



XXXVI. on the causes of the variation of the magnetic pole

Mr. Richard Webster

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Further, as any other point G may be assumed, corresponding points R, I and H will be obtained: hence it follows that a polygon of m sides may be inscribed in a circle so as to have $m-3$ or $m-4$ points of intersection in the same straight line, according as m is an even or odd number.

When any two points E, G coalesce and the line drawn through them passes into a tangent, corresponding points will be found in the pentagon: and when any other line AB also becomes tangential, similar properties will occur in the quadrilateral.

XXXVI. *On the Causes of the Variation of the Magnetic Pole.* By Mr. RICHARD WEBSTER.

To the Editors of the Philosophical Magazine and Journal.

ON the return of Captain Parry from exploring the Northwest passage, in which he succeeded as far as 115 degrees of west longitude, I hastily wrote the following hypothesis upon the causes of the variation of the magnetic pole: if you deem the paper worthy insertion in your Magazine, it may cause some of your scientific friends to devote a portion of their attention to the theory of that desideratum in science.

Cornhill.

I am yours, &c. RD. WEBSTER.

In commencing an hypothesis upon the magnetic pole, and the causes of the variation of the needle, it may be legitimately a portion of such a paper to venture an opinion upon the first formation of the earth; that it then was in a vitrified liquid state is conclusive in my mind, from many circumstances; but I will only give two illustrations, as necessary to this position, namely, the increased bulk at the equator, being an oblate spheroid, a form the earth must take in its revolution on its axis (when liquid), as far as it could overcome the power of gravity; but had it been a solid body, its component parts would not disunite, and could not tend towards the centre. Again, though I must avoid, as much as possible, any geological observations, as it will lengthen this paper much beyond your limits; yet I must observe, the earth is in every particular formed in regular strata, the denser deposits being always the lowest; deposits can only take place in uniform succession where there is fluid to admit the denser to sink: as we dig into the earth, we find gneiss and granite, the primary rocks having no organic remains beneath them in any single instance on record, which proves they must have there sunk of their
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own specific gravity, before any organic matter had existence; and if a fluid, from any cause but fire, organic matter may have had existence, in the latter it is impossible. Assuming as a fact the earth was in its first formation a fluid, by excess of heat, the denser bodies, as the metals, iron, &c. would, by the power of gravity, compose the centre of the earth, and gradual and partial coolings taking place, on the exterior surface, before the interior, would of necessity cause violent explosions and convulsions, throwing the earth into variety of mountains and valleys; metallic matter would retain its liquid state long after what I assume as the substance composing the outer crust of the earth, namely, what the geologist calls primary rocks, had formed itself; and as it dried it would contract, and cause large fissures, in which the metallic fluid may have been driven in the diurnal revolution of the whole on its axis, making the veins of metals which intersperse the surface of the globe. Admitting the outer crust would be complete long before the interior was cool, a position self-evident, metallic fluid would occupy a much larger space than when concentrated into a solid mass, and between this solid and the outer crust is an immense body of water, having sunk from the earth's surface as the space between the centre sphere and it became unoccupied by the concentration of fluid into substance which had for ages during the period of cooling, as the lighter body, surrounded the whole. I need not say much upon the probability of water for a very long period covering the earth, it being evident from the immense deposit of shells in every part of it. I shall assert iron to be a very large component part of this inner sphere, as it is admitted to be the most universally diffused substance in nature; it must also form a component part of some other planet or portion of the system of which this earth is but a trifle, as it is known that all the meteoric substances that have fallen on the earth bear the proportion of nearly nine-tenths of iron to one-tenth of the scarce metal called nickel.

Having said thus much as a prelude to my hypothesis on the causes of the variation of the needle, and assuming still, this inner sphere to be suspended or rather inclosed in fluid, it would revolve on its axis with the earth; yet with a progressively less motion, falling backwards in its course each successive day, that would amount to one entire retrograde revolution in 584 years; and this may be readily conceived, that an interior ball suspended in fluid may not equal the outer in a rotary motion. I would now fix the north magnetic pole about $72^{\circ} 40'$ north latitude, and $100^{\circ} 30'$ west longitude,

longitude, five of the variations in Captain Parry's chart * making that longitude, and three the latitude. I conceive the true poles and the magnetic poles to have been at one period at the same point, and that some violent convulsion of nature, say at the period of the Deluge, the magnetic pole was thrown out of its natural position about 17 degrees (and what but some inconceivable force could drive out the waters from the earth's centre to the overwhelming the whole surface?) We see in all matters that concern us, the Omnipotent works by means, and there is no effect without a cause, and no attraction could draw the waters from the interior that would not remove them from the surface; whereas an impetus from the centre must drive them out. The interior sphere being driven from its position relatively, would assume a different axis, leaving the influence and form of its poles the same; thus irregularly revolving upon its new-formed axis, it makes the considerable variation which is known to take place during different periods of the day, making, when each revolution is complete, but a very trifling diminution in its progress with the earth, which travelling from west to east causes the magnetic pole to recede from east to west. I would add, as an illustration of this hypothesis, that its considerable increase westward, and rapidly till it come to near its greatest elongation from England, when its appearing stationary in its progressive motion from 80° to 100° , an appearance that must follow in the extreme of the circle, while revolving under the true pole of the earth at and near 90° on either side of any given point; the return of the magnetic pole towards the east, or rather the diminished west variation, which will be more rapid as it approaches our meridian, not between us and the pole, but on the opposite side of the earth, approaching longitude 180° , at which point it will arrive about 1950, when the true and the magnetic pole will be the same in the meridian of London, after which it will progressively increase in eastern variation; and when near 80 to 100, its greatest elongation eastward, it will again for years appear stationary, will then diminish its easterly variation, and when the half revolution is again complete, will pass between us and the pole under our meridian.

At a future day I may trouble you with an opinion, why the concentration of the magnetic fluid should direct the needle to that point.

RICHARD WEBSTER.

* This was written after Captain Parry's chart was out, and previous to the publication of his book; therefore 584 years was calculated upon the assumed data of $100^{\circ} 30'$ west longitude and $72^{\circ} 40'$ north latitude being correct.