

Sand

NOT having had the pleasure of perusing Mr. Waller's paper on sand, I gather from Mr. Gardner's notice of it that it is an attempt to distinguish by the aid of the microscope whether sand has been formed by the action of wind or of surf. Having a number of years ago become possessed with the idea that the form of the materials which make up the soils and subsoils found in any country might lead to a knowledge of the sources from which they had been derived, I had many soils and subsoils from Europe and Australasia looked at, but without being able to detect sufficient difference of shape or form as to lead to any definite result. Having been long familiar with the soils formed out of the boulder clay and drift of the south-east of Scotland, I had hoped to have seen a very marked difference in the form of the particles of sand existing in them from those of the interior of Victoria, New South Wales, and Queensland, large portions of the surface coverings of which countries are believed to have been deposited when covered with the sea. This difference exists certainly—that the soils of the boulder clays and drifts contain a far greater portion of fine and rough gravel, and rounder in shape than do those from Australia. Yet, so far as I could observe, the form of the sand was similar. It seems to me that both Messrs. Waller and Gardner are on the wrong track when searching solely for the typical forms of sand in the seashore or from torrents. The amount of sand found on the seashores of the world is large, no doubt, so is that from the rivers. What is that to the quantities contained in the surface coverings of the land? It is from this source the rivers obtain the supply they carry to sea or the shores, and make up the waste by friction. It has long seemed to me probable the sands, fine gravels, and silt formed by the passing of ice over the surface of the rocks would have a distinct form from the surface covering produced by other forces. The gravel or shingle of the rivers has a flatter shape than that of the seabeach when derived from the same rock. If such difference can be discovered in the silts, sands, and gravels derived from glacial action, it may be possible to assign limits to the extent to which ice has effected the present covering of the surface from the broken up strata over which it has passed. Silt, sand, and shingle must all, however, be taken into account, and that from the deposits themselves, not from what has been subjected to littoral, fluvial, or wind action.

Bonnington

JAMES MELVIN

Garfish—Wild Fowl

WITH reference to Mr. Archer's note in NATURE last week (p. 226), may I remark that the beak of the garfish of southern waters (*Hemiramphus*, A.) is of rather too fragile a nature to be capable of making a slit of four inches in length in a hard felt hat? May not the fish in question have been more likely a young and small *Xiphias*—or, as is equally probable, a juvenile *Pristis* or sawfish—emulating with the thoughtless exuberance of youth the habits of *Exocoetus*?

Any Australian can confirm the correctness of Dr. Rae's observations in the same page of NATURE re wild ducks and railways. Looking down upon the reedy waterholes on the south bank of the Yarra, from Princes Bridge in Melbourne, abundance of native waterfowl can any day be seen swimming about in conscious security and much less on the alert than they are in any swamp in the loneliest part of the bush. The constant roar of a great passing traffic, as well as the unceasing turmoil and unearthly noises of a large railway station within stone's throw of their haunts, is now quite unnoticed by these usually most watchful and wary of all birds.

But for the fear of trespassing on your space, I could give many more illustrations of the truth of Dr. Rae's remarks and of the quick and unerring instinct which so soon teaches both furred and feathered animals to dread less the roaring and shrieking ogre that is so swiftly tearing his way into their most secluded haunts in the uttermost parts of the earth than the silent, solitary biped who with gun in hand creeps stealthily upon them.

ROBERT S. GOODSIR

Edinburgh, July 9

Glowworms

WHILE watching, last evening, some glowworms in a mossy stone wall, my attention was attracted to a firefly flying to and fro in the field beyond and approaching the wall where I stood. Arriving within two or three feet of the glowworm I was watch-

ing, he made several sharp zigzag flights, drawing nearer the light of the glowworm, and then, making a dash like that of a hawk at an object it has been watching, pitched directly on the glowworm, covering it in the fraction of a second. I had been noting the curious habit of this, which thus appeared to be the female insect, of standing with its abdomen erected in the air and quite motionless, except for a sort of pulsation, but on the contact of the male, the body fell to a normal position, and it was evident that coitus was taking place. I watched them ten minutes until I was completely satisfied that this was the case, when I swept them both into a card box which I send with this for examination by a competent entomologist of the insects, which have not the slightest likeness to each other, the female resembling in general form the glowworm of England, but having an intenser light, and the light-emitting organs, beside the abdominal, which is the most luminous as well as the largest, being two glands (apparently) situated where the joints of wings might be expected if the insect were winged. The light is of an exquisite green, and so brilliant as to pale little at the proximity of a wax taper burning at six inches' distance.

This morning, on opening the box, I found the female apparently dead and collapsed; but the male, on the light returning to them, attempted to renew his embraces.

I remember a discussion at Cambridge (U.S.A.) some years ago, in which Agassiz conjectured that the light of the glowworm served as an amorous guide, but I had only a few weeks before noticed quite a different use for it. In one of the primitive forests of New York State, where twilight is normal from the density of the shade, I was attracted by the loud buzzing of a fly under a recumbent tree trunk. On looking for the cause of it I found a large, luminiferous insect resembling in general construction the common glowworm, but with powerful mandibles, which had built itself a little pit resembling that of an ant-lion, at the bottom of which it was lying, its light distinctly visible. The fly was in the clutch of the mandibles, helpless, though as large as a bluebottle, nor could I easily extricate him. There could be no more mistaking in his case that the light was a decoy than in this of the Pistoiese insect being a sexual invitation.

W. J. STILLMAN

Cutigliano, Pistoiese Apennines, June 25

[The name of the glowworm is *Lamprohiza splendidula*, a common South European species.—ED.]

Mimicry

I HEARD what I fancy was rather a curious instance of mimicry last Wednesday evening (June 28) about 10 o'clock. I was walking with a friend across a field adjoining a meadow, in which was a landrail (*Kallus Crex*); we both noticed that the animal's cry, or crake as it is called here, was pitched in a higher and somewhat softer key than is usually the case, and my friend remarked that perhaps it was a young bird, but we were considerably surprised to hear him imitate the cry of the lapwing (*Tringa vanellus*). At first this cry was uttered only once alternately with several crakes, but we listened for about ten minutes, at which time, I suppose, he fancied that his note was perfected (which, however, it was not, being much less sharp than the peewit of the lapwing), and so he essayed it several times in succession. But he ultimately relapsed into his craking again.

Filston Hall, Shoreham, Kent, July 4

A. HALE

Indian Numeration

IN your review (p. 195) of "Field and Garden Crops of the North-Western Provinces and Oudh" you speak of the peculiar system of numeration used by the author, as in the instance 6,79,06,496, expressing sixty-seven millions, &c. Perhaps I may be allowed to point out that this marking is quite in accordance with the native Indian method of numeration, in which there is no word equivalent to "million." In India the series runs thus:—Thousands, tens of thousands, lakhs, tens of lakhs, kroris (or crore). A lakh is a hundred thousand, a krori is ten millions.

It may be doubted whether it is advisable to adopt this system in an English book, for even native readers of it would easily enough follow our own; still it is not uncommon to see lakhs and kroris made use of in English official papers.

Of three questions asked by the reviewer, the above remarks give an answer to one; as to the others I may say that a "ceer" is two pounds avoirdupois, and a "maund" is forty seers.

Eton College, July 4

FREDERIC DREW