Combined Gas and Electrical Light.

M. Somzee has made another attempt to produce a cheap and brilliant light by the combination of gas and electricity. The arrangement comprises an ordinary gas flame, fitted with a curved metallic rod passing through the flame, provided with means for preventing overheating under the action of the electric current, which is taken from a secondary battery. It is claimed, in a notice of the arrangement given in the *Journal de l'Eclairage au Gaz*, that under these conditions the illuminating power is considerably augmented in proportion to the additional expense. The light is also said to be white, and much cooler in respect of radiation than a corresponding light from gas alone; the relative proportion of luminous and heat rays being completely changed. What is supposed to render this combination practicable is the fact that the platinum does not require a great intensity of current, and that "one or two small elements will suffice to supply an ordinary light, and make it give four or five times more light at a cost three times less than gas." These are nearly the same data of cost and illuminating power as those to which the public have been made accustomed by electricians. It is a novelty, however, to find gas introduced into the combination in this fashion. According as the intensity of the current is increased or diminished, the flame may be rendered more luminous or hotter as the case may be, so that the arrangement is "capable of furnishing all gradations, from the brilliant flame to the most calorific radiations." Here, it is evident, is a gas stove and lighthouse in one, and only needing a reliable secondary battery to be capable of use for either purpose.

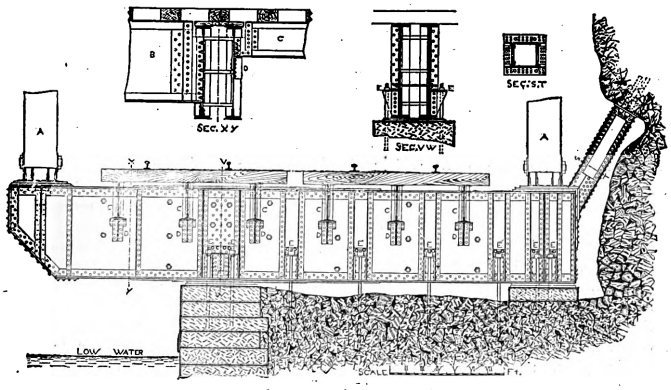
A RAILWAY BRACKET GIRDER.

On the New York, West Shore, and Buffalo Railway, at Cozzen's, the road runs along the bank of the Hudson River at an elevation of only a few feet above the surface of the water, and hills of solid rock dip into the river, forming only an insignificant shore.

The line of the road was such that excavating in the side of the hill to the distance needed was out of the question. To overcome these difficulties, says the *Railroad Gazette*, the bracket shown in the engraving was decided upon. This consists of two rigidly connected plate girders placed 1 foot 10 inches between centers and having a length of 35 feet. The web is ⅝ inch thick, stiffened with angle irons 5 by 3½ by ½ inch. The ends of this twin girder rest on masonry, as illustrated. Not quite one-third of the girder projects over the water. The trusses for the long span bridge over the bay (span, 134 feet 9 inches) rest on this girder, one at each end as indicated at A A'. The stringers, C C C, are supported on brackets, D D D, the ties being laid as shown. The cross section through X Y shows this arrangement, and also the supports for the plate girder comprising the short bridge, which is 89 feet 1½ inches long. There are two of these longitudinal girders placed about 8 feet apart, and upon which the outer track runs until it reaches land some 50 feet from the twin girders.

The outer support of the twin girders is so located relative to the outer track that the moving load of a train on this track is just balanced over the edge of the masonry, and does not, therefore, affect the stability of the structure. In order, however, to guard against all contingencies, the girder is secured to the rock at regular intervals by bolts 9 feet long, shown at E E E. The cross section, V W, shows the method of fastening these bolts to the girder. The bolts are held in the rock by splitting the lower ends and driving them upon feather wedges of steel, the spreading thus caused bearing firmly against the sides of the holes and preventing any liability of drawing. The holes were then carefully filled with Portland cement, and it may be stated in this connection that the spaces beneath the girders and also between them will be filled with concrete in order to exclude all water which might spray up from the river.

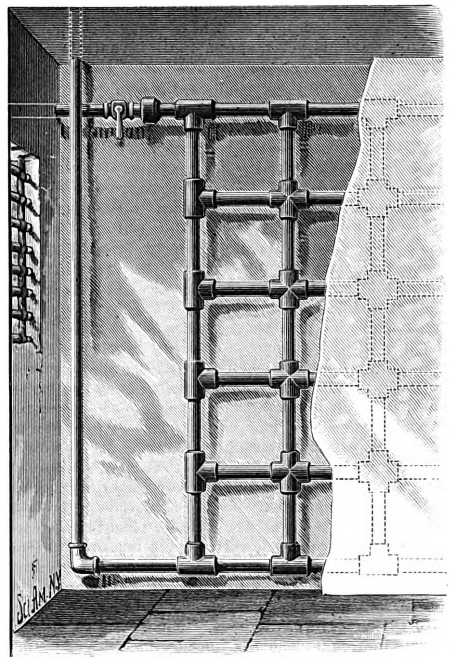
The rock has been cut away as shown at the right of the engraving and a strut inserted. This is a square column (cross section, S T), having interior dimensions of 16 by 18 inches, and exterior of 2 feet 5 inches by 2 feet 7 inches, with plates 1 inch thick. The length is 5 feet 9 inches. To make a perfect fit a slightly tapering plate was driven in at the top, after which the bolts were screwed up.



BRACKET GIRDER FOR NEW YORK WEST SHORE AND BUFFALO RAILWAY.

IMPROVED WALL FOR JAILS AND TREASURE VAULTS.

The annexed engraving shows an improvement in the construction of walls designed to prevent prisoners from escaping from jail, and to protect treasure vaults from the attack of burglars. The improvement consists in lining the wall with or incorporating in it a network of water pipes supplied by water under pressure from the city mains or other suitable supply, so that any attempt at cutting through the pipes will result in the flooding of the building, giving notice to the guard of the attempt before it can be successful. A system of water pipes forming the sides of the cell or chamber consists of pipes placed about ten inches apart, parallel to each other, and crossing each other at right angles and connected at the point of crossing by cross couplings.



McLEAN'S SAFETY WALL FOR JAILS AND TREASURE VAULTS.

This system of pipes has two or more sources of supply at the corners, and the pipes may be made to cover the side walls of the cell or chamber, the ceiling, the floor, or all of them, or it may be made simply to protect the windows as a grating. The provision thus made effectually prevents jail delivery, or the breaking into treasure vaults, as at least four pipes each of an inch diameter will have to be cut to effect a passage, and before this work can be completed the water flowing from the ones first cut would deluge the building and give notice.

For enabling the guard to know when an attempt is being made to saw through the pipes, a pressure gauge is arranged in the guard's room, which will indicate a diminution of pressure whenever the water commences to escape through a sawed pipe. In cold weather the water in the pipes can be slightly warmed, so as to avoid freezing and at the same time impart a sufficient degree of warmth to the jail. This invention has been patented by Mr. Samuel M. McLean, of Modisto, Cal.

Case Hardening.

Probably no better method of case hardening can be employed than that of packing the article to be hardened in a box or crucible with the carbonizing materials — ground bone or animal charcoal — luting the vessel tight, and exposing it for several hours to a red heat. In large establishments where case hardening is a daily duty ovens and special appliances are always at hand. But when there is only one piece to be treated, and the necessity for case hardening occurs only occasionally, a simpler method may serve. It is well to keep on hand, for this purpose, a powdered mixture of prussiate of potash and bone black or animal charcoal, in equal proportions by quantity. This may be applied to the red hot iron, either as a powder, or as a paste made with oil or even mixed with water.

ASTORIA, Oregon, is making very rapid progress. It has 24 salmon packing concerns within its limits, employing 5,000 people.

Baldness.

In an article recently contributed to the *Gesundheit*—a paper, as its name imports, devoted to sanitary subjects—Professor Reclam, a German *Gelehrter*, makes some timely and useful observations on the subject of baldness. After describing, in a vein of pleasantry, the vast array of bare polls which may be seen any evening in the pit of a theater or the body of a lecture-room, he discusses the causes of baldness. He does not think, as is sometimes said, that loss of hair is the result either of impaired health or of much study. The strongest men are often bareheaded, and German professors, who are nothing if not studious, are distinguished above all men by the profusion of their locks. On the other hand, soldiers and postilions, who wear heavy helmets and leather caps, and wear them a good deal, are frequently as bald as billiard balls. From these facts Herr Reclam draws the conclusion that baldness comes chiefly of the artificial determination of blood to the head, and to the heat and perspiration thence arising. The result is a relaxed condition of the scalp and loss of hair. If the skin of the head be kept in a healthy state, contends the professor, the hair will not fall off. To keep it healthy, the head-covering should be light and porous, the head kept clean by washings with water, and the hair cut short. The nostrums vended as hair restorers, and on which a fabulous amount of money is wasted by the ignorant for the benefit of quacks, he denounced as worse than useless. In ninety-nine cases out of a hundred they are worse than useless. Cleanliness and cold water are the sole trustworthy specifics; but when once the hair roots are destroyed, not all the oil of Macassar, the bear's grease of Siberia, nor the cantharides of Spain will woo back the vanished locks.

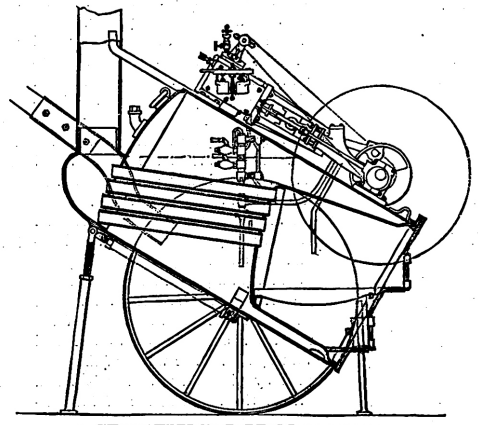
Without a Rival.

The SCIENTIFIC AMERICAN, published by Munn & Co., New York city, is without a rival as a scientific paper, and to mechanics it is simply invaluable. Thus says the Glasgow, Ky., *Weekly Times*, to which it adds: We honestly believe any mechanic would derive information from a year's reading of the SCIENTIFIC AMERICAN which any amount of money could not buy elsewhere. Some of our enterprising mechanics, we hope, the editor adds, will try the experiment of reading this really valuable and practical journal one year, and they would never give it up.

Good advice, Mr. *Times*, and now, at the commencement of a new volume, which begins next week, is a good time for not only your citizens, but for lovers of science, practical mechanics, and others throughout the land who are not already subscribers to commence taking the paper.

TWO WHEELED PORTABLE ENGINE.

The illustration shows the engine by Mr. E. S. Hindley, in the position it occupies when at work, the two shafts being raised in the air out of the way, and the engine being fixed by means of the three adjustable stays shown, these holding it firmly. Under these conditions the boiler occupies, as will be seen, a diagonal position, the tubes rising slightly toward the smokebox, and the firebars being horizontal. The water line is shown by the dotted line, from which it will be seen that the tubes are entirely covered by water. This arrangement of boiler has the advantage, says *Engineering*, of being free from any flat heating surface on which deposit can lodge, while it also affords facilities for the collection of mud, etc., below the firebox, where it can be readily blown off or cleaned out. What would in an ordinary vertical boiler be the bottom of the firebox is closed by a neat casting fitted with firehole and ashpit doors, as shown. The gauge glass fittings and gauge cock are fitted to the side of the boiler, as indicated in dotted lines.



TWO-WHEELED PORTABLE ENGINE.

The engine, which is complete in itself—it having a cast-iron bed plate taking all strains due to working—is mounted diagonally on the top of the boiler as shown, the cylinder casting containing the stop valve and also carrying the two safety valves as illustrated. The whole design is neatly worked out.

The engine is mounted on two large wrought iron wheels, which enable it to be readily transported over rough roads, while it is, of course, very handy to turn and shift about in a limited space.