tive amount of magnetism at several points of a needle,[9] and the proposition that the directive force of the earth on similar needles saturated with magnetism, was as the cube of their dimensions; conclusions which agreed with experiment.

The agreement thus obtained was sufficient to give a great probability to the theory; but an improvement of the methods of calculation and a repetition of experiments, was, in this as in other cases, desirable, as a confirmation of the labors of the original theorist. These requisites, in the course of time, were supplied. The researches of Laplace and Legendre on the figure of the earth had (as we have already stated,) introduced some very peculiar analytical artifices, applicable to the attractions of spheroids; and these methods were employed by M. Biot in 1811, to show that on an elliptical spheroid, the thickness of the fluid in the direction of the radius would be as the distance from the centre.[10] But the subject was taken up in a more complete manner in 1824 by M. Poisson, who obtained general expressions for the attractions or repulsions of a body of any form whatever, magnetized by influence, upon a given point; and in the case of spherical bodies was able completely to solve the equations which determine these forces.[11]

Previously to these theoretical investigations, Mr. Barlow had made a series of experiments on the effect of an iron sphere upon a compass needle; and had obtained empirical formulæ for the amount of the deviation of the needle, according to its dependence upon the position and magnitude of the sphere. He afterwards deduced the same formulæ from a theory which was, in fact, identical with that of Coulomb, but which he considered as different, in that it supposed the magnetic fluids to be entirely collected at the surface of the sphere. He had indeed found, by experiment, that the surface was the only part in which there was any sensible magnetism; and that a thin shell of iron would produce the same effect as a solid ball of the same diameter.

But this was, in fact, a most complete verification of Coulomb's theory. For though that theory did not suppose the magnetism to be collected solely at the surface, as Mr. Barlow found it, it followed from the theory, that the *sensible* magnetic intensity assumed the same distribution (namely, a surface distribution,) as if the fluids could permeate the whole body, instead of the "magnetic elements" only. Coulomb, indeed, had not expressly noticed the result, that the sensible

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[9] p. 485. [10] *Bull. des Sc.* No. li. [11] *A. P.* for 1821 and 2, published 1826.