

though in a weaker degree than the magnet itself,⁸ and he asserted distinctly that the magnet is merely an ore of iron, (lib. i. c. 16, Quod magnes et vena ferri idem sunt.) He also noted the increased energy which magnets acquire by being *armed*; that is, fitted with a cap of polished iron at each pole.⁹ But we do not find till a later period any notice of the distinction which exists between the magnetical properties of soft iron and of hard steel;—the latter being susceptible of being formed into *artificial magnets*, with permanent poles; while soft iron is only *passively magnetic*, receiving a temporary polarity from the action of a magnet near it, but losing this property when the magnet is removed. About the middle of the last century, various methods were devised of making artificial magnets, which exceeded in power all magnetic bodies previously known.

The remaining experimental researches had so close an historical connexion with the theory, that they will be best considered along with it, and to that, therefore, we now proceed.

CHAPTER II.

PROGRESS OF MAGNETIC THEORY.

THEORY OF MAGNETIC ACTION.—The assumption of a fluid, as a mode of explaining the phenomena, was far less obvious in magnetic than in electric cases, yet it was soon arrived at. After the usual philosophy of the middle ages, the “forms” of Aquinas, the “efflux” of Cusanus, the “vapors” of Costæus, and the like, which are recorded by Gilbert,¹ we have his own theory, which he also expresses by ascribing the effects to a “formal efficiency;”—a “*form* of primary globes; the proper entity and existence of their homogeneous parts, which we may call a primary and radical and astral *form* :”—of which forms there is one in the sun, one in the moon, one in the earth, the latter being the magnetic virtue.

Without attempting to analyse the precise import of these expressions, we may proceed to Descartes’s explanation of magnetic phenomena. The mode in which he presents this subject² is, perhaps, the

⁸ Lib. i. c. 9—13.

¹ Gilb. lib. ii. c. 3, 4.

⁹ Lib. ii. c. 17.

² *Prin. Phil.* pars c. iv. 146.