conflicting interpretations of the portion of the accounts of the Koh-i-nur from Babar's time onward. There are still some interesting questions of a difficult kind regarding its history antecedent to the days of the Mogul Empire. But I believe I have said now my last word regarding the later history, and leave to my readers the decision as to the side in this little controversy on which the truth is more likely to lie.

N. STORY MASKELYNE.

Basset Down House, October 26.

A Rare Phenomenon.

AURORAS were visible at Lyons, New York, on September 9, 10, and 11. That on September 9 was very fine, flickering streamers and arches forming at intervals from 8 o'clock to 10 o'clock·p.m. A peculiar feature of this aurora was an arch similar to that described in NATURE of September 17 (vol. xliv. p. 475), as having been seen by Mr. Tuckwell at Loughrigg, Ambleside, on September 11. The arch seen at Lyons on September 9 was visible shortly after sunset, and remained in the same position throughout the evening. It consisted of a narrow band of light, which arose vertically from a point on the horizon nearly due west, and passed through the constellations of the Northern Crown and the Lyre, and just south of the zenith down to the eastern horizon. When it was brightest, at about 10 p.m., a few small streamers formed in connection with it nearly in the zenith; otherwise it consisted simply of a narrow band of white light separated by a wide interval from the auroral coruscations and streamers in the northern heavens. This seems to have been very similar to the band seen by Mr. Tuckwell. Other instances have been noted by the writer in which some peculiarity of form or colour characteristic of an outbreak of the aurora has attended its appearance in localities remote from each other.

M. A. VEEDER.

Lyons, N.Y., October 17.

Two instances of the occurrence of the rare phenomenon referred to in your issue of September 24 (vol. xliv. p. 494), by Prof. R. Copeland and Mr. W. E. Wilson, will be found recorded in the Transactions of the Nova Scotian Institute of Natural Science, vol. vi. p. 100. The dates of these occurrences were July 31 and September 5, 1883. The general appearance and position of the luminous arch were the same in both cases as in those described by Prof. Copeland and Mr. Wilson. Two additional points were noted, however, which are worthy of mention, viz. (1) that the arch of September 5 had a slightly marked rayed structure, which, when first observed, was in the direction of its length, but which gradually changed to a direction inclined about 45° to the longitudinal, and (2) that the spectrum of this arch, as determined by one of Hilger's pocket spectroscopes, consisted of two lines in the green, one quite bright and the other faint.

On Tuesday, September 1 of this year, I again observed the same phenomenon at Halifax, N.S. I was unable to make accurate observations, but noted the following facts:—The luminous arch was quite bright when first observed, at 11.30 p.m., and extended from horizon to horizon. Fifteen minutes later it had completely faded away. It was about 4° or 5° in width throughout its whole length. It met the horizon at points about 10° or 15° to the north of the east and west points, and passed through a point a few degrees south of the zenith. When first observed, it was approximately uniformly bright throughout, except at the edges, where its brightness diminished rapidly outwards. To the eye its light seemed to be white, and stars were visible through it. In fading away, the east and west ends disappeared first, and the main body of the arch became gradually fainter, wider, and more variable in width. The night was bright and clear, and the temperature lower than it usually is in the beginning of September, and there was no appearance of aurora in other parts of the sky.

Except on this occasion I have neither observed this phenomenon nor heard of its occurrence since 1883. But as it might readily occur without my either seeing it or hearing of it, I cannot say that I know it to be rare.

J. G. MACGREGOR.

Dalhousie College, Halifax, N.S., October 14.

It has twice been my good fortune to observe phenomena similar to that described in NATURE of September 24 (vol. xliv. p. 494). My recollections of the first occasion are some-

what indistinct, but at all events the luminous band extended east and west almost through the zenith, and was preceded by an auroral display. It occurred in August or September of 1883 or 1884.

My attention was again directed to a similar appearance on the evening of September 9 of the present year, while near Toronto. The narrow band of light, as before, extended from the eastern almost to the western horizon, passing through the zenith, and was accompanied by an aurora.

It is worthy of note that I saw the phenomenon at Toronto on the evening of September 9, not September 11.

R. N. HUDSPETH.

Bishop's College, Lennoxville, P.Q.

Apparent Size of Objects near the Horizon.

SOME years ago there appeared an account of an investigation into the cause of the sun and moon looking larger when low down than when high up in the sky. The theory advanced as the result of the investigation attributed the effect to a physiological cause. One could not expect an explanation of this kind to be applicable to all individuals, but rather that with different persons there would be different results; so I have made observations—81 in number—to find out what law applies to my own case. These observations were made by taking notice of two stars near the horizon, and then looking up near the zenith to see what stars in that situation appeared to be the same distance apart as those near the horizon. I took a great variety of different cases, the length of the compared arcs varying from 1°·4 to 100°. I observed them also in various angles of position, from horizontal to vertical; and sometimes had the two arcs at the same angle of position upon the retina, and at other times at different angles.

The result of this investigation is an unexpected one, showing that the length of the observed arc greatly affects the result of the estimation—short arcs appearing longer when near the horizon than when high up, and long ones appearing shorter.

The comparisons were made in either of two ways; according to one method, after I had carefully taken note of the apparent length of the arc near the horizon, and had fixed an idea of it in my mind, I then took a single glance at the stars near the zenith and fixed in a moment upon an arc that appeared to be of the same length; whereas in the other plan I made as deliberate and careful an estimation of the arc near the zenith as of that near the horizon with which it was compared, looking to and fro from one to the other till I was satisfied as to their apparent equality.

One would naturally expect that the instantaneous estimations would be less accurate than the careful ones, and this is found to be the case. Taking all the observations, I find the average deviation from the truth of a single estimation is 7·7 per cent. in the case of careful comparisons, and 10·3 per cent. in the case of the instantaneous ones. The following formula is based upon the *careful* comparisons—

$$ L = l \left\{ 1 + \frac{A° - a°}{74°} (·085 - ·00321 l) \right\}, $$

where l and L are the lengths (in degrees) of apparently equal arcs at $a°$, the lower altitude, and at $A°$, the higher altitude, respectively. According to this formula, an arc 26°·48 long appears the same length at whatever altitude it is situated, but an arc shorter than 26°·48 appears longer at the horizon than at the zenith, and an arc in excess of 26°·48 would actually appear longer near the zenith than near the horizon: an arc 1°·4 long (the shortest in my observations), when at the horizon, would appear equal to an arc in the zenith 109·85 per cent. of its length; while an arc 100° (about the longest in my observations) at the horizon would appear equal to an arc of 71°·30 only in the zenith (*i.e.* with its middle point in the zenith). When the above formula is applied to all the observations, the average deviation (of the observed lengths from the computed) is reduced to 4·2 per cent. in the case of the careful comparisons, and 7·0 per cent. in the case of the instantaneous ones. If this formula can rightly be applied to objects of such small dimensions as the sun and moon, it (as will be seen) allows only a small increase for their apparent size near the horizon upon that when they are seen at a considerable altitude.

It would be easy to find a more complex formula which would satisfy the observations still better, but these are not sufficiently numerous to warrant the doing so.