tinct. When it was absent, dark lines, following the direction of the lateral axes, were visible in some cases. Frequently an indistinct striation was present. GILBERT RIGG.

Manchester Museum, Mineralogical Department,
January 12.

A Tortoise inclosed in Ice.

I SHOULD like to be allowed to record a case of a water-tortoise surviving an incarceration in ice, somewhat similar to that given in NATURE (vol. xlv. p. 520).

In this instance, the tortoise has hibernated in a stone basin, in which there were about 6 inches of water and a quantity of dead leaves. The whole was, I believe, frozen into a solid mass. At any rate, when, on December 29, I examined a cake of ice and leaves, from 2 to 3 inches thick, which was floating in the basin after a thaw, I found the tortoise with its back embedded in the *under* side of the mass, and with nearly 2 inches of porous-looking ice above it. The animal, though torpid, was alive, and I replaced it in the basin. Later on it put its nostrils up to the surface, and two days afterwards was seen with its head out of the water as usual. It remained in the pond, which has been again frozen over, in less than a week after this observation. FRANK FINN.

31 Walton Crescent, Oxford, January 22.

Alpine Rubi.

In a footnote in NATURE (vol. xlv. p. 10) it is stated that "The two highest-known species of *Rubus* are *pinnatus* and *rigidus*, at 5000-6000 feet." This is hardly correct, unless it is intended to refer to African species only. In South America, *R. megallococcus*, *R. bolivienensis*, *R. bogotensis*, and *R. roseus* occur at 8000 feet, and *R. rusbyi* at 10,000. In Colorado I have found *R. strigosus* above 10,000 feet (see *Bull. Torrey Bot. Club*, 1890, p. 10; 1891, p. 169). In the Indian region, *R. ellipticus* goes to 7000, *R. lasiocarpus* to 8000, and *R. biflorus* and *R. rosifolius* to 10,000 feet.

The name of the wild *Zea* is *Z. canina*, Watson (local name, "mais de coyote"), not *nana*, as given in NATURE, vol. xlv. p. 39. T. D. A. COCKERELL.

Institute of Jamaica, Kingston, Jamaica,
December 30, 1891.

UTILIZATION OF HOMING PIGEONS.

THE utilization of the homing instinct of the domesticated varieties of the blue rock pigeon, the *Columba livia*, for military purposes, has been effected by most of the Governments in Europe. In France, Germany, Austria, Switzerland, Italy, Spain, and Portugal the organization has been very complete. It has even extended to Russia, Denmark, and Sweden; and Africa has been brought into communication with Spain by stations at Ceuta and Mellila. England alone, of all the great Powers, has neglected this important mode of communication, which is available under circumstances that preclude the employment of any other means.

It cannot be said that they have not been brought under the notice of the military and naval authorities. Nearly twenty years ago, on the occasion of the despatch of a flight of seventy-two birds from the Crystal Palace to Brussels, when the first birds arrived before the telegram which was sent to announce their departure, I wrote a letter to the *Times* of June 27, 1873, calling attention to their utility, and asking the question: "What would be the value of the birds, in the event of a war in which we may be engaged, that would convey messages to or from Guernsey, Jersey, and other places, when the submarine wires had been cut by the enemy?" and in a lecture delivered by me before the Royal Engineers' Institute at Chatham, on the use of pigeons for military purposes, I entered at some length into their mode of training and general utilization.

The employment of the *Columba livia* depends upon several conditions which are not without interest. In

the first place, this species is one of the comparatively few capable of domestication, a faculty which is totally distinct from, though frequently confounded with, the faculty of being tamed. A domesticated animal is attached to its home, and returns to it of its own will; a tame animal is merely familiar with man. These two states are admirably illustrated in the closely allied species, the fowl and the pheasant. Both were originally perfectly wild, but when domesticated the chickens invariably return home to roost, while the pheasants, though descended from numberless generations of birds bred in confinement, have no attachment whatever to the place of their birth or rearing.

In its natural habitat (the rocky cliffs of the sea-shore) the blue rock pigeon has to fly long distances in search of food, which, when breeding, it stores up in its crop and carries home to its young. This necessitates strong powers of flight and well-developed perceptive faculties, it being guided in its return solely by sight, and not, as is often supposed, by any special instinct.

The pigeons that are used for carrying messages are bred solely for that purpose. A process of artificial selection, as rigorous and remorseless as that of nature, is followed. The young birds, after acquiring their power of perfect flight, and learning the contour of the country in their circuits around their home, are taken in

FIG. 1.

the direction in which it is desired that they should fly, and trained stage after stage until they know every locality over which they have to traverse. This training is absolutely necessary, if their return home is to be depended on. During its performance the inferior birds, those whose intelligence and determination are not well developed, are lost; and the best birds, only, retained. This loss, in the long-distance flights which are flown by the Belgians and by the best homing pigeon societies in England, is very severe. Old birds, that know large tracts of country well, may be taken in new directions, provided they are not too extended, with safety, but young birds that have not been trained would almost certainly be lost if carried many miles from their home.

Every homing pigeon flyer recognizes the hereditary character of this acquired faculty, and will give a very high price for birds descended from parents that have flown long distances, whereas he would not purchase another bird of precisely similar appearance were he not acquainted with the performances of its ancestors. The fancy varieties of pigeons, especially those which are called carriers in England, are perfectly useless for the purpose of flying distances.

The birds that are most valued are almost all descended