PILES FOR FOUNDATIONS.

Sand, if coarse in quality, dry, and sharp or angular in the form of its particles, is frequently found to afford a tolerably good base for foundations; not so good as gravel of variable structure, it must be admitted, yet sufficiently firm, if well supported by the surrounding material, to receive ordinary foundations. It will, however, be improved by a little lime fronting, and will require all possible precaution in preserving it from the insidious action of water percolating through it from springs or upper drainage. When, however, sand occurs in a shifting condition, constantly sliding away from the inclination of its bed, or from want of cohesion, or when it assumes the form of a quicksand falling in through wide fissures, and drifting into heaps, filling up holes in the subsoil, and undermining the surrounding materials by gradual insinuation among them, complete preparations become requisite, in order to prepare for the building of the foundations. In these cases the access of water and drifting sand must be intercepted, which may be effected by the use of concrete, aided by draining off the water from the upper strata. Or a row of sheet piles may be driven about the intended site for foundations, the interstices caulked—that is, filled up with oakum driven in with a tool—and the surface afterwards well coated with pitch. If the existing bed of sand be of small depth, it may be found worth while to remove it altogether over the surface required for the foundations, clear out the trench completely, level the surface of the sub-materials, if good, shore up the side of the trench with rough 3 in. planking, well pitched, and fill in with concrete or rough masonry.

If, however, the sand be of great depth and extent, piling will become necessary. Piles thus employed to secure a firm support for buildings effect this purpose in one of two ways, either by passing through the loose material, as sand, etc., and reaching a solid substratum of chalk, etc, into which they are driven so as to secure a firm footing or position, or by penetrating the loose material to such an extent that the friction between the sides of the piles and the surrounding materials sufficient to preserve them in their places and prevent future subsidence. This latter condition is evidently compatible only with stationary sand. If they have any disposition to shift, it becomes indispensable that the piling reach an independent footing in the firm material beneath, and thus afford a foundation free from the action of the sand through which it passes. Even with such piling as this it may be advisable to protect it with a row of sheet piling driven on that side from which the sand has a tendency to move, so as to protect the work from lateral pressure hereafter. The piles should be of Memel or Dantzic whole timber, from ten to fifteen square inches, care being taken that they are nice, straight-grown sticks, free from shakes, and in all respects sound and perfect. They must be properly shod with iron and pointed, and the top squared and properly fitted with wrought-iron rings or collars to prevent splitting from driving. Their length will, of course, depend on the depth of the soil through which they are to be driven, or its tenacity. The monkey of the pile engine is usually from 8cwt. to 15cwt. in weight, and each pile should be driven until ten blows of this monkey will not force the pile down more than ¼ in. When all are thus driven to the proper depth, the tops of the piles are to be carefully squared to a uniform level throughout, and the upper timber work fitted. Longitudinal half timbers, 5in. to 7in. wide, and 10in. to 14in. deep, are first bolted to the piles, notched down upon the shoulders cut for them. These constitute the walings, and serve to bind the whole pile framing together. If the piles be sufficiently near to each other—say, not more than 2ft. from centre to centre—the longitudinal planking, which is rough, and 3in. or 4in. in thickness, may be spiked at once down on the surface formed by the piles and waling. If the piles are further, it will be necessary to fix transverse timbers, say 6in. by 6in., on the waling, in order to receive the planking which is to be spiked down upon them. The height to which the pile heads are first levelled will, of course, depend on the determination as to which of these methods is to be adopted.—Illustrated Carpenter and Builder.

POWERS OF A CORPORATION.

A case of much interest to municipal officers, as affecting the powers of a municipality, came up before the Courts at Osgoode Hall, Toronto, recently. A motion for an injunction was made by Wm. Horton, a citizen of Windsor, Ont., to prevent the water commissioners of that city from spending $20,000 in erecting water filters. By statute the city is permitted to spend $300,000 on waterworks. Horton claims that the city will exceed this amount if permitted to spend money for filters, and he seeks by injunction to prevent them doing so. The water commissioners claim that in addition to $300,000 they are entitled to spend the water rates of the city. This is the question at issue. Chief Justice Armour ruled that Windsor should be a party to the action, and adjourned the case for two weeks to permit this being done, an interim injunction being granted in the meantime.

BONDING OF MASONRY.

The careful bonding of masonry is a very important matter, and should receive the close attention of the workman. A wall built of the roughest stones ought to be perfectly stable, though no mortar is used.

The principles of bond, by the stones overlapping and breaking joint thoughout the wall, are the same as in brickwork, and should be thoroughly understood by the mason, for upon their skilled application his reputation as a good waller depends.

Dry and porous stones should be well wetted before being laid in mortar, so as not to absorb the moisture required for the proper setting of the mortar. All joints in the wall should be filled up solid with mortar and spawls. The thickness of the bed-joints, depending on the smoothness of the beds, must be sufficient to prevent any unequal bearing resulting from actual contact between any irregularities on them.

When a good appearance is aimed at, all stones exposed to view should be selected free from stains, chiefly caused by the presence of oxides of iron. In cobble or field stone building, bowlders are often chosen that are variegated in color, in order to give an æsthetic effect to the work, but the proper disposition of these stones can only be directed by an artist, and this part should be considered if "cobble-work" is undertaekn with a view of being artistic.—National Builder.

Brickwork constructed in cold weather, using ordinary mortar prepared with warm water, proves very satisfactory in point of resisting power; nor is any improvement effected by dissolving in water ½ per cent. of calcium chloride. Excellent results are obtained when the mortar is produced with warm water containing in solution 1¼ per cent of common salt. The addition of freshly slaked lime to ordinary mortar results in a satisfactory degree of durability; but still better results are obtained by the exclusive use of freshly slaked lime, especially when employed in conjunction with calcium chloride. An admixture of Portland cement with common mortar increases its resisting power to frost.—Thon Industrie Zeitung.