

be expressed by 2.052 (the unit still employed being the intensity which I discovered on the magnetic equator in Northern Peru), Sabine found it was only 1.624 at the magnetic north pole near Melville Island ($74^{\circ} 27'$ north lat.), while it is 1.803 at New York, in the United States, which has almost the same latitude as Naples.

The brilliant discoveries of C̄rsted, Arago, and Faraday have established a more intimate connection between the electric tension of the atmosphere and the magnetic tension of our terrestrial globe. While C̄rsted has discovered that electricity excites magnetism in the neighborhood of the conducting body, Faraday's experiments have elicited electric currents from the liberated magnetism. Magnetism is one of the manifold forms under which electricity reveals itself. The ancient vague presentiment of the identity of electric and magnetic attraction has been verified in our own times. "When electrum (amber)," says Pliny, in the spirit of the Ionic natural philosophy of Thales,* "is *animated* by friction and heat, it will attract bark and dry leaves precisely as the loadstone attracts iron." The same words may be found in the literature of an Asiatic nation, and occur in a eulogium on the loadstone by the Chinese physicist Kuopho.† I observed with as-

Mount Crozier, west-northwest of the south magnetic pole, at a place where Captain James Ross found the inclination of the needle to be $87^{\circ} 11'$ (Sabine, *Contributions to Terrestrial Magnetism*, 1843, No. 5, p. 231); the latter, observed by Erman, at $19^{\circ} 59'$ S. lat., and $37^{\circ} 24'$ W. long. from Paris, 320 miles eastward from the Brazilian coast of Espiritu Santo (Erman, *Phys. Beob.*, 1841, s. 570), at a point where the inclination is only $7^{\circ} 55'$. The actual ratio of the two intensities is therefore as 1 to 2.906. It was long believed that the greatest intensity of the magnetic force was only two and a half times as great as the weakest exhibited on the Earth's surface. (Sabine, *Report on Magnetic Intensity*, p. 82.)

* Of amber (succinum, glessum) Pliny observes (xxxvii., 3), "Genera ejus plura. Attritu digitorum accepta caloris anima trahunt in se paleas ac folia arida quæ levia sunt, ac ut magnes lapis ferri ramenta quoque." (Plato, in *Timæo*, p. 80. Martin, *Etude sur le Timée*, t. ii., p. 343-346. Strabo, xv., p. 703, Casaub.; Clemens Alex., *Strom.*, ii., p. 370, where, singularly enough, a difference is made between τὸ σοῦχλιον and τὸ ἤλεκτρον.) When Thales, in Aristot., *de Anima*, 1, 2, and Hippias, in Diog. Laert., i., 24, describe the magnet and amber as possessing a soul, they refer only to a moving principle.

† "The magnet attracts iron as amber does the smallest grain of mustard seed. It is like a breath of wind which mysteriously penetrates through both, and communicates itself with the rapidity of an arrow." These are the words of Kuopho, a Chinese panegyrist on the magnet, who wrote in the beginning of the fourth century. (Klaproth, *Lettre à M. A. de Humboldt, sur l'Invention de la Boussole*, 1834, p. 125.)