consequence, however, of the annual cycle of temperature not having been completed, it is impossible to begin a discussion of the results; indeed, the longer the period of observation is from which these two correcting quantities are derived the more accurate will the result be. The discussion, when it is commenced, will involve an immense amount of work, and the results will be such that the magnetic quantities over the period of observation can, if necessary, be given every five minutes of the day. It is usual to publish hourly values. The photographic method by which the results are recorded is that of reflection of a spot of light from two mirrors, one of which is fixed and the other attached rigidly to the magnet. The spots from these two mirrors fall on a drum, on which is clamped a sheet of sensitive photographic paper (bromide). This drum—or, rather, the three drums, for there is one for each of the instruments—is caused to revolve by a driving-clock. The spot of light from the fixed mirror makes, of course, a straight line on the paper, whilst that from the mirror attached to the magnet follows any motion the magnet may make, and its trace is left on the sensitive paper. From a knowledge (derived otherwise) of what alteration in magnetic force is represented by a movement of the movable spot of one centimeter, the alterations of magnetic strength from hour to hour are determined. The straight line drawn on the paper is generally known as the base line, and its value is determined by the absolute observations taken from time to time. The value of the base line with quite uniform temperature and old magnets would not alter. In our instruments the value is not the same from observation to observation, and from its variations we shall, as indicated above, determine the rate of "aging" of the magnets and the temperature coefficient.

In order to fall in with the wishes of the International Magnetic Co-operation I have had the driving-clock altered, so that now we can cause the drums either to rotate once in twenty-four hours or once in one hour and a half. In view of the departure of the various antarctic expeditions, a programme has been drawn up by which all the observatories in the world are adopting on certain days precisely the same course of procedure, and the same is being done by the British and German expeditions in the south. On these days—known as "term days"—viz., the 1st and 15th of the month—the drums of the magnetographs are caused to rotate at the quicker speed for certain specified times. The result of this quick-speed driving is that it enables the exact time of any magnetic event to be picked out with great accuracy, and it will be possible to say, for instance, that such-and-such a change of magnetic conditions took place at any observatory at a certain time, and which time it will be possible to give to an accuracy of less than five seconds. We shall thus be able to trace a disturbance from one observatory to another and determine its velocity of travel with much greater accuracy than has been done hitherto. The desire of the International Magnetic Co-operation is to have information over the whole world of the three magnetic elements for every twenty seconds of time. This involves 543 measurements for every hour of quick-speed driving.

Owing to the improbability of the British expedition being able to keep all the term days, I have agreed with Captain Scott to drive the magnetograph drums at the quick speed for the whole of every term day from the 1st March until the expedition returns, and the drums of the expedition magnetographs will similarly be driven at the higher rate of speed for as many of the term days as possible. A circular announcing our intention was sent to the other observatories, and in consequence of it the observatories at Mauritius, Batavia, De Biet, and, to some extent, Kew, are adopting the same course of action. Thus on every one of the term days there will be 543 points of comparison to within an accuracy of five seconds between all the observatories and amongst the six mentioned—namely, Batavia, De Biet, Kew, Mauritius, Victoria Land, and Christchurch. There will be over twelve thousand points of comparison to the same degrees of accuracy for every one of the days. Unfortunately, we were unable to let the German expedition know of our arrangement, but I think it quite possible that they will adopt it notwithstanding. Such work as this is very laborious, for, besides involving a nightly vigil once a fortnight, the reduction of each term day's records will mean an enormous amount of work. It is, however, quite a special occasion, and calls for quite special energy, and the records once obtained can be reduced more leisurely. It is, of course, the first time such a co-operation in working has been attempted; indeed, it is the first time that magnetographs have been in the antarctic regions. It therefore behoves us to make the most of the opportunity.

Quite apart from its ordinary functions the higher driving-speed for the magnetograph drums acted as a most valuable seismograph for the Cheviot earthquake-shocks in November, 1901, and that on the very day after the adjustment of the instrument was completed. It has been a point on which there has been room for much difference of opinion whether or not an earthquake, besides shaking the earth's crust, causes also magnetic disturbances. Magnetic records have been examined over considerable lengths of time by the Seismological Committee of the British Association, and the conclusion reached—chiefly in consequence of a record obtained in Bombay by Mr. Moos, where drums were driven at only one-fifteenth of the speed at which ours were—is to the effect that the two are associated. A reproduction of Mr. Moos's record is given in the British Association Report for 1898, page 239, and an inspection of it will show that, owing to the very small amount of sensitive paper used per minute, no detail is visible. On the occurrence of the Cheviot shocks we decided to test the efficacy of our arrangement for high-speed running by attempting to record some of the shocks on the magnetographs, and at the same time throw light, if possible, on this point. With the cordial assistance of Mr. H. F. Skey, we managed thus to keep the instruments running at high speed for some eighty hours. (Under these circumstances they require constant attendance.) In all, we recorded four shocks and many minor tremors. The general character of the records of all four was the same, and very surprising and interesting, for they not only, in my opinion, settle the question of the magnetic effect of an earthquake, but they show that the effect is of a rhythmical, wavy character, which cannot fail to be suggestive of its cause. (See plate V.)

Mention has already been made of the seismograph—one of two in the colony—which is at the Observatory, and some account of it may not be uninteresting. It is necessary to understand