

to play upon its outer and inner surfaces, whereby it is made very hard. After this, it is tempered by heating it to a red heat in a bath of molten tin until it has acquired a straw color at the front, and a blue colour at the rear end, then it is cooled and ready to be charged.

Gas Light in Railway Trains.

It is highly to the honour of the Scottish Central Railway, that it has, of all the railways of Scotland, initiated a movement, the first steps of which ought to have been long ago taken. It is somewhat singular that of all the improvements which have been effected by science in the ordinary conveniences of life, during the last half century, so little has been done to secure comfort in railway travelling. Of these requisites, none is of more importance—as those who are in the habit of making long journeys are well aware—than a system by which a clear and equable light may be obtained. The filthiness, the dimness, and the expense of the ordinary oil lamps cannot be excused in so great a scheme as a railway. The Scottish Central train which left Edinburgh for the north on Monday night, was brilliantly illuminated with gas, and the trial has been so successful that, so far as regards this particular line and train, it may be looked upon as a *fait accompli*. The gas is supplied from a large boiler at the Perth station, which is filled from the gas-works there. The supply for the train is kept in an india-rubber gasometer of about six feet square defended by iron hoops, and kept in a compartment of the break-van. When full it occupies the whole of this compartment, but as the gas passes away it is compressed by a weight on the top. The gas is conveyed into it, from the hold, by a large tube in the bottom of the van, and is conveyed out of it to supply the carriages by a smaller tube, also in the bottom. This tube again passes up through the anterior part of the van to the roof, and the gas is thence conducted along the carriages by metal pipes, connected by india-rubber tubing, and passes down by brackets into large and strong glass globes in the various divisions of the carriages. The supply necessary for the double journey to Perth and back, which occupies somewhat less than eight hours, is about 260 cubic feet; and the expense, after the fittings are completed, is estimated at one-half of that of the ordinary oil apparatus. The only objection to the scheme is that it must be confined, except with great difficulty and expense, to trains which do not require to be taken down, such as those for long journeys, and express trains; but, as it is in these that the light is most required, the objection is not a strong one. The system has been for some time in operation on the Lancashire and Yorkshire, and London and North Western Railways, and was introduced on the former line by Mr. Newall, inventor of the patent break. The honour of introducing this great improvement into the Scottish Railway system, belongs to Mr. Anell, of the Scottish Central line.—*Caledonian Mercury*.

Railway Bridges over the Thames.

The Thames will shortly be crossed by no less than five bridges for railways. The Charing Cross Railway will have two of these bridges, one at Hungerford, and a second at Cannon-street, for the city extension. The London, Chatham, and Dover,

will have one near Blackfriars, to bring that line into Farringdon-Street. There is a bridge nearly completed higher up the river for the North and South London junction, which will admit of the trains of the London and North Western and the Great Western Railways, passing to the Surrey side, and these can recross the river by the railway bridge at Battersea, and avail themselves of the west-end station at Millico.—*Artizan*.

Atmospheric Gas.

The apparatus by which the Atmospheric Gas, as it is termed, is manufactured, is stated to be very simple. A carburator saturates atmospheric air (which may be forced through it by any means, provided a regular supply be kept up) with an inflammable vapour, and the same result would probably ensure benzoine, naphtha, or any similar liquid were used. The apparatus consists of two chambers, the upper containing the principle body of liquid, and the lower a smaller quantity to saturate the air with. The liquid in the lower chamber is kept at a uniform height by a tube and valve, or other means. The lower chamber is completely filled with wicks, which are kept saturated by capillary attraction. The air passes through these wicks, and not through the liquid, and licks up so much of the inflammable vapours as to become capable of ignition.—*Artizan*.

Sir John Walsham's System of Ventilation.

It consists of zinc tubes, 3 inches in diameter, perforated at the sides, towards the bottom, with holes 1-12th of an inch in diameter, which are carried across the ceiling of the room, suspended by hooks, and taken through the walls to the open air, where they terminate in perforated convex ends, provided with caps, hung by a small chain, to cover the end most exposed to the wind in extremely cold weather. Three tubes will suffice for a room 23 feet by 16, or in that proportion for larger apartments, intervals of about 10 feet in the length of the room being ordinarily the just medium.

The atmosphere in sick wards of workhouses has been rendered quite agreeable by this system of ventilation.—*Banner*.

Paper from Different Substances.

Inventors have for many generations tried their skill in making paper from the fibres of plants easily and cheaply obtained. About 1770, one Jacob Christian Schaffer, a pastor at Ratisbon, produced a little volume of sixty leaves, all made of different substances. Among them were the bark of the willow; the beech, the aspen, the hawthorn, the linden, and the mulberry; the down of the catkins of the black poplar; the silky down of the asclepias; the tendrils of the vine; the stocks of the nettle, the mugworts, and the dyer's weed; wood shavings, saw-dust, potatoes, and fir cones; and numerous other varieties of leaves, stalks, reeds, straw, moss, and lichen. On every leaf a portion of description was printed. A copy of this curious book will be found in the British Museum. Later in the century a French marquis printed a small volume of his own poems on paper derived from those unusual sources; and, as it was sarcastically observed, "the paper was worthy of the poetry."