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THE ATOMIC THEORY FROM THE STANDPOINT OF MAGNETISM[1]

WHEN any substance is exposed to the influence of a magnetic field it behaves in various ways, depending upon the physical and chemical properties of the material examined. Oxygen is attracted to the poles of a magnet, while carbon dioxide is repelled. Bismuth shows a marked change in resistance when magnetized and copper only slightly. Varying degrees of hardness in steel are accompanied by corresponding changes in length due to a magnetic field. Each substance discloses its own peculiar temperament in a magnetic field, whether it be a gas, a liquid or a solid.

Magnetic phenomena are classified as effects according to the form of behavior which matter is observed to undergo when magnetized. If a magnetic field changes the optical properties of a substance it is called a magneto-optical effect, which is a very suggestive term. Unfortunately, corresponding terms to designate those effects which are produced when a magnetic field changes the mechanical, acoustical, electrical, magnetical and thermal properties of matter have not been adopted to any great extent, and while it may be unorthodox, nevertheless, such a division gives an excellent bird's-eye view of magnetic phenomena. Introducing these terms which would correspond to the term magneto-optical, the following outline of magnetic phenomena is herewith given.

OUTLINE OF MAGNETIC PHENOMENA

(1) Magneto-Magnetics	The magnetic field, forces in dia, para and ferromagnetism. Magnetic induction, intensity, hysteresis, permeability, susceptibility, coercive force, retentivity, reluctance and leakage.
(2) Magneto-Mechanics	Joule effect—Villari effect—Wiedemann effect—2nd. and 3d. Wiedemann effect—Barrett effect—converse effect—Wertheim effect—Piezo effect. Change in moduli. Volume change on solidification.
(3) Magneto-Acoustics	Production of sound by magnetization "magnetic tick."

[1] Read before the chemistry and physics section of the Mid-year Educational Conference held at the Michigan State Normal College, Ypsilanti, January 18 and 19, 1924.