

families of hedgehogs, swine, and dormice, and of the genera *Meles*, *Equus*, *Bos*, *Gazella*, *Mus*, *Cricetus*, *Meriones*, *Dipus*, and *Hystrix*, among mammals; and of the important families of flycatchers and starlings, the extreme rarity of larks, the scarcity of warblers, and the absence of such widespread genera as *Acrocephalus*, *Hypolais*, *Ruticilla*, *Saxicola*, *Accentor*, *Garrulus*, *Fringilla*, *Emberiza*, *Motacilla*, *Yunx*, *Cuculus*, *Caprimulgus*, *Perdix*, *Coturnix*, and all the true pheasants, among birds, many of which are groups which may almost be said to characterise the Old World as compared with the New, must surely be allowed to have great weight in determining this question.

The geographical individuality of the two regions is of no less importance, and if we once quit these well-marked and most natural primary divisions we shall, I believe, open up questions as regards the remaining regions which it will not be easy to set at rest. There runs through Prof. Heilprin's paper a tacit assumption that there should be an equivalence, if not an absolute equality, in the zoological characteristics and peculiarities of all the regions. But even after these two are united, there will remain discrepancies of almost equal amount among the rest, since in some groups the Neotropical, in others the Australian, far exceed all other regions in their speciality. The temperate and cold parts of the globe are necessarily less marked by highly peculiar groups than the tropical areas, because they have been recently subjected to great extremes of climate, and have thus not been able to preserve so many ancient and specialised forms as the more uniformly warm areas. But, taking this fact into account, it seems to me that the individuality of the Neoarctic and Palæarctic regions is very well marked, and much greater than could have been anticipated; and I do not think that naturalists in general will be induced to give them up by any such arguments as are here brought forward.

ALFRED R. WALLACE

A Remarkable Phenomenon.—Natural Snowballs

I TAKE the liberty of inclosing a copy of an account of natural snowballs which I furnished to the *Courant* newspaper in this place. It may be well to state that the distance from Long Island Sound to Massachusetts is some seventy miles, and that the Connecticut Valley Railroad is about fifty miles long, and runs close to the bank of the Connecticut River for some forty miles; the rolls of snow on the frozen river are said to have been very large and handsome.

SAMUEL HART

Trinity College, Hartford, Conn., U.S.A., February 22

On Tuesday evening a light but damp snow fell upon the crust that had formed over the snow of Sunday's storm; and the south wind, which arose at a later hour, produced an unusual phenomenon. Wednesday morning the college campus, the park, and vacant lots everywhere hereabouts were seen to be strewn with natural snowballs, some of them resembling spheres with diameters of from one to nine inches or more, and others looking very much like rolls of light cotton batting, having a cylindrical shape, but in nearly every case with a conical depression at each end reaching nearly or quite to the middle. It was easy to see how the balls had been formed, as it is easy to see how boys roll up the snow for their forts. The wind had in each case started a small pellet of the moist snow, and it had rolled along until it grew so large that the wind could move it no further. The ball not only increased in diameter as it rolled, but also grew gradually in length as a little more of the snow stuck to it on each side, and thus the snow was formed into the peculiar shape described—that of a cylinder with a hollow at each end, as if a long isosceles triangle were rolled up, beginning at its vertex. The largest of the cylinders measured on the college campus had a diameter of twelve inches and a length of eighteen inches, while others in the fields in the neighbourhood seemed much larger. The path of the balls could in many cases be readily traced for a distance of twenty-five or thirty feet. The snow, it should be added, was not at all closely packed, but lay together very lightly and yielded to a slight touch, so that it was impossible to move a ball without breaking it.

Observers in other parts of the city report that some balls were seen of the size of a barrel which left tracks behind them for more than sixty feet. From East Hartford it is reported that they studded the fields thickly, especially in places where the wind had a long range, and were of every size to that of a half bushel or larger. Similar balls were seen yesterday morning in many places from the Sound north to Massa-

chusetts. All along the line of the Valley Railroad they appeared on every rod of ground, and at some places they had left tracks showing that the wind had blown them in every direction, even in some cases up hill.

This interesting phenomenon, though quite unusual, has been noticed before in different places in this country and elsewhere, the most striking instance on record being one which was observed in New Jersey in 1808; this was in the daytime, when the whole process could be watched. On this occasion some of the masses of snow which were rolled up by the wind attained a diameter of three feet. They appear to have been seen, however, over an area of only some four hundred acres, whereas the snowballs yesterday were spread thickly over many square miles.

[We have received a communication on the same subject from Prof. Brocklesby of Hartford.—ED.]

The Late Transit of Venus

I AM told that, in referring to the observations on the late transit of Venus which were made from a station on our college grounds by the astronomers of the German Imperial Commission, you speak of them as using the photographic process. This is not correct; besides contact observations they restricted themselves to the use of the heliometer. The first and the second contacts were not seen by reason of clouds; but four half sets and six full sets of heliometric measurements were made—128 in all. The third and the fourth contacts were observed by the German astronomers and by myself.

SAMUEL HART

Trinity College, Hartford, Conn., U.S.A., February 22

Rankine's "Rules and Tables"

I DO not know upon what authority your reviewer of Rankine's "Rules and Tables" bases his dictum that the r in the rule for the extension or compression of a spiral spring should be to the second power instead of to the third power. Prof. Rankine's view was that it should be r^3 . I would refer your reviewer to vol. xviii. of the *Transactions of the Institution of Engineers and Shipbuilders in Scotland*, where he will find, amongst other results of an experimental committee's investigations upon the important question of the loading of safety-valves by such springs, that the *third* power of the radius or diameter of the spring is also used.

W. J. MILLAR

Glasgow, March 10

[The formula given by Mr. Millar is, the writer of the notice informs us, perfectly correct, and the error is his.—ED.]

Meteors

ABOUT five minutes past seven this evening I saw the most beautiful "shooting star" I have ever witnessed. It was moving from east to west directly over this town, and disappeared at an apparent distance of ten or twelve miles, after traversing an arc of about 75° as I saw it. It was visible whilst one might count ten or twelve at the usual rate of speaking. In its course it not only left a most unusually long train of light behind, but whole pieces kept *dropping*. What appeared is thus best described. These pieces followed the original for a space, leaving perceptible lines of light. Probably ten or a dozen such pieces were broken off during the time I was looking. Some idea of it may be gathered from the fact that for a time I thought it was a rocket. The light was remarkably white, the brilliance much above that of Venus at any time, and its rate of motion slow. The most remarkable feature, however, was the continuous breaking away of pieces, which left in turn visible trains of light.

THOMAS MASHEDER

The Grammar School, Ashby-de-la-Zouch, March 17

IN NATURE, vol. xxvii. p. 434, reading somewhat hastily, I took the brilliant meteor there mentioned to be one I myself saw. Reading more carefully, however, in last week's issue, I see that both day and hour and direction differ. On March 4, about 8.45 p.m., a very large and bright meteor passed at a low altitude from south to north. It was of a greater apparent size than Venus, quite as bright, but with a greener light. The motion was slow, no train; it only became incandescent during