

instead to a theory which pacified them, if it did not satisfy himself, "That it was the star, not the compass, that had changed its position!" Here then, we have reached a starting point for terrestrial Magnetism as a science of observation, namely, at that period of history when it first became a familiar fact in men's knowledge of the globe they inhabit, that the compass does not point, in most places, truly to the North, but deviates to the East or West of the true meridian, according to certain symmetrical, but complicated laws. I am unable to state at what date the first authentic observation of the amount of the variation was made. Probably, however, the observation made at Paris in 1541, was one of the very earliest. The compass then pointed 7° East of North, in the neighborhood of that city. The earliest observation in London, was in 1580, when the variation was found to be 11° East. From that period, observations of tolerable accuracy became sufficiently numerous to have enabled the celebrated Swedish philosopher Hanstein, several years ago, to construct charts, shewing the variation over a large part of the globe, at a number of epochs, beginning as early as the year 1600.

(Some diagrams copied from Hanstein's Variation Charts, were here exhibited, for the purpose of shewing, thus early in the subject, one of its most remarkable, and at present most inexplicable features, namely the alteration which the magnetic condition of every point on the earth's surface undergoes, in the course of no very long periods of time. This alteration, or secular change, as it is called, takes place equally in the force of magnetism, and in the angle in which that force acts, (called the dip, or inclination;) but the variation having been the longest observed, its changes are best known.)

In the year 1600, the needle pointed to the true north at every point situated along a curve which would be found pretty nearly, by holding one end of a thread on a map, at the island of Trinidad, the other end about the middle of the

Gulf of Guinea, and drawing out the centre, in a long loop or oval, as far as the parallel of 70° on the coast of Norway; This was the line of *no variation*, or the line which separates on the surface of the sphere in this Hemisphere, those regions in which the needle points *East of North* from those in which it points *West*. In the year 1700, by what Sir John Herschell has termed the *absorption* of this oval into another system, the line possessing this remarkable property was found, forming a simple curve, sweeping from the coast of South Carolina across the Atlantic, to a point a little westward of St. Helena, and then proceeding in a direction nearly south. In 1787 the centre almost touched Cape St. Roque, and at the present time its situation is far within the continent of South America, while its northern branch passed over Toronto about twenty years ago. But this is not the only line on the globe along which the needle has no variation. There is another of a much more intricate character in the Eastern Hemisphere. Commencing near the North Cape, it descends through Russia, Persia, Tartary, Bokhara, encircles our Indian possessions, thence sweeps back to the heart of Siberia, with a second curve descends through the China seas, and with a final inflexion in the Eastern Archipelago departs without further eccentricity to the Southern pole. It would complicate the map too much, were I to draw on it the lines at which the variation is 1° , 2° , and so on; but, while we are on this subject, there are two other peculiarities of the variation lines, so remarkable that I must briefly advert to them. I mean the system of closed circles, or ovals, represented by these two rings, one in the Eastern part of Siberia, and one in the Pacific. At every point in the Siberian circle, the needle has 6° of west variation, at every point in the other, (which encircles the Marquesa group,) it has 5° of east variation. In the former,