in the British Museum," a large part of which was written by Dr. Sharpe, but the new species described since the publication of the twenty-seven volumes which comprise the "catalogue" are here included. Proofs of the work have been read and corrected by a number of leading ornithologists throughout the world, assistance sufficient, as Dr. Sharpe says, to give the work "the importance of an international publication."

Human Nature: its Principles and the Principles of Physiognomy. By Physicist. Part ii. Pp. viii + 175. (London: J. and A. Churchill, 1899.)

THE nature of the volume can be indicated by stating one of the propositions of the author's theory of colour: "That exhausted viable matter absorbs the luminous rays, and reflects the invisible (potential) rays, therefore it is dark or nearly colourless, sometimes violet or purple being perceptible; and that viable matter stored with energy reflects the luminous rays, therefore it is yellow or some colour containing excess of yellow, as brown, or cream colour, &c., and absorbs the invisible or potential rays."

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

The Cause of the Darjeeling Landslips.

PROF. JOHN MILNE'S prompt contradiction in the *Times* of October 3, and in NATURE (5th) of the telegraphic statement concerning the cause of the recent Darjeeling landslips is a distinct "score" for the seismograph. With the Committee appointed by the Bengal Government to investigate the causes of the recent disaster, and to formulate measures for anticipating its possible recurrence, I made special inquiries into the alleged occurrence of earthquakes at Darjeeling on the night of September 24–25, and we all agreed that there was no evidence to show that any seismic phenomena whatever occurred. No movements were felt in well-built houses, and those that were noticed, as well as the sounds which were heard during the violent cyclone, were only of a kind that might be expected in the ill-built, rickety structures which, for the shelter of those who temporarily reside in our hill stations, are known to their owners as "houses." Local earth-tremors may have resulted from the slips, but they were the effects, not the cause, of the latter.

The unprecedented rain which accompanied the September cyclone was a sufficient and satisfactory immediate cause for the numerous landslips near and in Darjeeling. Up to the morning of the 23rd, the monsoon rains measured some 17 inches in excess of the average for previous years, and the thick soil-cap was consequently already saturated. The cyclonic depression first reported by the Meteorological Department to be formed to the south-east of False Point in the Bay of Bengal moved northwards until its centre, on the 24th, had reached lat. 25°, causing heavy rain over most of the province. During the twenty-four hours ending at 8 a.m. on the 23rd, 5·31 inches of rain fell at Darjeeling, followed by 19·40 inches during the next twenty-four hours. Of the latter amount 14·32 inches fell between 4 p.m. on the 23rd and 4 a.m. on the 24th, being thus over an inch an hour for a stretch of twelve hours. It was during this last period, when the rainfall was at its heaviest, that the disastrous slips occurred.

The hill-sides in the neighbourhood of Darjeeling are by natural means already at or near their angle of repose for earth-slopes, and the reduction of frictional stability, due to the thorough saturation by the heavy rainfall of September 23–24, was sufficient to permit slipping of the less stable portions of the soil-cap. The biotite-gneiss massif below is undisturbed and perfectly stable: there is nothing here comparable to Naini Tal, where the slates, by differential movement along their bedding planes, have caused cracks in the masonry structures built upon them. In Darjeeling the slips were confined entirely to the soil-cap, which ran down the steep hill-sides as rivers of mud, and, with occasional included boulders, bombarded the back quarters of some of the houses. A more interesting example on the eastern side of the Jalapahar ridge shows movement on a comparatively large scale now in progress. The sides of the moving mass are defined by longitudinal shear cracks, whilst its upper region—the *Abrissgebiet* of Heim—shows gaping fissures with, in the uppermost ones, a vertical displacement of about 8 feet. A description of this interesting landslip, with map and photographs, will be issued at a later date by the Geological Survey Department. T. H. HOLLAND.

Geological Survey of India, Calcutta, November 8.

Barisal Guns.

I MUST first state how I came to notice this phenomenon so well known in Bengal. Early in February, 1890, I was posted to Backergunge, as District Superintendent of Police, and remained there till December, 1891, a period of twenty-two months. In order to travel quickly over the district a steam launch was always at my service, and as I had to visit each of the numerous police stations scattered all over the district at least twice every year, there are few places in Backergunge I have not visited repeatedly.

Shortly after my arrival I received a letter from my friend, Mr. G. A. J. Rothney, of the firm of Messrs. John Dickinson and Co., 65, Old Bailey, who has a very wide experience of India, and takes a keen interest in natural phenomena, asking me to try and elucidate this phenomenon of the Barisal Guns; to make careful observations and record them on the spot. This I did, and I now forward a copy of the note I sent him.

The causes usually assigned for this phenomenon are three in number, viz. :—

(1) High banks of rivers falling in;
(2) Surf breaking on the shore, and
(3) Subterranean explosions.

The first of these theories cannot stand in face of the undisputed fact that any such sound would be purely local and could be heard only at very short distances, whereas it is admitted these guns are heard at places a hundred miles apart. The second is equally untenable when we remember the whole delta is composed of alluvial deposit, without a rock for hundreds of miles. And, thirdly, this alluvial deposit entirely does away with the possibility of subterranean explosions.

It is well known to all navigators of these waters there is a peculiarly deep depression to the south of this delta, which either has never been sounded, or, if sounded, has shown a most unaccountable depth, and it is assumed these reports emanate from this depression. But I am not inclined to accept this as a sufficient explanation, as the sounds are so very irregular in their frequency. We all know that Geysers in various quarters of the globe are celebrated for shooting out great masses of water from time to time; but these usually have some periodicity, and their times for discharge have been, more or less, tested and reduced to some well-known law or theory. Now the very irregularity of the Barisal Guns proves they can be subject to no such law, for, if they were, the phenomenon should be heard with some regularity, whereas, as I have shown in my note to my friend, their irregularity is one of their most noticeable features.

There are two special occasions to which I would draw attention: the first in February, 1891, when from the southernmost outpost, Chaltabuni, I followed the reports for some forty miles out to sea; the second, mentioned in my letter to the Surveyor-General of Bengal, when, in August, 1891, for more than six hours, I followed the reports without getting any appreciably nearer, and also never hearing them to the north of me. HENRY S. SCHURR.

34, Bloomsbury Street, W.C., November 28.

(*Report.*)

BARISAL GUNS are heard over a wide range extending from the Twenty-four Pergunnahs through Khulna, Backergunge and Noakhali, and along the banks of the Megna to Naraingunge and Dacca. They are heard most clearly and frequently in the Backergunge district, from whose headquarters they take their name.

These Guns are heard most frequently from February to October, and seldom in November, December or January. One very noticeable feature is their absence during fine weather, and they are only heard just before, during, or immediately after heavy rain.