SCIENCE

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MAGNETIC SUSCEPTIBILITIES[1]

A. Classification of Bodies, Magnetically.—1. Let us assume that we have at our disposal a *uniform* magnetic field whose intensity, H, and direction we can vary at will. H will be expressed in Gauss and may be graphically represented by drawing through a unit area a number of parallel lines numerically equal to H. Into such a field of force we may introduce any substance we wish and study the effects which that substance may produce on the number of lines of force which thread through the space we call the magnetic field. Experimentally we find that any substance when brought into a uniform magnetic field causes a perturbation of the lines of force, the character of which separates all substances into two classes, viz., dia- and paramagnetic bodies. The lines of induction are a continuation of those of the field, but in the case of a paramagnetic substance are more closely packed together, while in a diamagnetic body they are further apart. Ferromagnetic substances are special cases of paramagnetism of which the lines of induction are, relatively, very closely packed together. A comparison with the electric currents would make this idea more precise.

Suppose a sphere of metal introduced into a mass of mercury traversed by a uniform current: the lines of flow which were originally parallel would tend to pass in greater number through the sphere if it were a better conductor than the mercury, and, on the contrary, in smaller number if it were a worse conductor. The words conductivity for lines of flow and permeability for lines of magnetic induction thus correspond to analogous ideas.

If we let B represent the number of lines of induction threading through unit area in

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