"... white and azure, laced
With blue of heaven's own tint." *Cymbeline*, ii. sc. 2.

"Whose ranks of blue veins."—*Lucrece*.

"Those blue-veined violets."—*Venus and Adonis*.

"Where fires thou find'st untraced, and hearths unswep't
There pinch the maids as blue as bilberry." *Merry Wives of Windsor*, v. sc. 5.

"And *Hony soit qui mal y pense* write
In emerald tufts, flowers purple, blue, and white,
Like sapphire, pearl, and rich embroidery."—*Ibid.*, v. sc. 5.

Here there is no confusion. The comparisons are exact and beautiful. Again we have—

"When wheat is green, when hawthorn buds appear."
Midsummer Night's Dream, i. sc. 1.

The season indicated shows there was no confusion between green and brown.

We must not forget the well-known song—

"When daisies pied and violets blue,
And lady-smocks all silver white,
And cuckoo-buds of yellow hue
Do paint the meadows with delight."
Love's Labour Lost, v. sc. 2.

And to conclude our comparisons of green and blue—

"... I will rob Tellus of her weeds
To strew thy green with flowers: the yellows, blues,
The purple violets, and marigolds,
Shall as a chaplet hang upon thy grave."
Pericles, iv. sc. 1.

Returning to the colour of eyes. Shakespeare not only knew a blue eye, but could discriminate, and appreciate the beauty of a grey eye—a shade which often does duty for blue. The lovely rivals Julia and Sylvia are so endowed—

"Her eyes are grey as glass—and so are mine."
Two Gentlemen of Verona, iv. sc. 4.

"... Thisbe, a grey eye or so."
Romeo and Juliet, ii. sc. 4.

I think the above quotations afford good proof of the poet's correctness of colouring with regard to green and blue. It is true that he occasionally uses a small degree of licence with purple and blue, in the case of violets; but clearly not from unconsciousness of the difference. I cannot remember any instance where he confuses green with blue except purposely and humorously.

In the use of other colours Shakespeare is in most instances I am acquainted with equally true to nature. To give examples would occupy too much space; but if there are exceptions I have no doubt that your correspondents—now that the matter is broached—will be able to furnish them.

Sligo, January 10

EDWARD T. HARDMAN

Intellect in Brutes

THE following incident may interest some of the readers of NATURE, as affording evidence of the possession and exercise of reasoning power by a brute. During the present frost the window-sills of my drawing-room are supplied with bread for the benefit of the birds, who, finding food there, are constantly fluttering about the windows. One day a large water-rat was seen on the window-sill, helping himself to the bread. In order to reach the window he had to climb to a height of about thirteen feet: this he did by the help of a shrub trained against the wall. Neither instinct nor experience will easily account for his conduct: since he never found food there before. If neither experience nor instinct, what save reason led him? His action seems to have been the result of no small observation and reasoning. He seems to have said to himself—I observe the birds are thronging that window all day; they would not be there for nought; it may be they find there something to eat: if so, perhaps I too might find there something which I should like. I shall try.

Bardsea

EDWARD GEOGHEGAN

OUR ASTRONOMICAL COLUMN

OLBERS' COMET OF 1815.—On March 6, 1815, Olbers discovered a small comet at Bremen, in about 49° right ascension, and 32° north declination, or between Perseus and Musca; it had an ill-defined nucleus and was not

visible without telescopic aid. The first parabolic elements were calculated by Olbers himself, and he was followed by Bessel, Gauss, Triesnecker and others in the determination of similar orbits. Ephemerides founded upon them showed that the comet would be observable for a considerable period, and as the result proved observers were not negligent of this circumstance. Gauss, writing to Bode on April 24, alludes to the long visibility of the comet, and the probability that elliptical elements would be found, but this remark apparently was merely intended to imply that the grasp which a long course of observation would afford upon the orbit, might lead to an ellipse, not that Gauss had remarked any sensible deviation from parabolic motion; indeed he mentions that he had not then reduced his April observations. The first detection of the inadequacy of the parabola to represent accurately the comet's course, is due to Bessel: he had calculated parabolic elements from observations on March 11, April 11, and May 20, which, while agreeing well with the positions employed, gave the right ascensions sensibly too small from March 11 to April 11, and between April 11 and May 20, as decidedly too great, even to as much as 4', and on May 26, the calculation was again many minutes in defect; these differences naturally induced Bessel to relinquish the parabolic hypothesis, and after some disappointment from the failure of the first method he employed, he communicated to Olbers on June 23 the elements of an elliptical orbit, in which the period of revolution was a little over 73 years. At the end of June Gauss deduced an ellipse with a period of 77 years, and soon afterwards Nicolai, then assistant to von Lindenau at Gotha, added a further confirmation of the elliptical character of the orbit, assigning a revolution of 72½ years. On July 22, being in possession of observations to the middle of the month, Bessel improved upon his first calculation, and now found an ellipse with a period of 73.8968 years, which was made the foundation for his subsequent investigations, of which we have presently to speak. Thus was the periodicity of the comet established, and Bessel, after remarking upon the importance of the addition to the system (at that time Halley's comet was the only one that could be considered certainly periodical) he proposed that it should bear the name of its discoverer—Olbers.

Besides a long series of observations taken by Olbers himself, the comet was observed by Gauss at Göttingen, Bessel at Königsberg, Triesnecker at Vienna, Struve at Dorpat, Oriani at Milan, Lindenau at Gotha, Maskelyne at Greenwich, and Bouvard at Paris. Its distance from the earth continued pretty nearly constant (about 1.45) during the greater portion of the time it was visible, and at no period was it a conspicuous object; its nucleus was pretty bright at the beginning of May, and it then had a tail about 1° in length.

On the disappearance of the comet Bessel collected the observations which extended to August 25, the last having been made by Gauss at Göttingen; indeed, he was the only observer after July 25. He then commenced the work which is incorporated in his great memoir upon this comet, published in "Abhandlungen der königlichen Akademie der Wissenschaften in Berlin, 1812-13," a volume which was not published until 1816. He formed ten normal positions, in which all the observations appear to be brought to bear, excepting those at Greenwich and Paris, which were doubtless unknown to him. He corrects these normals for the effect of perturbations from the action of Venus, the Earth, Mars, Jupiter, and Saturn, during the comet's visibility, and by a fine series of observations of the sun at Königsberg between March 8 and August 29, 1815, he applies corrections to the sun's places obtained from Carlini's first tables. Equations of condition were then formed and solved on the method of least squares, and thus the following definitive elements of the comet's orbit in 1815 were obtained:—