3. *Bond.*—The popular bond here is one course of headers to four or five courses of stretchers. One 42-ft.-high solid 22½ in. brick wall which is still standing was laid in English bond with very poor mortar, which seems to indicate that bond is almost as important as mortar. The use of an orthodox bond should be enforced in all new work.

4. *Cavity Walls.*—All manner of cross-ties have been used in cavity walls, the most effective being the figure 8 wire tie, but even this was not sufficient to prevent the spalling-off of the exterior wall in some cases. The use of a strip of metal to close the cavity when pouring the band course has been popular, and this should be discouraged, as it weakens the bond of the band to the brickwork.

5. *Bonding-metal.*—Bonding-metal was very sparsely used, and where used, wire-mesh strips were most popular. A few examples of expanded metal were seen. The omission was most noticeable at corners and in narrow panels between openings. In older buildings flat strips were much used. The average spacing was every nine or ten courses.

6. *Band Courses.*—The effectiveness of band courses in holding a building together was well illustrated in many cases. These, however, were invariably placed at floor and ceiling levels only, independent of the height of the wall. Where there are no window-openings a second band could well be placed in a high wall. The universal size for band reinforcement was ¾ in., and in only one case was this size increased when the walls were exceptionally long. Very few cases of bands being provided at the top of partition walls, connecting the main bands, were seen.

7. *Gables.*—Gables invariably proved a weakness under existing methods of tying them in, and many cases of gables being pushed out by purlins were seen. Hip ends to roofs should be preferred, wherever possible.

8. *Parapets.*—Brick parapets, together with gables and heavy façades, were responsible for loss of life and should be discouraged, and where used, the height should be strictly limited. There was one case of a parapet on a party wall falling on a roof-truss, displacing the wall-plates underneath, and so pushing out the opposite wall of the building by a thrust transmitted through the trusses.

9. *Damp-courses.*—Several examples of movement in bituminous band courses were seen, and a movement of about 8 in. in one case was reported to have taken place. In one building in Napier the band courses were burned out, and this assisted in subsequent failure of curtain walls.

## (3) BUILDINGS WITH REINFORCED-CONCRETE FRAMES.

This type of construction has proved eminently successful, and there are many examples of reinforced-concrete buildings which have suffered very little structural damage. Had it not been for the fire, there would have been many more monuments to the success of this type of building. There was only one outstanding failure.

1. *Foundations.*—Invariably, spread footings were used, taken down to shingle. In many cases central piers were isolated, and the provision of a network of tie-beams at footing-levels would have been a desirable feature, though no trouble could be traced to their omission.

2. *Basements.*—No cases of failure in basements were seen, either to the structural frame or to floors and walls. All basements examined were, however, on good shingle foundations.

3. *Columns.*—Most of the damage observed occurred in the columns, and particularly in ground-floor columns. Some strenghtening of the junction of columns and floor beams is indicated as being desirable, and the provision of small haunches or haunch-rods in the walls at these points is worth considering.

4. *Partition Walls.*—Where integral reinforced-concrete walls were used very little trouble occurred, but brick partition walls in many cases were damaged. Concrete-block walls were used in some cases, and these stood better than brick. Concrete walls are to be preferred.

5. *Light-wells.*—Where light-wells were introduced and the continuity of the building broken, they proved a source of weakness; but this was avoided in several cases by continuing wall-beams across the wells.

6. *Shop-fronts.*—Almost invariably encased R.S.J.s were used across shop-fronts, and this does not seem to have proved a source of trouble. The difficulty with shop-fronts has been to provide the glassed area insisted on by owners without sacrificing lateral rigidity of the front of the building. In many cases the owner has prevailed, and the disastrous result has been well illustrated in certain shops in Napier. In this part of a building, more than anywhere, on account of absence of walls, it is important that columns be substantial and well fire-protected, and that some form of bracing be introduced.

7. *Cantilevers.*—There is only one example of a cantilevered veranda on a reinforced-concrete building. This one suffered no structural damage.

## (4) BUILDINGS WITH STRUCTURAL-STEEL FRAMES.

The only example of this type of construction in Napier was completely gutted by fire. There was no evidence of any extensive earthquake damage to the main frame.

## GENERAL.

*Maximum Accelerations.*—The results of investigations in this direction have proved very disappointing. Carbide generators in a shed in the Acetone Company's works were overturned, and the horizontal acceleration required is 0·27 $g$ ($g$ = acceleration due to gravity); but it must be remembered that these were bunched together in a shed and were probably subjected to other influences. One cylinder had some heavy top gear omitted, and this one gives a value of 0·37 $g$. Monuments