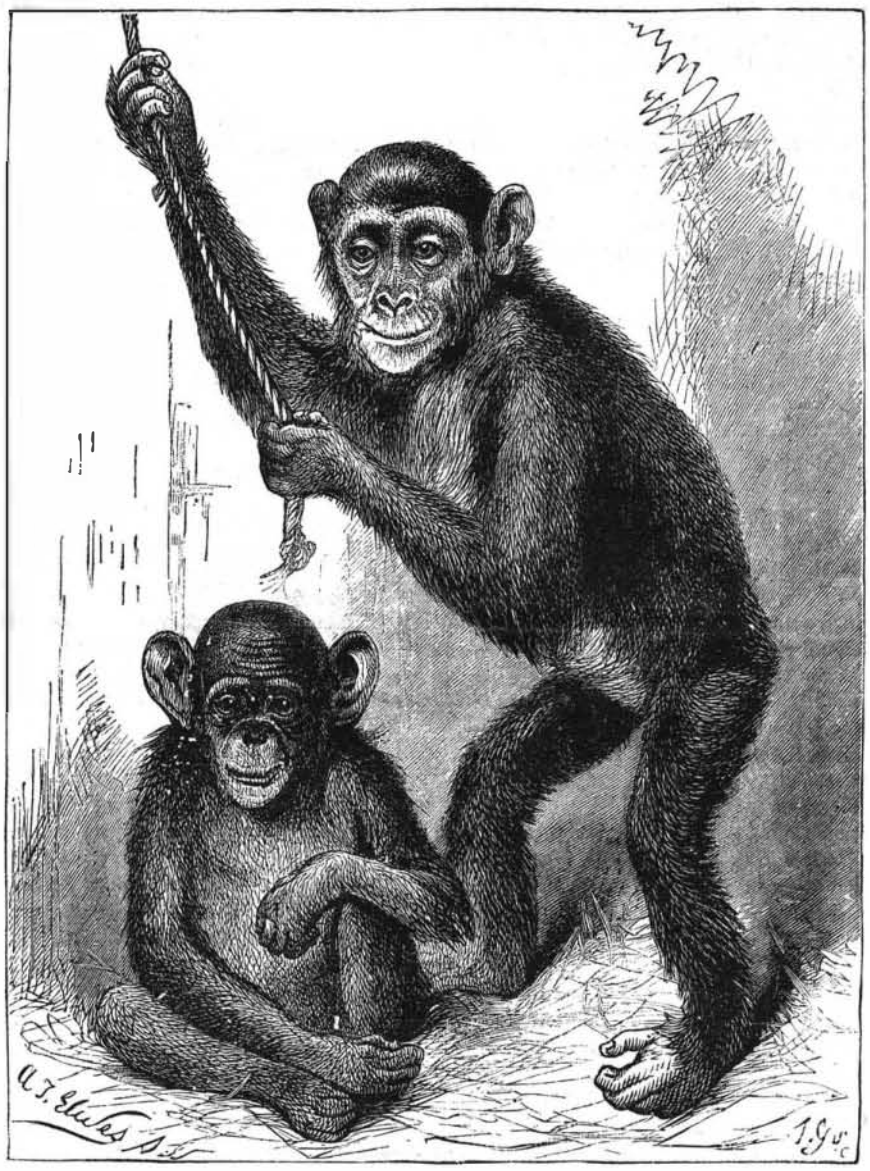
Connecticut Valley Fossils.

At Portland, Conn., on the Connecticut River, three large blocks of freestone have been lately taken out of the quarries, 300 feet below the surface, for the Putnam high school, which are said to be the most singularly marked of any yet found there. On the upper surface of two of the blocks are visible, plainly indented, some of them being a half inch deep and sharply cut, the footprints of birds of a past age; some are large and some small. The third block has the fossilized remains of a creature that in shape resembles a turtle. It is about 1 foot and 6 inches wide, octagonal in shape, and oval like the back of a turtle, it is firmly attached to the rock, and there are no traces of legs.

THE CHIMPANZEE AND KOOLOKAMBA.

The subjects of our illustration were purchased by the Zoological Society of London on Oct. 24; but, unfortunately, the chimpanzee, after living a few days, has succumbed, as many of this species have before, to the fatigue and close confinement of a long and tedious journey.

He was the largest specimen the Society ever had the chance of procuring, and is, consequently, a great loss. He stood, if upright, about 4 ft. 7 in.; and, although slight in comparison with some of his brethren, was of a very powerful frame. It is but seldom that these monkeys are kept alive in Europe for any lengthened time; they almost invariably succumb to cold and lung disease, owing, of course, to the changes in our climate. The other animal, the little koolokamba, is of a rarer species, and is happily thriving well. He appears to be of a hardier constitution. The koolokamba, which gets its name from saying "Koola! Koolo!" over and over again in a strong voice, dwells in the forests of equatorial Africa, and is often seen in company with the chimpanzee. This is the first specimen that has appeared in England, and is an object of great interest to zoologists on account of a certain resemblance, in some points, to the 'nschigombouvie," the chimpanzee, and the gorilla; but is unlike them all in its general appearance, which is rather frog-like. It has an immense belly, and is a vegetable feeder, like all the troglodytes: its skull is globular, it has long ears, and seems to have great intelligence, or rather cunning. Its gait is like that of the gorilla in walking on all fours, resting on the backs of the fingers. We may congratulate the Society upon the acquisition of so valuable a specimen of this rare little creature.—*Illustrated London News.*



THE CHIMPANZEE AND KOOLOKAMBA.

The Alaska Volcano and Tidal Wave.

The Kodiac, eleven days from Kodiac, arrived Dec. 27, and Capt. Cullie, together with C. T. Sands, talked with a *Bulletin* reporter at the office of the Alaska Commercial Company. Mr. Sands says that the tidal wave came about thirty minutes after the eruption, and from shore it appeared like an approaching wall of water. Had the first wave come at high tide, Mr. Sands thinks the little settlement at English Bay would have been obliterated and the inhabitants drowned. The interval between the waves runs about five minutes. The receding waters of the first wave carried the fishing boats from the river to the sea, and the next wave stranded the boats high on the beach. Mr. Sands and others noticed along in the month of August that the mountain in Chernaboura was emitting smoke, but there seemed to be no other premonition of the great explosion which occurred at eight o'clock in the morning of October 6. The shower of ashes followed soon after the rumbling was heard, but the earth did not quake or tremble perceptibly. It was remarked by Mr. Sands as something unusual that the fishes disappeared from English Bay on the night of the 5th. On the morning of the 6th not a fish could be caught or a sign of one seen. The atmosphere was warm, evidently heated by the shower of ashes, which obscured the sun and rendered the place as dark as night for two hours. Looking at night to the west from English Bay to Chernaboura, a distance of forty-nine miles, the spectacle was grand and awe-inspiring beyond description. Columns of lurid smoke and flame seemed to shoot from the earth to the heavens. No one has approached nearer than ten miles to the island since the eruption. At that distance the low ground of the island seemed to be a vast crater from which smoke and fire were issuing.—*San Francisco Bulletin*

Disappearance of Lake Tulare.

Tulare Lake once had an area of 1,736 miles, and depth sufficient for steamboat that navigated it, but its area has been reduced to 196 miles and its greatest depth is only 22 feet. Its contraction is attributed to the absorption of water for irrigating purposes from the two streams that feed it. Some San Franciscans who have just returned from a visit to the lake predict its utter absorption, as every farmer who settles near it digs a new canal for irrigation. There are about forty artesian wells within a radius of forty miles around the lake.

Naturalist Club of Victoria.

Before the Field Naturalist Club of Victoria, Mr. Thomas Harrison contributed a paper on the habits of certain spiders, which we find reported in the *Federal Australian.* It was stated that on placing a large spider on the web of a much smaller but very fierce one, suspended across an old water-butt, the latter deliberately cut the web, and allowed the intruder to fall into the water. After about two hours the spider so unfortunately situated was nearly drowned; and was then hauled up, killed, and eaten. A spider, an immense epira diadema, was placed within a glass case, together with a small tarantula. Next day they were found to have actually eaten each other, only the thorax, head, and a few of the legs remaining. Yet they severally held on by means of their respective mandibles, with an eminent deadly grip, both being quite dead. Six spiders, of the species found under the bark of the eucalyptus, were confined under a tumbler, a bull-dog ant being subsequently introduced. The ant speedily killed five of his fellow prisoners, but on approaching the one remaining the latter turned round, and ejecting several threads of web, succeeded in embarrassing the ant. This done, the spider became the assailant, and rushing upon his antagonist almost bit him in two. Spiders are usually brave; but a tarantula dropped upon an ant-hill in most cases curls up his legs and makes no attempt either to run away or to defend himself. If attacked by a large hornet, the spider generally behaves in a similar manner. On the other hand, one species of spider having very large mandibles strives vigorously, and nips many of the ants venturing to approach him. One particular kind of spider, with long legs, very common in dwelling houses during the autumn months, when touched with the finger commences to sway itself to and fro, continuing the motion for one or two minutes. The late Mr. Darwin supposes that the spider resorts to this practice in order to render himself invisible, but it may be remarked that the trick fails entirely so far as the human eye is concerned. The webs of spiders vary very much as to form and arrangement. Some are of a perfectly polygonal shape, and are supported by a number of threads radiating from the center. In some cases there are only a few radial threads, the interstices between them being filled up with short straight lines, which form quadrangular spaces, and present a general appearance resembling that of a Greek bordering. In other webs the threads are arranged in an irregular manner, so that the entire structure of the web reminds one of the intricate maze of the rigging of a full-rigged ship, while one species of spider does not suspend its web at all, but attaches it flatly upon a wall or door. In this latter case the threads are evidently covered with an extremely viscid substance, which retains any insects accidentally alighting thereon. The "vibrating" spiders, if placed on the bottom of a tumbler reversed and standing in a plate filled with water, throw out a web, which, adhering to some adjacent object, forms a sort of aerial suspension bridge by means of which the spider escapes from captivity. The spiders found under the bark of the eucalyptus, if thrown into water, eject threads of web, and these, being wafted ashore, enable the spider to speedily haul itself to dry land. A spider inclosed on a sheet of paper within a circle of wet ink, to all appearance ejected a thread perpendicularly upward until it attached itself to the ceiling. The spider then climbed up the thread and escaped. Some fifty or a hundred common house flies were once noticed to swarm round and follow, for more than a hundred yards, a gossamer spider floating through the air, supported by the quasi balloon which this species is known to construct. This habit of the gossamer is well known to naturalists, but the behavior on the part of the flies has never been previously observed.

Wonderful Insect Eyes.

Physicians call attention to the increasing instances of defective or imperfect sight occurring in civilized countries, and attribute it to various conditions of modern life—the overwork of the eyes in childhood, the study of books in small print, the habit of reading by imperfect light, and many other causes. It appears certain that in the matter of eyesight the savage has usually the advantage of the civilized man. The gift of sight is one very unequally distributed among the animal world. Some creatures enjoy it in excess, like the eagle; others are totally deprived of it, like the earthworm. In many other instances the sense of sight, if not actually lacking, is extremely imperfect, as in the case of the mole. Insects are in many cases far more richly endowed with eyes than even birds or beasts. The little creature called a whirlwig (*Gyrinus natator*), which skims about on the surface of standing water, is furnished with a double set of optics, the upper portion of the eyes (fitted for seeing in the air) being placed in the upper portion of the head, and the lower portion of the eyes (fitted for seeing in the water) in the lower portion of the head, a thin division separating the two. Spiders possess six eyes—some species eight; centipedes twenty, while the eyes of many insects (bees, butterflies, dragon-flies) are composed of a number of facets, each eye being, in fact, a cluster of eyes. Dr. Hook counted 14,000 of these facets in the eye of a dragon-fly, and Leeuwenhoek found as many as 12,544 in another specimen of the same species. The latter naturalist adapted one of the eyes of a dragon-fly so as to be able to see objects through it by means of a microscope, and found that he could view the steeple of a church 299 feet high and 750 feet from the place where he stood; he could also distinguish if the door of a house, at the same distance, was open or shut. Fleas' eyes diminish as well as multiply objects, as Puget discovered by performing a similar experiment to that of Leeuwenhoek. "A soldier viewed through it represented an army of pygmies; . . . the flame of a candle seemed the illumination of a thousand lamps." Blind or imperfectly sighted human beings may think with envy of the beautiful provision of visual organs bestowed by Nature on some of her children; and yet many creatures live happily with but a small share of the blessings of sight. In some of the insects who possess the largest share of visual organs, some other sense—taste, hearing, or touch—is deficient. Huber believes their sense of both hearing and taste to be imperfect. On the other hand, the blind earthworm will retreat rapidly into its hole if the light of a candle is thrown upon it, its sense of hearing or smell warning it of the approach of the danger it cannot see. A bat's senses of touch, hearing, and smell are so acute that it depends little on the aid of its eyes. Spallanzani tested this by the cruel experiment of destroying the sight of several bats, and then setting them free. In their flight through the room they avoided even the smallest thread placed to obstruct their way. Latreille, the French naturalist, states that there is a species of ants which are entirely blind, but pursue the same mode of life as their sighted brethren.—*London Globe.*

The Wonderful Sunsets.

Concerning the wonderful phenomenon of our sun risings and settings of late, and the suggestion that it may be caused by volcanic dust from earthy or lunar volcanoes, I have this remark to make: If it were caused by such dust or mist, it must sensibly affect the rays from the moon and sun, whereas no such effect is perceivable. Heavy and dense as that mist appears the moon rises from and sets below it with not the slightest diminution of its power to shine. The same may be said of Mars and Jupiter. Jupiter rises now in or near the Crab. I do not see that it affects the rays of any star. If it does not, then we may conclude that the cause exists far beyond the most distant star. Those who have the opportunity of ascertaining if these speculations are correct should report. Certainly it would seem that the cause of the phenomenon lies far beyond the orbit of our sun.

C. I.

Oregon, Mo.

Sorghum Sugar Experiments.

Prof. Collier, late chemist of the Department of Agriculture, and a firm believer in the practicability of producing sugar from sorghum in sufficient quantities and of a quality to supply a great part of the demand for sugar in this country, appears to have awakened the interest of the Agricultural Department in a subject about which it was supposed to have become somewhat inefficient. According to a Washington correspondent of the New York *Times*, Prof. Wiley, of the department, in a forthcoming report, will make public some interesting information about the experiments with sorghum during the last year, and takes a more hopeful view of the subject than Commissioner Loring formerly held. He pronounces erroneous the prevalent impression that every farmer may become his own sugar-maker. Sorghum, unlike sugar beet, contains various non-crystallizable sugars, the separation of which demands much skill and scientific knowledge. Sorghum sugar will have to be made in large factories. The existing factories have shown that it can be made, but how profitably or unprofitably cannot be stated by Prof. Wiley, who suggests that farmers near factories may, in effect, make their own sugar by raising the cane and trading it at factories for sugar.

Cane giving 60 pounds of sugar per ton ought to bring the farmer 35 pounds, the rest of the sugar and molasses going to the manufacturer to pay expenses and yield profit. The profitableness of making sugar from sorghum depends largely on utilizing all waste products. The scums and sediments make manure hardly inferior to guano. Bagasse, or crushed cane, can be turned into manure by being thrown into hog pens, as at Rio Grande, N. J., or it will make a fair quality of printing paper. It is not economical to burn it. If the manufacture of sorghum sugar is proved to be profitable, it will result in supplying to a large extent our demand for sugar; but as sorghum makes a great deal more molasses in proportion to sugar than sugar cane does, the Professor concludes that when there is enough sugar there will be a great deal more molasses than can be disposed of.

Prof. Wiley has made experimentally some fair samples of rum and alcohol from sorghum molasses. Under favorable circumstances one gallon of molasses, weighing 11 pounds, would give 2·75 pounds absolute alcohol, 3·03 pounds of 90 per cent alcohol, and 5·5 whisky or rum. Thus, each gallon of molasses would give nearly half a gallon of commercial alcohol and two-thirds of a gallon of whisky or rum.

As it has been abundantly proved, he says, that sugar can be made from sorghum, the Government should make no further experiments in this direction. Prof. Wiley has tried the diffusion process, and finds it yields 20 per cent more sugar, but at a somewhat higher cost than grinding. The Government, he thinks, should purchase machinery for large experiments in the diffusion process, and should raise its cane somewhere else than near Washington, as land there is expensive and not adapted to the purpose. The Government should also make arrangements with agricultural colleges or other agencies in various States for experimenting with sorghum culture to determine what parts of the country are most favorable to the culture of sugar-producing plants. Prof. Wiley suggests in each State the trial of two acres divided into ten plots—five for sorghum, four for beets, and one for corn—to test for purposes of comparison the general fertility of the soil and the character of the season. The Government ought to carry on for a series of years the process of selection of sorghum seed, in order to secure an improvement in the quality of the cane. It may be stated that the past season proved a disadvantageous one for sorghum sugar making, not only at the Agricultural Department, but generally. The conviction is growing among some of those who have made experiments that sorghum cannot be relied on to make sugar in the extremely Northern States, but that in spite of occasional successes in Minnesota there is a sorghum belt, as there is a corn belt, north of which the crop cannot be relied on.

Railway Bridge Inspection.

Bridges, like car wheels, do not break down without showing signs of weakness long in advance. Careful inspection of wheels at frequent intervals has enabled railways in this country to practically eliminate "broken wheels" from among the causes of accidents, at least those of a serious nature. A bridge failure is admittedly of a much more dangerous character than one resulting from a broken wheel. It would be expected, therefore, that bridges would be much more carefully looked after than wheels; yet, on some roads, even in the vicinity of New York, faulty and dangerous structures of this class have been allowed to stand on main lines for the last five years. Nominally, these bridges have been inspected, and probably the flaws have been reported, but so long as no attention is paid to the defects the inspection is a farce. A dangerous wheel on the same road, if allowed to run under a passenger car, would cause the instant dismissal of whoever allowed the car to proceed, knowing that it was defective.

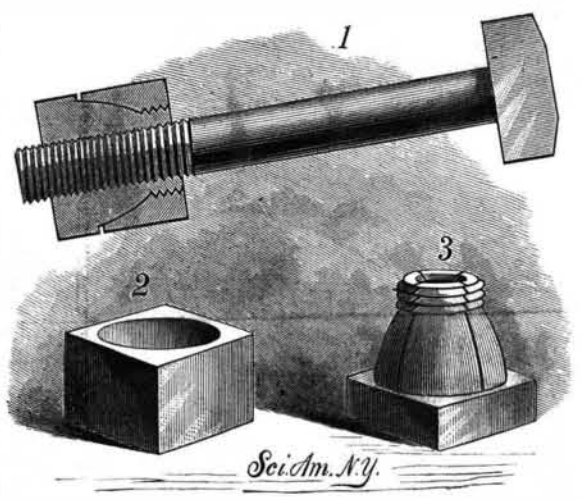
If the true, or inside, history of many bridge accidents could be written, it would be found that numerous warnings had been given and disregarded. The condition of the structures had not been hidden from the officers, and had been continued long after they had passed the point where danger was imminent at each passage of a train.

One of the bridges alluded to as having been a long time defective showed its first sign of weakness by the cracking of a cast iron member. This crack has been slowly enlarging. Another member, through a mistake in placing the braces, is relieved from its proper load under certain conditions, and has been slowly rotating about its horizontal axis. At any moment, however, it is liable to experience a heavier shock or stress than usual and turn over completely, or break from the application of a strain in a manner not contemplated by the designer. These facts have been known to the officers of the road for a long time. Attention has been called to this particular bridge not only by their own inspectors, but by outside engineers.

It is hardly necessary to add that engineers do not generally believe that bridges, roof trusses, buildings, or boilers fail from weakness or decay that could not have been discovered by proper examination. Mysterious causes are no longer admitted by engineers of repute to have a place in engineering science. However, the inevitable conclusion is that failures of all kinds of engineering structures may be anticipated and prevented by taking proper precautions.—*The National Car Builder.*

NUT LOCK.

The bolt is of the ordinary form and of any size of thread. The nut, Fig. 3, is threaded throughout its aperture to fit the bolt, and is formed at one side with a conical extension terminating in a cylindrical portion that is threaded. The extension is formed with longitudinal incisions, of which there are, preferably, four. The washer, Fig. 2, corresponds in width with the extension of the nut, and has its aperture tapered to fit the conical surface, and also has a straight portion that fits the threaded cylinder. These threads correspond in the number to an inch with those on the bolt, and the conical surface is slightly swelled, as shown in Fig. 3. To use the device, the washer is first placed on the bolt against the body to be clamped, when the nut is screwed on the bolt, its extended portions entering the washer until the threads on the end take the threads on the washer; the conical surfaces coming together, the nut is clamped on the



FULWILER'S NUT LOCK.

threads of the bolt. The nut is held fast by the clamping action, and the washer cannot become loose for the reason that it must, to do so, move back against the pressure of the body. This construction gives a long threaded surface to the nut, so that the pressure cannot strip the thread. The smooth conical surfaces commence to clamp as soon as in contact and increase in pressure as the washer moves up the cone.

This invention has been patented by Mr. J. A. Fulwiler, of Lexington, Illinois.

Better Prospects.

It is evident to one who gets about among the manufacturers that there is a more hopeful feeling regarding business than there was at the beginning of December. Machine tools of the standard sorts are ordered to a much larger amount than at that time, and some establishments are keeping their men busy in getting a stock of these tools ahead, which, of some makes, are rarely a drug in the market. The demand for special tools has somewhat fallen off, as might have been expected when the newly started manufactories of the last building season were completed, but there is a call for small machine tools fully as imperative as a year ago, one manufacturer of small machine tools and appliances reporting that he has all that his means will enable him to undertake, and another, who commands the production of two styles of patented planer and lathe tools, stating that two men on the road are doing well for themselves and for him in their sale.

Tobacco and the Pulse.

Dr. Troitski has made a number of observations upon the effects produced on the temperature and pulse by smoking. He found that in every case, varying according to the condition of the individual, there was an acceleration of the pulse rate and a slight elevation of temperature. If the average temperature of non-smokers were represented by 1,000, that of moderate smokers would be 1,008; and while the heart in the former case was making 1,000 pulsations, in the latter it would beat 1,180 times. It is in the latter effect that he thinks the danger of tobacco smoking is manifested.—*Journal de Medecine de Bruxelles.*

How to Make Burnt Cork.

The popular impression about the application of burnt cork by minstrel performers is that it is rubbed on the face and hands of the performer from a cork whose end is charred in a convenient gas jet. This is incorrect. To supply the burnt cork used by minstrel performers of this city occupies the entire time and earnest attention of one interesting character. A little man, whose place of business is on the curbstone on the north side of Pine Street, explained to a reporter the process of making it.

"I first gather my corks. I get them from the big bottling houses, who buy lots of bottles, many of them with corks that wouldn't keep the air out of wine or beer.

"When I get ready to burn, I put the corks into those three washboilers you see there with holes punched in their sides and bottom, sprinkle alcohol over them, and set them afire. Then I fill one of those muslin sacks with the charred cork, and knead the sack in this barrel of water. That forces the powdered charcoal through the sack into the water.

"When I have worked all my charred cork through this sack into the water, I drain the water through a close canvas sack you see on that frame there, and what remains in the canvas sack is ready for the artists. I put it up in one pound tins, and they use it out of them. When a performer is ready to 'black up,' as they call it, he takes a little of this black paste in his hands and washes his face, neck, and hands in it, and he is blacked as you see him on the stage."—*San Francisco Call.*

A Remarkable Phenomenon seen in Porto Rico.

A correspondent in Humacas, Porto Rico, describes a beautiful comet observed by himself and a few friends in Humacas on the 21st of November, 1883, between nine and ten o'clock in the evening. He writes that "its head inclined to the west and its tail extended majestically due east, and at an altitude of about 35° to 40°." It was observed on "three successive nights, but on the fourth night it disappeared."

The writer asks for information, and asserts his belief that he has seen again the great comet of 1882. His conclusion is an utter impossibility. The great comet of 1882 is now far beyond the reach of mortal vision. Moreover, it was visible in the morning instead of the evening. The latest observations of this comet were made by Dr. Schmidt at Athens, on the 27th of April; by Mr. Atkinson, of New Zealand, on the 6th of May; by Mr. Maxwell Hall, at Kempshot, Jamaica, on the 6th of May; by Prof. Ricco, at Palermo, on the 12th of May, when it was extremely faint. The very last observation was made by Mr. Thome, assistant at the Cordoba Observatory, in South America, where it was seen until the 1st of June, and described as "an excessively faint whiteness."

It was announced that this comet would be in a position during September and October where it would probably be visible in a powerful telescope in the early morning, when the moon was out of the way. We have heard no report of its visibility, and therefore conclude that it is winging its flight through the star depths to return no more until the passage of several hundred years will complete its circuit, and bring it safely back to our domain.

Neither can the comet seen at Porto Rico be the Pons-Brooks comet, now plainly visible in the northwest as a small nebulosity with a very small tail when seen by the naked eye; and as a nebulous mass with a bright nucleus and a well defined tail, when seen in a telescope.

We cannot therefore throw any light upon the celestial phenomenon seen in Porto Rico by our correspondent and his friends. A comet such as he describes would have been seen elsewhere, and its presence would have been telegraphed all over the civilized world. We should like a drawing of the strange visitor and its position among the surrounding stars. We should like also to know whether the observations were made with the naked eye or with the aid of the telescope.

Perhaps the Java earthquake had some connection with the beautiful phenomenon. The superb sunrises and sunsets occurring nearly at the same time are traced to this source by scientific men of the highest authority. Cosmic dust takes on wonderful forms, under the right conditions for development.

A Young Electrician's Theory.

An Ohio boy, who wishes to make electricity his life study, sends us his theory of its generation. He believes it is made by the earth being hot in the interior acting on the cold at the poles, which are supposed to be of platinum; that thus electricity is given off, not only to make the auroras so frequent in high latitudes, but to charge the whole stratum of air around the globe, the atmosphere in this way acting as a storage battery.

In regard to matters where the wisest have thus far obtained so little satisfaction, our young correspondent expresses himself in a way which indicates a thoughtful observance of what is going on in this most interesting field.

THE Oxide Bronze Company, of Philadelphia, send us certificate of result of testing, for tensile strength, of a sample of their oxide bronze. The sample tried was of the area of 0·5574 sq. in. in cross section, and broke at 20,350 lb., equal to 36,502 lb. per sq. in. This bronze is a new composition for which many advantages are claimed.