pressure of non-magnetic phase appeared evident at 150 kbars. The additional magnetoresistivity changes in the region of 150 to 500 kbars can be explained by the anisotropic scattering of conduction electrons by dislocations. The negative shift of the Kohler curve at 90 kbars is characteristic of ferromagnetic metals. The annealing data up to 750°c showed that the shift in $\Delta\rho/\rho_0$ could be recovered for specimens deformed between 150 and 500 kbars, and between 0 and 90 kbars. The 500 and 300 kbar Kohler curves shifted toward the 150 kbar curve, while the 90 kbar curve recovered toward the annealed material. The recovery effect in Fe–Mn and Fe–Ni, as in Fe, can be explained by the annealing out of dislocations. A second-order magnetic transformation has occurred above 90 kbars ; the residual effects cannot be annealed out since the recovery temperatures were maintained below the Curie temperatures.

In conclusion the transverse magnetoresistivity of annealed and of shock-deformed iron, plotted on a Kohler diagram, shows that the deformed material yields a curve which is in general shifted from that of the annealed metal. This shift can be explaned by considering the anisotropic scattering of conduction electrons by dislocations. The shift in shock-deformed Fe–Ni Fe–Mn alloys can be explained by a shock-induced second-order phase transformation occurring above 90 kbars.

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References

Chambers, R. G., and Jones, B. K., 1962, *Proc. R. Soc.* A, **270,** 417.
Cottrell, A. H., 1953, *Dislocations and Plastic Flow in Crystals* (Oxford).
Duval, G. E., and Fowles, G. R., 1963, *High Pressure Physics and Chemistry*, Vol. 2 (New York : Academic Press).
Kohler, M., 1938, *Phys. Z.*, **39,** 9.
Kressel, H., and Brown, N., 1967, *J. appl. Phys.*, **38,** 1618.
Rose, F., Villere, M., and Berger, T., 1969, *Phil. Mag.*, **18,** 1167.
Taylor, M. T., Merrill, J. R., and Bowers, R., 1963, *Phys. Rev.*, **129,** 2525.
Van Bueren, H. G., 1957, *Philips Res. Rep.*, **12,** 896.