early account; another by Scott, in the *Quarterly journal of the royal meteorological society* (i. 1873, 55–59), in which most of these references are mentioned.

Further attention to the festoons is given in Poey's little book, 'Comment on observe les nuages pour prévoir le temps' (Paris, 1879, 86), and in Ley's review of it in *Nature* (Jan. 1, 1880, 210). The former calls it '*globo-cirrus*,' and traces its first mention back to Lamarck in 1804; but Poey finds only twenty records of the cloud that he can recognize, seventeen of them being connected with storms. Ley calls the festoons *mammato-cumulus* and *mammato-cirrus*, figuring both kinds, and noting that they are certainly not common, although not nearly so rare as is usually supposed. Abercrombie notes that the festoons result from the failure of the ascensional current that is commonly associated with showers and squalls (*Nature*, May 24, 1884).

My object in writing is to ask if the cloud is commonly seen in this country, and if it is then generally associated with the cirro-stratus of thunder-storms, or with the larger storms that are so unfortunate as to have no special name, unless we call them 'areas of low barometer.' My note-books record the festoon clouds twice in Montana in 1883, twice during the past summer of 1885 in Connecticut and New York (all these being in the cirro-stratus cover of the after-part of thunder-storms), again here in Cambridge, on Dec. 13, 1885, about noon, in the pallio-cirrus sheet attending one of the above-named 'areas,' and at a distinctly greater altitude than the low scud and intermediate cirro-stratus clouds that soon closed in, and gave us rain in the afternoon. They seemed in all cases to be gently falling cloud-masses of films, resembling the forms that ink may take when dropped into water; and, when watched attentively, they could be seen to descend and dissolve away. Are they as rare as the notes by Symons and Poey would lead us to think? W. M. Davis.

Cambridge, Mass., Jan. 5.

Topographical models or relief-maps.

I must personally thank you for your good words in behalf of non-exaggerated reliefs in your last issue, p. 24. I have had a long experience in this kind of work, and never found a case which required the vertical scale to be exaggerated. No relief of the surface is too delicate to escape the human eye when represented with sufficient skill and care in modelling. The demand for exaggeration in a relief comes from those who will not spend a sufficient amount of time and pains upon the intermediate contour curves, or from those who have not trained themselves in drawing from objects. The habit of exaggerating the relief excuses itself at first on the plea that common people cannot appreciate heights when true to nature, but the fact is that the difficulty is felt by the modeller himself; and when the habit is once formed, it becomes incurable. If a relief-map be not true to nature, what is the good of it? Geologists have been forced to abandon exaggerated cross-sections; why should they permit relief-map makers to revive the discarded error, and put the representation of the whole in antagonism to the representation of the parts?

About the year 1865 or 1866 I made a wooden model of one of our lower Silurian limestone valleys, with its bounding ridges, about 20 miles long. The model was about 18″ by 36″, in 12 bars of wood, each 18″ long by 3″ wide. On each side of each bar I painted the corresponding section of the valley, with its limonite horizons, and faults. The model still exists. My purpose was first to get correct ideas of the country structure for my own work, and then to exhibit my conclusions to the Pennsylvania railroad company, who employed me. The reliefs in the valley were very low; but they were perfectly legible to the eye of a layman. What would have been the fate of my side-sections had I used an exaggerated vertical scale?

In 1865 I made a model of the underground of the Plymouth anthracite mine, with its remarkable vertical fault, from levels which I took in the mine. What good would this have been had I used a different vertical scale?

I have myself made models on several plans; the most satisfactory, but the most laborious, being to draw a good many cross-sections on the same vertical and horizontal scale, along parallel lines, as nearly as possible at right angles to the general strike; then cut strips of wood, lead, zinc, or stiff paper (I have used all four) to represent the cross-sections; set these up in their places; fill in with wax or plaster; and finally tool the surface thus obtained. I prefer this method to the common one of jigging out the contour curves, and filling the terraces between them with slopes of wax. The latter method is easier and less costly; but it is sure to make the modeller slovenly in his geological representation, and it is a powerful seduction towards exaggeration of the vertical scale. Beginners and earnest scholars ought not to be allowed to use this method until they have been drilled to accuracy, and to love the true natural aspect, by the compulsion of the method of cross-sections. I never see a false relief-map without indignation, and a touch of the contempt we feel for all anachronisms. J. P. Lesley.

Philadelphia, Jan. 10.

The cherry tortrix.

This insect, Cacoecia cerasivorana Fitch, was very common in Michigan the past summer. The most interesting thing about it is the large web or tent which it spins, and in which it usually stays. As it needs more food, it 'ropes in' new twigs, and thus has fresh foliage right at hand. I found that these little caterpillars would deflect a shrub, an inch or more in diameter, several inches, that its leafy branches might be brought into its tent. How do these little larvae exert so much force? I know that entomologists usually say it is by the pulling of the hundreds of larvae as they move their heads back and forth in the operation of spinning; but I do not see how they can pull. As they touch their mouth to the web or twig, the liquid secretion adheres, and quickly hardens into a tough thread; but the larvae do not seem to draw, nor is it certain that the thread would be strong enough so early in its formation to draw with any force. From very careful observation in the laboratory, I was led to believe that it was due to the contracting force of the many hardening silk threads that brought the large twigs together. These larvae are smooth, and must find the web a great protection. The teeth on the chrysalides are of great service in enabling them to push out of the tents, just as the moths are to issue. A. J. Cook.

Lansing, Mich.