

and waited until the deer was water-logged. Their prey being thus rendered heavy and short-winded, would fall an easy victim if induced to run sufficiently far,—i.e. if prevented from entering the jungle. It was, of course, impossible to estimate the number of jackals engaged in this hunt, for it is not unlikely that, as soon as one had done duty at one place, it outran the deer to await it in the another.

A native servant, who accompanied my friend, told him that this was a stratagem habitually employed by the jackals in that place, and that they hunted in sufficient numbers "to leave nothing but the bones." As it is a stratagem which could only be effectual under the peculiar local conditions described, it must appear that this example of collective instinct is due to "separate expression," and not to "inherited habit."

Cases of collective instinct are not of infrequent occurrence among dogs. For the accuracy of the two following I can vouch. A small skye and a large mougel were in the habit of hunting hares and rabbits upon their own account, the small dog having a good nose and the large one great fleetness. These qualities they combined in the most advantageous manner, the terrier driving the game from the cover towards his fleet-footed companion, which was waiting for it outside.

The second case is remarkable for a display of sly sagacity. A friend of mine in this neighbourhood had a small terrier and a large Newfoundland. One day a shepherd called upon him to say that his dogs had been seen worrying sheep the night before. The gentleman said there must be some mistake, as the Newfoundland had not been unchained. A few days afterwards the shepherd again called with the same complaint, vehemently asserting that he was positive as to the identity of the dogs. Consequently, the owner set one watch upon the kennel, and another outside the sheep-enclosure, directing them (in consequence of what the shepherd had told him) not to interfere with the action of the dogs. After this had been done for several nights in succession, the small dog was observed to come at day-dawn to the place where the large one was chained: the latter immediately slipped his collar, and the two animals made straight for the sheep. Upon arriving at the enclosure the Newfoundland concealed himself behind a hedge, while the terrier drove the sheep towards his ambush, and the fate of one of them was quickly sealed. When their breakfast was finished the dogs returned home, and the large one, thrusting his head into his collar, lay down again as though nothing had happened. Why this animal should have chosen to hunt by stratagem prey which it could easily have run down, I cannot suggest; but there can be little doubt that so wise a dog must have had some good reason.

Dunskaith, Ross-shire, Aug. 18

GEORGE J. ROMANES

IN your number of August 14 (Vol. viii. p. 302) Mr. E. C. Buck alluded to the curious and interesting instances of instinct and gregarious action in lower animals, and mentioned that this action has been more particularly observed in the case of wolves in India. These remarks remind me of a curious instance of combined action between two foxes for the capture of their prey, which I witnessed myself more than once; and as similar proceedings, on the part of these animals have been so frequently observed in the hilly country of the department in which I reside, I cannot but conclude that the same habit will prevail among them, wherever they are found. The case is as follows:—One of the two foxes, in the pursuit of a rabbit or hare, continued yelping at short and regular intervals and thus drove the unsuspecting victim in the direction of the appointed bush, where the other fox was concealed and ready to seize its prey as soon as it came within its reach. The capture being effected, they generally divide the prey between them; but if the ambushed fox, in jumping at its prey, has not gained the end in view, the two baffled peers alternately repeat many times the unsuccessful leap, in order probably to find out the cause of the miscarriage.

The above allusion to foxes leads me to mention another instance of the ingenuity of these animals, which is very remarkable, and one, I believe, which is but little known. On one occasion, in early life, when I happened to pass my College vacation at the Chapelle d'Angillon (Department of the Cher), my attention was attracted twice or three times, when rambling by the side of a small stream called the Petite-Saure, by a floating mass of moss, which, when drawn to the bank, was found to be swarming with fleas. An old peasant of the neighbourhood, who observed my surprise, gave me the following explanation of the fact, the correctness of which, said he, he could

warrant:—Foxes are much tormented with fleas, and when the infliction becomes severe, they gather, from the bark of trees, moss which they carry in their mouths to the side of a stream where the water deepens by degrees. Here, they enter the water, still carrying the moss in their mouths; and, going backwards beginning from the end of their tail, they advance by slow degrees, till the whole body of the animal, with the exception of the mouth, is entirely immersed. The fleas, during this proceeding, have rushed successively in rapid haste to the dry parts and finally to the moss, and the fox, when he has, according to his calculation, allowed sufficient time for all the fleas to take their departure, quietly opens his mouth. The floating moss, with its interesting freight, is carried away by the stream, and the animal finds its way back to the bank, with an evident feeling of much self-satisfaction at having thus freed himself from his tormentors.

Many persons, and very trustworthy ones, confirmed to me the old peasant's account.

Montpellier, Oct. 17

A. PALADILHE

### Venomous Caterpillars

ONCE before I wrote to you on this subject, and had hoped that the entomological mountain had long since been safely delivered of its mouse. But from recent communications such appears not to be the case.

Any large caterpillar with tolerably stiff hairs that will not, in different degrees, affect tender skin when brought incautiously in contact, may probably be looked upon as a phenomenon. That any larva with stiff spines will occasion inconvenience by more violent contact is, I should think, evident to any thinking naturalist. That inflammatory symptoms will most probably follow in either case is also evident. The puncture made by a single steel filament would occasion little or no inconvenience; but if multitudes of these filaments were simultaneously directed on a limited surface of skin, the result would be very different. The best analogue of the irritation caused by larval hairs is, as I before hinted, to be found in that following the handling of certain boraginaceous plants—*Echium vulgare*, *Symphyltum officinale*, &c.

Mr. Riley, the State Entomologist for Missouri, has, in his fifth annual report, devoted a chapter to this subject, and states that he is acquainted with fifteen indigenous larvae having so-called urticating powers, and in every instance the action is mechanical. Those observers who place so much stress upon the fact of contact with a hairy larva causing pain should not let surprise get the better of their judgment; nor, in the case of those residing abroad, should they allow themselves to be influenced by native superstitions. The position is simply this: any hairy larva is likely to cause irritation mechanically, from particles of the numerous hairs piercing the skin; no case has yet been proved in which such irritation is the result of *venom*, such as that of *Urtica* among plants.

Lewisham, Oct. 10

R. McLACHLAN

### Harmonic Echoes

THE phenomenon mentioned by W. G. M. of notes higher in pitch than the sound producing them being reflected from railings, is not at all uncommon, and is very easy of explanation. Suppose a person standing close to a line of upright bars, the distance between the bars being  $a$ . If he now makes any sharp sound, so as to propagate a single wave, this wave will be successively reflected by each of the bars; so that, in answer to the single wave he propagates, he will have an echo of the pitch corresponding to  $\frac{V}{2a}$  vibrations per second

( $V$  being the velocity of sound). If, however, he stands at any distance, say  $x$ , from the row of bars, he ought to get a slightly descending echo, as then each wave succeeds the last at a distance increased by twice the difference between  $\sqrt{x^2 + n^2 a^2}$  and  $\sqrt{x^2 + (n-1)^2 a^2}$ , where  $n$  is the number of the bar measured from opposite the observer.

Brampford Speke, Oct. 13

ARNULPH MALLOCK

### Evolution as applied to the Chemical Elements

WHEN so little is really known about evolution, even in the sphere of organic matter, where this grand principle was first