THE ALBANY RAILROAD BRIDGE.

The large and handsome engraving which we publish on another page is an excellent view of one of the finest pieces of civil engineering work existing in this country. It is the largest double track iron railway bridge in the United States, and extends across the Hudson river at Albany, N. Y. Messrs. Clarke, Reeves & Co., the designers of the proposed iron centennial tower, were the constructors.

The total length of the structure is 1,740 feet, or nearly one third of a mile, and it consists altogether of fifteen spans, of which one is a draw span 274 feet in length. The superstructure is entirely of wrought iron, and the main girders are proportioned to carry a rolling load of 6,000 lbs. per lineal foot of bridge, in addition to the weight of the fabric itself. The turntable is operated by a steam engine, and is so constructed, that if any part wears out, it may be replaced without interrupting the use of the swing bridge; and suitable lever turning gear is also provided, so that, should it become necessary, the swing bridge may be operated by hand.

The engine and boiler, and all the machinery required to actuate the draw span, are situated within the turntable and are out of sight. The draw span can be opened and closed very quickly. When being swung, the weight is carried by the center and amounts to about 350 tuns, but the equilibrium is so accurate that it can be readily moved by two men.

The floor system of the bridge is rather stronger than is usually made in this country, and the system of construction generally was based on the plan followed at the Phœnixville works, which provides that the bridge does not fail to return to its original camber without readjustment after testing. To allow for expansion, one end of each girder is fixed to the pier, while the other end is carried upon rollers formed of lengths of 1¼ inches cold rolled shafting, mounted in wrought iron frames.

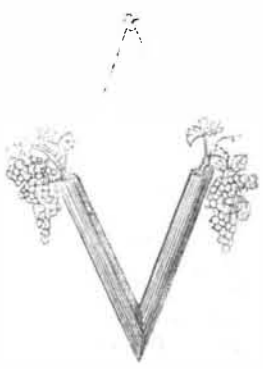
The weight of iron in the fabric is 1,750 tuns, and the total cost, including machinery, sidewalks, etc., was about $320,000. Our view is taken from the Albany side, at which point a new and finely arranged depot has recently been constructed.

A New Idea about Comets.

A paper was read before the Hackney Scientific Association on January 13, by Mr. Reeves, advancing an entirely new theory with regard to comets; and by the use of diagrams, he showed that the part of the comet termed the tail, being always in a direction from the sun and therefore as often in advance as behind the nucleus, is not really a tail. That as comets are transparent, and all matter is known to be either solid, liquid, or gaseous, comets must be the latter, for solids and liquids are opaque. That the only known power by which this gaseous matter can be held together is gravity, which must necessarily have a center, and, every part of the body being free to move, resolves itself into a sphere, the center of which is in many cases exceedingly dense, gradually attenuating towards the circumference. That the rays of the san are refracted in their passage through the spherical comet, thus luminating the portion beyond the center or nucleus, which illumination forms the tail. He then explained how all the various and peculiar phenomena of comets, such as their shapes, colors, horns, nuclei, as well as their being with and without tails, etc., arise; and that they are entirely in accordance with the universal laws of Nature.

Preserving Cut Bunches of Grapes.

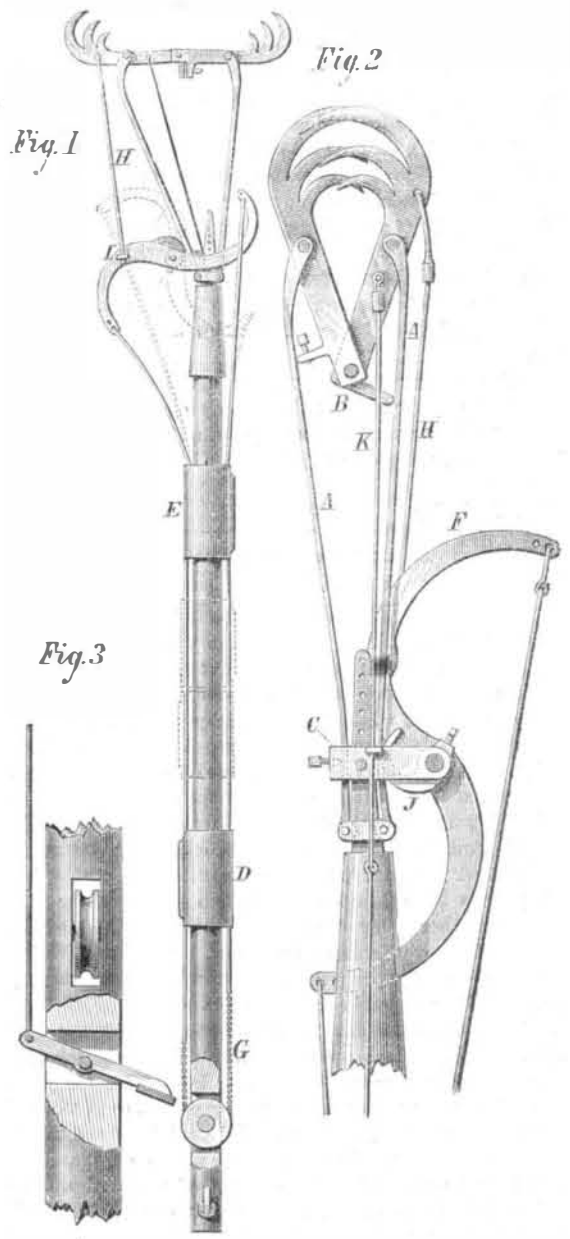
A correspondent of *The Garden* recommends the use of the ingenious little device depicted in our engraving, for preserving bunches of grapes in water, after they are cut from the vines. Any plumber can make the tin tubes for a few cents each, and they should be hung up, with the bunches, in the vinery; but a separate small house or hot frame, to which the heat could be turned on when necessary, would be an improvement. The house or frame should be well ventilated and free from damp and dust; and it would be useful for young vines in pots, cucumbers and melons.



IMPROVED FISH GRAPPLING SPEAR.

This invention, the object of which is indicated by its title, is an improvement of considerable merit over the old-fashioned fish spear. It is also excellently adapted as a substitute for the gaff, as its action is much more certain, while it requires less skill to manage. The grappling arms are easily and quickly set by ingenious mechanism leading to the handle, while there seems little about the apparatus to get out of order and so impede its working. Our engraving represents the device with its claws open (Fig. 1) and closed (Fig. 2), and also (Fig. 3) show the tripping arrangements in the handle.

The spear hooks are jointed together, as shown, and provided with springs, A, which are bent when the hooks are opened and so held by the toggle joint at B. The springs are arranged in a clip, C, and not permanently attached, so that the hooks may be released to facilitate their opening and setting. D and E are sliding sleeves upon the handle with which the rock lever, F, is connected by a chain, wire, or cord, G, which passes up over a pulley near the end of the stock. The rock lever communicates with the spear hooks by a wire, H, so that, by sliding the sleeves along the handle toward the hooks, the lever will be turned to the position shown in Fig. 1, to open and reset the hooks; and by moving the sleeves in the opposite direction, it will be turned back again (as shown in Fig. 2 and the dotted lines in Fig. 1), by sliding the swivel stud, I, back upon it to free the connecting rod, H, so that the latter will allow the jaws to close when tripped. The same operation subjects the springs to the required tension for actuating the hooks, by means of the cam, J, pivoted to the clip. A set screw is provided in connection with the cam for producing and varying the tension of the springs; and the clip is made adjustable on the stock and along the springs for the same purpose.



Generally the hooks are tripped by striking them against the back of the fish at the joint; but as, in case of striking a stone or other hard substance, the points might be injured, a wire, K, is connected to one of the prongs near the joint, and extends up to a small trip lever shown in Fig. 3. This lever, worked by the finger, pulls the joint back, and so trips the hooks.

Patented through the Scientific American Patent Agency, October 28, 1873. For further particulars address the inventor, Mr. Jonah W. Knapp, Cross Rivers, Westchester county, N. Y.

ASTRONOMICAL NOTES.

OBSERVATORY OF VASSAR COLLEGE.

For the computations of the following notes (which are approximate only) and for most of the observations, I am indebted to students. M.M.

Positions of Planets for March, 1874.

Mercury.

On the 1st of March, Mercury rises at 7h. 12m. A. M., and sets at 7h. 20m. P. M. On the 31st, Mercury rises at 4h. 59m. A. M., and sets at 4h. 37m. P. M.

Mercury should be looked for soon after sunset; early in March, some degrees north of the sun's place. Mercury and Venus pass the meridian or south at nearly the same time on the 14th, Mercury being, however, 6° north of Venus in declination.

Venus.

On the 1st of March, Venus rises at 6h. 50m. A. M., and sets at 5h. 50m. P. M. On the 31st, Venus rises at 6h. 14m. A. M., and sets at 7h. 4m. P. M.

The moon and Venus will be in conjunction on the 18th.

Mars.

On the 1st, Mars rises at 7h. 58m. A. M., and sets at 8h. 41m. P.M. On the 31st, Mars rises at 6h. 52m. A. M., and sets at 8h. 35m. P. M. It will be seen that Mars is very unfavorably situated for observations.

Jupiter.

Jupiter rises on the 1st at 7h. 12m. P. M., and sets at 7h. 30m. A. M. On the 31st, it rises at 4h. 54m. P. M., and sets at 5h. 18m. the next morning.

All through March Jupiter is in excellent position for observation, coming to meridian at midnight on the 19th, and nearly at midnight for the whole month. Its altitude, too in our latitude, is above 50°, and it can be studied to great advantage. Every person who has a telescope, even a small one, should watch the varied phenomena of its moons, especially on the evenings of the 7th and 18th. On the 7th, the largest of its moons will disappear by eclipse, passing into Jupiter's shadow, and the smallest will disappear by transit, coming between us and Jupiter, and being lost to view while projected on Jupiter's disk.

Jupiter and the moon are in conjunction on the 31st, when the moon is nearly full.

Saturn.

On the 1st of March, Saturn rises at 5h. 19m. A. M., and sets at 3h. 1m. P. M. On the 31st, Saturn rises at 3h. 30m. A. M., and sets at 1h. 18m. P. M. As this planet comes to the meridian in the forenoon and is far south in declination, it is not well situated for observation.

Uranus.

Uranus is in good position for observations, but needs a good telescope. On the 1st it rises at 2h. 48m. P. M., comes to meridian at 10 P. M., and sets at 5h. 12m. the next morning. On the 31st Uranus rises at 0h. 46m. P. M., and sets at 3h. 12m. A. M. the next morning. It is still among the small stars of *Cancer*, a few degrees south of *γ Cancri*.

Neptune.

On the 1st, Neptune rises at 8h. 32m. A. M., and sets at 9h. 34m. P. M. On the 31st, it rises at 6h. 37m. A. M., and sets at 7h. 42m. P. M. Even with good telescopes, no good observations can be made on Neptune at present.

Sun Spots.

The record is from January 20 to February 14 inclusive, and, though much broken by cloudy days, is yet regular enough to indicate that in the spots individually there has been no marked change, no sudden appearance or disappearance. On the 24th, spots appeared on the eastern limb which proved to be the advance of a large group, the whole of which was on the disk by the 26th. Photographs of the 29th and 30th showed the group still entire, and on these days the largest portion of it was seen with the naked eye. Observations were then interrupted until February 6, when what was probably the last of it was just within the western limb. On the 6th there was a small circular spot "coming on," that is, near the eastern limb, which was still seen on the 14th, having been carried during the interval to the opposite side of the disk, still maintaining its original shape. Five other small spots, on the 14th, extended east of the circular one, nearly in the line of the horizontal diameter. There were faculæ on the 10th and 14th.

Zodiacal Light.

This was seen, early in the evening, on the 4th, 5th, 11th, and 14th, stretching from the western horizon towards the Pleiades.

Barometer and Thermometer.

The meteorological journal from January 17 to February 13 gives the highest barometer, February 2, 30·63; the lowest barometer, January 28, 29·62; the highest thermometer January 23, at 2 P. M., 56'; the lowest thermometer, February 9, at 7 A. M., —11°.

Amount of Rain.

The rain which fell during the morning of January 28 amounted to 0·12 inches.

The rain which fell between the afternoon of February 13 and the morning of February 14, amounted to 0·13 inches.

Patent Calf Feeder.

In these days, when the successful rearing of cattle is an important item of farm management, a wide difference may be seen in the appearance of two calves—the one fed by a painstaking hand, and the other allowed to gulp down its food without time for admixture with the saliva. This is a very important matter, seeing that success or failure frequently depends upon it. Of course, the nearer the process of feeding is approximated to the slow natural action of sucking, the better for the young animal. The implement shown in our illustration, for which we are indebted to the *Ironmonger*, if properly cleansed from time to time, feeds in the most natural manner and renders it impossible for the calf to gorge itself. It is a vessel of galvanized iron, shaped like a milk can, having upright sides and concave bottom, with an iron bale handle and a splayed hoop foot, which causes it to stand firmly on the ground. Midway in the vessel is a fixed ledge, into which a self-locking cover closely fits. This cover has a vulcanized india rubber teat, fixed in its center and communicating with an india rubber tube extending to the bottom of the vessel, the concave nature of which allows of the calf making a clean meal. The vessel holds about five quarts, and can be readily cleaned by removing the cover. The new feeder entirely dispenses with the unpleasant and dangerous practice of feeding with the finger, and the food is not so liable to be wasted.

TO TAN SKINS.—The following method is recommended by a correspondent: Take equal parts salt, alum, and Glauber's salt, and half a part saltpeter; pulverize and mix. Handle the skins and rub the mixture in well three or four times a day, the oftener the better. If there is not moisture enough in the skin to dissolve the salts, put a little water into the latter. We are assured that no moth will attack furs, the felts of which have been thus prepared.