

INTRODUCTION.

THE importance of obtaining a correct knowledge of the elementary facts of terrestrial magnetism, for the purpose of supplying a foundation whereon the advancement of that science on inductive principles may be based, has of late years been strongly and extensively felt.

The geographical determination of the direction and intensity of the magnetic forces at different points of the earth's surface has been regarded as a worthy object of especial research, in journeys and voyages undertaken to remote parts of the globe, by continental philosophers of great eminence—by men, as Humboldt, Hansteen, and Erman, whose names are among the most distinguished in the age in which we live, for devoted and successful cultivation of the sciences most intimately connected with the physical history of our planet. In our own country the example thus set has been, at least zealously, followed by officers of Her Majesty's naval and military services, who, in the interval of a long peace, have given a portion of their time to such pursuits; and recently the large and liberal aid which the British Government has extended in the equipment of maritime expeditions, and in the promotion of magnetic surveys in parts of the earth which are beyond the reach of individual enterprise, gives a reasonable prospect that, with such assistance and such encouragement, maps of the magnetic elements, corresponding to the present epoch, and based on observations extended to almost every accessible portion of the globe, will shortly be completed.

But valuable as are the researches which lead to such a result, they accomplish but one part of the determinations required for magnetic theory. The *periodical variations* of the magnetic direction and force, and their comparison with meteorological variations also of a periodical character,—and those *secular changes* which, with slow but systematic progression, alter the whole aspect of the magnetic phenomena on the surface of the globe from one century to the next, and which, in their nature, are not improbably intimately connected with the causes of the magnetism of the globe itself,—present subjects of scientific inquiry not less important in the view of those who, by the inductive process, would seek to ascend to general laws and to the discovery of physical causes.

But for investigations of this class a laborious and sustained system of observation is indispensable; and establishments are required possessing an observing staff whose attention