

## LETTERS TO THE EDITOR.

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## Electric Fishes.

WHILE I was fishing for cod the other day off Walmer, I took up in my hand a small whiting pout that was flopping about in the bottom of the boat, when I received what appeared to me a slight though distinct electric shock in the palm of my hand, which made me exclaim at once, "That fish has given me an electric shock." On asking the fisherman (seventy years of age) if he had known of such a thing occurring before, he said that he had "heard tell of it," and on inquiring further I found that he was referring to whiting pout and not to any other fish. He had never, however, noticed anything of the kind himself.

It will be interesting to know if any of your correspondents can confirm the observation. W. H. CORFIELD.

Savile Row, W., September 22.

## Sonorous Sands.

THE communication of Mr. Cecil Carus-Wilson in NATURE of August 30 (p. 415), induces us to state that we are rapidly bringing to completion, and preparing for publication, an exhaustive study of "Sea, Lake, River, and Desert Sands" in their geological, physical, and chemical aspects. Our researches have extended over a period of six years, and are based on studies made in the field, in the laboratory, and with the microscope, and will be found to embrace many novel facts and original views. We have collected in person, by correspondence, and with the aid of the Life Saving Service of the United States, and of the Smithsonian Institution, several hundred specimens of sands and silts from localities in America, Europe, Africa, and Asia: these we have subjected to systematic examination and have tabulated the results.

The interesting phenomena of "musical sands," so called, have also been made special objects of our investigations, resulting in the discovery of many new localities, and of novel properties, as well as of the circumstances connected with the origin, production, and extinction of the sonorous qualities from which these sands receive their name. Furthermore, we have traced the history of musical sands through the literature of many centuries, and have brought together from widely scattered sources memoirs and notices of both scientific and popular interest. Throughout our work the bibliography of the subject has not been neglected, and we have availed ourselves of the photographic art for the purposes of illustration. We beg leave to make this preliminary announcement because our researches have been lengthened far beyond our expectations, and their publication (save in a few abstracts in the Proceedings of the American Association for the Advancement of Science) unavoidably delayed.

With regard to the occurrence of musical sand in Europe, the existence of which is unknown to Mr. Carus-Wilson, we may add that we have specimens from various localities, and the literature of the subject is accessible to everyone.

H. CARRINGTON BOLTON.

ALEXIS A. JULIEN.

London and New York, September 1.

YOUR correspondent in NATURE of the 30th ult. (p. 415), mentions a sea-beach in Dorsetshire as the only place in the Kingdom, besides the Island of Eigg, where "musical" sand is known to occur. This summer I found the sand in Lunan Bay (Forfarshire) to be distinctly sonorous. The sound occurred on moving the foot across the sand, or moving a walking-stick or the finger. The sound was little inferior to that in Eigg. The attention of a fisherman having been directed to the circumstance, he informed me they were quite aware of the occurrence, and that the sound was frequently much louder than on the day I was there; depending, I presume, on the state of the sand and of the atmosphere. He also mentioned that the sound occurs in the sand of Montrose Bay. I observed that the best result was got where the sand was moderately dry, and that little or no effect was produced with such a greater degree of moisture as

gave a good result in Eigg. The form and composition of the sand-grains differ considerably in the two localities. It seems probable that sand of this character occurs in more localities than hitherto supposed. K.

Torquay, September 8.

## THE LATE ARTHUR BUCHHEIM.

I HAVE been requested, and feel it a melancholy satisfaction, to notice in the columns of NATURE the premature decease on the 9th inst., at the age of twenty-nine, of Mr. Arthur Buchheim, for many years Mathematical Master at the Manchester Grammar School.

He was educated at the City of London School, whence he proceeded to Oxford, and gained an open Scholarship at New College there. He was a favourite pupil of the late Henry Smith, my distinguished predecessor in the Savilian Professorship of Geometry, who always spoke of him as the most promising young mathematician that had appeared in the University of Oxford for a long series of years. I am not able to speak of his earlier work as an original investigator, but know and value highly his contributions to the great subject which engaged the principal part of my own attention during the transition period between my residence in Baltimore and at Oxford, and to which I have given the name of Universal Algebra. He was a man of singular modesty and goodness of heart, which made him beloved by all who were brought into connection with him. Had his life been spared, I think we may safely say of him what Newton said of Horrocks, that "we should have known something" of what may now probably remain long unknown.

His life, it is to be feared, may have been shortened by his intense application to study, as after the arduous labour of the day he would sit up at night to study languages such as Sanskrit, Persian, Chinese, and Russian, almost any one of which was sufficient in itself to occupy his undivided attention.

After leaving Oxford he studied for some time under Prof. Klein at Leipzig. This episode in his life no doubt contributed to widening his intellectual horizon, but at the same time had the unfortunate effect of getting him out of the style of ordinary English University Examinations, in consequence of which he abstained, although strongly pressed by the authorities to do so, from offering himself as a candidate for a vacant Fellowship at the College of which he was a Scholar.

He comes of an intellectual stock, his father being the well-known Prof. C. A. Buchheim, of King's College, London.

Up to the last, after he had been obliged from ill health to resign his appointment at Manchester, he continued in harness, and made a communication to the London Mathematical Society at the monthly meeting in May or June last.

I have been furnished with a list of his published papers, fourteen in number, up to the year 1885 (exclusive), of which four appeared in the Proceedings of the London Mathematical Society, eight in the Cambridge *Messenger of Mathematics*, one in the *American Journal of Mathematics*, and one (November 1884) in the *Philosophical Magazine*. This last was entitled, "On Prof. Sylvester's Third Law of Motion," with which, I regret to say, I was previously unacquainted.

"The three laws of motion" of which it forms one were formulated by me in one of the Johns Hopkins Circulars, and it is a proof of the keenness of his research, that the subject of this notice (probably the only mathematician in Europe) should have made himself so well acquainted with them as to be able to write an independent paper on the subject. They have no direct connection (except in a Hegelian<sup>1</sup> sense) with mechanical principles, but are

<sup>1</sup> By which I mean that sense according to which motion in space is to be regarded as only a particular (visualized) instance of change in *actu*.