Further confirmation of the facts stated as to the modification of arterial tension may be found in Marey's work, 'De la Circulation du Sang,' published in Paris in 1863. In that book the author ascribes the uniformity of the heat in the internal parts to the same cause as the author of the present paper ascribes the variations.

The fact observed by Dr. W. Ogle in the St. George's Hospital Reports for 1866, and by Drs. Ringer and Stewart in a paper read before the Royal Society this year, that the temperature falls at night, and is lowest at from 12 to 1 A.M., and begins to rise after that time, is simply explained on the theory given above; for it depends on the custom of Englishmen going to bed at about that hour, and thus giving a large amount of heat to the cold bedclothes, which at first is expended in warming the sheets &c., while later on in the night the bedclothes are warm, and therefore the body has only to make up for the heat diffused.

Other natural phenomena can be similarly explained. Thus, on a cold day, the effect of sitting with one side of the body in the direct rays of a fire is to cause the other side to feel much colder than if there was no fire at all, because the fire lowers the tension over the whole body, and supplies heat to the full cutaneous vessels of one side, while the other side, being equally supplied with blood in the skin, does not receive heat, but has to distribute it rapidly to the cold clothes &c.

II. "Observations of the Absolute Direction and Intensity of Terrestrial Magnetism at Bombay." By CHARLES CHAMBERS, Esq., Superintendent of the Colaba Observatory. Communicated by Lieut-General SABINE, R.A., President. Received April 5, 1869.

(Abstract.)

The observations made by the author were of the three usual elements —the Dip, Declination, and Intensity of the Horizontal Component of the Force. They were taken with instruments supplied to the Colaba Observatory in the year 1867 through the Kew Committee of the British Association, after having been tested at the Kew Observatory. The dip-circle was made by Barrow of London, and is furnished with two needles; the other instrument, the unifilar magnetometer, which serves both for observations of declination and horizontal force, was made by Elliott Brothers of London. The results of the observations for dip only have as yet been received from the author.

A complete observation consists of thirty-two readings, each end of the needle being read twice in each different position of the needle and circle; and the mean of the thirty-two is taken as the result of the observation. The observations were 178 in number, commencing on the 29th of April 1867, and extending to the 29th of December 1868. They were generally taken, with the two needles alternately, on particular days of the

week. Up to August 17, 1867, the observations commenced with either end (A or B) of the needle dipping, and without remagnetizing the needle; *i. e.* the magnetization for the latter half of one observation was made to serve for the first half of the next observation with the same needle, the two needles having been kept during the interval with contrary poles adjacent in a zinc box; but after August 17, 1867, the needle was always remagnetized, so as to make the end A dip during the first half of the observation. The effect of this change of practice was to produce a marked increase in the accordance of successive observations. Tables are given containing every complete observation made up to the end of 1868, and showing, as well as the mean dip, the partial results in each position of the circle, and with each end of the needle dipping, and also the mean weekly and mean monthly values. The mean dip obtained for the months April to December 1867 was 19° 2′·00, and for the year 1868 was 19° 3′·87. The period embraced by the observations is too limited to allow of an exact determination of the rate of secular change; nevertheless the observations show distinctly that the dip is increasing. The author takes +1′·3 as the rate of annual change.

For the probable error of a single weekly determination, including the effect of actual magnetic disturbance of an irregular character, the author obtains for the period from April 29 to August 16, 1867, 0′·67; from August 23 to December 31, 1867, 0′·26; from January 1 to December 31, 1868, 0′·24. Notwithstanding the extreme smallness of these probable errors, the indications of needle No. 2 exceeded those of needle No. 1 by quantities ranging, in the means of periods of a few months, from about 0 to +5′·0. An endeavour is made in another communication to explain a possible cause of these differences.

III. "On the Uneliminated Instrumental Error in the Observations of Magnetic Dip." By Charles Chambers, Esq., Superintendent of the Government Observatory, Bombay. Communicated by Lieut.-General Sabine, R.A., President. Received April 15, 1869.

(Abstract.)

A single reading of one end of a dipping-needle placed in a dip-circle provided with microscopes for observing is liable to a variety of instrumental errors, which are eliminated by taking the mean of the sixteen readings of the two ends in the eight different positions included in a complete observation. Nevertheless it is found that with the best modern instruments a mean value results from these sixteen observations different for each different needle, and that the difference between the results obtained with two different needles is not the same at all times.

The irregularities in the values of the dip observed at Bombay with two needles of excellent character made by Barrow of London, led the author