the fact that thus far all attempts at connecting auroral phenomena directly with meteorological have failed, goes far to show a cosmic rather than a terrestrial origin for the aurora. H. A. H.

An extinct hydroid.

Whether Shakspeare was the first to give expression to the idea of 'Sermons in stones,' the writer of this notice is not scholarly enough to answer. Strongly impressed by many demonstrations of its truth, it is in no spirit of detraction that he ventures the opinion that the inspired bard could not have appreciated the significance of his declaration, if we take into consideration what these sermons have since revealed to us of the past history of the world. The rocks have proved to be volumes of the most convincing sermons, and every pebble has a story that may be read. Such a pebble, the subject of the present communication, was sent to the writer by a greatly esteemed friend, the well-known naturalist and philologist, Prof. Samuel S. Haldeman, shortly before his death. It was picked up in Lebanon county, Penn., but exactly at what locality I failed to inquire. It is an irregular rectangular piece of quartzite, about an inch and a quarter in two diameters, and half an inch in the third diameter. It has several conchoidal fractures, is water-rolled, with rounded edges, and smooth. It is dirty white, opaque, homogeneous, and of flinty texture. Embedded in it, scattered here and there, are seen several dozen little fossils, all of the same character, and worn level with the smooth surfaces of the pebble. Most of the fossils have the form of a narrow ellipse with acute extremities, or have the shape of a section of a double convex lens. Where they cross the edges of the pebble, they exhibit the same form of outline on the contiguous surfaces; so that, if isolated, they would appear to be actually lenticular in form. They are composed of smoky-colored quartzite, cross-barred with white, and contrast conspicuously with their matrix. My first impression, on seeing the pebble, was, that the fossils were rhizopods, related to the nummulites; but an inspection with a lens indicated them probably to be hydroids related to the graptolites, and especially to Phyllograptus. The lenticular sections of the fossils generally range from four to nine millimetres in length by one to one and three-eighths millimetres in thickness at the middle. As represented in the accompanying figure, the white bars crossing the short diameter of the lenticular sections are produced by what appear to be two rows of cells, with their bottoms applied together inwardly, and separated by a median, slightly undulating line. Many of the cells are flask-shaped, with the neck directed outward, and reaching the convex surface of the fossil. In others the neck is variably shorter, and in some appears to be absent, the difference apparently being dependent on sections of the cells at different levels. In the specimen figured, the beaked cells appear somewhat curved or retort-like, but in other specimens they are straight. The body of the cells mostly exhibits a nucleus of smoky hue, while the walls of the cells are white, though not sharply defined from the nucleus. The appearance seems to be due to the interior of the cells being occupied by a more translucent deposit of silex. In several of the fossils like the one figured, the number of cells in each row is about two dozen. The lenticular sections of the fossils are not all equally symmetrical with the one figured, some bulging more on one side than the other, and a few being thicker towards one pole than the other, and less acute at the end. Two specimens, of which one is eleven millimetres long, are slightly constricted near the middle, and look like conjoined pairs. Another specimen, unlike the others, extends across the pebble for about eighteen millimetres, is of nearly uniform width throughout, and is broken near the middle. One extremity curves laterally, and ends in an obtusely rounded manner: the other extremity extends obliquely in an opposite direction, tapers a short distance, and is then prolonged to a broken end.

HALDEMANA PRIMAEVA.

From the well-known graptolites of the Silurian rocks, our fossil differs especially in the cells being embedded in a common basis or matrix, in this respect resembling such polyzoa as Cristatella in comparison with Plumatella. The age of the fossil I am unable to read in the pebble, though doubtless others may be able to do so. In Lebanon county the prevailing rocks are of lower Silurian age; and it is probable the pebble pertains to one of these, though it may have travelled from another source. The character of the fossil appears to be different from any previously indicated; and I would propose to name it Haldemana primaeva, in memory of the one who called our attention to this interesting representative of the hydroids. JOSEPH LEIDY.

Phosphatic rocks of Florida.

In my 'Report on cotton-production in Florida,' vol. vi. of the quarto series of census reports, p. 14 (194), there is an analysis, by Dr. G. W. Hawes, of a building-stone from Hawthorne, Alachua county. This rock contains 16.02% of phosphoric acid; and it was considered as of eocene or oligocene age, like the rest of the limestone of the peninsula.

During the past winter, Mr. L. C. Johnson of the U. S. geological survey has been collecting in Florida, and has made a very important discovery. He finds that the building or chimney rock in several of the counties of the state, and probably wherever it is found, like that occurring at Hawthorne, is generally phosphatic. Specimens sent to me for examination by Mr. Johnson, from Suwannee, Levy, Alachua, and Marion counties, are strongly phosphatic, varying in content of phosphoric acid from five to ten per cent. The material which contains most phosphoric acid is a porous, soft rock, consisting in the main of grains of quartz, with occasionally a little carbonate of lime, but seldom very much. In some of the specimens, especially those from near Waldo, the soft friable rock contains small nodular masses of nearly pure phosphate of lime disseminated through it. The largest of these nodules is some two inches in diameter.

By the discovery of a highly fossiliferous bed near Waldo, Mr. Johnson has been able to fix the age of these phosphatic rocks as miocene or later; and this view is confirmed by the specimens from Rock Spring in Orange county, collected by me in 1880, which Professor Angelo Heilprin determined from the fossils to be miocene. I have recently tested all these specimens, and find them, without exception, highly phosphatic.

From these facts, and others presented in the subjoined letter of Mr. Johnson, it appears that the deposits of miocene age are generally spread over the Florida peninsula, if indeed they are not co-extensive with those of the oligocene.

This will lead to a modification of some of the views advanced in my census report above referred to, concerning the past geological history of the peninsula, and the origin of the high hummocks; for these hummocks, in part at least, are produced by the action of the *miocene* phosphatic limestone, and not the *oligocene*, upon the prevailing sandy soils.

And, similarly, the much wider distribution of these miocene rocks proves that a much larger proportion of the peninsula was submerged after the oligocene period than I at one time supposed.

We shall look with the very greatest interest for the results of Mr. Johnson's investigations of the rocks of the western coast of Florida, in Hernando and Hillsborough counties.

I may add that none of the specimens of the upper oligocene or Vicksburg limestone, either from Florida or Alabama, which I have examined, show more than a slight trace of phosphoric acid.

EUGENE A. SMITH.

University of Alabama, April 20.

It might have been hasty, without books, and without sufficient opportunity for comparison, to have pronounced the phosphatic rocks of Preston's Sink, Fort Harlee, miocene, or not older. I now think it later still; but always with the reservation that I may be permitted to change my mind upon a more careful study, under circumstances more favorable, and also deferring to the opinion of Dr. White, who already has such favorable opportunities, when he can get time to take up the subject, with all my collection before him.

The location of these phosphates is of more immediate import to you and me. But, on the question of the horizon, I ask the consideration of the facts and specimen already sent you. The 'Nigger Sink' at Downing's, in this vicinity alone, ought to set the question at rest.[1] There you find *in situ*, and exhibiting their due relations, the oligocene limestone at the base, and finally, after various intermediate deposits, a hundred and fifty feet above, the siliceous phosphatic rock, exactly similar to that sent you from the quarry at Gainesville, from Liveoak, and which is found in this oak and hickory region on the top of every hill.

There, also, you find two fossils,— the Ostrea, found also at Hawthorne and in the Wacahootie region, Marion county, always underlying the phosphates, and above the Orbitoides and Pecten of the limestone; and the other, the great coralline, of which I could mail but a fragment. This last is seen *in situ*, so far as I am now informed, nowhere but on the tops of these hills, overlooking the Natural Bridge of Santa Fé.

The Fort Harlee marl, near Waldo, is quite different from the phosphatic rock I have been sending you from so many points. It has all its shells, or casts of shells, intact. The vertebrate fossils, however, seem the same; that is, the sharks' teeth and saurian remains are alike. The phosphatic rock has lost all its fossil shells. That these once existed, is clear from the fact that occasionally a trace may be found. If not the same, then how are they related? The argument must be postponed; but to me the conclusion is clear that the Waldo bed is newer than the others. All the others, from the texture of the rock, the obscure traces of shells, the chemical constituents, and from the surroundings, may be classed as one. The great extent of the formation, and the uniformity of the rock, are still very remarkable.

Undoubtedly it is the same rock seen near Ocala, where the limestone is not visible, at Hawthorne, at Gainesville, at Newmanville, at two or three knolls in the vicinity of Liveoak, and on innumerable others all over this central region of oligocene sinks. Strangely, too, the knobs are uniformly of a height of about sixty feet above the surrounding flats and depressions marked by the cherty limestone. It would be interesting and valuable, if I had the means in my power, to locate and measure the extent of every one of these deposits. Your own census report, giving the extent of hummocks, and oak and hickory soils, east of the great chain of sand-dunes from Apopka northward, and west of the lake region, is the nearest means I can suggest for making an approximate estimate.

LAURENCE C. JOHNSON.

Newmanville, Fla., March 22.

[1] Three others, heretofore explained, — Simmons at Hawthorne, Sullivan old field, and the devil's mill-hopper, — sustain the same conclusions, and none contradict.

Do telegraph-wires foretell storms?

Probably some thousand Americans have noticed the automatic storm-signalling of wires by sound-vibration. I allowed a telephone-wire to remain for a long time attached to one corner of my (frame) house because of its practical utility as a weather-prophet. When not a leaf was stirring in the neighborhood, and not a breath to be felt, the deep undulations were audible in almost every room, although mufflers had been duly applied. Before that, some hours in advance of every severe storm, the upper story was hardly inhabitable on account of the unearthly uproar, which would have made a first-rate case for the Society for psychical research.

The warning that it gave varied from six to twelve hours, rarely exceeding the latter; and I do not think it ever warned in vain. When the storm actually came, the noise nearly always ceased. It never was noticeable in the warmer part of the year; and through the heat of midsummer it was silent. I cannot recall any exception to this. Its climax of clamor was reached some hours before the 'electric storm,' as it was called, of November, 1882. But all through two winters and the proximate parts of autumn and spring I found it a trustworthy and self-announcing storm-signaller, which left me abundant time to prepare. I had it removed, finally, because there was sickness in the house, and its doleful prophecies were not appreciated.

I explained the phenomenon, partly at least, by the effect of very distant air-impulses transmitted in sound-waves from wire to wire, after the manner of the acoustic or mechanical telephone. Yet this does not seem quite adequate, when one considers how far those vibrations must have travelled to outstrip a storm by hours; and yet how much energy and sonorousness they retained when they reached me!

WM. H. BABCOCK.

Washington, April 16.

[We have good authority for saying that the vibrations of the telephone and telegraph wires here referred to are certainly not due to electric currents, nor to the minute acoustic waves of the mechanical telephone, but are simple transverse vibrations and longitudinal waves such as occur on every stretched cord that gives out a musical note. These vibrations are ultimately caused by the wind. For any given wire stretched in a permanent location, there will undoubtedly be a certain direction and character of wind that will call forth its loudest tones. Our correspondent's wire may be specially influenced by the south-