

Zoological Society of London for February of the present year, and is entitled "A Synopsis of the Genera of the Family *Soricidae*." Probably the most extensive collection of these interesting little mammals ever examined by a single investigator, came under the hand of the writer of the works just quoted, wherefrom to make his deductions. His classification is most complete and acceptable, and goes to show that the Shrews are first to be divided into two sub-families, viz. the *Soricidae*, and the *Crocidurina*, the first being characterized by having their teeth red-tipped, while in the latter the teeth are white. Five genera make up the first sub-family—which stand, *Sorex*, *Soriculus*, *Blarina*, *Notiosorex*, and *Crossopus*. In the *Crocidurina* we find six genera—namely, *Myosorex*, *Crocidura*, *Diplomesodon*, *Anurosorex*, *Chimarrogale*, and *Nectogale*. This adds four genera to M. Milne-Edwards's list, and from the same omits the genus *Neosorex*. Dr. Dobson believes that "the red-toothed Shrews diverged from the white-toothed, development having proceeded on somewhat similar lines in the descendants of both according to similarity of environment and modes of life." Of Dr. Merriam's genus and type, *Atophyrax bendirii*, he says that "there are no leading characters which would enable one to define the genus, were I inclined to admit it in my synopsis."

It is refreshing in these days to meet with such classification, and such an able classifier—one who, as Dr. Dobson most emphatically does, draws good strong lines in taxonomy, and discourages the hair-splitting methods adopted by some mammalogists in these days. R. W. SHUFELDT.

Takoma Park, D.C., September 13.

Musical Sands.

IN reference to the note respecting Mr. Hyndman's query *re* sonorous sand (NATURE, October 2, p. 554) it may be interesting to him, and others, to know that in our own islands musical sand is by no means rare. In the second edition of my "Musical Sand," shortly to be issued, I shall give a list of the places at which it occurs in England, Scotland, Ireland, and Wales, showing that only *observers* are rare—not the sands.

My investigations since my paper was first published nearly two years ago have brought many new and interesting facts under my notice, not the least being that the musical sands at Studland Bay are always mute during an easterly wind. This I have been able to account for.

About three years ago I propounded a theory to account for the emission of these musical sounds from sands; briefly it is that they are the result of the rubbing together of millions of clean sand-grains very uniform in size: two such grains rubbing together would not produce vibrations audible to us, but the *accumulation* of such vibrations issuing from millions of surfaces, and, approximately, of equal length, would produce a note sufficiently powerful to be sensible to us.

This theory has long been published, and though it has been examined by some of our most eminent physicists, and tested in a variety of ways since, nothing has been suggested which has caused me to abandon it. I shall be pleased to send Mr. Hyndman a copy of my first paper on the subject.

Bournemouth, October 6. CECIL CARUS-WILSON.

With what Four Weights (and a Pair of Scales) can be Weighed any Number of Pounds from 1 to 40 inclusive?

WITH two weights four amounts can be weighed, viz. each weight and the sum and difference of the two.

With a third, in addition to these four, the sum and difference of each and the third can be weighed. Three weights therefore give 13 amounts. Similarly a fourth weight gives $13 + 2 \times 13 + 1$, or 40 amounts, exactly.

It is therefore evident that each amount must be arrived at by only one combination, and that the sum of the weights must be 40 pounds. To weigh 39 pounds, then, we shall clearly want a 1 pound weight. With 1 and 39 we can weigh 1, 38, 39, 40. For the next weight 2 clearly will not do, as 1 could be arrived at in two ways. Taking 3, we find that 1, 3, and 36 give us 1, 2, 3, 4, 32, 33, 34, 35, 36, 37, 38, 39, 40. Now to get 5 without getting any amount by more than one combination we clearly want 9, and this will be found to solve the question, the weights being 1, 3, 3², 3³. A fifth weight of 3⁴ will enable us to weigh any number of pounds up to 121, and so on.

E. R. F.

Protective Coloration of Eggs.

IN view of Mr. Grensted's letter to NATURE last year (vol. xli. p. 53), asserting the writer's belief that the egg of the red-backed shrike varies with the tint of the lining material of the nest, and of my own reply to this (same volume, pp. 129-30), I had intended this summer to examine as large a series of nests and eggs as possible, in order to verify or disprove my former observations. I have, however, been unable to devote any time to the matter; and have only obtained two nests—both from the neighbourhood of Evesham. In each of these, I must confess that Mr. Grensted's contention is borne out. The lining of one nest is dull brown in colour; and the eggs (5) are of a mouldy-brown ground-colour, tending towards dull green. The lining of the second is brighter in tone; and contains a small fragment of red flannel. The eggs (5) of this nest show the commoner flesh-coloured ground.

In spite of these two instances, I must hold to my former opinion, that the correlation of ground-colour and environment is very imperfect in the nests and eggs of these birds. Next year I hope to be able to examine a greater number of nests.

E. B. TITCHENER.

Mote House, Mote Road, Maidstone, October 2.

LUNAR PHOTOGRAPHY.

THE idea of employing the process invented by Daguerre and Niépce for the purpose of obtaining photographs of our satellite was first suggested by Arago in a report made to the Paris Academy of Sciences on August 19, 1839. Daguerre acted on the suggestion, but, in spite of a long exposure, he obtained only feeble impressions, in which all details were conspicuously absent (Arago, "Œuvres," vol. vii. p. 458). The first photographic representations of the moon may therefore truly be said to have been made by Dr. J. W. Draper in America by means of a Newtonian reflector of five inches aperture. The specimens were presented to the New York Lyceum of Natural History. The following is an extract from the minutes of that association:

"March 23, 1840. Dr. Draper announced that he had succeeded in getting a representation of the moon's surface by the daguerreotype. . . . The time occupied was 20 minutes, and the size of the figure about 1 inch in diameter."

Dr. Draper also wrote in September of the same year:—

"There is no difficulty in procuring impressions of the moon by the daguerreotype beyond that which arises from her motion. By the aid of a lens and a heliostat, I caused the moon-beams to converge upon a plate, the lens being three inches in diameter. In half an hour a very strong impression was obtained. With another arrangement of lenses I obtained a stain nearly an inch in diameter of the general figure of the moon, in which the places of the dark spots might be indistinctly traced" (*Phil. Mag.*, vol. xvii. p. 222, 1840).

In 1850, W. C. Bond, in conjunction with J. A. Whipple, a photographer of Boston, obtained some really good daguerreotypes of the moon. The instrument used was the equatorial of 15 inches aperture belonging to Harvard College Observatory, and images from two to three inches in diameter were obtained on plates adjusted at its focus. Some of these pictures on glass, and mounted for the stereoscope, were exhibited in London at the Great Exhibition of 1851, and also at Paris ("Annals, Observatory of Harvard College," vol. i. p. clvii.).

Also in 1850, Niépce de St. Victor obtained a strong impression of the full moon in twenty seconds on an albumenized glass plate sensitized with silver chloride. He had only discovered this photographic process a few months previously, and the plate was exposed in order to test the efficiency of the film employed. No attempt was made, however, to follow the moon's motion, so the pictured disk could hardly have exhibited the circular