

himself at station No. 12, on one of the peaks of the San Juan Mountains, in August, 1874, at an altitude of 13,967 feet above the level of the sea.

An interesting and significant circumstance recorded by Mr. Rhoda was the fact that there was a sudden and instantaneous cessation of the distressing electrical manifestations whenever a stroke of lightning took place, to be speedily renewed by the returning tension of the electricity. He says, "The sharp points of the hundred stones about us each emitted a continuous sound, while the instrument outsang every thing else, and, even at this high elevation, could be heard distinctly at the distance of fifty yards. The points of the angular stones being of different degrees of sharpness, each produced a sound peculiar to itself. The general effect of all was as if a heavy breeze were blowing across the mountain. The air was quite still, so that the wind could have played no part in this strange natural concert, nor was the intervention of a mythological Orpheus necessary to give to these trachytic stones a voice."

JOHN LE CONTE.

Berkeley, Cal., Dec. 25.

Stereoscopic vision.

In reply to the inquiry of Mr. W. H. Pratt in the last issue of *Science*, it is necessary only to consider the various elements which are combined in the formation of a visual judgment. If an observer, who possesses but a single eye, looks out upon a landscape, the relative distance of the different objects viewed may be roughly estimated in terms of some standard arbitrarily chosen, so long as they are not precisely aligned with his eye. The judgment is less accurate as the angular separation of the objects becomes less, and as there are fewer of them at moderate distances for comparison with the rest. Always, and usually unconsciously, he employs one or more of the following elements in judging the distance and form of each object regarded:—

I. Near objects subtend larger visual angles than remote objects of equal size.

II. Near objects are seen more distinctly than those that are remote. The illusion of distance may hence be produced by decreasing the brightness of the object viewed, by changing the nature of the medium, or by increasing the contrast between light and shade.

III. Near objects that are almost aligned with those which are remote, often partly cover them. Covering objects are judged nearer than those covered.

IV. Familiarity with the dimensions of known objects when near enables us to compare them when remote, and thereby judge their relative distance.

V. By moving from one stand-point to another, and comparing the new view with what is retained in memory of the previous one, parallax of motion thus contributes to the formation of a judgment of both distance and form.

All of these elements may be imitated in pictures, except the last. In the examination of ordinary stereographs they are combined with the important element of binocular perspective, and to such an extent that it is impossible to know just how much we are indebted to binocular perspective for the illusion of apparent relief. Skeleton diagrams, properly constructed, are hence the only means of studying stereoscopic

vision, if this term be taken as a synonyme of binocular vision. If Mr. Pratt will try his method with an outline drawing, it will fail.

In regarding an ordinary painting, binocular vision is often a hinderance, rather than an aid, in appreciating perspective. It is at least important to cut off from view the objects surrounding the picture, which we involuntarily take into comparison with it. In the application of geometry to perspective, a single point of view (station-point) is always assumed, and in examining the result the observer should place a single eye as nearly as possible at the same station-point to attain the best perspective illusion. The other eye must be closed, if he wishes to exclude the interfering element of binocular vision which will at once be unconsciously applied to the card or canvas on which the picture has been made.

It is by the observance of these precautions that Mr. Pratt has been able to appreciate perspective in the pictures examined, but true stereoscopic vision was excluded instead of being attained by what he may have supposed to be a new method.

W. LE CONTE STEVENS.

Brooklyn, Jan. 1, 1887.

Star rays.

Mr. Randolph will find the phenomenon of the long vertical rays or streamers proceeding from a strongly luminous point described and fully explained in my little volume entitled 'Sight,' pp. 87-89. They are produced, not by *reflection* from the eyelashes, as he supposes, but by *refraction* of light passing through the meniscus of moisture between the lid and the cornea, and are therefore more distinct when the lids are brought near together. I had investigated the phenomenon and ascertained its cause before I was aware of the very brief mention of it in Daguin's 'Traité de physique,' vol. iv. p. 323.

The radiating points about a star are more difficult to explain. They are probably due to some peculiarity in the structure of the crystalline lens.

JOSEPH LE CONTE.

Berkeley, Cal., Dec. 25.

A German sentence.

In your current number you give an example of a German sentence. In *Teutonicity* it can hardly compete with the following extract from an advertisement of a well-known periodical: "Als eines der vorzüglichsten Weihnachtsgeschenke müssen die elegant gebundenen Quartalsbände der Deutschen Rundschau herausgegeben von Julius Rodenberg Preis pro Band in elegantem, rothem Originallewandband mit Schwarz und Golddruck 8 Mark bezeichnet werden."

N.

Washington, Jan. 3, 1887.

Pleuro-pneumonia.

It may not be worth while to call attention to two slight mistakes in the printing of my communication on p. 631 (viii. No. 204). The 'meplis' should be 'Mehlis,' the author of micrurus; and the 'U. S. fish commission' on the first line of second column should be 'U. S. entomological commission.'

C. V. RILEY.

Washington, D.C., Jan. 3, 1887.