Within one week, the operation of boring for the spring at Tottenham, was begun and finished; a depth of one hundred and five feet!

*Answer to the Queries, "On Artificial Fountains." By B. BEVAN,
Esq. Civil Engineer.*

Leighton Buzzard, Sept. 13, 1823.

Dear Sir,

Observing, in your very useful Repository, No. XX. p. 140, some Queries respecting the present mode of Boring for Water,—and finding none of your Correspondents have noticed the subject in the last Number,—I take the liberty of sending a few observations, in reply to the said Queries, in case you may not be already furnished with more useful particulars.

From the manner in which the art of obtaining water has been often mentioned, it might be supposed that it might be practised with success in any situation; whereas the possibility of succeeding is confined to certain districts, and depends upon the succession of the strata, and the elevation of the surface; requiring an impervious stratum of moderate thickness, resting upon an open stratum charged with water from a source of greater elevation than the surface of the spot to be bored.

If the sub-stratum is altogether porous, and open to the passage of water, it will be in vain to look for a supply above the natural outlet of the springs in the vicinity: and if the relative height of the situation, where water is required, to the outcrop of the underlying porous stratum, should not be favourable, it will also be in vain to bore: but should the surface of the district be low, and have a substratum of clay or marl to a moderate depth, an aperture made through the clay to the confined water below, will allow it to rise to the surface, and in some instances to rise many feet above the surface, up pipes properly fixed for that purpose.

At Cambridge, where this practice is very common, the substratum, after passing through the alluvial gravel and soil, is the chalk marl, or, what is commonly in that place called *gault*, and is about from 120 to 130 feet in thickness, resting upon a stratum of sand saturated with water, the outcrop of which is at a considerable distance, and much above the level of Cambridge: any opening therefore through this marl, or gault, will allow the confined water to rise; but, if no further precaution was used, it would reach the surface indeed, but, upon coming to the alluvial gravel, would be diffused in that reservoir of water constituting the more superficial springs, which are often, without any good reason, called *land-springs*:—therefore, to secure a supply at the surface, it is *essential* to cut off all communication with these higher springs; and this is usually done by inserting an iron pipe several feet into the water-tight stratum, and puddling or ramming strong clay round the

lower part, and continuing the pipe, by additions, as may be required, until it reaches the intended place of delivery. The hole is then bored through the clay with an auger of about four inches in diameter; and when cleared of the mud and softened clay, produced by the operation of boring; a tin tube, as large as the hole will admit, is passed from the top to the bottom, to keep open the aperture first made; and afterwards the fountain-head is fixed upon the iron pipe.

The boring-rods are generally about one inch square, of bar-iron, screwed together in lengths of 6 to 12 feet. Sets of joints may be obtained at any general iron-factory, and welded to bars of any length. The cost of rods and joints, ready for use, will be about 5s. per yard; and the total expense of the operation, including the use of all the implements, and iron and tin pipes, to holes of 130 feet deep, is about 25*l*.

It occasionally happens, that thin beds of rock are found, in boring, too hard for the auger: these are cut through by a piece substituted for the auger, in the shape of a chisel; worked continually round, in a stamping motion, until the rock is perforated: this tedious process sometimes requires two or three days to pass a rock of eight or nine inches in thickness.

The quantity of water produced at one of these apertures lately made at Cambridge, is regularly 12 gallons per minute; and at another finished this week, full 11 gallons per minute.

I am, Dear Sir, your obedient servant,

B. BEVAN.

[*Gill's Technical Repository.*]

In account of the Overflowing Well, in the Garden of the Horticultural Society, at Chiswick. By JOSEPH SABINE, Esq. Secretary to the Society.

TURNHAM GREEN, NOV. 27, 1823.

In consequence of the success which had attended the operations of several persons in the vicinity of Chiswick, in boring for water it was determined, by the Council of the Horticultural Society, that an attempt to procure an overflowing-well should be made in the Society's Garden, for the purpose of obtaining a supply of water for various purposes; but, more particularly, to form an ornamental canal in the *Arboretum*, for the growth of hardy aquatic plants.

After the necessary inquiries had been made, it was determined that Mr. John Worsencroft, a person who had previously succeeded in making an overflowing-well for Messrs. Bird of Hammer-smith, should be employed to execute the experiment. He commenced his operations upon the first of September last; and, after boring for five weeks without material interruption, tapped the spring on the 18th of October, and finally completed his task on