

tween 1600 and present date, while the full curve has been drawn to harmonize with the observations back to the time of Columbus. It will be seen that there is a marked difference between the two curves for the date 1500. A similar state of things is revealed at Rome, the broken curve again representing the law from 1510 to present date, while the full curve represents the observations which can be obtained with the aid of the early "compass charts" of the fourteenth and fifteenth centuries. The departure between the broken curve and the full one amounts to about 17° for the year 1400! We have similar indications at other stations of a change in the law of the secular variation prior to 1600.

The special purpose of the diagram has been to show what relation the secular variation as obtained at Baltimore bears to the general phenomenon. Each station bears a somewhat different testimony of the phenomenon we are studying, and it is only by considering the collective evidence that we can hope to make headway and be enabled to say what likely transpired at any one station prior to the records, or what is likely to occur at this station in the future. By following the curves systematically around the globe it is quite possible to construct a composite curve, with the aid of which we can obtain a clearer conception of this most perplexing phenomenon.

The laws actually governing the secular variation cannot be discovered by simply considering the changes in the magnetic declination alone, as already explained in another place. We can only hope to make progress by studying the phenomenon in its entirety, namely, if we take a magnetized needle and suspend it at its centre of gravity in such a way that it is free to move in any direction whatsoever, to the left or to the right, up or down, then we shall find that, under the influence of the earth's magnetism, the north end of the needle while still pointing approximately towards the north also points downward and the south end upward. The actual direction assumed by the needle lies somewhere between a true vertical line and a true horizontal line, nearer to the former than to the latter in these latitudes. This is the true direction in which the earth's magnetic force acts. On the compass needle we only have the horizontal component