once it has frozen it does not increase in strength. As a protection against frost, the concrete should be at once covered over with sacks, tarpaulins, straw, sawdust, etc. Canvas screens assist in protecting concrete from cold winds, and in severe weather the covering of windows affords a partial protection to internal concrete work in buildings in course of construction.

WATERPROOFED CONCRETE.—The production in a laboratory of concrete which is practically waterproof is a relatively simple matter when clean, well graded and best quality materials, properly proportioned, are thoroughly mixed with the correct amount of water under ideal conditions. In practice, however, where the conditions are less favourable, impervious concrete is not readily produced, and unless the various factors which tend to the production of good quality concrete are rigidly controlled, it will be interspersed with voids to such an extent as to render the product porous. Where the concrete is required to be impervious, it is now a common practice to use admixtures, known as waterproofers, which will have the effect of reducing the void space. Reference has been made to waterproofers on p. 27. The powder, paste and liquid forms are used for waterproofing concrete. The amount of waterproofer added to the concrete varies, but if in powdered form the usual proportion is 3-lb. of the powder to 100-lb. of cement. When hand-mixed, the concrete is prepared by adding the required amount of the waterproofer to the cement and thoroughly mixing them. This is then added to the aggregate as explained on p. 34. If the concrete is machine-mixed, it is recommended that approximately half of the coarse aggregate, sand and cement are charged in this sequence into the hopper, all of the waterproofer is then spread over the cement, followed by the rest of the cement, sand and aggregate ; these are placed into the drum, which is rotated for about one-quarter of a minute before the measured amount of water is added and the mixing is completed. The general proportion of paste waterproofer is 3-lb. of paste per 100-lb. of cement, the paste being dissolved in the mixing water before the latter is added to the cement, sand and coarse aggregate. When in liquid form, the waterproofer is usually in the proportion of 1-gal. of the liquid to 15-gals. of the mixing water (see pp. 27 and 57).

Certain of the waterproofers are just finely ground chalk, talc and iron filings which reduce the voids in the concrete. Others are chemically active, such as sulphate and sodium carbonate. Waterproofers which are claimed to act as water-repellents (impermeable materials which line the pores) include resin, calcium soap, and soda mixed with calcium chloride or lime.

BONDING

Students should revise the principles of English and Flemish bonding, which are stated on pp. 3 to 15, Vol. I.

SQUINT JUNCTIONS.—Most junctions between walls are right-angled, as described on p. 10, Vol. I, and squint or oblique junctions are not often called for.

Fig. 10 shows some typical examples of squint junctions. Those at A, B, C and D show English bond and the remainder are in double Flemish bond.

Details A and B show alternate courses of 9-in. and 13½-in. squint walls connected at an angle of 45° to a 13½-in. wall, and those at C and D indicate an angle of 60° between the walls. It should be noted in each case that (1) the heading course of the squint wall is bonded into the stretching course of the main wall, (2) the alternate stretching course of the squint wall butts against the heading course of the main wall and (3) the first brick at J in this stretching course is a three-quarter bevelled bat. For comparative purposes and convenience in setting-out, the angle between the walls in each detail has been made to coincide at J with the continuous transverse joint of the main wall. In practice, both the position and magnitude of this angle vary.

The double Flemish details at E to H show similar angles and thickness of walls. It will be observed that, for convenience, the 6¾-in. bevelled bat in each of the squint walls coincides with the through transverse joint of the main wall at J, and the first bonding brick in the alternate course of each squint wall is a header on face.

In this class of work the amount of cutting necessary to avoid continuous vertical joints should be kept to a minimum, the cut bricks should be as large as possible, and awkward shapes of bricks difficult to cut should be restricted

SQUINT QUOINS.—The description of the more usual right-angled or square quoins on pp. 10 and 12, Vol. I, should be referred to when considering squint quoins. The latter are of two forms, *i.e.*, (*a*) obtuse and (*b*) acute squint quoins.

(a) *Obtuse Squint Quoins.*—These are formed when two walls meet at an internal angle greater than 90°, such as at a bay window (see O, Fig. 11) and splay-corners of buildings adjoining streets. Typical examples are shown at A, B, C, D and E. Conforming to the general rule, the closer appears next to the quoin header, which latter is often less than 4½-in. on face. It should be noted that, in each case, the combined width of the header and closer is 2¼-in. less than the quoin stretcher. Thus, the alternate courses at A show the stretcher face to be 6¾-in. ; therefore the return header, together with the closer, is 6¾-in. − 2¼-in. = 4½-in. ; as the header is 3-in., the closer is 4½-in. − 3-in. = 1½-in. as shown. Joints which appear at the internal angles should be lapped as much as possible at successive courses. In this connection stability would be increased at the internal angle at A if purpose-made bricks Q and R (shown shaded) were used, as these would eliminate the 4½-in. wide mitred joints at the angle.

For faced work it is now general to employ purpose-mades for the quoin bricks, and most of the larger manufacturers stock special bricks, such as A, B, C, D and J, Fig. 5, for this purpose. A much better appearance is thus obtained than when ordinary standard bricks are cut to shape. In the absence of purpose-made bricks, wire-cuts only should be shaped, as those with frogs produce ugly joints if the margins are removed.

(b) *Acute Squint Quoins* are rarely employed. They are necessary at corners of