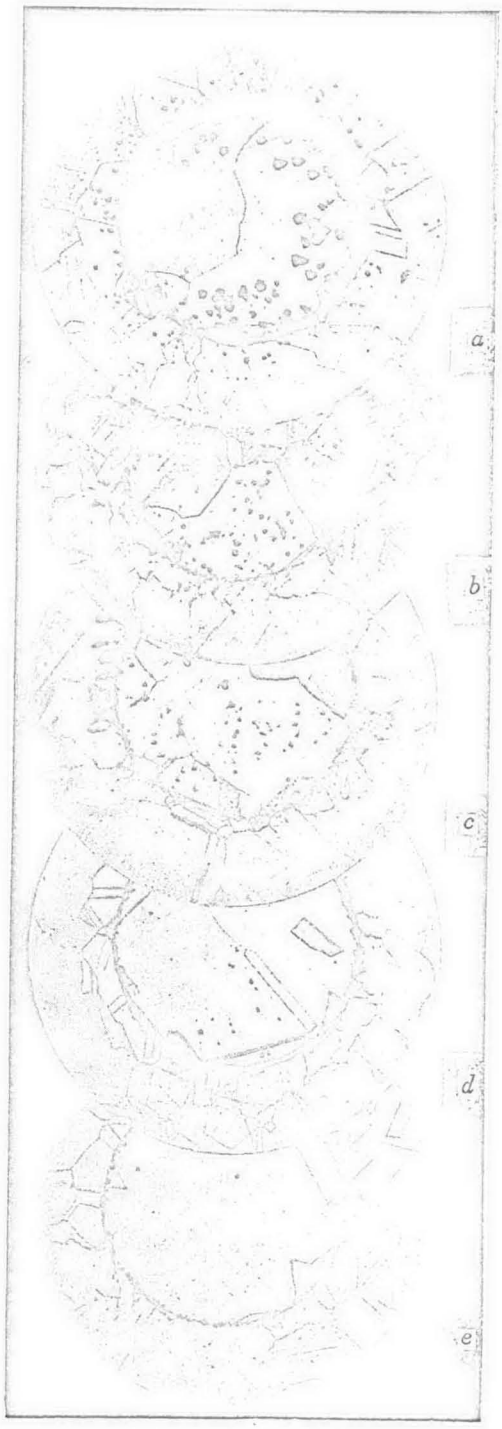

FIG. 1. Structure of specimens after annealing at 800°C for 6 hr and at the following pressures:

a – 1; b – 10; c – 25; d – 50; e – 100 kg/cm².