P R E F A C E

The present work was carried out in the department of Physics and Meteorology, Indian Institute of Technology, Kharagpur from December 1964 to December 1968. The thesis reports the result of investigations on the Hall coefficient, electrical resistivity and magnetic susceptibility of nickel and nickel-copper alloys. These investigations were undertaken with a view to explore the nature of interaction causing the spontaneous Hall effect in ferromagnetic metals by extending the measurements to the paramagnetic region. It was also intended to find out the influence of impurities on the spontaneous Hall coefficient.

The material in the thesis is organised as follows :

Chapter 1 presents a general introduction about the various mechanisms proposed in the past for the explanation of the anomalies in the electrical resistivity and Hall coefficient of ferromagnetic metals and alloys. A detailed calculation of the magnetic resistivity and the spontaneous Hall coefficient, on the basis of some interactions considered recently, is also included in the later sections.

Chapter 2 describes the various aspects of the design, construction and working of the different apparatus utilised for the measurement of the desired parameters.

The results of various measurements on nickel and nickel-copper alloys are presented in chapter 3.

In chapter 4, the results are discussed in the light of the models described in chapter 1 and the conclusions arrived at are summarized at the end.

The references to previous work, having a bearing on the present investigations, have been compiled and appended at the end of chapter 4.

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