3. EXPERIMENTAL RESULTS

Some of the transition curves at various pressures are reproduced in Fig. 1. As we were not so much interested in the absolute value of the temperature in these studies, as in its shift under pressure, we have plotted the resistance ratio versus the temperature difference from the uncompressed specimen. At low pressures we clearly see a lowering of the transition temperature, though there are some regions of high T_c. As the pressure is raised, T_c rises; and the transition curves become much broader. Apparently, two effects are responsible for this broadening. On the one hand, inhomogeneities of pressure

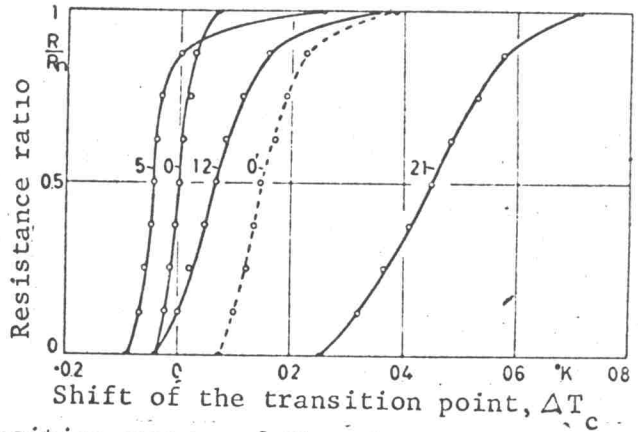

Fig. 1. Transition curves of Nb under pressure. The figures alongside the curves give the pressure applied in 10^3 kg/cm^2. The dashed curve is observed after the maximum pressure of $21 \cdot 10^{-3}$ kg/cm^2 has been removed. The residual resistance ratio of the initial material is $R_n/R_{273} = 0.05$.

in the concentration of the lattice defects produced by the plastic deformation association with pressure may entail a broadening of the transition curve. The irreversible influence of the lattice defects* becomes apparent after relief of the stress (dashed curve). The transition temperature is raised by the lattice disorder produced. This finding agrees with observations of cold-worked Nb specimens /4/.

The perceptible broadening compared to the original transition curve must no doubt be attributed to inhomogeneities of the lattice defects. On the other hand, this transition curve is much steeper after removal of stress than the curve for $21 \cdot 10^3$ kg/cm^2. Consequently, substantial pressure irregularities may also occur at these high pressures. The regions of high T_c observed at moderate pressures ($5 \cdot 10^3$ kg/cm^2) are probably due to local deformation.

The general shape of the transition curves discussed here appeared more or less distinctly in all the specimens. The transition temperature is shown as a function of pressure in Fig. 2. The plotted points always denote the half-value temperature. The breadth of the transition is plotted for the transition

* Of course, elastic strains may also be produced during deformation, which remain frozen after relief of stress.