Even those explorers who attempt to describe closely what they see are hampered by the lack of terms of precise meaning with which to name the elements of a landscape; for, apart from the rarity of teaching in this important branch of physical geography, there is too little recognition of the connection that necessarily and often clearly exists between internal structure and external form, — too great neglect of the evolution of topography, during which the features of youth, maturity, and old age, succeed one another. There should be a terminology as well defined and extensive as that which botanists have invented for the description of leaves; for it is about as indefinite to call a country hilly as to call a plant leafy. There should be a collection of typical forms in models or figures marked with descriptive terms, approved by some authoritative body, to serve as a standard by which travellers might be trained. The question is well worthy the attention of geographic societies and congresses.

IT is much to be regretted that it has been found necessary to suspend the operations of the Northern transcontinental survey. It was organized about two years ago, under the direction of Mr. Raphael Pumpelly, to obtain a comprehensive and authoritative knowledge of the resources of the vast region in the northwestern part of our country tributary to the Northern Pacific railroad and the associated companies, at whose cost it was undertaken. Up to that time this extensive territory, embracing, perhaps, one-fifth of the United States, had been very imperfectly explored geographically, and was still less known as regards those resources which will contribute to the business of the railroads that traverse it. A large amount of accurate information has now been gathered, and in small part published. Mr. A. D. Wilson, of broad experience in western exploration, was put in charge of the topographical work, with Messrs. Goode and Nell as chief aids; and we have just received a set of six maps, the fruit of their first season's surveys, a notice of which will be found in the 'Notes and news.'

FROM a circular just issued by Professor Dohrn, we learn that the cost of publishing the *Zoologischer jahresbericht* for 1879 and 1880 amounted to nearly $7,000, while the income from sales of the publication amounted to only $2,317. The zoölogical station at Naples has thus been obliged to meet a large deficit, amounting to at least two-thirds of the cost of publication. It is plainly not within the means of the station to continue indefinitely this work without assistance. The governments of Italy, Germany, and Russia, as well as one or two zoölogical societies of Holland, have made subventions which cover about one-third of the deficit. The three volumes of this work already completed speak for themselves. Every naturalist will learn with regret that a work of such general usefulness is in danger of being discontinued from the cause above named. We certainly hope that Professor Dohrn's appeal for assistance will meet with a liberal response, both in the way of subscriptions for the *Jahresbericht* and in subventions.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

Earthquake waves at San Francisco.

ASSISTANT George Davidson telegraphs the superintendent of the U. S. coast and geodetic survey from San Francisco, that at 7 h. 24 m., last evening, earthquake waves were indicated by the delicate levels of the astronomical instruments of the observatory. The amplitude of each vibration was three seconds of arc, in three seconds of time, and they continued for twenty minutes.

C. O. BOUTELLE,
Assist. in charge of office, etc.

Coast and geodetic survey office,
Jan. 26, 1884.

Influence of winds on tree-growth.

I notice at p. 471 of the issue of *Science* for Oct. 5 some remarks by Mr. W. S. Kennedy on the influence of winds on tree-growth. It may be of interest to learn that many of the trees on the seashore at Government House, Malabar Point, Bombay, are bent landward from the effect of the prevailing sea-breeze.

H. RIVETT-CARNAC.

Allahabad, N. W. P., India,
Dec. 8, 1883.

Some curious natural snowballs.

On p. 237, vol. i., of *Science*, under notes and news, is a reference to some curious snowballs noticed in *Scientific American* for March 17. Such an exhibition I lately saw; and it may interest readers of *Science* to know the conditions favoring such a phenomenon.

On Jan. 8 and 9 some thirty inches of snow fell in this region, followed by warmer weather and light rain on the night of the 10th, settling the snow into a

compact mass. On the 11th and 12th came freezing weather, and the fall of a small amount of very light snow. On the 13th the thermometer, toward noon, rose above freezing-point, with a stiff breeze from the south. This wind so acted on the surface-particles of the upper layer of uncompacted snow as to set some of them in motion. Each particle thus set in motion, owing to the soft condition of the surface-snow, formed a nucleus, which, as it proceeded, forced along by the wind, gathered the contiguous portion of the soft layer, and assumed the form of a cylinder, with a conical cavity at each end, and having a length about twice as great as its diameter. The size depended upon the inclination and smoothness of the surface traversed. The largest cylinders I saw were about three feet long, at which limit they acquired sufficient weight to indent the frozen surface of the under or main body of the snow. This, of course, stopped the further rolling of the mass. The only locality where they acquired the above large size was where the surface had a slight inclination to the north; and the snow was deep enough to cover all weeds, leaving a perfectly uniform and smooth surface for their formation. In many cases the balls were rolled up an inclination of as much as one foot in ten, when exposed to the unbroken force of the wind; but those thus formed acquired weight sufficient to resist the pressure of the wind, when about six inches in diameter. When the surface inclined toward or directly away from the wind, the balls traversed a straight path; but, when the surface declined to the north-east or north-west, the path was a curve; at its initial, approximately straight; but, as the ball acquired weight, its direction was a compromise between that required by gravity and that by the direction of the wind, until, in some cases, the ball obeyed gravity alone. The most curious part of the display was the abundance of the balls. While travelling three miles, I saw what I estimated at over a hundred acres dotted more or less thickly with the cylinders. In some cases there were twenty-five balls to the square rod; in others, only two or three; averaging, perhaps, eight or ten. I saw multitudes in the process of formation, which was as sudden as a flash; but they almost immediately assumed a slow rate of motion, about that of a mole taking his leisurely walk. In a few cases the cylinders would stop, and afterward be forced into motion again. The largest examples required for their formation the traversing of from two to three rods. SAM HUSTON.

Richmond, O., Jan. 16, 1884.

The wind performed a very pretty feat in some portions of northern Ohio on the morning of Jan. 13. Loose bits of snow were caught up as a nucleus, and rolled along upon the surface until balls of considerable size and peculiar shape were formed. The whole surface was strewn with the balls; but they were most abundant upon lawns and fields where the wind was not obstructed, every square yard, in some places, bearing a ball of greater or less size. The largest observed here were upon the college ball-grounds, where they reached ten inches in height, and a horizontal length of eighteen inches. Even these were swaying as the gusts passed over them; and their tapering track could be plainly traced back towards the south-west, twenty-five or thirty feet, to the apex where they started. Their shape was cylindrical, deeply hollowed at both ends, so that they looked like 'muffs,' and the spiral formed by the successive layers was finely regular and distinct.

The meteorological conditions which made the phenomenon possible were as follows. Two days before the occurrence a slight crust was formed upon the snow. On the following day an inch of light flaky snow fell upon this crust. Then followed the warm south-west wind on the morning of the 13th, which brought the upper layer of snow into the adhesive state, and rolled the balls before the crust was weakened; the crust sustaining the balls, and keeping them up to the wind, and at the same time furnishing a smooth floor upon which they could be propelled. The nuclei of the balls were obtained from chance foot-tracks, walk-borders, lumps blown from trees, etc., though often it was difficult to account for them. The balls were most abundant and perfect at about nine o'clock A.M. Before noon the crust had been attacked, and all sunk to rounded, insignificant clumps.

Oberlin, O. ALBERT A. WRIGHT.

[Similar snow-rolls were seen at Sharpsville, Mercer county, Penn., on the same day, by J. M. Goodwin.]

Halos round the moon.

On the evening of Jan. 12, at 9.20 (90th meridian time), my attention was called to a peculiar appearance about the moon. The sky was quite clear at the time, and there appeared around the moon several colored circular bands. The first was of a bright silver-gray shade, and about two diameters of the moon in width. The next was yellow, the next faint orange, and the next violet. The three bands were each about one-half a diameter in width. The outermost band was of a green shade, and about two diameters in width. At ten o'clock the innermost light band remained, but all the others had been replaced by a blue band lighter than the surrounding sky.

H. A. HUSTON.

Lafayette, Ind., Jan. 14, 1884.

Explorations in Guatemala.

Looking over the back numbers of your esteemed journal, I came across a slight error. In the article 'Lorillard City' it is said (ii. 412), "M. Charnay found the ruins of an ancient city, which he named after his generous patron. In his exploration here, he was assisted by a young Englishman, Mr. Alfred Maudslay, with whom he shares the honor of discovery," etc.

Neither Mr. Maudslay, who arrived at these ruins before Mr. Charnay, nor the latter, can claim this honor. In fact, Mr. Maudslay distinctly states (p. 196 of the *Proc. roy. geogr. soc.*, April, 1883) that they have been discovered by Mr. Edwin Rockstroh, tutor on the Lyceo nacional at Guatemala City. This gentleman made, during the first half of 1881, a geographical and archeological exploration in the northern and western parts of the republic, visiting Tikal, and navigating the Rio de la Pasion, Rio de las Salinas, Rio de los Gacandones, and the Usumasinta as far down as the ruins mentioned. He sent a short account of this voyage to Petermann's *Mittheilungen* (1881, p. 396).

In that account Mr. Rockstroh mentioned particularly the building described by Mr. Maudslay on p. 198 of the geographical society's proceedings; and (1882, on p. 435) he clearly states that Charnay's 'Lorillard City' is the same as that discovered by him in 1881. Mr. Rockstroh mentioned in his first letter to the *Mittheilungen* (July 19, 1881), that the Gacandones call these ruins 'Menche,' and promised in his last notice (1882, p. 435) an explanation of this name. I am not aware that he has furnished one.

I find in the 'Historia de la provincia de San Vicente de Chiapa y Guatemala,' by Antonio de