

The Romance of the Nitrogen Atom.

WITH reference to the interesting letter by Dr. Irving in NATURE of June 15 on "The Romance of the Nitrogen Atom," I should like to point out that ammonia is not so stable as is sometimes imagined. I have shown recently not only that ammonia decomposes slowly at a temperature of about 700° C., but that the decomposition is *irreversible* (*Proc. Roy. Soc.*, June), so that it will proceed until no ammonia remains. The rate of decomposition decreases rapidly with temperature, but it appears probable that even at the ordinary temperature of the air the decomposition must still proceed, although with excessive slowness. A mixture of nitrogen, hydrogen, and ammonia would thus appear to be in "false equilibrium," in the same way as a mixture of hydrogen, oxygen, and water vapour, but in the opposite sense. The "silent discharge" will decompose as well as synthesise ammonia, and brings about a state of equilibrium. Sparking has also the same effect. In these cases the equilibrium is a true one, so long as the experimental conditions remain unaltered, and it ensues when the rates of formation and decomposition of the ammonia are equal. E. P. PERMAN.

University College, Cardiff, June 17.

Notes on the Habits of Testacella.

UNDER the above heading in NATURE, vol. xxxiv. p. 617 (October 28, 1886), Prof. E. B. Poulton recorded the capture of twenty-two specimens of this rare slug upon a wall in Oxford. On that occasion there had been exceptionally heavy rains, and it was suggested that the animals had been driven out of their usual habitat, the earth, as it became sodden with moisture. I am in a position to confirm the accuracy of this suggestion. Last evening I captured five specimens of *Testacella haliotide* upon a stone wall near Charterhouse. The slugs were apparently crawling out of the ivy which thickly clothes the top of the wall, and were making their way back to the earth. During the previous eight days no less than 3.80 inches of rain fell at this place. It seems probable that the slugs had taken refuge in the dense shelter of the ivy while the soil was unfit for them, and that on the return of hot, dry weather were once again seeking their subterranean quarters. OSWALD H. LATTER.

Charterhouse, Godalming, June 15.

Researches on Ovulation.

I SHOULD be greatly obliged if you would allow me to state in your Journal that the paragraph on "ovulation" in relation to oestrus on p. 517 of my text-book on the "Vertebrata," which was issued in March last, contains references to discoveries which were at that time unpublished, and that by inadvertence I omitted to direct attention to this. The information was supplied to me by Mr. Walter Heape. The facts relating to rabbits were discovered by him, those relating to ferrets and dogs by Mr. F. H. A. Marshall. These observations, with others, have recently been separately communicated to the Royal Society for publication in the Proceedings. A. SEDGWICK.

Trinity College, Cambridge, June 16.

ABORIGINAL METHODS OF DETERMINING THE SEASONS.

AN important and timely confirmation of the astronomical significance attached to the stone circles of Britain, and to the pyramids and temples of Egypt, comes from the Far East. From an interesting paper (*Journal of the Asiatic Society*, Straits Branch, January) by Dr. Charles Hose, who has made a special study of the subject, we learn that the natives of Borneo are at the present day using just the same general principles in determining the advent of their agricultural seasons as were used by the early Britons and the ancient Egyptians between one and two thousand years B.C. It will be remembered that, in Greece, Mr. Penrose observed (see NATURE, April 6) that the Hecatompedon and the older Erechtheum,

built about 1495 B.C. and 2020 B.C. respectively, were oriented to the cluster of the Pleiades at its heliacal rising on May morning. In Egypt, Sir Norman Lockyer found that the same asterism, as the deity Nit-Isis, was probably employed as the warning star for sunrise at the vernal equinox ("Dawn of Astronomy," 1894, p. 388).

Although in Great Britain there are a great number of stone circles, their astronomical significance has, until quite recently, not been satisfactorily understood. However, the recognition of Stonehenge as a solstitial temple (*Proc. Roy. Soc.*, vol. lxi. pp. 137-147) led to an inquiry into their possible character as observatories, used by priest-astronomers to determine the advent of the seed-time and other festivals, and the investigation met with gratifying results at the outset. In the case of "The Hurlers," a group of three stone circles situated near Liskeard, in Cornwall, *prima facie* evidence was found that they were arranged in their present positions, and the stones around them placed in accordance, so that the officiating priesthood could announce to the people the arrival of the crucial seasons in the agricultural year. Among the stones used as azimuth marks at "The Hurlers," there is one with an amplitude of E. 11° N., which would mark the exact heliacal rising of the Pleiades on May morning about the year 1600 B.C. (*Proc. Roy. Soc.*, March 30). In addition to the Pleiades, it has been found that the belt of Orion was frequently used as the warning sign.

Now we learn from Dr. Hose's researches that, at the present time, the natives of Borneo, more especially the Dyaks, are using the same stars in much the same way to determine the season of the year ordained by the local meteorological conditions as the time for the preparation of the ground on which they hope to grow their food supply for the ensuing twelvemonth. During the semester October to April the prevailing wind in Borneo is from the north-east, and brings rain with it; during the other six months of the year the direction of the prevalent wind is changed, but it brings none of the month-to-month variations of conditions which—in lieu of more refined knowledge—would lead the agriculturist of the temperate zones to a more or less approximate knowledge of the season.

In Egypt it was the advent of the Nile flood which fixed the seed-time, and for which the celestial heralds were observed; in Britain it was, as it is now, the advent of the warm, sunny weather that was the matter of importance; in Borneo it is the commencement of the driest season that has to be recognised, because the land which is to be cultivated is overgrown by jungle or forest, and, before seed may be sown thereon, a clearance must be effected. Like the Malaysians, the Dyak might use the moon as his indicator, but then, like the Malaysians, he would probably get about eleven days wrong every year, a serious matter where the dry season is of short duration. The variation of the length of the day is too small in the tropics to give a definite cue as to the commencement of any special season. Consequently, the Dyaks and many of the smaller neighbouring tribes have recourse to the stars, and the stars chosen as the heralds are the Pleiades ("bintang banyak") and Orion's belt ("bintang tiga"). The native names are borrowed from the Malays, and this probably indicates that the similar use of these stars is not totally unknown among the latter. The alternative expression used by the Dyaks in naming the Pleiades is "Apai andau," meaning "the father of the day," probably so called because it is the heliacal rising of them that the natives watch for before commencing their clearing process. In Borneo it is, at present, merely an observation of the Pleiades