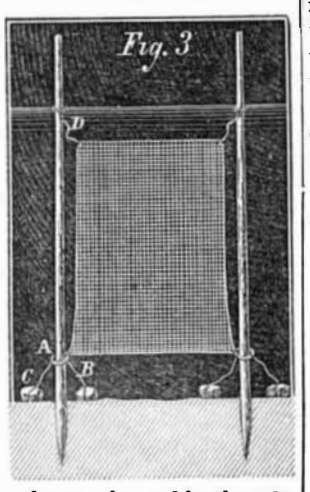
pole sunk in the same manner as was the first. The same operation is repeated until the whole row is "planted."

The nets which are spread between each pair of poles are from 20 to 25 feet in depth and their upper portion is generally situated at a depth of from 15 to 20 feet below the water surface, so as to avoid being caught by propellers, ships' rudders, etc.



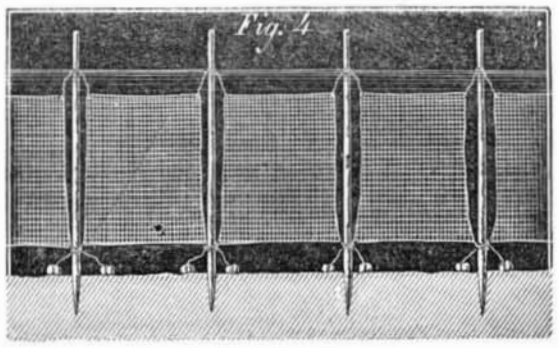
Over each pole is slipped a hoop, A, Fig. 3, to the bottom of which, by means of a fifteen fathom line called the "foot rope," B, is attached a heavy stone, C. The net is attached by one corner to the hoop and above to an "arm line," D, 15 fathoms in length. This arrangement as will be seen, allows of the passage of fish both above and below, as well as on the sides of the nets, when they are bagged by the tide. The following diagram gives an idea of this arrangement.

The planting of the poles, as well as all repairs to the nets, is made at low water slack. The meshes in shad nets vary from 4, or even less, to 5½ inches. The best fishermen employ only these last, and derive a larger profit through the sale of fewer but larger fish, than could be realized from a greater number of small and inferior ones. The nets are hauled up at every high water slack.

Shad is a very tender fish, which in warm weather is generally dead before being taken out of the net, but in cold weather it is much longer lived.

The deplorable fact is but too manifest to-day, that the shad fisheries of the Hudson river, through unpardonable legislative negligence, are rapidly declining, so much so indeed, that unless some energetic measures be resorted to without delay in order to protect both fish and spawning grounds, not many years will elapse before this fine fish will have entirely disappeared from our river. Less than fifty years ago, shad were so abundant in the North River that they sold regularly at seven dollars per hundred: this year they brought from 30 to 40 dollars, and averaged 30 dollars.

Thirty years ago the great porgie, the striped bass, and many other fine fish were caught in abundance a long way up this river, but at present they have entirely disappeared from it, as have also the sharks which in the olden time were a terror to the bathers of the metropolis. The shad, if not looked after will in less than twenty years be "a thing of the past." Not one half of the number of shad that went up the river twenty-five years ago do so at present, but the



greatest falling off has taken place during the last five years. This is attributed not so much to the continually increasing steam navigation of the river which scares the timid creatures, as to the license allowed the kerosene refineries and gas works to poison the water with their residues, as is clearly proved by the fact that some years back fish could be kept alive for our markets for weeks at a time in tanks filled with the river water, whereas to-day they die within a very few hours after being put into it.

The next reason for the rapid decrease in the number of shad is due to the fact, that this fishery in the Hudson is perfectly free and uncontrolled, that no regulations of any kind exist in regard to it, and that no laws have been passed protecting the future interests of the community from the thoughless cupidity of present fishermen.*

We earnestly commend this subject to our representatives. Regulations should be passed strictly forbidding the catching or vending of shad before the first of March, or after the 25th of May, and also prohibiting the use of nets whose meshes are less than 5½ inches. A fine of $500 for each violation of the law, with $100 of it for the informer, would soon replenish our stock of shad, and all would eventually be gainers by it.

The genuine fishermen of the North river, will, we know, be the first to sustain our views, and none but hungry poachers off the National domains will be found to oppose them.

* The laws existing in regard to our North River fisheries have become a dead letter to the fishermen, who are ignorant of their very existance, and unless the States of New York and New Jersey act jointly in the matter of new regulations, not much good will be done, even while stocking the River through the process of artificial incubation, as commissioner Green is at present attempting to do, near Coeyman's, some 150 miles up the Hudson.

GOOD strong tea, cooled with ice and flavored with lemon, with the addition of a very little sugar, is an excellent drink for hot weather.

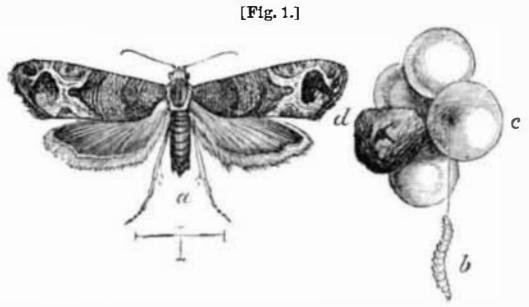
The Grape-Berry Moth.

(*Penthina vitivorana,* Packard.)

Scarcely a year passes but some new insect foe suddenly makes its appearance amongst us; and were it not for the fact that the ravages of others are at the same time abating, the destruction which they unitedly would cause would be intolerable.

The insect which forms the subject of this article may be cited as an illustration of such a sudden appearance in many different parts of the country, for until last year no account of it had ever been published, and it was entirely unknown to

[Fig. 1.]



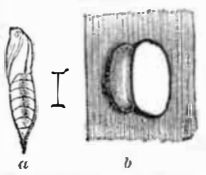
Colors—(*a*) deep brown, pale buff and slaty; (*b*) olive-green or brownish.

science. It had, however, been observed in Ohio, for three or four years, and in Missouri and South Illinois. It has gradually been on the increase, and was never so numerous as last year. We found it universal in the vineyards along the Pacific and Iron Mountain railroads, in Missouri. It was equally common around Alton, in Illinois, and we were informed by Dr. Hull, of that place, that it ruined fifty per cent of the grapes around Cleveland, Ohio. It also occurs in Pennsylvania.

Its natural history may be given as follows: About the 1st of July, the grapes that are attacked by the worm begin to show a discolored spot at the point where the worm entered. Upon opening such a grape, the inmate, which is at this time very small and white, with a cinnamon colored head, will be found at the end of a winding channel. It continues to feed on the pulp of the fruit, and upon reaching the seeds, generally eats out their interior. As it matures it becomes darker, being either of an olive-green or dark brown color, with a honey-yellow head, and if one grape is not sufficient, it fastens the already ruined grape to an adjoining one, by means of silken threads, and proceeds to burrow in it as it did in the first. When full grown it presents the appearance of (Fig. 1) *b*, and is exceedingly active. As soon as the grape is touched the worm will wriggle out of it, and rapidly let itself to the ground, by means of its ever-ready silken thread, unless care be taken to prevent its so doing. The cocoon is often formed on the leaves of the vine, in a manner essentially characteristic. After covering a given spot with silk, the worm cuts out a clean oval flap, leaving it hinged on one side, and, rolling this flap over, fastens it to the leaf, and thus forms for itself a cozy little house.

One of these cocoons is represented at Fig. 2, *b*, and though the cut is sometimes less regular than shown in the figure, it is undoubtedly the normal habit of the insect to make just such a cocoon as represented. Sometimes, however, it cuts two crescent-shaped slits, and, rolling up the two pieces, fastens them up in the middle as shown at Fig. 3. And frequently it rolls over a piece of the edge of the leaf in the manner commonly adopted by leaf-rolling larvæ, while we have had them spin up in a silk handkerchief, where they made no cut at all.

Fig. 2.



Color—(*a*) honeyyellow.

Fig. 3.

In two days after completing the cocoon, the worm changes to a chrysalis. In this state (Fig 2, *a*), it measures about one fifth of an inch, and is quite variable in color, being generally of a honey-yellow, with a green shade on the abdomen. In about ten days after this last change takes place, the chrysalis works itself almost entirely out of the cocoon, and the little moth represented at Fig. 1, *a*, makes its escape.

The first moths appear in Southern Illinois and Central Missouri about the 1st of August, and as the worms are found in the grapes during the months of August and September, or even later, and there is every reason to believe that a second brood of worms is generated from these moths, and that this second brood of worms, as in the case of the Codling moth of the apple, passes the winter in the cocoon, and produces the moth the following spring, in time to lay the eggs on the grapes while they are forming.

THE REMEDY.

This worm is found in greatest numbers on such grapes as the Herbemont, or those varieties which have tender skins, and close, compact bunches; though it has also been known to occur on almost every variety grown.

As already stated, there can be little doubt that the greater part of the second brood of worms passes the winter in the cocoon on the fallen leaves; and, in such an event, many of them may be destroyed by raking up and burning the leaves at any time during the winter. The berries attacked by the worm may easily be detected, providing there is no "grape rot" in the vineyard, either by a discolored spot or by the entire discoloration and shrinking of the berry, as shown at Fig. 1, *d*. When the vineyard is attacked by the "rot," the wormy berries are not so easily distinguished, as they bear a close resemblance to the rotting ones.

Many wine makers are in the habit of picking up all fallen berries, and of converting them into wine. The wine made from such berries is but third rate, it is true; but we strongly recommend the practice, as upon racking off the juice obtained from them, countless numbers of these worms are found in the sediment, while unseen hosts of them are also, most likely, crushed with the husks. Those who do not make wine should pick up and destroy all fallen berries.—*Entomologist.*

ADVERSE REPORT ON THE EAST RIVER BRIDGE.

The writer of the following report is the projector of a number of extensive and important public improvements which have attracted much attention, one of which, the Broadway Arcade Railway, is well known to our readers. According to Mr. Nowlan's figuring the proposed East River Suspension Bridge, although the plans are indorsed, either tacitly or expressly by nearly all our leading engineers, will be a dead failure. He thinks it cannot be made to hold together except for a short time, and that with the hight of towers proposed the bridge will almost touch the surface of the water at high tide. Mr. Nowlan's report contains several interesting statements, and we have no doubt will call out suitable replies. It is, we believe, the first adverse report upon the project that has been made public:

Report on the construction of suspension bridges over the East River as proposed by a company incorporated by the Legislature of the State of New York, made before the Commissioners appointed under an order of the Senate of the United States, to meet at the city of New York, to hear such objections and recommendations upon the subject of such bridges as may be made by competent persons, professional or otherwise, such commission consisting of Gen. Newton, Gen. Wright, and Major King, all of the United States Army.

REPORT OF SAMUEL BARNES B. NOWLAN, C. E.

Gentlemen: In reply to your request, I submit the following report, based upon an experience of many years in practical engineering, and the attendant scientific investigation of details, particularly as applied to engineering manipulations in the construction of military works in connection with submarine engineering.

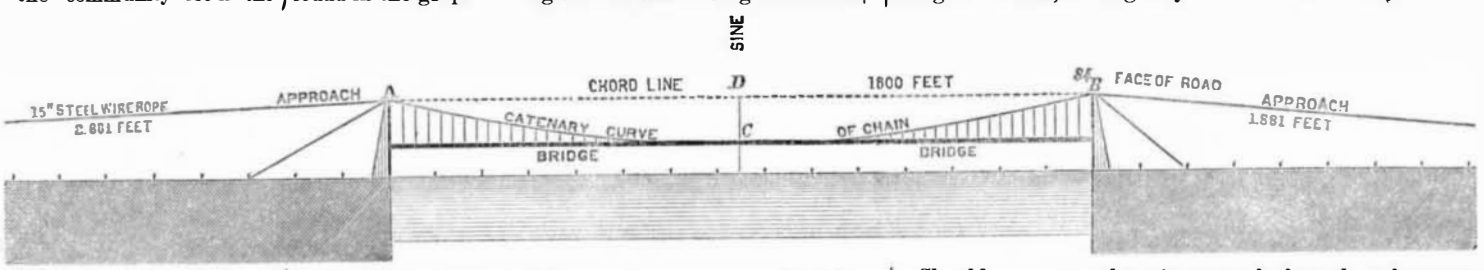
The proposed bridge, according to the plans now before the Commissioners, will be very nearly one mile (5,228 feet) in length. The abutment on the New York side will be at pier No. 29, and on the Brooklyn side at the slip at Fulton Ferry. The grade on the approach from the New York terminus at the City Hall Park to the level of the bridge will be 3½ feet in every 100 feet, while the grade on the Brooklyn side, from its terminus near the junction of Sands and Fulton streets, will be less.

The hight of the bridge is to be 135 feet, as fixed by the State charter.

The center span will be 1,600 feet. It is very doubtful if 135 feet of hight would be sufficient to allow the passage of vessels of a large tunnage, and it seems impracticable to increase the hight of the bridge by reason of the steeper grade, which would render it too great for the convenience of travel. In slippery weather wagons would find it impracticable to ascend to the elevation of even 135 feet, and passengers would prefer the ferry boat.

As to the proposition of any bridge on the suspension plan by wire cables or iron chains, I desire particularly to give the causes and practicable results in cases of failure under similar circumstances.

Referring to the diagram, I would remark that the distance spanned will range about 1,600 feet. A B represents the chord, A C B the catenary curve with the line C D. Now, as the natural sag of the suspended chain should be in proportion as 1 is to 16, and the towers being as represented, 135 feet at the point of hight for the chord, the catenary curve being 1 in 16 would produce in the distance of 1,600 feet a sag of 100 feet, leaving only 35 feet for water way.



Should an unnatural strain or taut be brought to bear upon the suspended chain it would not allow for the deflection and variations of temperature, which from extraordinary changes may vary from 120° Fah. to 20° below zero.

When the catenary curve is obtained, a natural curve is obtained which will meet all deviations of temperature. But if not, the overstrain or taut will cause the snapping under the vibration, as in the case of the Menai Suspension Bridge.

The cause of the falling of that bridge was from the oscillating motion to which it was subjected, there being no strands employed on that bridge as now used by the projectors of the Niagara Suspension Bridge. If those strands were not used that bridge would not last half its time. At present the deflection is over 9 inches at noon under a temperature of 85°. At the time it was first built it gave only 5 inches on the catenary curve.

The great feature of the suspension bridge over the East River will be the two towers, and as the grade of the approach is given at 3½ feet for 100, and the towers are to be 135 feet, this will give the hypothetical grade line of 3,717 feet, which will carry the roadway across Broadway if the line be to the City Hall Park, or if it be taken in the direction of the Bowery will reach about Chatham Square. Now, if we consider the immense expense of some $5,000,000 or $6,000,000 merely to make an approach, without including the cost of construction, we may appreciate the motive that would induce such an unnecessary outlay of public money.

Each of these towers is proposed to be 134 feet at its greatest axis on line at right angles with the thread of the stream, and 36 feet the lesser axis in line with the thread of the stream; below the upper cornice at top of the tower these dimensions are reduced to 120. The elevation of the floor will be 118 feet above high water mark. The roofing above the floor is 150 feet, which will be a total hight of 268 feet from high water mark to this proposed roof. And the commencement of each tower will be three feet below low water mark, with a cubical content of stone in the two towers of 62,824 yards of 27 cubic feet each. The cubical contents of one tower 31,412 cubic yards multiplied by 27 cubic feet will give 848,124 cubic feet, or 67,850 tuns; add to this the greatest weight of superstructure and load of 4,753 tuns, and it gives a total of 72,603 tuns.

Now, the area of base at low water line is 4,660 feet, and therefore the pressure of the structure on each superficial foot will be 15 58 tuns.

The admitted usual pressure on the superficial foot is from 3 to 4 tuns on all railroad engineering in the construction of railroad bridges on piers of 50 or 60 feet in hight, and such pressure is always deemed secure on a bed of compact gravel or sand, provided there is no danger of undermining or spreading laterally.

This great weight sustained between these two towers, 1,600 feet apart, and sustaining a compound leverage and lateral abutting power, will evidently increase the destructive action of the dead weight of gravity of 4 chains. The weight given of the superstructure without cables will be 2,675 tuns, stretched over a space of 1,600 feet, the leverage strain on the center will be as 1 is to 8 by progression, so that 1 tun in distance from the abutting point is increased in its gravity to 8 tuns in the proportion of 1 foot to 8 feet.

By this calculate at half of 1,600 feet what is the supporting power required to support a dead weight of half the mean weight of superstructure, 4,753 tuns, equal to 2,376½ tuns, which, by the accumulated strain on the spandrel, as we may express it, of one side of an arch which is to cross a space of 1,600 feet, this will give a distance to each spandrel of 800 feet, and as each tun actually requires from every abutment for every 8 feet just 8 times its own weight to suspend it, then, consequently, 16 feet leverage will require 16 tuns abutting force to support 1 tun at that distance, and so on in proportion for the length of power represented and required at the extreme end of the entire section of each chain at mid center representing these spandrels.

When it is borne in mind that the action of the temperature varies from 10° below zero, to 120°, Fah., the destruction of this chain is greatly increased by the vibration in stormy weather, under a taut strain, below zero, and the deflection of the chain under a high degree of summer heat; and as the sagging of the chain on the catenary curve, can never of itself return to the original at night, say 60° which at noon gave 95°, Fah. The dead weight, has no power to rise of itself the space of its noon deflection, as illustrated in the Niagara Suspension Bridge, which when first constructed deflected only five inches on the span of 800 feet. But the set strain at each deflection, has now caused the present Suspension Bridge to permanently sag four inches from its former constructed catenary curve, the sine line being increased to 9 inches at noon, at a temperature of 95° Fah. This accumulating set strain caused the breaking of the suspension bridge at Brighton, England, and the Milford suspension for railway transit, which broke down in 1832, and 250 lives were lost, the train falling a distance of 46 feet into the river.

This principle of suspension bridges has been superseded in Europe by the tubular bridge invented by the celebrated Engineer Stephenson, who constructed the Victoria Bridge over the river St. Lawrence, Canada.

In the plans I submitted to the Commissioners, I obviate all these defects, and can construct a permanent bridge with arches indestructible, of 500 feet span, and 200 feet above high water mark, with a permanent approach through fireproof iron buildings, on line with the thread of the stream, forming stupendious and magnificent bonded warehouses capable of paying the entire expense of each building, in sixteen years, and without using one foot of private property, with free access to the river front at all points, as these constructions are raised 25 feet above the sidewalk and the flooring forms a perfect shelter for all merchandise temporarily wharved, from rain or snow in winter, and from the sun in the heat of summer.

I have the honor to be, Gentlemen, respectfully yours,

Samuel B. B. Nowlan, C. E.

New York, April 17, 1869.

Maryland Institute Exhibition.—The second annual exhibition of the Maryland Institute for the promotion of the Mechanic Arts, will be found advertised in another column. The first was a success, and doubtless the second will also be a fine display. Manufacturers and inventors will do well to notice.

Magnets, whose coils are long, discharge their magnetism much less easily and slowly than those whose coils are short.

Correspondence.

The Editors are not responsible for the Opinions expressed by their Correspondents.

Expansion of Mineral Oils.

Messrs. Editors:—I inclose an extract from the *Tidioute* (Pa.,) *Journal*, in relation to the paper of M. Deville, on the "Expansion of Petroleum," commented on, in your issue of 17th inst., by Prof. Vander Weyde and yourselves. The article, as it states, agrees in its conclusions with practical observations on from 10,000 to 30,000 bbls. of crude oil, in iron and wooden storage tanks, car tanks, and barrels:

"A Frenchman, with the very aristocratic name of Henri Saint Claire Deville, has lately presented to the Academy of Sciences, at Paris, a paper—the third of a series—on the 'Physical Character of Mineral Oils,' in which he mentions the increase in bulk occasioned by an elevation of temperature, as a prominent cause of danger by fire where petrolenm may be stored. From long experience, oil dealers in this country have come to be well aware of the fact of such expansions, although without, in most cases, any idea of its amount. This is odd enough, too, when we consider the constant use made of oleometers, 'measurers of the density of oil.' For this reason, the following remarks may not be inappropriate:

"The scale of Baumé's hydrometer, or oleometer, or densitometer, a wholly arbitrary one, represents for each degree within the usual limits of crude American petroleum, as nearly as may be, four and a half thousandths of the density of water at 60° Fah. As every increase of temperature of 10° Fah. equals a decrease in density of 1° B., the expansion of oil may be taken, without sensible error, to be ·00045 of its bulk for each degree of Fahrenheit's thermometer. Allowance for expansion is always made in shipping oil, except in the old-fashioned wooden tank cars, where the oil is permitted to force its way through the hatches, roof, and sides of the tanks. In shipping in barrels, it is customary to leave about one gallon 'outage,' as in 50° (which may be considered the extreme variation in temperature likely to occur while the oil is in transit,) 44 gallons would become 45. It would be safer and more economical to allow yet greater room, were it not for the advantage, in that case, apt to be taken of the shipper by the consignee. The allowance for expansion in Empire Line iron cars is very large, consisting of a cylindrical dome, about 40 inches in diameter, and 30 inches high—the capacity of which is about 4 per cent of the whole car—50° of temperature representing an expansion of but 2¼ per cent, it is evident that these Empire iron cars are as safe and economical as they are convenient. The writer has no knowledge of the empty space left in the five gallon cans so largely used for exported refined, but 5 inches square by 1 inch high would be sufficient.

"The increase in bulk, in the summer, of oil stored in iron tankage in winter, is of considerable importance in these times of high prices. A twelve thousand barrel tank is 60 feet in diameter, and 24 feet high, and holds in each inch of its hight 1762·56 gallons. The mean temperature of oil here in Tidioute is, in winter, about 20°, and in summer 70°—both very nearly. The range being thus 50°, the volume of oil to each inch, at 20° Fah., is increased 39·66 gallons; but as the tank has, also, grown larger, this amount is not shown by measure. Iron expands ·000006964 for each degree, or for 50°, about three and a half ten thousandths; so that the circumference of the tank is increased ·7917 of an inch—the diameter by ·252 of an inch; and the capacity for each inch of hight by ·62 of a gallon. Therefore the apparent gain is only 39·04 gals. for each inch of the tank at 20°. It is to be noted, however, that no allowance is here made for the fact, that the temperature of the tank is always higher or lower than that of the oil; that the yearly mean is greater than 50° Fah., and that nothing was said of the increased hight of the tank. All, of course, for the reason of their insignificance, and because the the expansion of the iron was taken as not interfering with the figures of the tank.

"The above results agree with the writer's experience of oil stored in this vicinity." T.

Tidioute, Pa.

Rights of Inventors.

Messrs. Editors:—I so fully believe in the rights of inventors, that I am sorry to see them hazarded by any attempt to urge them to an extreme and ridiculous extent. I therefore have little sympathy with the criticisms of your correspondent, G. W. P., who objects not merely to Mr. Greeley's argument in defense of the idea of protection for a term of years, as distinct from perpetual protection, but to the idea itself, as embodied in our Patent Laws.

It seems to me that Mr. Greeley and G. W. P. have both made a serious mistake in regarding an invention as ordinary property. The particular machine one may build is ordinary property, and may be so held. But the principle of its construction is not a piece of property. An invention is not a creation,—it is a discovery. When one invents he simply takes a principle which is as old as the laws of nature.

The laws which apply to property do not forbid one to imitate another in his transactions. They only prevent him from taking the material thing which the other has secured, whether it be land, or a gold nugget, or a machine. But the Patent system has its foundation in the idea that a man may not only hold a machine which he may build, but that he may also forbid any one to imitate that machine. The Australian miner, referred to by G. W. P., had a right to the gold nugget, just as an inventor has a right to his particular machine. But no law forbids another to imitate his example and "strike his pick a few inches into the earth," in the hope of finding, and holding for his own, another $50,000 nugget.

The proper defense of the Patent system is found only when one views it as a system of rewards, offered by the community, for the unfolding of natural principles to meet the community's needs. If one does not like the rewards offered, he need not do the work. If the community does not want the work, it need not offer the reward. But every community does greatly need this service, and so cannot afford to neglect to offer the reward. But talk about "innate and perpetual right" is entirely out of place.

The Patent system is for the good of the whole community, and is not legislation in behalf of a particular class. Let every wise man defend it upon the ground of what is for the good of the community. Let attention be called to the fact that a people cannot prosper except as it shall employ some persons to unfold and wisely apply the as yet hidden laws of nature. Let there be the most resolute opposition to any suggestion to abolish the Patent Laws, in view of the fact that the community cannot afford to dispense with that service which the Patent Laws invite by offering to that service suitable rewards. If the rewards now offered are not sufficient, let that be shown, and a people, having even the beginnings of wisdom, will anxiously seek the increase of these rewards. But why should one talk about "innate and perpetual right," unless it be with the idea of bringing the whole system into contempt? J. D. B.

Clinton, Mass.

Nocturnal Hail storms.

Messrs. Editors:—In response to your request in issue of July 10, concerning "the occurrence of hail storms *between sunset and sunrise*," I will state that probably the greatest hail storm that ever transpired in this section of country, occurred here two years ago this summer. An intensely hot day was succeeded by a beautiful evening, pleasantly tempered with gentle southerly breezes. At half past eight, a large black cloud moved heavily toward the zenith from the west; its interior blazing continuously with red lightning, while the increasing reverberations of heavy thunder, apparently shook the earth to its very center. Domestic animals were unmanageable, and the human mind was fraught with awe and apprehension. Occasionally, gusts of chilling air swept from the northeast, bearing fragments of fleecy vapor, which manifested electrical excitement upon nearing the great cloud. After a few seconds of ominous silence, the storm burst forth. An avalanche of hail of immense size, driven by a furious gale from the west, denuded trees of twigs and foliage, and did immense damage to property; in many instances killing fowls and small animals, and leaving scarcely a pane of glass in windows exposed to its fury. The Erie Railway company alone lost several thousand panes from the skylights of their machine shops. At the conclusion of the storm, which lasted fifteen minutes, I picked up hail of an oblate spheroidal form, measuring two inches in diameter and three fourths of an inch axially. The storm limited its fury to a district four miles in length by one mile in width. F.

Susquehanna Depot, Pa.

Mr. J. J. Weber, of St. Clair, Schuylkill Co., Pa., writes that a hail storm occurred at that place, May 13, about 10 o'clock, P.M. "The windows of houses, on the northwest side, were, in some instances, broken, though the hailstones were small. They came down very thick and with tremendous velocity.

"We had another hail storm here about seven or eight weeks ago. On this occasion the hail stones came thicker and faster than on the previous one, the ground being yet covered with them in some places, half an hour after the storm had subsided.

"I have noticed that hailstones never fall when the clouds are low; that whenever they fall you cannot see a distinct outline of a cloud, all being dark overhead, showing that hailstones come from an immense hight, through the cold current of air running from the north pole to the equator. I have often noticed three or four currents of air running one under the other in opposite directions, and my belief is that whenever the vapor is carried up to, or beyond the current of air coming from the pole, hailstones are formed; if not carried so high, it descends again in the form of rain."

How to Make Good Bread.

Messrs. Editors:—Liebig justly complains of the stationary character of bread-making; but in recommending the use of chemicals only, that by the generation of carbonic acid gas in the oven render the dough spongy, he loses sight of the general demand for good *fermented* bread, and that the fermentation should be accelerated, improved, and rendered reliable to insure a good product. The desired pleasant taste and flavor of good bread are due to vinous fermentation, in which sugar and alcohol are formed from starch, and carbonic acid gas directly evolved, which, in this manner, remains more intimately combined with the dough. While the soft dough is constantly stirred, air should be introduced from below to accelerate and insure the process of fermentation, which only requires about two hours, or less if the ferment was sufficiently vigorous, to be ready for molding, and shortly after for the oven. This has been practically demonstrated. The phosphoric acid, to increase the nourishing property, could be added while the fermentation proceeds, and thus the advantages claimed by Prof. Horsford's baking powder, combined with those by thorough fermentation, are economically and safely obtained.

The fermentation by air-treatment is patented, but the patentee gives it free for family use, reserving to himself the right to the manufacture of articles when engaged in by bakers and manufacturers of fermented beverages, etc. He will cheerfully give further information to parties interested. The same process holds good for purifying drinking water, by