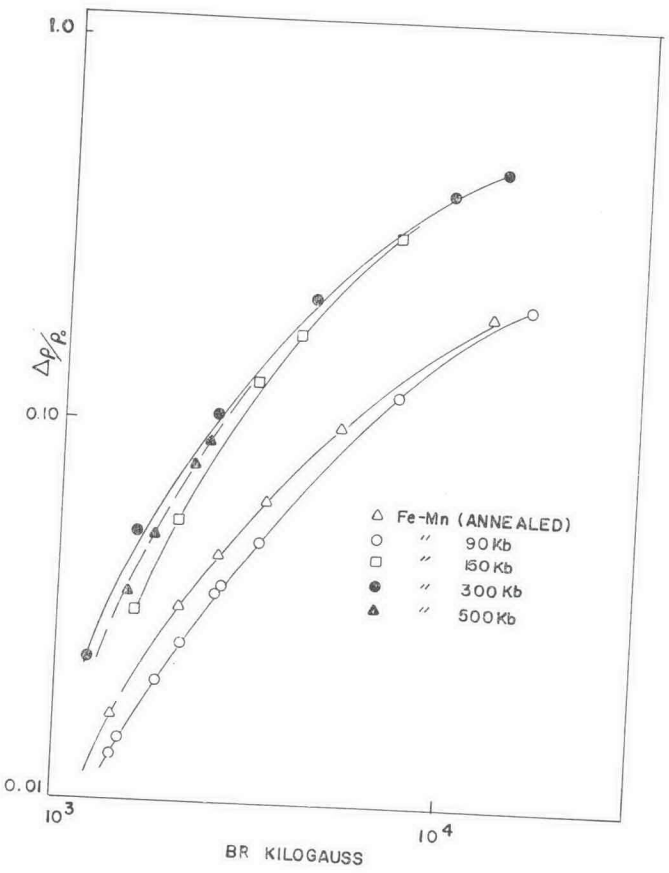
In the series of experiments on iron shown in fig. 2, it was found that at low BR strengths the shock deformation at 150–500 kbars caused an upward shift of the reduced Kohler curve. This shift increased with deformation, but decreased as BR approached 10^4 kilogauss. The negative shift of the 90 kbar specimens is the expected normal behaviour for shock deformation up to the 132 kbar magnetic transition point. The positive shift observed for pressures in the 150–500 kbar range denotes the modified behaviour attributed to the magnetic transformation. The 500 kbar deformation results in a smaller shift than that at 300 kbars. From electron microscopy studies it is evident that at 500 kbars the deformation process is competing with a recovery process induced by heating behind the shock wave. In fig. 2 (B), it is evident that annealing at 400°c produced a large negative shift towards the original position. At 600°c the curve returned

Fig. 3



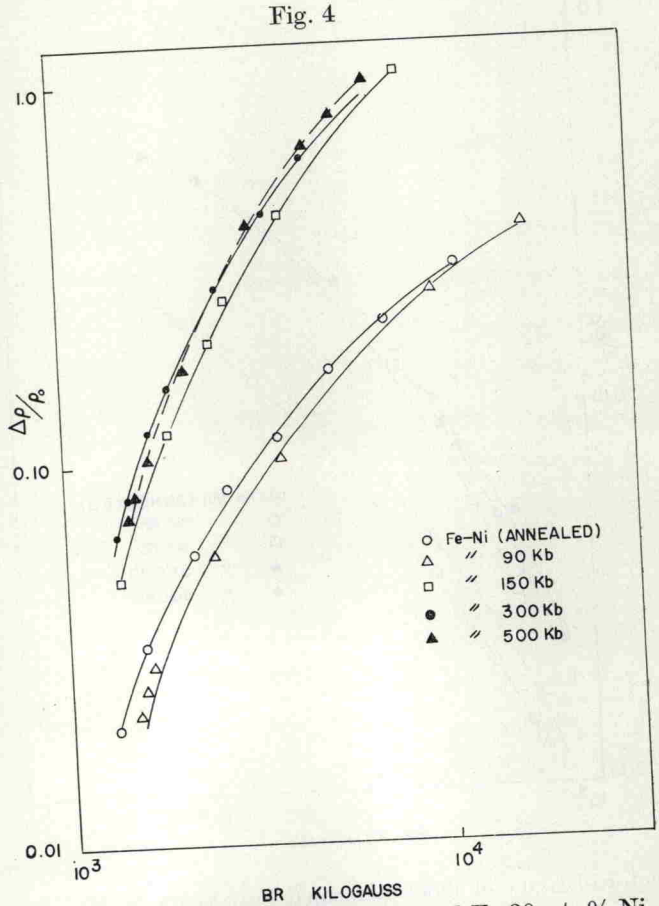
Magnetoresistivity of shock-deformed Fe-7·37 wt. % Mn, showing a shock-induced transformation shift.

to its original position. It is well known that the recovery of electrical resistance after plastic deformation occurs in various stages. The interpretation of these stages still presents difficulties, but investigators agree that stages II, III and IV are due to the migration and disappearance of point defects and stage V to the movement of dislocations. In shock-loaded material Kressel and Brown (1967) have situated stage V at 320–740° c. Consequently we conclude that the shift is totally suppressed only when dislocations are annealed out of the metal.

3.2. *Transverse Magnetoresistivity of Shock-deformed Fe–Mn and Fe–Ni*

The resistance changes in annealed and shock-deformed Fe–Mn and Fe–Ni were studied as a function of external magnetic induction. The results shown in figs. 3 and 4 indicate that in general two different values of magnetoresistivity can be obtained depending on the specimen's previous deformation history. The difference in $\Delta\rho/\rho_0$ due to the retained high

Fig. 4



Magnetoresistivity of shock-deformed Fe-30 wt. % Ni.