INSTITUTION

OF

CIVIL ENGINEERS.

SESSION, 1843.

January 10.

The PRESIDENT in the Chair.

THE business of the meeting was commenced by reading an abstract of Mr. Davison's Paper (No. 539) describing the mode adopted for sinking a well at Messrs. Truman, Hanbury, Buxton, and Co.'s Brewery, which was published in the Minutes of Proceedings of the session 1842, p. 192, and the following observations were made.

Mr. Braithwaite described the difference between the method employed in sinking the well for Messrs. Truman and Co., and that for Messrs. Reid and Co. In the former the bore was small, and would therefore only produce as much water as was procured from the veins through which it passed vertically; while the latter, by its larger diameter, permitted lateral galleries to be driven in the direction of the fissures in the chalk; thus forming feeders for the well, and at the same time capacious reservoirs wherein the water accumulated when the pumps were not at work.

He attributed the comparative failure at Messrs. Truman's to errors in the mode of sinking; the length of the cylinders which had been attempted to be forced down was too great, and the lateral pressure had prevented them from reaching the chalk, so that when the pumps were set to work an undue quantity of sand was drawn up with the water, causing a cavity behind the brick-work, which at length fell in. The water having been pumped out to a lower level than was proper, the equilibrium between the water and the sand around the cylinder had been disturbed, and the "blow" of sand had ensued.

Well at
Messrs.
Truman
& Co.'s
Brewery.

Mr. F.
Braith-
waite.

The New River Company had been advised to sink a well of sufficient diameter to enable them to excavate lateral galleries, but they had sunk their well in the Hampstead Road, of a small diameter, as described in the paper by Mr. R. W. Mylne, published in the Third Volume of the Transactions of the Institution;* and although fissures had fortunately been traversed, which gave an ample supply of water, many of the difficulties encountered would, he contended, have been avoided by adopting the larger diameter, and sinking the cylinders into the chalk, before the pumping was commenced.

The supply of water at Messrs. Reid's well had been sensibly affected by the recent proceedings at the Hampstead Road well, which was now being constantly pumped in order to sink it deeper.

Mr. Davison explained that a bore of small diameter had been adopted, because it was calculated that a supply of water, sufficient for the wants of the brewery, would have been obtained by it. The excavation to within 5 feet of the chalk was suggested by the sudden dropping of the cylinder. He believed that when (contrary to his express instructions) the level of the water was reduced by pumping to below a given point, the sand from beneath the oyster-bed rushed in to restore the equilibrium within the cylinder, and thus caused the difficulties which he had to contend with.

During the last year the pumps had been at work 1616 hours, in which time 300,000 barrels, or 50,000 tons of water, had been drawn from the well.

Mr. Farey. Mr. Farey believed that the casualties in well sinking generally arose from the sources which had been mentioned. Mr. Woolf encountered them when sinking the well at Messrs. Meux (now Messrs. Reid's) Brewery. The pumping up of sand with the water was there carried to such an extent as to cause an accumulation of sediment 2 feet deep in the liquor back, in 14 days, and ultimately the new well broke into the old one adjoining it.

Mr. Braithwaite explained that in the year 1814, the well at Messrs. Meux was pumped "to clear the spring," which caused a cavity of nearly 40 feet deep from the sides of the well, and endangered the stability of the buildings around. Piles were therefore driven to support the upper ground, and upon them the brick steining was carried up. If the cylinders had in the first instance been carried down to the chalk, before the pumping had commenced, this accident would not have occurred.

Mr. Vignoles. Mr. Vignoles remarked that the same question as to the relative merits of boring or sinking had been discussed at Liverpool, for wells

* Trans. Inst. C. E., vol. iii. p. 229.

in the red sandstone, and in practice it had universally been found that, by the latter system the best supply of water had been procured, particularly when side drifts had been made.

Mr. Mylne said that the works at the well in the Hampstead Road, Mr. Mylne. which had been repeatedly stopped from accident, were now resumed as an experiment; the quantity of water obtained was more than could be drawn by a pump 12 inches diameter, 6 feet stroke, making 10 strokes per minute (= 294 gallons per minute). The spring was struck at about 234 feet below the surface of the ground, and when the engine was regularly at work, the water generally stood at within 20 feet from the bottom of the well. He coincided in the opinion of the advantage of a well of large diameter over one of small bore, as it permitted side excavations to be made in search of water. This plan had been pursued with success at Brighton.

Mr. Taylor observed that another of the advantages of the large Mr. Taylor. diameter was, that the proceedings could be watched, and accidents could be more readily remedied; the opinion of all practical miners was, that the large diameter was cheaper, as well as better, than the small bore.

Mr. Clark promised an account and drawings of a well now Mr. Thomas Clark. sinking by him at the Royal Mint. The advantages of a large diameter were manifest to all practical men, particularly when the auger or "miser" was used, as it enabled the operation to be continued without pumping; the cylinders, in lengths of not more than 30 feet each, followed the "miser" down regularly, and as soon as they reached the chalk the operation was considered safe; and as the "miser" did not excavate more than was due to the area of the cylinder, the equilibrium between the water within and the sand without the cylinder, was never disturbed. In a well sunk by him at Messrs. Watney's Distillery, the cylinders were 11 feet diameter; the "miser" used was 5 feet diameter, and was turned by twelve men at a time.

Mr. Braithwaite concurred in the advantages of using the "miser," Mr. F. Braithwaite. he invariably employed it, and generally with success.

Mr. Farey believed that the "auger" or "miser" was first used Mr. Farey. in this country by the late Mr. Vulliamy* of Pall Mall, for sinking an Artesian well, into which there was an irruption or blow of sand, the effect of which was only overcome by this instrument.

* Vide Nicholson's Journal of Philosophy, vol. ii., p. 266;—"An Account of the means employed to obtain an Overflowing Well at Norland House in 1794," by Benjamin Vulliamy.