The Structure of Coryphodon

I OBSERVE in your issue (vol. xvii. p. 340) a note by Prof. O. C. Marsh stating that I have included in the cast of the olfactory lobes of the brain of *Coryphodon* that of a part of the nasal cavity also. Prof. Marsh fails to point out the qualifying remarks to be found in my descriptions. In the explanation of Plate I. of the *Proceedings* of the American Philosophical Society, 1877, p. 620, I say, "The right bulbous of the olfactory lobe is too large above, owing to the want of preservation of the superior wall of the cavity." In my quarto report to Lieut. G. M. Wheeler in Vol. IV. p. 223 of his Report to the Chief of Engineers, I remark, "In excavating the matrix from the Olfactory chambers some difficulty was experienced in attempting to lay bare the superior and inferior walls, &c. On one side of the bulb this boundary was probably passed through, giving a larger vertical diameter than the true one."

Philadelphia, March 23

E. D. COPE

[Prof. Cope adds other remarks on this subject and on other questions in dispute between himself and Prof. Marsh, which our space will not permit us to reproduce.—Ed.]

Lightning Phenomenon

ON observing the lightning on Friday evening I noticed that several of the brighter flashes were preceded by one, or sometimes two smaller flashes, the large flash following immediately after and taking the same course as the smaller ones. I should be glad to know if any of your readers observed this, and also how it is accounted for.

H. J. STAPLES

Clifton College

Secondary Lunar Rainbow

AT an early hour this morning I had the good fortune to witness a phenomenon which is of somewhat rare occurrence.

Soon after 12.15 A.M., at which time I was burning the midnight oil, by a curious coincidence, over spectrum analysis, I was roused from my books by the pattering of rain outside the open windows; upon looking up I perceived that the moon was shining brightly, and naturally concluded that as it was not very far above the horizon there must be a rainbow.

I rushed over to the opposite side of the "quad," and was rewarded for my wetting by the appearance of a most magnificent bow, in which the colours were easily distinguishable on the dark background of clouds. To complete the phenomenon and to render it remarkable, there was also a perfect secondary arc.

The primary bow lasted in great brilliance for more than ten minutes, and thus I was enabled to rouse some of our men to see it, but it vanished with the punctuality of a creation of a fairy tale, immediately the clock tolled the half-hour. Soon after its disappearance the clouds were dispersed and the heavens studded with stars.

W. J. NOBLE

Keble College, Oxford, May 12

OUR ASTRONOMICAL COLUMN

THE REAPPEARANCE OF TEMPEL'S COMET, 1873, II.—The *Bulletin International* of the Observatory of Paris for May 7, contains the elements of this comet for the return to perihelion in the present year, as determined by M. Leopold Schulhof from a complete discussion of the observations in 1873, and the application of the perturbations up to the next perihelion passage. Expressed in a form slightly modified from that adopted in the *Bulletin*, the elements are as follow:—

Perihelion passage, 1878, September 1.4961 G.M.T.

Longitude of perihelion	306° 7' 2"	Mean Eq.
" " ascending node	120° 59' 41"	1878° 0.
Inclination of the orbit	12° 45' 34"	
Eccentricity	0.552895	
Log. semi-axis major	0.476478	
Mean daily sidereal motion	684".3689	
Motion—direct.		

It will be remarked that the date of perihelion passage given by M. Schulhof's investigation is considerably later than was assumed in a former note in this column, from

the best calculation of elements at the last appearance then available, and we believe it is yet open to material uncertainty. The recovery of the comet at this return may therefore involve a very close search with instruments of great optical capacity, but as it may, and very probably will be within reach when the moon is again below the horizon in the evenings, it may be hoped that no time will be lost in commencing a strict examination of the track of sky on which its orbit must be projected at different dates. The following positions are extracted from M. Schulhof's ephemeris:—

12h. Paris M.T.	Right Ascension. h. m. s.	Declination. ° ' "	Distance from earth.	Intensity of light.
May 18 ...	15 59 16	+ 6 32	0.779	0.54
" 20 ...	15 57 34	6 39	—	—
" 22 ...	15 55 49	6 45	0.755	0.59
" 24 ...	15 54 0	6 49	—	—
" 26 ...	15 52 9	6 50	0.734	0.65
" 28 ...	15 50 16	6 49	—	—
" 30 ...	15 48 22	6 47	0.715	0.70
June 1 ...	15 46 29	6 43	—	—
" 3 ...	15 44 38	+ 6 36	0.700	0.75

The intensity of light at the date of the last observation of the comet in 1873, which was made at Mr. Bishop's Observatory, Twickenham, on October 20, was 0.385. At this time the comet was the *extremum visibile* with a 7-inch refractor. It may appear strange that observations should not have been made at a later period with the more powerful instruments available in many of the European observatories, but it does not always occur that the largest telescopes show decided advantage over much smaller ones in following up faint comets. With the same refractor De Vico's comet of short period of 1844 was distinctly visible on December 31 in that year, which is the date of the last observation at Pulkowa, and but for the intervention of clouds, observations would have been possible. Nevertheless neither object could have been detected, in all probability, if the positions had not been pretty accurately known, and thus the recovery of a faint periodical comet when it first comes within reach, subject as the calculated places may be to material error, is a very different matter to distinguishing a faint object when we know exactly where to look for it.

On this, the first return, of Tempel's comet of 1873 since its periodicity was discovered, the date of perihelion passage upon which the geocentric path depends may reasonably be expected to be several days in error, although not necessarily so. The following would be the variations in right ascension and declination on May 18 and 30, caused by assuming the perihelion passage to occur four days earlier or four days later than the time calculated by M. Schulhof:—

	P.P. four days earlier.			P.P. four days later.	
	R.A. m.	Decl. ° ' "		R.A. m.	Decl. ° ' "
May 18 ...	+ 16.7	— 50		— 15.9	+ 48
" 30 ...	+ 17.9	— 45		— 16.7	+ 43

This comet was discovered on the night of July 3, 1873, by M. Tempel, at the Observatory of Milan, in the constellation Cetus. Its short period of revolution was pointed out about the same time by M. Schulhof and Mr. Hind, from the observations made in July. At aphelion it approaches the orbit of Jupiter within 0.64, and in about 309° heliocentric longitude is within 0.052 of the orbit of Mars.

OCCULTATION OF MARS.—On the evening of June 3 Mars will be occulted by the moon, and no other occultation of a bright planet, visible here, will take place for several years, until 1882 or later. At the Royal Observatory, Greenwich, the immersion will occur, according to the tables, at 10h. 1m. 9s., and the emersion at 10h. 42m. 49s., mean times, the angle at emersion counted as in the *Nautical Almanac* for inverted image being 288°.