attractive force of the earth's magnetism is the greatest. There are *four* foci of maximum intensity, two in the northern hemisphere and two in the southern, none of which, as stated, fall together with the foci of vertical dip. The stronger of the two intensity foci in the northern hemisphere, according to Lefroy's observations in 1843–44, lies somewhat south of Hudson's Bay, in latitude 52° 10′ N. and in longitude 99° 59′ W. of Greenwich, whereas the point where the direction assumed by the dipping needle coincides with that of gravity is, according to Sir James Ross's observations of 1831, in Boothia Felix, in latitude 70° 05′ and longitude 90° 46′ west of Greenwich.

The "magnetic poles" of the earth are not to be compared with those of a bar magnet. *There are no points on the earth's surface which possess the same properties as the poles of a bar magnet.* Some time ago the writer received a letter in which a seemingly plausible argument was advanced to overthrow Gilbert's theory that the earth is a great magnet, the fallacy in the line of reasoning being due to the overlooking of the very fact just pointed out. The earth is a great *spherical* magnet and, as well known, the external action of such a magnet is analogous to that of a bar magnet at the centre of the sphere—a bar magnet whose magnetic moment is equal to that of the magnetized sphere, whose poles are infinitesimally close to each other and whose axis coincides with the axis of magnetization of the sphere.[1] The equivalent magnetic poles of the earth would therefore both lie near the centre of the earth.

[1] To obtain some slight conception of the magnetic moment of the earth, the figures below are given. Suppose we take as our unit, a bar magnet of the hardest steel, magnetized as strongly as possible, which shall be 14 inches long, one and a quarter inch wide—such a bar magnet would weigh one pound. According to Gauss, it would take the following number of such bar magnets placed at the earth's centre in order to produce the same external effect as the earth:

8,464,000,000,000,000,000,000.

Or if we assume that the earth's magnetism is uniformly distributed throughout the earth, then will the magnetic intensity of each cubic yard be equal to six of the one-pound steel magnets.

To put the same fact in still another form. The radius of a soft iron sphere magnetized to saturation, and concentric with the earth, which shall have the same magnetic effect as that of the earth, is, according to Overbeck, 243.2 kilometers, or 132.4 geographical miles, or 151 statute miles, or $\frac{1}{26}$ of the earth's radius.