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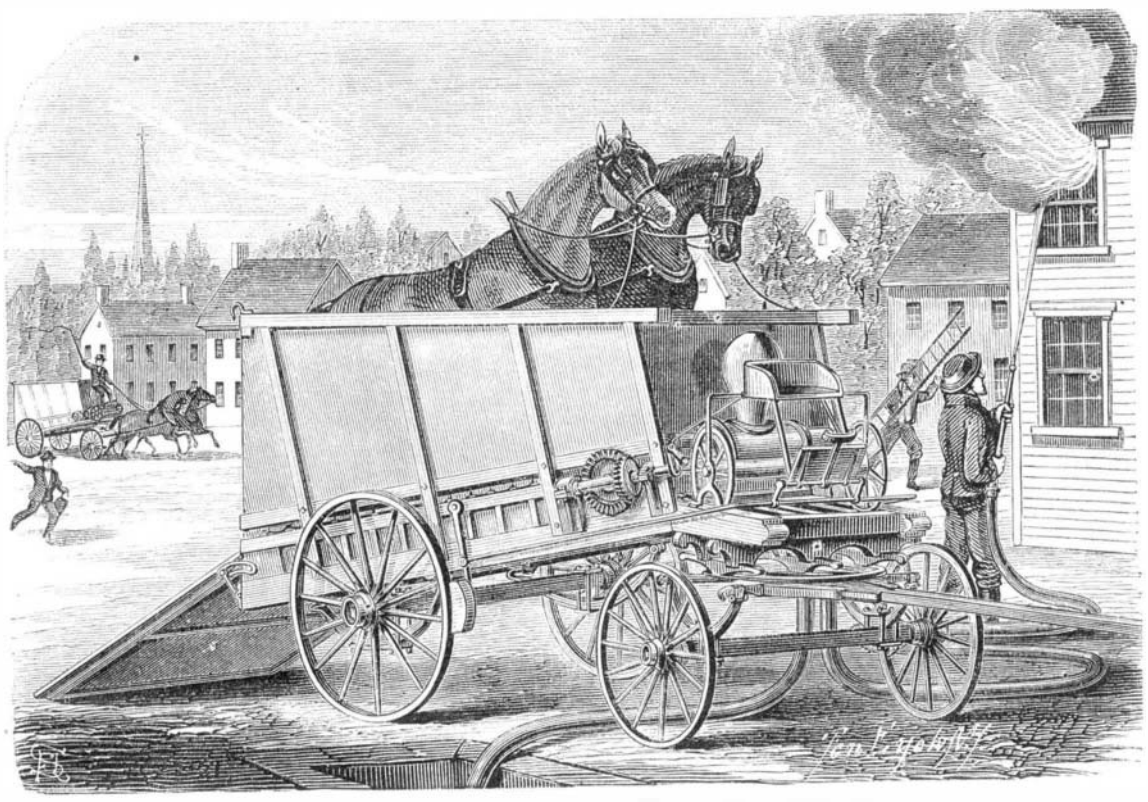
Improved Horse-power Fire Engine.

The several parts of this invention, in themselves, contain but slight elements of novelty, yet the combination of these parts, which is covered by the patent, constitutes, in our opinion, an important and useful improvement, and one which has before it a large field in which it may be advantageously and economically applied.

Our artist has so well delineated the machine that it will be at once understood by all familiar with fire engines. It is a combination of the well-known and extensively used endless apron horse-power machine with a force pump, and reel for a hose; the force pump and reel being placed at the front, as shown. The pump is driven by a crank motion actuated by a pair of bevel gears, the suction and delivery hose being coupled underneath the barrel of the pump, or in any other convenient position, the relative position of the parts not being material to the claims of the inventor. The whole is placed and fixed on a suitable truck, and the weight of the entire apparatus including truck may, it is thought, be brought within 2,500 pounds.



McCARTHY'S HORSE-POWER ENGINE FOR EXTINGUISHING FIRES.

A folding back, when let down as shown in the engraving, forms a bridge whereby the horses mount to the endless apron. The engine is drawn by horses to the place of conflagration, and is ready to operate as soon as the horses can be unhitched from the carriage and led upon the endless apron described.

For rural towns and the suburbs of large cities, this engine possesses many advantages, coming, as it does, between the hand engine and the expensive steam fire-engine. Its lightness enables it to be rapidly drawn to a fire, and the cost of fuel is saved. Its cost is much less than a steam engine, and its working efficiency may be made much greater than that of a hand engine as the number of horses is not limited to two, but three or four may be used in machines of large capacity. It thus has, in proportion to the working power of the horses, the advantages of steam fire-engines, without the defects of hand engines, not the least of which is the generally admitted demoralizing tendency of volunteer fire-company organizations upon the youth who for the most part compose them. Extra hose-carts are not needed. The machine may be placed in charge of some responsible person in small towns, and when required two or three men may effectually operate it. Where the water has to be raised only a short distance through the suction pipe it is claimed that two horses will, through two hundred feet of hose, throw a three-quarter-inch stream to a hight of from sixty to seventy feet.

We think this machine peculiarly adapted to the wants of far-western towns. In such cases it might be placed in the care of the postmaster, merchant, or other responsible party centrally located, and would be an important safeguard against those disastrous conflagrations which have so frequently ravaged our border settlements.

Patented, through the Scientific American Patent Agency, Nov. 2, 1869. For further information concerning rights, etc., address John C. McCarthy, patentee, 131 Barrow street, New York.

Novel Trout Fishing.

The *Virginia City* (Nevada) *Enterprise* states that trout are taken at Carson in the following unique manner:

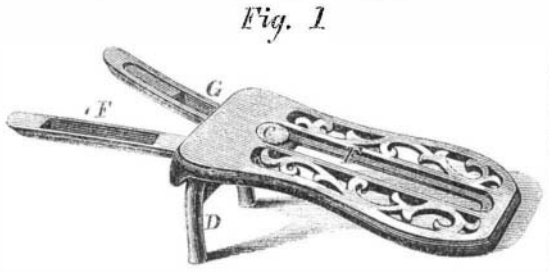
"They take a cartridge of 'Giant' powder, weighing about a quarter of a pound, insert into it a piece of fuse, properly capped, about six inches in length, then, lighting the fuse, the cartridge is thrown into any deep hole supposed to contain trout or other fish. After the cartridge has been thrown into the water, smoke and bubbles of gas are seen to rise to the surface, then in a few moments comes the explosion—a dull, heavy report. The surface of the water is seen to bulge up, and the ground can be felt to shake for fifteen or twenty feet back from the water.

"Immediately after the explosion, all the fish that happen to be within a circle of twenty-five or thirty feet of the spot where the cartridge fell, come to the surface, either killed outright or so badly stunned that it is some minutes before they recover. Our informant says that with two cartridges he saw over fifty pounds of fish killed, counting trout, white fish, and chubs. In places, after a blast, the whole surface of the water would be covered with minnows from an inch to three or four inches in length. At Elko they are practicing the same style of fishing, only that out there they tie the cartridge to the end of a long pole and thrust it into the water, holding it until the explosion occurs. This is the most destructive mode of fishing we have ever heard of; it is a regular wholesale slaughter of great and small, good and bad. Should the practice gain ground it will be necessary for the Legislature to put a stop to it by making it a criminal offense to fish with Giant powder. Parties have already been talking of trying this process in Lake Tahoe, where, by using large cartridges, they expect to bring up hundreds of trout at a single shot."

SEYMOUR'S PATENT POCKET BOOT-JACK.

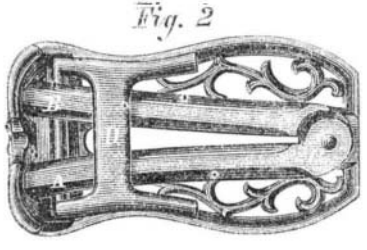
This convenient little implement is made of cast iron, and is so contrived that it may be folded into a very small space, as shown in Fig. 2, or extended for use as shown in Fig. 1.

Fig. 1



The jaws, F G, are pivoted together at C, the head of the pivot sliding in a rib of a slot, E, in the foot plate. The jaws have grooves in their upper surfaces, as shown in Fig. 1, the groove of one being placed further back than the groove of

Fig. 2



the other. The support, D, of the foot plate, is pivoted to the foot plate, and folds down, as shown in Fig. 2, when the jaws are thrust back; thus making a very compact arrangement for carrying in the pocket or carpet bag. The folding and unfolding of the support, D, is effected by lugs cast upon the portion of the support, D, which passes between the jaws and the foot plate. These lugs lie directly under the points of the jaws indicated by the letters A and B, Fig. 2. The outer end of the groove which lies nearest to the foot plate, Fig. 1, striking against the lug which plays in that groove folds down the support when the jaws are thrust in; while the inner end of the groove in the other jaw, striking the lug which slides in that groove, unfolds it when the jaws are thrust out. The jaws slide in ways which force them together when they are thrust in, and open them when they are thrust out.

This implement will draw any sized boot from a lady's gaiter to the largest men's wear. Its convenience to travellers, as well as others, is obvious.

Patented through the Scientific American Patent Agency, Oct. 29, 1867, by Albert P. Seymour, of Hecla Works, Oneida county, N. Y., who may be addressed for the entire right for the United States or for State rights.

The East River Bridge.

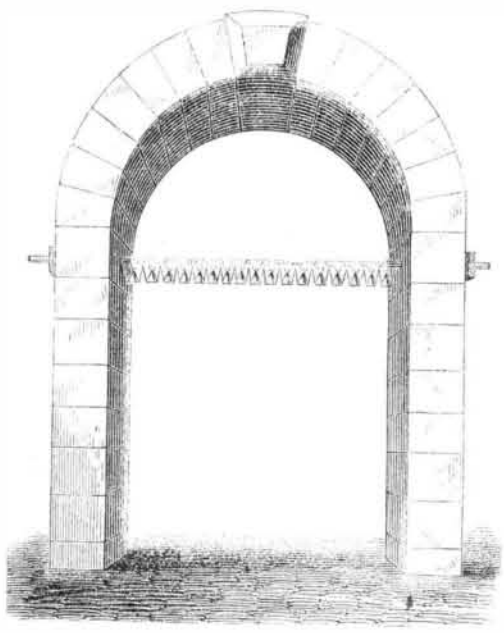
We learn from the Brooklyn *Times* that the construction of the caisson which is to be sunk at the base of the Brooklyn tower of the East River Bridge, is begun, and is now well under way. Colonel Wm. H. Paine is present at Messrs. Webb's yard every day, superintending the work on behalf of the Bridge Company. It is expected that the caisson will be ready to launch some time in March. It will then be floated to the location of the Brooklyn foundation of the tower. The river shore will be dredged out to low water line, and the caisson floated into its position on a high tide; on the water receding, it will be anchored or "seated," and excavating to sink it the required depth will be carried on in its interior. Through the roof will be six shafts, or funnels, made of half-inch boiler iron. The two supply shafts through which the workmen descend and ascend, and by which the excavated soil is removed, will be twenty-one inches in diameter each. Each of the two air shafts, by which air is supplied to the workmen, is forty-two inches in diameter. Each of the two water shafts, in which the water oozing through the soil will be conducted, so as to keep clear of the workmen, is seven feet square. On top of this caisson will be piled timber to the hight of fifteen feet, and the whole mass filled in with concrete; and on this bed of wood and stone will be placed the masonry for the towers.

The caisson is in shape a parallelogram, 168 feet long and 102 feet wide on the outside, and is about 15 feet high. The sides are V-shaped, the bottom being eight inches thick, and the top eight feet three inches, and ten feet high, and the roof, which rests on these sides, is five feet thick. The whole is constructed with yellow pine a foot square, with the seams caulked. Between the outside layers of timber is a sheathing or layer of tin, between two of felt, intended to prevent the atmosphere from working into the interior of the caisson. The sharp edges of the structure, are to facilitate the sinking of the box thirty feet beneath low tide level, and accordingly this portion is strongly made. The first layer of timber is of oak; on this is bolted a cast-iron shoe, eight inches wide, oval on its face, being three inches thick in the center. Around the shoe is placed an armor of boiler iron, extending three feet above the shoe, on both sides of the wall, the whole strengthened by heavy angle irons on the interior, sixteen feet long. As the pressure of air on the caisson will increase as it sinks, it is estimated that the atmosphere resting on the surface will vary from 18,000 tuns to 40,000 tuns. Consequently, careful and accurate calculation is made to give strength to the box. The timbers are all bolted together, perpendicularly, horizontally, and diagonally, with the heaviest and longest bolts ever used. These bolts are, on an average, eighteen inches apart throughout the structure, and the ends are made air-tight by rubber washers. The immense number of bolts may be imagined, when it is expected that one hundred tuns of them will be used. The interior of the caisson will be a room one hundred and sixty-six feet long, one hundred feet wide, and nine feet high. There will be about one million five hundred thousand lineal feet of timber used in constructing the caisson, and when ready for launching it will weigh three thousand tuns. In order to launch it, there will be seven ways or keels underneath, and a water-tight compartment, or air-chamber, in the interior, thirty-eight feet wide, extending lengthwise. In addition to this there are ten heavy supporting frames to sustain the roof.

As regards the negotiations for obtaining the site for the tower on the Brooklyn side, it appears that they have so far made but little progress. This tower will, it is understood, be built in the third or upper slip of the Fulton ferry. The Ferry Company lease their ferry property from the City of New York, and the Commissioners of the Sinking Fund of that city are vested with the power of leasing and selling public property. The Brooklyn *Eagle* states that when negotiations were opened by the Bridge Company to obtain possession of the upper slip and section of the adjacent land, the Sinking Fund Commissioners referred the matter to a Commission of Estimate and Assessment, consisting of Wilson G. Hunt, and Thomas R. Agnew, who have not yet made their report. It is understood, however, that this will be forthcoming without much further delay, after which the preparations for the reception of the caisson will be at once proceeded with.

The Force of Contraction Applied to Repairs of Buildings.

The force of contraction is equal to that of expansion, and quite as irresistible. Its immense power was strikingly illustrated some years since in Paris. The two sides of a large building, the "*Conservatoire des Arts et Métiers*," having been pressed out by the spreading of the arched ceilings and the immense weights supported by the floors, M. Molard undertook to remedy the evil by boring holes in the wall at the base of the vaulted ceilings, and opposite to each other, through which strong iron rods were introduced, so as to cross the interior of the building from one side to the other. On the projecting ends of the bars on the outside of the building were placed strong iron plates, which were screwed, by means of nuts, tightly against the walls. The rods were then heated by means of rows of lamps placed under every alternate bar, and being lengthened by the expansion, the



nuts and plates were pushed out to the distance of an inch or more beyond the walls. While in this condition, the nuts were screwed a second time tightly against the wall. The lamps were then extinguished, and the rods, contracting as they cooled, drew the walls together with a force almost irresistible, and to a distance as great as that to which they had been lengthened by expansion. These bars being then left in their new position, the *alternate* bars, which had remained unheated, and by the contraction of the others had been also made to project beyond the walls, were again tightly screwed against the building. These were in turn expanded and lengthened by the application of the lighted lamps, and once more screwed up tightly against the walls. The lamps were then extinguished, and by the contraction of the second set of bars the walls were drawn still further toward each other. These were then left, in turn, to hold the building in its new position, and the first set of bars a second time brought into requisition. And thus the process was continued until the walls were drawn into their proper vertical position; and the bars being left in their places, they have remained firm and upright ever since. In this manner a force was exerted which the power of man could scarcely have applied by any other means. The same process has since been applied to the restoration of other buildings which were threatening to fall.—*Pynchon's Chemical Forces.*

Air in Illuminating Gas.

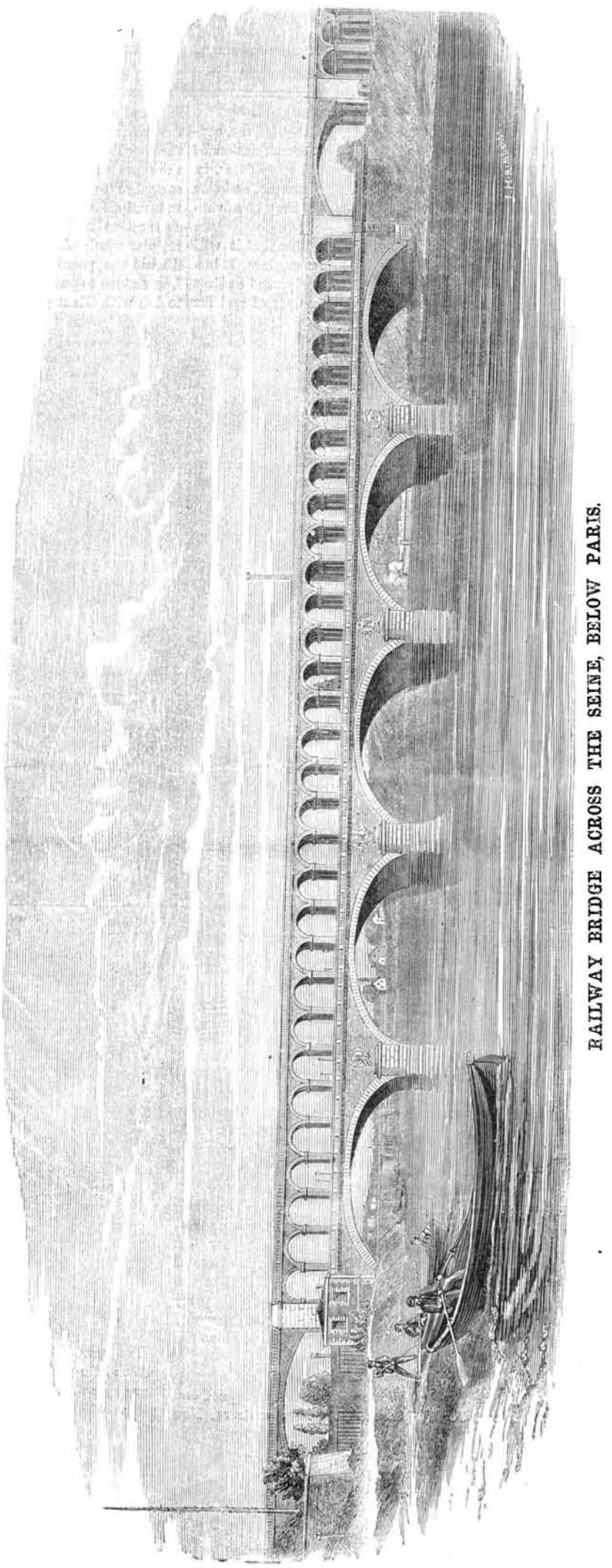
Professors Silliman and Wurtz have been investigating the effects of atmospheric air upon the illuminating power of gas, with, according to the *Chemical News*, the following results:

"For any quantity of air less than 5 per cent, mixed with gas, the loss in candle power due to the addition of each 1 per cent, is a little over six tenths of a candle (0·611 exactly); above that quantity the ratio of loss falls to half candle power for each additional 1 per cent up to about 12 per cent of air; above which, up to 5 per cent, the loss in illuminating power is nearly four tenths of a candle for each 1 per cent of air added to the gas. With less than one fourth of atmospheric air, not quite 15 per cent of the total illuminating power remains, and with between 30 and 40 per cent, it totally disappears.

A BELGIAN report on the preservation of telegraph posts decides that chloride of zinc is the best and cheapest agency to employ, though it does not work equally well in all soils

RAILWAY BRIDGE ACROSS THE SEINE.

Our illustration annexed represents a railway bridge which crosses the Seine, below Paris, at the Point du Jour, on the Chemin de Fer du Ceinture. The bridge, which is rather a remarkable structure, is built in two stories, the lower one consisting of five elliptical, and the upper one of thirty semicircular arches. The span of the lower arches is, in each instance, 99·2 feet; and that of each of the upper arches 15·5 feet. The intermediate piers of the lower arches are each 15·5 feet thick in the direction of the length of the bridge, and those of the upper series of arches measure at the springing of the latter 3·36 feet in the same direction. The upper arches carry the Chemin de Fer du Ceinture, the roadway being 29·5 feet wide, the width of the lower being 131·7 feet, thus affording ample room on each side of the upper viaduct for a carriage and foot-way, the carriage roads being each 24·6 feet wide. The materials used in the erection of the bridge are cut stone and rubble, the parapets and balustrades being of Jura marble. In the large spans the stones are set in cement. The river bed beneath is of clay, chalk being reached under the left abutment, at a depth of about 26 feet, while on the sides of piers and right abutment, sand was met with. In making foundations for the piers, large bottomless wooden caissons were sunk nearly to the chalk, and were then partially filled in with beton, on which the masonry was built by the aid of coffer dams. The ends of the centers of the large arches were supported by dried sand contained in suitable boxes, and they were struck by allowing the sand to escape; the centers were only lowered about one fifth of an inch at one time. The lower story was entirely completed before the upper one was commenced. The bridge was erected about four years and a half since, at a cost of $650,000, from the designs of M. Bassompiere, engineer to the Chemin de Fer du Ceinture.



RAILWAY BRIDGE ACROSS THE SEINE, BELOW PARIS.

Co-operation in Italy.

A Naples correspondent of the London *Times* says:

"One of the most striking features in modern constitutional Italy, is the disposition to form associations. This, of course, is one of the natural results of political liberty, but in the last week or so, we have had a development of it on the co-operative principle, which has probably received an impulse from what is going on in England. A co-operative bank of credit has been formed for the working classes in Naples. One half of its shares have already been taken. The remaining shares are offered to the working classes, and as soon as two fifths are taken the bank will commence its operations. What these are is explained as follows: Limited loans on word of honor, prudently restricted to seventy-five lire; discounting work; discounting bills; receipt of savings, even so low as ten centesimi; deposits in running accounts; advances on public property. Many even of the half who have already taken shares, it is said, are working men, not heads of establishments; and, as this is the first instance of the application of the co operative principle to credit in Southern Italy among the working classes, the experiment is regarded with much interest.

"A bank of the same kind exists in Padua, and has met with considerable success, having with a capital of 30,000 lire conducted affairs in the first year to the amount of 300,000 lire; but without meaning to throw cold water on any effort in a right direction, still it remains to be seen whether the social atmosphere of Southern Italy is as favorable to the growth of such institutions as that of Northern Italy. At all events, the working classes are daily becoming a more important element here; partly, no doubt, from the increased demand for labor, which has been created by private and public enterprise, and as much from the instruction they have received during the last nine years.

"The labor market, I may add, is not sufficiently supplied in this country, and the rate of wages has risen within a few years, in some trades, one half higher than it was before. Another and a novel instance of the application of the co-operative principle, is announced as having been made, not by workmen, but by masters—that is, by the architects of Caserta, with whom those of the neighboring town of Maddaloni have united themselves. Under the title of the 'Association of Architects of the city of Caserta,' they undertake, in their common interest, any commission connected with their profession, and to resolve all questions of art in the meetings of the society. While, therefore, not paying more than would be demanded by a single engineer, it is pointed out as one of the great advantages offered by the association that any person entering on a building or engineering enterprise would here have the benefit of the united study, intelligence, and activity of many. I do not say a word as to the merits or prospects of success of these associations, but report them merely as an indication of that awakening of the public