Squeaking Sand *versus* Musical Sand.

ALLOW me to use your columns to thank Mr. Henry C. Hyndman for the reference in NATURE of October 2 (vol. xlii. p. 554) to a locality of sonorous sand in the interior of South Africa. Its occurrence in the interior is new to me, though it has been reported from the west coast at Liberia, and at Cape Ledo, from which latter place my friend, Mr. L. Harold Jacoby, a member of the American Eclipse Expedition, recently brought me specimens.

Dr. Alexis A. Julien and myself quite agree with Mr. Carus-Wilson in his remarks (NATURE, October 9, vol. xlii. p. 568) that there is no scarcity of sonorous sand, and only observers are lacking. This we established in 1884, when we announced at once seventy-four localities on the Atlantic coast of the United States, although at the time we began our researches its occurrence at Manchester, Massachusetts, was thought to be unique in America. The localities were in part reported by the keepers of life-saving stations to whom we had sent circulars.

The old theory adopted by Mr. Carus-Wilson, that the sounds are produced by "rubbing together of millions of clean sand grains very uniform in size," is, we think, insufficient to explain *musical* sand, but well adapted to explain *squeaking* sand. Two distinct classes of sounds are produced by disturbing sand, both undoubtedly due to vibrations ; the more common sound is caused by attrition of the particles, and has a well-known harsh character by no means musical ; this in rare cases becomes a loud squeak. The second is caused, we believe, by oscillations of the particles themselves protected from actual contact by elastic air-cushions, and this is decidedly musical in tone. Musical sand yields notes by friction only when *dry ;* squeaking sand yields a harsh, shrill squeak (reminding one of the cry of a guinea-fowl), best when *moist.* This latter variety is very rare ; we have collected by correspondence and in person over 500 samples of sand from around the world, and musical sand seems to be comparatively common, but only two localities of squeaking sand are known to us, both in so-called boiling springs—one in Maine, and the other in Kansas. A very small quantity of squeaking sand pressed between the thumb and forefinger produces, when wet, a peculiar shrill squeak—a phenomenon which we think well explained by the attrition theory. The magnificent acoustic displays which I have witnessed in the desert of Sinai (NATURE, vol. xxxix. p. 607) and on the coast of Kauai (NATURE, vol. xlii. p. 389) are, however, manifestly due to greater freedom of oscillatory motion than is possible if the particles merely scrape against each other.

Dr. Julien and I await with interest the second edition of Mr. Carus-Wilson's paper, and shall be very much obliged to him for giving a large circulation to the results we have obtained by extended travel and years of study, though we had planned to present the results to the scientific public in our own way.

H. CARRINGTON BOLTON.
University Club, New York City, October 27.

Honeycomb Appearance of Water.

THIS afternoon, while ascending a mountain pathway adown which water was trickling, after the torrents of rain that fell in the morning had ceased, I observed an appearance of the surface of running water so exactly like the hexagons of the bees' cells that I looked at it carefully for some time. Little air-bells of water seemed to issue from under the withered leaves lying in the tract, which rushed towards the hexagons, occupying an irregular space about four inches by five. As soon as these air-bells arrived at the hexagons, they arranged themselves into new cells, making up, apparently, for the loss occasioned by the continual bursting here and there of the cell-walls. No sooner had these cell-walls burst, than others closed in and took their places. The worst-formed hexagons were those at the under or lower side of the surface—the part of the surface farthest down the hill ; here they were larger, and more like circles. By an ingenious mechanical theory, Darwin accounts for the hexagonal structures of the cells of the hive-bee so as to supersede the necessity of supposing that the hive-bee constructed its comb as if it were a mathematician. But here the blind forces of Nature, under peculiar conditions, had presented an appearance, on running water less than half an inch in depth, so entirely like the surface of a honeycomb, that it would be a startling result could it be reproduced in a laboratory. J. SHAW.
Tynron, November 7.

On the Soaring of Birds.

MR. GUTHRIE has suggested (November 6, p. 8) one more *vera causa* of soaring. Like all its predecessors, this seems to the last degree unlikely to occur to an extent adequate to the explanation of soaring in the sense in which the term is commonly used, viz. floating at a constant height without motion of the wings.

May not the true cause be that birds do not soar at all in this sense, but only seem to soar because the movement of the wings is too rapid for our imperfect eyes to detect ? Is it not possible that birds which to our eyes seem to soar would betray themselves to the camera ? Is it not also possible that in some cases the motion may be too rapid to be discovered even by photography ?

Whether this be the whole truth or not, I venture to protest against such statements as that a bird followed a ship for 11 minutes "without flapping a wing." If Mr. Guthrie had said, "without any flapping which my eyes could perceive," I should not have had a word of criticism to offer. But that would be an entirely different statement. What would be thought of one who should say that he had seen a conjurer with hands a yard apart take a card with the right hand out of the left without any movement of either hand ? Yet many people have seen or seemed to see this common trick. G. W. H.

A Bright Green Meteor.

AN exceedingly bright green meteor was seen here on the 8th inst. at 5.30 p.m. It passed from north to south under *α* and *β* Aries, which would give it an altitude of 19°. The path was parallel to the above stars and about 5° in length. This indication may serve to determine the height of the meteor if it was seen from elsewhere. J. P. MACLEAR.
Cranleigh, Guildford.

Weighing by a Ternary Series of Weights.

IT has been shown in NATURE (vol. xlii. p. 568) that any number of pounds may be weighed with weights, the numbers of pounds in which form a geometrical progression with 1 for first term and 3 for common ratio. The following method of treating the same problem may serve to illustrate some remarks made by the President of the Mathematical Section of the British Association at the recent meeting in Leeds. One of these remarks had reference to the fascinating interest attaching to such inquiries into the properties of series of numbers, another showed that the adoption of special systems of notation for different problems was often of great service, and a third remark alluded to the attainment of one and the same result by diverse methods of procedure. In the present case the interest attaching to the subject may be left to speak for itself ; the notation suitable for the problem requires elucidation. It is well known that by means of only two figures, 1 and 0, any number may be expressed if we agree that the value of the 1 shall be doubled every time it is removed one place further to the left, so that, for example, 11111 would denote the number $1 + 2 + 4 + 8 + 16$, and that any number not greater than 31 would be denoted by means of five figures or less. It follows that if we had five weights of corresponding value to the above five numbers we could weigh any number of units of weight from 1 to 31. Now, the present problem only differs from this in two respects—namely, in that the 1 increases threefold in value on being removed one place to the left, and that the value denoted by it may in any position, except the place on the extreme left, be taken negatively. Let us agree to denote the negative value by using a different type, and we may then indicate all values from 1 to 40 as follows :—

1	1	111	5	1111	14	1011	23	1111	32
11	2	110	6	1110	15	1010	24	1110	33
10	3	111	7	1111	16	1011	25	1111	34
11	4	101	8	1101	17	1001	26	1101	35
		100	9	1100	18	1000	27	1100	36
		101	10	1101	19	1001	28	1101	37
		111	11	1111	20	1011	29	1111	38
		110	12	1110	21	1010	30	1110	39
		111	13	1111	22	1011	31	111	40