

right to left and back again from left to right, been observed. At some stations, however, a little over half a swing has been obtained. Comparing the time interval between the two extreme positions, *i. e.*, half a swing, at various stations we are brought face to face with another remarkable fact, *that the time intervals between the extreme positions of the needle are of different lengths in different parts of the earth.* To illustrate: At London, Paris and Rome the time interval between dates of extreme positions of the needle is about 230-240 years, while for stations in the Eastern states of this country it is on the average about 150 years. If we take into consideration all the facts at present known to us with regard to the secular variation, we find that it is not possible to explain all those facts on the assumption that there is a secular variation period common to all parts of the earth of about 300-500 years in length. The indications are that for a common secular variation period we must have a much longer one than 300-500 years. But if this is so, it means that the secular variation is a far more complicated matter than generally supposed. Besides the main swing as described above, there are a number of minor swings whose periods are not as yet definitely known. These minor swings have the effect of slightly altering the annual change due to the main secular variation.

Fig. No. 4 illustrates graphically the change in the magnetic declination for various points in the northern hemisphere. I have selected such stations as would be typical of the regions represented by them. It will be seen that the stations encircle the globe. This one diagram exhibits at a glance all the characteristic features of the secular variation of the magnetic declination in the northern hemisphere as at present known. It is presented here for the first time, the data having been collected from various sources. With the aid of the table (No. VI) the meaning of the curves will be readily understood. Thus, for example, selecting the date 1800 and running the eye along the horizontal line marked 1800 until it intersects the London curve, let us say, casting the eye now upward from this point of intersection along the vertical line, we find that the declination of the needle was a trifle over 24° west. For Paris, the observations