and plotting these, we arrive at a curve the symmetry of which over ten months of the year is within the limits of observational error. This curve is shown at A in the diagram given, with its apparent constituent curves—B, a variation of half-yearly period with a complete amplitude of about 12 γ, and C, a variation in about a two-months period with a complete amplitude of about 3·6 γ, the latter curve undergoing a complete reversal, or a hesitation followed by complete reversal, at the time of solstices. Curve B has maxima at the solstices, minima at the equinoxes; and curve C has maxima in February, April, June and July, September, November; minima in January, March, May, August, October, December. A reversal at the time of solstice would be expected, as the direction of the sun's change of declination is then reversed.

It is hardly necessary to remark that such a degree of symmetry has not hitherto been noted here for any individual year. Indeed, it was the evident individual irregularity that led to the idea of combination in pairs at about half a sun-spot-period distance.

H.F. curves for the years 1905 and 1910 were first combined, and then those for the years 1914 and 1919 were combined with them also. It was then found that the curve 1905–10 differed very little, and systematically, from the curve 1905–10–14–19. On plotting 1914–19 the symmetry of the curve about the midwinter point was very noticeable.

The degree of seemingly accidental irregularity during the years taken singly is shown by the plotted diagram attached to this report. The average rate of secular change from 1913 to 1915 was about −30 γ, and from 1918 to 1919 it has been −24 γ, both considerably larger rates than that used in forming the diagram.

In comparing these H annual variations with E_m daily variations it must be remembered that the long-period H annual variation is presumably not affected by a time-lag behind the assumed producing cause, the sun; whereas in the short-period daily change of E_m some amount of lag probably exists. (E_m = the component at right angles to mean magnetic north.)

It is not until about 2.30 p.m. local time that the E_m curve becomes symmetrical at all in the local equinoctial vector diagram, and this amount of lag is rather unthinkable; but, anyway, the exact shape of the vector diagram is not well determined about that time. A half-hourly measurement of the daily curves about that part of the curve might reveal a sinuosity there corresponding to the annual H curve, but the sinuosity must be very small to be not immediately apparent in the quiet-day curves.

It has been noticed that the variations in mean monthly values of H.F. occurring at Christchurch agree over some months with those at Mauritius; and, as a possible peg to hang future investigation on, it is worth while calling attention to the great similarity existing between the variations in H.F. at Christchurch over the mean years 1905–10 and 1914–19. This, at any rate, proves that a mathematical analysis of the annual variation over a period of eleven years may yield valuable results. It would be rather surprising if it did not reveal solar changes of shorter period than the well-recognized 11·1 year average sun-spot period. A period of about twenty-seven days is already more than suspected, the exact length of which may prove to change with the varying presentment of solar latitudes to our earth. The time of rotation of the solar surface varies with the distance, from the sun's equator to the sun's pole, and the earth's orbit is inclined to the plane of the sun's equator, so that if the effect is due to radial projection of very minute electrified corpuscles impinging upon the atmosphere of the earth, the energy of projection varying with longitude on the sun's surface, such a variable period must be exhibited by the terrestrial magnetic field, and the variation of the period will be seasonal.

In order to rapidly complete the measurement of hourly values from curves it is intended to have constructed special scales of celluloid giving direct readings to 10 γ, and by estimation to 1 γ. This is rendered possible only when the scale values of ordinates are constant over a long interval, as has lately been the case.

Seismological Observations.

Milne Seismograph No. 16 has been kept in continuous operation. Details of the earthquakes recorded are now published in the *New Zealand Journal of Science*.

The recent advances in seismological science really necessitate more up-to-date seismographs in this country, and it is desirable that a Milne-Shaw boom should be supplied for our seismograph. Local microseisms continue on most nights to keep the boom of our seismograph in motion. These are evidently a feature of our locality. Their existence tends sometimes to prevent a reading of the time of arrival of preliminary tremors from the seismogram of distant earthquakes.

It is intended to publish New Zealand records every three months, but it is hardly possible to commence this for Christchurch records until the arrival of the new assistant.

Meteorological Observations.

As in previous years, these have been made at 9.30 a.m., noon, and 5 p.m. daily, with the omission of noon readings on Sundays. Monthly tables of results have been forwarded for the information of the Dominion Meteorological Office.

An increasing number of inquiries are made yearly for meteorological information for evidence in the Courts of law, and for use by other Government Departments.

Daily results have been published in the local newspapers for the information of the general public.

Amberley Substation.

During the year valuable records have been obtained at this station, which have enabled the tables of D and H to be published without any loss of hourly record.