

the grand trigonometrical survey, on the top of Quainton-hill, near Aylesbury; and being surprised, while there, by a considerable explosion, I hastened to a pit, near where some workmen had just blasted a large piece of rock into fragments. On inquiring their process, they assured me they used no gun-powder, but simply undermined the rock for about a yard in length, and half a yard in depth, and introduced a small faggot of brush-wood, furze, or a bundle of straw, into the cavity, and set it on fire, and that, in a few seconds, the confined air in the stone blew up with great force. The fragments of the explosion I had heard, were lying about, much the same as they would have been thrown by a blast of gunpowder. I saw in the pit several other excavations forming under blocks of two or three feet thickness, intended to be blasted up in the same manner: but night was approaching, and I was unable to stop to witness the next explosion, or to collect further particulars; which I have many times since regretted. Should this singular mode of blasting be practised in other places within the knowledge of your correspondents, they will be rendering me and some others a service by communicating the local and other particulars.

I am, sir,

12, Crown-street, Westminster,
Dec. 1, 1804.

Your obedient servant,
J. FAREY.

P. S. Blast-holes are frequently required to be made horizontal, or even inclining upwards; in which case dry sand would be inapplicable as a stopper.

XXXVII. *On preventing the Freezing of Water in Pipes.*
By J. T. BARBER, Esq.

To Mr. Tilloch.

THE discovery of an effectual means of preventing the freezing up of water-pipes has long been a desideratum in science; but although some methods have been proposed, they have either been so troublesome or expensive, or partially applicable, as not to prove calculated for practical use; simplicity and cheapness, being essential to the general introduction of any contrivance for the above object, must be considered inseparable from the invention that would aim at public utility. In submitting to consideration the following plan, therefore, I only lay claim to the merit of pointing

out how principles already known, may be accommodated to this useful end in every family, without material trouble or expense. In my family the invention has been in use with the most satisfactory effect; and if it is duly made known, I have no doubt but that the inconvenience which families labour under from a want of water in winter, will, in a short time, be no longer known. The nuisance of water-plugs in the streets will then be unnecessary, and the accidents to which they lead, in consequence, avoided, as well as the mischief arising from the bursting of pipes.

It will be unnecessary to enter into an argument, in order to prove that the freezing of water in pipes does not take place while the *current* of the supply *continues*; the generality of pipes known are *at all times full of water*, and it is when there is *no current* that the formation of ice takes place. But if we prevent any water from remaining in the pipes, after the current of the supply has subsided, it is obvious that they cannot be frozen up.

The effectual means of preventing the freezing of water in pipes, then, being to allow no water to remain in them, we have only to inquire whether a way of getting rid of this waste water can be devised, sufficiently simple and commodious to be eligible for public adoption.

Now it is known that by tying up the ball-cock during a frost the freezing up of pipes will often be prevented; in fact it will always be prevented where the main is higher than the cistern or other reservoir, and the pipe is laid in a regular inclination from one to the other, for then no water can remain in the pipe: or if the main is lower than the cistern, and the pipe regularly inclines, upon the supply's ceasing, the pipe will immediately exhaust itself into the main;—but as it is scarcely practicable to preserve the leaden pipes in an absolute straight line, their inclination must be rather considerable and uninterrupted, to ensure the whole of the water's running off.

These cases, however, are comparatively but few; various deflexions in laying of pipes are necessarily occasioned, and many are capriciously formed by the workmen not proceeding on clear and regular principles. Thus, if the main and the cistern are nearly on a level; but the pipe, passing from one to the other, has materially to curve, to follow the sloping of the road-way, or to be conducted (more readily perhaps) beneath the arching of a cellar; it will be easily seen, that the pipe must be always full of water, as its whole course is lower than both its openings. But if at the lowest part of its course we make a small hole with an awl, a channel will
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be formed, through which a current will spirt while the supply is on, and as long afterwards as any water remains in the pipe. This hole may be stopped with a nail in general, and only left open in frosty weather; when the water, which will run to waste at each supply, will scarcely exceed a few pails full. In pipes that are already laid, should the lowest part of the course not be conveniently situated for the draining of the pipe, as in an area, or over a sink, such alteration must be made in shaping the course of the pipe, as will place its *lowermost part* in a convenient situation for *draining*. But in pipes that are to be new laid (if what I have already said is understood) it will be obvious, that when a deflection between the main and cistern is necessary, the lowest angle or part thereof should be fixed in a convenient situation for draining the pipe, as *over a sink*; and to this point the whole of the pipe must incline. I have taken some pains in examining the laying of pipes in manufactories, &c.; and I have met with no instance wherein the necessary deflections of a pipe might not be reduced to *one lowermost angle, to effect the exhaustion of the whole course*.

Should the small current alluded to be found an objection, as continuing during the whole of the supply, the peg need only be removed for one or two minutes, within a few hours after the supply has ceased, when the waste water will be drawn off before a formation of ice can take place.

XXXVIII. *Experiments and Observations on Feathers, and the Down of domestic Fowls.* By M. PARMENTIER*.

BIRDS are caught and reared not only for the sake of their flesh, their fat, and their eggs, but also on account of their feathers: the feathers, given them by nature for their clothing, and to form their principal means of flight, are applied to different purposes more or less useful to society.

Some, remarkable for their softness and elasticity, for the beauty of the filaments of which their barbs are composed, serve to overshadow the helmets of warriors, to ornament the head-dress of ladies, to form those tresses and those elegant plumes by which the richest articles are surmounted.

Others, sought for on account of the length and solidity of their barrels, and the facility with which they can be cut at

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