Correspondence.

Dangers of Electric Light Wires.

To the Editor of the Scientific American:

Absence at sea prevented me noticing sooner your observations on the death of the fireman on board the Livadia, who was killed by an electric light current. If not too long behind the time of the occurrence, I would like to add my experience on the subject, in connection with Siemens machines, which you presume would be equally dangerous under the same conditions.

I have myself received the current capable of giving four lights (each of 400 candle power) through the legs, trunk, left arm, thumb, and one finger, between which I had caught a wire. I do not say I liked the sensation, but could have endured it if necessary; the finger and thumb were rendered incapable of motion, and the wire was so firmly held by them that it took a good tug to drag the wire through by main force. The only resistance the current had to overcome was my shoes and some damp boards.

In another case I know of an operator who inadvertently took a wire in each hand, thus completing *across his chest* a current of same strength as in my case, but without any harm resulting. The muscles of the hand were strongly contracted, and he was unable to call out for help, although he was perfectly conscious it was close at hand; but by walking back until he could exercise a strain on the wires he dragged them from between his fingers as I did. This, I think, shows that currents such as are generated in Siemens machines are incapable of causing death to a person *not affected* with heart disease. If, however, passed through the brain or spine it might be more serious, possibly resulting in temporary unconsciousness.

As the Livadia's fireman seems undoubtedly to have been killed by the dynamo current, I can only suppose that the machines there used were constructed to give currents of high tension for sake of getting a considerable number of lights on one circuit.

Perfect insulation of the leads throughout the *entire* circuit should be deemed a necessity, especially in a ship or other structure of iron. This is best done by using covered wire, *not omitting to cover* any joints that may be made.

Your suggestion about protecting the lamps and terminals is a very good one, even where the insulation of the leads has been attended to, for the reason that a man in renewing the carbons may be up a ladder or in a position from which he might easily fall in case he got even a slight shock, which by startling him might cause him to lose his balance. I think it is better that the exact amount of danger attendant on any system may be known, so that it may be guarded against and so avoided, and also to prevent those who otherwise could inform themselves from forming exaggerated notions of what that amount really is

J. W. L.

S. S. City of Berlin, Pier 37, New York.
January 5, 1881.

The New Comet Pennule.

To the Editor of the Scientific American:

Telegraphic announcement was received by me December 17, 1880, of the discovery of a new comet by Pennule at Copenhagen, Denmark, on the 16th ult. Dense clouds prevented any observations of the object until the evening of December 31, when in a very few minutes I picked up the comet and secured a good observation. It was at discovery in right ascension 18 hours 49 minutes; north declination 10 degrees 35 minutes. When observed by me on the 31st, it was, by estimation, in right ascension, 19 hours 47 minutes; north declination 19 degrees 30 minutes. This brought the comet about midway on a line drawn from Albireo in Cygnus to Epsilon Delphinus—the last star in the tail of the Dolphin. Good observations were also obtained on the two following evenings.

The motion of the comet is northeast something more than one degree daily; so that its position is improving, and being quite a bright telescopic comet, it may be readily seen in moderate telescopes for some time. The present direction of its motion is toward Zeta Cygni.

It is nearly 3 minutes of arc in apparent diameter, has a considerable condensation not quite central, but no tail.

WILLIAM R. BROOKS.

Red House Observatory,
Phelps, N. Y., January 4, 1881.

Cutting Hard Steel with Soft Iron.

To the Editor of the Scientific American:

About forty years ago, having often heard that hard steel could be cut readily with a circular disk of sheet iron when driven at a high motion, I made a disk about ten inches in diameter out of a piece of heavy stove-pipe iron, having a round eye at the center about one and a half inches in diameter. I then put a stick of hard wood in the turning lathe, turned it off true, making a wooden mandrel for holding this iron disk, just as a circular saw is held true on a metallic mandrel. The periphery of the disk, after it was secured to the wooden mandrel swinging in the lathe, was ground and filed until it would run as true as a millstone. The disk was secured to the collar or shoulder of the wooden mandrel by putting four screws through the disk into the wood. While the disk was revolving at a high motion the soft sheet iron would cut off a ten inch cold-steel file in a few seconds. After we were satisfied that soft iron would cut cold and hard steel (no matter how hard), the disk was put on one of the journals of a circular saw which was driven at a very high motion; and that disk was employed for many years afterward to gum saws of all sizes.

During the past season, having occasion in a new shop to make a goodly number of cutters for the power moulding machine, we made another sheet iron disk, which was fitted to the mandrel of one of the little circular saws, which revolves about two thousand times per minute. After the periphery had been dressed off as true as practicable, that disk of soft iron would (and will) cut off a bar of cold steel four inches broad and one-fourth of an inch thick in one minute, making a kerf as true and smooth as a good saw will cut through a piece of timber. The disk will save an immense amount of filing when making cutters for moulding machines, as we can cut slots into the heel ends of the cutters, and cut and dress off the edge ends faster than twenty men can dress the steel away with chisels and files. One can "gum" an old cross-cut saw, or a mill saw, or drag saw, or large circular saw with such a disk in a few minutes, without any apprehension whatever of cracking or injuring the saw blade. After a large saw has been gummed by an iron disk, if one has a small emery wheel of the proper form he can dress up the teeth almost to a perfect cutting edge without a file, thus saving an enormous expense for files.

I have found in some instances, when gumming cross-cut two-men saws, that the steel of certain kinds of saws would be case-hardened a little on both sides of the kerf made by the disk. That very thin film of case-hardened steel would wear away a new file rapidly. But by employing an emery wheel instead of files until all the case-hardened steel had been removed, the expense for files is always small. Indeed, we use files only to fit up the very points of the teeth.

I may add, for the advantage of beginners, that the true way to fit up the periphery of a disk is to cut it with heavy shears as nearly round as practicable, after which hold a piece of a grindstone or sandstone so that the edge of the disk will strike it when in motion. We always use a stone and file, and then attempt to cut steel a little, thus working off the periphery until it is as smooth and true as it can be made. Then the cold and soft iron when in high motion will literally melt the hard and cold steel and drive the melted metal from the bar in a stream of white-hot sissing and burning steel dust.

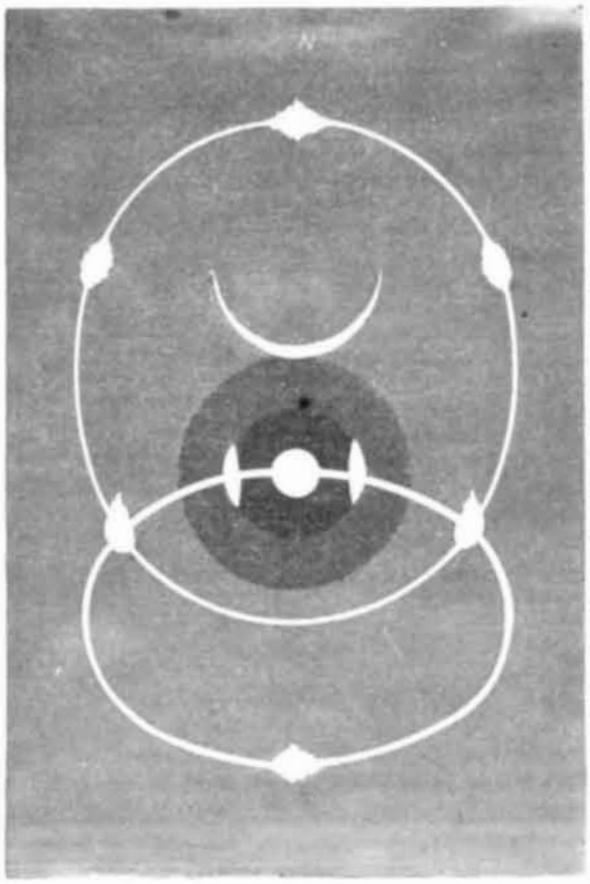
S. E. T.

Orange, N. J.

The Meteor.

To the Editor of the Scientific American:

I send you a diagram of a most singular atmospheric phenomenon witnessed here on the 30th ult. The display in the heavens of so peculiar a combination of reflection and refraction of the rays of light was of such rare occurrence I doubt if the like was ever before seen. You may the better understand me if I explain from the diagram. It was first observed at five minutes before eleven o'clock, A.M. The mercury registered at the time 5° below zero. The sky was clear, save that the air was full of floating frost crystals that gave a leaden aspect to the heavens around. The sun, as I have tried to represent, was surrounded by a double halo, both very perfect and distinct in outline. To the right and left of the sun and on the rim of the first halo were very bright parhelia or mock suns. Passing through the sun and these mock suns and around the whole dome of the heavens, seemingly, at about 20° from the horizon, was a great circle of light. This had the appearance of the large ring of Saturn—very bright and about ¼ of a degree in width. Again, about 15° from the rim of the outer or second halo, and in the path of this circle of light, were other parhelia on either side of the sun; and on the opposite side of it, from the sun, was another or third parhelion. This circle was very brilliant, describing a diameter of about 100°. Intersecting this bright circle, at the points of the two parhelia, passed a somewhat less brilliant ring of light in form of an ellipse, with its longest diameter some 130° and the short one 80. At the northern end of the ellipse were three parhelia, as represented in diagram. These mock suns were all very distinct and beautiful. To complete this phenomenon there was as perfect a rainbow as we ever see in midsummer, describing an arc of about 35°, with its crown resting on the rim of the second or outer halo, directly over the sun. In fact this rainbow was of such brilliancy that it was too dazzling for the uncovered eye to look at, unlike the soft mellow tints in our summer rainbow phenomena. The duration of this most rare spectacle was an hour and fifteen minutes.



THE METEOR OF DECEMBER 30, 1880, AS SEEN AT SUNK CENTER, MINN.

F. M. MORGAN,
Assistant Principal, Sauk Center High School.
Sauk Center, Minn., December 31, 1880.

New Solvents for Nitrocellulose.

To the Editor of the Scientific American:

In the preparation of nitrocellulose compounds, which are known as celluloid, and are also used as varnishes, some new solvents have been patented in Germany by Parkes. Among others he suggests the use of a solution of tetrachloride of carbon and camphor, either alone or with gums, resins, oils, dyestuffs, etc. He also proposes to use the bichloride of carbon and camphor, when the solution takes place under the aid of heat and pressure. Camphor, too, is a good solvent when heated to its melting point; at this temperature and under pressure it dissolves the nitrocellulose as fast as it can be mixed with the melted camphor until it forms a stiff mass. This mass, to which other substances may be added, can be rolled and pressed into moulds. To lower the melting point he adds oil, paraffine, turpentine, alcohol, benzol, ether, etc., whereby thinner solutions are obtained.

Another powerful solvent for nitrocellulose can be made by conducting sulphurous acid gas through granulated camphor, or by dissolving camphor in sulphurous acid.

A solution of camphor in benzole of such quality that no unpleasant odor is left when the compound is done, works very rapidly with the aid of heat and pressure. Oils, gums, resins, and dyes can be added according to taste. Turpentine and camphor also dissolve it with heat and pressure very quickly. Nitrocellulose softens rapidly if sprinkled with alcohol, ether, or other solvents of gun cotton and then pressed into hot moulds.

Sometimes it is better to dye the nitrocellulose before it is dissolved instead of dyeing the compound, as brilliant and delicate colors are obtained in this way of greater beauty than by the usual manner. If the compounds are to be used as lakes, the above-named solvents can be used, but of course larger quantities of the solvent are required than for making solid bodies. The solvents can be used alone or mixed with gums, resins, pigments, and metallic bronzes, to obtain the greatest variety of waterproof paints for surfaces, as well as cement for capping bottles. The solvents of nitrocellulose above given, as well as the bisulphide of carbon mixed with benzole and alcohol, are likewise good solvents for shellac.

D. I. Z.

[The tetrachloride of carbon is a colorless liquid boiling at 170° Fah.; specific gravity, 1·56. It can be made by the action of chlorine gas upon bisulphide of carbon, or on chloroform; also by the action of pentachloride of antimony upon bisulphide of carbon; sells at $3 per pound.

The bichloride of carbon is a very mobile liquid; specific gravity, 1·62; boiling at 248° Fah. It is generally made from the terchloride. It is quoted at $17 per pound in Berlin; hence we find a strong objection to its use in the arts at present.—ED. SCI. AM.]

Easy Test for the Purity of Olive Oil.

When it is desired only to ascertain whether the oil is pure or not without precise reference to the nature of the oils used in adulteration, take equal quantities of olive oil known to be pure and the oil to be tested, place the samples in separate test tubes, into which a good thermometer may also be inserted, and heat each separately to a temperature of 482° Fah. The pure oil will become somewhat paler during the heating, while the adulterated oil will turn darker. The pure oil will emit a pleasant smell, while the adulterant oils will give off an offensive odor.

To Prevent Clouding of Mirrors by Moisture.

A writer in the *Manufacturer and Builder* says that by coating over the surface of glass mirrors with glycerine their clouding by the accumulation of condensed water vapor will be prevented for a considerable time. The attraction of the glycerine is so great for the water as to absorb the latter as fast as deposited. This hint may prove of great use to dentists, who are frequently troubled by the clouding of mouth-mirrors, and it may also be of value to those who are compelled to shave themselves in chilly apartments.

SALT WATER FOR STREET USES.—The town of Tynemouth, England, has lately completed arrangements for supplying salt water from the mains of all the principal thoroughfares of the place. Salt water is to be used for flushing the sewers, watering the streets, and supplying public baths.