

second two miles of the road were quite straight; so that I could easily have seen the dog if he had been merely running a comparatively short distance in front of the horses. Why this animal should never have returned to his former home on his own account, I cannot suggest; but I think it was merely due to an excessive caution which he also manifested in other things. Be the explanation of this, however, what it may, as a fact he never did venture to come back upon his own account, notwithstanding there never was a subsequent occasion upon which any of his former friends went to the town but the terrier was sure to return with them, having always found some way of escape from his intended imprisonment.

Regent's Park, N. W.

GEORGE J. ROMANES

Equilibrium of Gases

IN a former letter (NATURE, vol. xi. p. 486) I ventured to express an opinion contrary to that of most authorities, that the temperature of a vertical column of gas at rest would tend to diminish from below upwards.

I then stated that there was nothing to counteract the tendency to the upward diminution of energy which must result from gravitation. I am indebted to Mr. S. H. Burbury for pointing out to me that a counter-action exists in the removal from the system, at every point of the ascent, of those molecules whose vertical energy at that point is *nil*. The total mean energy of the molecules may thus remain the same, although a constant deduction is made from the energy of every molecule remaining in the system.

Mr. Murphy's argument (NATURE, vol. xii. p. 26) from the absence of cumulus in the Arctic regions, is also a sound one as far as it goes, and fairly counterbalances that derived from tropical calms and storms.

I must therefore withdraw my dissent from the generally received doctrine of the tendency to equality of temperature in a vertical column.

R. C. NICHOLS

Athenaeum Club, May 20

Contributions to the Natural History of the Wolf (*Canis pallipes*) of Northern India

HAVING had the opportunity of examining a number of wolf-cubs, it may not be without some interest to record my observations in your useful journal.

This year (1874-75) I examined fourteen batches or litters of wolf-cubs between December 18 and February 1. Judging from the apparent ages of the different litters, I should fix the breeding time of the wolf from about the middle of October to about the end of December. But the majority are bred in December, as out of the fourteen batches I could approximately fix the birth of eleven of them in some date of December. On the 29th of December a full-grown she-wolf, in milk, was brought to me, with seven cubs, which appeared to be about a week old. She had ten teats. The eyes and ears of the cubs were closed; their ears were drooping; their general superficial colour was sooty brown, with an under colour, that is, at the roots of the hairs, of dirty light tan. The latter colour was more marked on the head and flanks, while the sootiness was more decided on the hinder part of the body. They all had a milk-white chest-spot varying in size. Six of them had white hairs at the tips of their tails.

All those I examined, of about this same age, had similar characters. When the eyes of young wolves open, and they begin to crawl, about the third week, their general colour is a dirty light tan, washed with soot. As they grow, their ears become erect, their general colour a uniform light tan, with only the tips of the hairs dark, the tail being the darkest part of the animal. After the sixth week or so, the white chest-spot emerges into the light fawn colour of the remainder of the chest, and a dark collar on the under part of the neck becomes visible. This collar looks as if dark grey ashes were brushed across the greyish white of the neck. All those I examined which looked older than four or five weeks had this collar. But it disappears again as the wolf gains its adult colouring, becoming merged into the uniform creamy white of the neck and chest. Out of seventy-nine wolf-cubs which I examined, all but one had a white chest-spot, varying in size from a few hairs to a patch the size of a rupee. Fourteen of them had white tips to their tails, varying in size. Seventeen of them had white tips to one or more of their feet. These white marks leave no doubt about the close relationship between the wolf and the domestic dog. The sex

of seventy-four cubs was noted, belonging to thirteen litters. Forty were males, and thirty-four were females. The number of young at a birth was from three to eight.

Lucknow

E. BONAVIA

OUR ASTRONOMICAL COLUMN

I LEPORIS (FL).—This star is wanting in both Argelander's *Uranometria* and in Heis's Atlas, though the estimations of magnitude are very accordant; indeed, with the exception of Lalande, who calls it $6\frac{1}{2}$, observers including Flamsteed, Bradley, Piazz, and Johnson appear to have uniformly estimated it. It is $4\frac{1}{2}$ *s.p.* ϵ Leporis, a star of the 4th magnitude. Baily has this note: "The star is designated as of the 9th magnitude in the *British Catalogue*; but I apprehend this is a typographical error, as it is stated to be the 6th in the original entry." Yet, the star having been omitted by Argelander, and particularly by Heis, there remains a suspicion of variability of light.

THE COMET OF DECEMBER 1872 (KLINKERFUES—POGSON). The observation of a telescopic comet by Mr. Pogson, at Madras, on the mornings of December 3 and 4, 1872, in consequence of a telegraphic message from Prof. Klinkerfues, of Göttingen, that Biela's Comet had "touched the earth" on November 27, and might be sought for near the star θ Centauri, will be fresh in the recollection of our astronomical readers. The remarkable shower of meteors on that evening had exhibited a radiant almost identical in position, with the diverging point, which meteors moving in the orbit of Biela's Comet would have, and hence the assumption of our close proximity to this body during the meteoric display. Places of the comet detected by Mr. Pogson in the first interval of favourable weather after receiving the telegram were communicated by him in the same month to the Astronomer Royal and Prof. Klinkerfues, but without details of the observations upon which they were founded. With the aid of these positions the question of identity of Pogson's Comet with one of the bodies forming Biela's Comet was examined. There was at the outset this difficulty in the way of entertaining the idea of identity, that if Biela's Comet were actually close to the earth on the evening of November 27, its perihelion passage would have taken place on the 27th of the following month, ten or eleven weeks later than the date indicated by Micherz's orbit as perturbed to 1866; nevertheless, since the comet was not detected in 1865-66, in the track it should have followed according to Micherz's calculations, though the largest telescopes were employed in a search for it, there remained the possibility of disturbance of the mean motion in 1852, when observations were last obtained, from some unknown cause. Klinkerfues, therefore, assuming the elements of Biela's Comet, examined their relation to Pogson's places, and arrived at the conclusion that the identity of the comet observed at Madras with one of the two Biela comets could hardly be doubted. Subsequently, Prof. Oppölzer, of Vienna, gave attention to the subject: he remarked that with Micherz's orbit of Biela, Pogson's observations were not represented upon any supposition as to date of perihelion passage, but with the semi-axis of Biela, and assumed small distances of the comet from the earth at the time of the Madras observations, he deduced several sets of the other elements bearing greater or less similarity to those of Biela, and indicating a very near approach to the earth on November 27th: his conclusion was, that Pogson's Comet stands with high probability in intimate connection with the meteor-shower of that evening; and it is at least possible that the observed object was really one of the heads of Biela.

Since these investigations, the full details of the Madras observations have been published in the *Astronomische Nachrichten*, and Prof. Bruhns, of Leipsic, has