

Correspondence.

Brooks' Comet No. 1.

To the Editor of the Scientific American :

I see in your SCIENTIFIC AMERICAN of May 15 a description of two new comets claimed by Mr. Brooks of the Red House Observatory, Phelps, N. Y. As to comet No. 1, I claim priority by 9 days, as I, in company with several other gentlemen, saw the celestial visitor through my $4\frac{1}{4}$ inch objective telescope, April 19, 4 A. M., near the constellation Cassiopeia and on the eastern side thereof, and appearing exactly as illustrated in your paper. Thinking it was the Fabry comet, I did not report it before ; but I see by your journal that it was a new comet, as the Fabry comet has a tail, while this one has no tail whatever. I also observed it again April 31, 4:30 A. M.

R. C. BURT.

Chatham, Ontario, May 17, 1886.

Ice Spicules.

To the Editor of the Scientific American :

I have read with much interest your article upon "Ice Spicules," in your issue of February 6. But having had troublesome experience with this stubborn agent, I am led to believe that there are other conditions necessary to the formation of what is called, in common parlance, anchor ice. If not, why is not the Cleveland water tunnel obstructed every bitter cold day or night when the lake is not covered with a sheet of ice ?

If the conditions mentioned are supposed to always produce ice spicules, I think observation will prove the premises to be incorrect. From years of experience with water wheels, I have never been troubled with anchor ice under a cloudy sky at night, or when the sun could be seen by day. Many times has the water wheel been stopped by the passage to it becoming filled with this soft, mushy ice, but never in the daytime or on a cloudy night, however cold. But after becoming obstructed at night, it may remain so during the day, or until the atmospheric conditions change.

Three conditions appear to be necessary to produce this result : water with a smooth surface, biting cold, still air, and a starlit sky.

The atmospheric conditions necessary to produce anchor ice are so infrequent that very little trouble is experienced at the tunnel's strainer, or by the water wheel. I feel quite confident that it is due to certain atmospheric conditions not yet fully understood.

Without doubt, a little warmth applied against the upper side of the tunnel's strainer would remove the trouble.

There are many very singular exhibitions of ice formation noticed by a close observer. One has come to the notice of the writer several times during the present winter, a solution of which he would like to see in your valuable journal.

A water pail stood in a cold room half filled with water. On it floated a tin dipper, containing one inch of water. The water in the pail froze to the depth of half an inch or more, while that in the dipper was perfectly free from ice. Query, Why did not the water freeze in the dipper ?

C. C. FARRAR.

Flint, Mich.

Our correspondent has given at the end of his communication an account of a phenomenon which might well form the subject of a pretty experiment in a lecture room, and which can, we think, if the conditions are properly observed, be repeated at will. A metallic vessel of smooth interior and exterior floating on the surface of water in a considerably larger vessel of wood, or of material which does not conduct heat readily, and a freezing atmosphere are the conditions.

The level of the water in the metallic vessel will be lower than the level of the water outside of it to an extent depending upon the weight of the vessel and its consequent displacement; and as, when the temperature of maximum density is reached, the colder water in the outer vessel will rise to the top in that vessel, while the water in the floating metallic vessel, being at a distance below this stratum, will be in warmer water, the good conducting quality of the metal will be sufficient to keep its temperature practically equal to the stratum of water surrounding it.



The accompanying diagram will illustrate this.

The metal of the cup being polished, it will be less affected than it otherwise would be by radiation. The more lightly shaded upper stratum of water in the pail is that which has arrived at the freezing point and congealed. The water in the cup has the same temperature—or nearly the same—as that of the same level outside of it. The heavier the cup, the deeper it will sink, and the thicker will be the ice formed in the pail before freezing will begin in the floating vessel.

As to the effect of a clear, still night in promoting congelation, there cannot be any doubt. Water, either

in the form of ice, liquid, or vapor, is one of the most powerful absorbers and radiators of radiant heat. Its presence in the atmosphere, in greater or less quantity, obstructs terrestrial radiation into space to such a degree that Tyndall says : "The removal, for a single summer night, of the aqueous vapor from the atmosphere which covers England would be attended by the destruction of every plant which a freezing temperature could kill."

It is well known that clouds are unfavorable to frost.

The bright sun shining into water by day would greatly retard the formation of ice, and this would be the case even though a sheet of ice of considerable thickness had formed. The radiant heat of the sun would warm the ice, and through it the water through its contact with the ice, even though the air might be far below the freezing point of water.

Clouds at night will greatly obstruct the passage of heat from the water into outer space, though the action of connection through the contact of cold air will continue irrespective of this obstruction. But as radiation into space is a most powerful factor in the production of natural ice, and—as a clear, starlight night is the very best condition for radiation from a body of water, the formation of spicules would, at such a time, be more rapid.

At the same time, these spicules will tend to rise and mass together at the upper surface of the water, unless sucked down by eddies or currents. We do not believe anchor ice ever formed in a perfectly still mass of water confined in a natural earth basin, though what apparently resembles anchor ice will form in metallic reservoirs exposed upon their surfaces to currents of very cold air. Ice formed in this manner, however, only resembles anchor ice in the fact that it masses below the surface. It is never mushy, and forms solidly, gradually thickening on the sides of the vessel exposed to the cold blast.

We do not see anything in the facts cited by our esteemed correspondent to modify what we asserted in our editorial referred to by him. It is true that water must reach the freezing temperature before ice can form, and it is also true that ice tends to rise to the surface, or rather to form on the surface, of still water. Currents or eddies may carry fine ice down to points below the surface, and keep it there long enough to mass and adhere to stone, timber, etc., and thus, being anchored, it is thereafter "anchor ice" in the full sense of the term.—ED.

Finding of a Great Aerolite.

The finding of the great aerolite which was seen by many persons in Independence township, Washington County, Pa., on the night of September 14, is told at length by the *Pittsburg Dispatch*. About a month after the aerolite was seen and was said to have fallen, Professor Jonathan Emerick, of William and Mary College, began searching for it. His search led him into Butler County, then into Alleghany, and, although he decided that if the stone fell anywhere it must have been near Claysville, he examined very minutely all that region of country lying contiguous to Claysville, extending his researches north and south of that point for about six miles, and also spent some time in wandering through that part of West Virginia lying adjacent to Washington County. On the 15th of this month the savant was rewarded by finding the huge stone on the farm of Mr. Frederick Miller, about two miles north of Claysville. It was lying at the base of a high hill, which is heavily timbered with oak, and was deeply embedded in the soil and almost concealed from view by the dead leaves the wind had blown over it. The discovery was only an accidental occurrence. The Professor, being well acquainted with the geological strata of Western Pennsylvania, was engaged in locating a well for the Claysville Oil Company, and in the discharge of this duty stumbled upon the spot where the immense aerolite lay. It required three men several days to unearth the monster. It had penetrated the earth until it came in contact with a stratum of limestone, when this sudden check of its fearful velocity caused it to break into many pieces of all sizes and shapes ; yet when the earth was removed from around it, it still preserved its original shape, so that the Professor was enabled to have a photograph made of it, and it only fell to pieces when the specimen hunters tackled it.

Professor Emerick states that there are only 18 well authenticated cases in which aerolites have fallen in the United States during the last 60 years. Besides these, there are 261 the date of whose fall is reasonably well determined. There are also 74 instances of aerolites in which the date of fall is not given authoritatively. Add to these, 86 masses which, from their peculiar composition, are believed to be aerolites, though the date of their fall is not ascertainable, and we find the entire number of aerolites which have fallen to be about 430.

Professor Emerick says this stone will weigh perhaps 200 tons, being considerably heavier than the aggregate weight of all which have heretofore fallen.

On an analysis, it was ascertained that there was in its composition chromium, nickel, aluminum, copper, magnesium, tin, and other metals and metalloids.

It contained 87 per cent of iron, which may be readily worked. This indicates that the stone is not of terrestrial origin ; for while iron ores are abundant in nature, iron in the metallic state is exceedingly rare. It also contains in a small quantity a substance called schreibersite, a composition which has never been found except in aerolites. Its specific gravity is 7.412, about twice that of the Guernsey, O., aerolite, which fell on the 1st of May, 1860. The elevation of the aerolite was computed to be about 52 miles above the earth's surface, and its path was nearly horizontal. The length of its visible path was about 150 miles, and it moved from northeast to southwest. The time of its flight was estimated between 5 and 10 seconds, indicating a velocity of not less than 15 or 20 miles per second.

Water Tanks for Fire Purposes.

The necessary expenses for a water tank placed upon a high trestle, designed primarily to supply manufacturing property with water for fire purposes, is frequently asked of special agents of insurance companies. It is a financial problem which will require very different answers, according to the locality and the character of the fire protection required. In one case the necessity of speedy construction and of the employment of a railroad bridge builder added very largely to the expense. The time was winter, the location was three miles from a large town in the southern part of New York, on the Erie Railroad, and the property was a paper mill, just being equipped throughout with automatic sprinklers. The problem was to place a 6,000 gallon tank on a trestle thirty-five feet high, commencing on a stone foundation laid on solid shelving rock. In this case extra strength was desirable, since the tank was exposed to fierce currents of air down a narrow valley. The trestle was built in octagonal form, sixteen feet square at the base and ten feet square at the summit. The sills were six by twelve inches, the posts ten by ten inches, the caps ten by twelve inches, the braces four by six inches, and the deck planks were four by twelve inches. Upon the whole was placed a wooden tank ten feet in diameter and ten feet high.

The bills in detail may some time prove important for reference :

Timber bill in Jersey City.....	\$130 15
Percentage to contractor.....	27 13
Railroad freight.....	17 00
Teaming.....	19 50
Tank, delivered.....	92 00
Foundation stone, no charge.....	..
Lime and cement.....	4 25
Laying foundation.....	7 50
Bolts and ironwork.....	29 05
Skilled labor.....	75 60
Ordinary labor.....	30 00

This makes the complete cost of the job \$432.18. The connection of the water pipes with the tank was included in the contract for sprinkler equipment. By reference to the items, it will be seen that some of the charges were local, but they are given as being very instructive in making rough estimates.

The following quotations were furnished last January to a property owner in Philadelphia, for cedar tanks of $3\frac{1}{4}$ inch planks, dressed down to 3 inches, and guaranteed of first-class workmanship :

7 feet diameter and 7 feet high.....	\$42 00
8 " " " 8 " "	56 00
12 " " " 10 " "	125 00
12 " " " 16 " "	190 00

—Insurance World.

Peppering an Ironclad.

On the 24th of March the obsolete French armor-clad *Armide* was towed to sea in the Juan Gulf and allowed to drift. The Colbert, Amiral Duperre, Friedland, Devastation, Redoubtable, and Suffren, of the French Mediterranean squadron, then steamed about, firing at her at ranges of 3,000, 4,000, and 5,000 meters with 24, 27, and 32 centimeter guns—roughly, $9\frac{1}{2}$ in., 11 in., and 12 in. In time the hull resembled a cullender. Three shots had passed through the armor at the water line, and would have sunk the ship if she had not been filled with casks. The *Armide* was then towed into harbor, and the effects of the fire carefully inquired into. This probably is the first occasion in which an armorclad has been used as a moving target by ships firing when under way.

Trade Mark Decision.

Royal Baking Powder Co. vs. Davis. In this case an injunction was granted in the United States Circuit Court, E. D. of Michigan, Judge Brown, in the opinion, saying : "I do not think the use of the words 'Coral Baking Powder' is in itself an infringement of the plaintiff's trade mark, 'The Royal Baking Powder.' The difficulty is with the similarity of the labels upon which the words are used. The general arrangement of the words being the same, the devices on the cans being very much alike, and the labels of the same color and general appearance, I think purchasers might be very easily deceived into buying one for the other."