Magnetism and Physics.—The extension of research into the phenomena of magnetism and atmospheric electricity, in the vicinity of the Poles, will necessarily be of much scientific importance; and generally, so far as the conditions of the climate and the means of an exploring expedition will permit, investigations in all branches of physics in the proximity of the Pole, where so many of the forces of nature operate in an extreme degree, either of excess or defect—will surely be followed by the acquisition of knowledge which can only be obtained in those exceptional localities.

The study of the Aurora, which is among the most striking phenomena visible on our planet, is almost impossible in low latitudes; while the advance of spectrum analysis has given the means of determining the chemical elements involved, so that all that seems required here is the means of applying this description of observation; and this can only be got near the Pole.

The separation of the terrestrial lines from the truly solar ones, in the solar spectrum, as seen from the earth's surface, is another important desideratum, inquiry into which can only be well pursued in high latitudes, where the path of the sun at low altitudes above the horizon gives opportunities for the necessary observations not to be secured elsewhere.

Geology.—A more complete investigation of the geology of the Arctic Regions is extremely desirable, both for its scientific importance and the value of its practical results. The existence of Carboniferous, Jurassic, and Miocene rocks is known, but much is needed to be done to obtain complete collections of their organic remains. The existence of a true palæozoic coal formation has been determined, but we require to know its extent and composition.

One of the most interesting facts of late years acquired to geological science has been that of a luxuriant and highly organised vegetation, of Miocene age, on the east coast of Greenland; a fact alluded to further on under the head of *Botany*. It is of great importance that some determinations based on fragments of leaves should be confirmed by the acquisition of more perfect foliage, as well as of seeds and fruits; such materials would be of great value in illustrating a flora which is in itself of much interest, but this interest is vastly increased when one realises the important inquiries on which such knowledge would throw light. These inquiries are:—

1. The geographical distribution of the Miocene flora, as indicated by the agreements and differences between the Miocene plants of Arctic Regions and of Central and Southern Europe.
2. The relation of the Miocene flora to previous and subsequent vegetations, and its bearings on the present geographical distribution of plants on the globe.
3. The evidence derived from these plants as to the physical conditions of the globe in past geological epochs.

It is certain that additional localities for fossil plants will be discovered, and of necessity additional species be brought to light, for, in the past, such remains have been found as far as explorers have penetrated.

From the important part extreme cold has of late years been found to have played in the last geological, or glacial period, it would be of much value to have exact observations of the effects produced on the rocks by the intense cold of the northern regions; to ascertain the extent, height, and range of the glaciers; and to note their effects on the surface of the country, and on the different classes of rocks. Again, it would be interesting to determine the extent of the river floods, and the depth of the channels they have excavated in the Arctic Regions.

Another desirable object of the proposed Arctic expedition would be the investigation of the Mollusca, not only of marine, but also of land and fresh-water kinds. In a geological as well as a zoological point of view, such an investigation would be especially valuable. The palæontological basis of the glacial epoch consists mainly in the identity of certain species which inhabit the Polar Seas, and are fossil in Great Britain and elsewhere. But such species may owe their present habitat and position to other than climatal causes, viz. to the action of marine currents. It is quite a mistake to assume that Arctic species are few in number; we know very little about them, because the exploration of the circumpolar seas by means of the dredge is so difficult. But the researches of the Scandinavian zoologists show that the Arctic marine invertebrate fauna is extremely varied and numerous. All fossils should be diligently collected and their positions accurately noted. The condition and climate of the Arctic Regions at the later geological periods may be thus ascertained, and a new chapter opened in the history of our globe.