

structures has given many good opportunities for observing the condition of the metal work. These observations have been very reassuring as to the permanence of the embedded iron. The writer has examined several buildings of this kind while they were being torn down, and has been much struck with the uniformly perfect preservation of the iron, even under seemingly adverse conditions.

In modern reinforced construction, the steel is far more carefully protected than in the older bridges and buildings just referred to, and should be even less liable to corrosion. Concrete steel has not been long in general use and, of course, few complete structures have been demolished to make place for new ones. Still, many beams, slabs, etc., have been cut into or entirely taken down, but in the author's experience, very few cases have been observed in which the steel has become seriously corroded.

It is, of course, not impossible that a longer and wider experience may give less favourable results, but this does not seem at all probable. There is no apparent reason why structures that have stood uninjured, say for five years, in exposed positions, should deteriorate later since the strength as well as the impermeability of concrete is not impaired but rather increased by age. It seems, therefore, that even with our present experience we may feel quite confident that the steel reinforcement will be indefinitely preserved, while the durability of Portland cement concrete itself is, of course, hardly open to question.

The second point to be considered is the *uniformity* and *reliability* of the concrete itself.

Concrete is not a new material, but has been used for fifty years or more though, perhaps, not very extensively. Of late years, its properties have been studied more carefully by scientific methods with a view to greater economy and certainty in its composition. More especially, an interesting series of experiments has recently been made in France and the United States on the effect which the relative fineness or coarseness of the aggregate has on the strength of the concrete. Many other points are being studied with equal thoroughness.

There are still many unexplained problems and indefinite room for further study, but even now the strength of concrete of given proportions can be predicted with considerable accuracy, and a safe minimum strength assumed in designing. Individual tests will naturally show variations in strength, though less than those that prevail in the case of timber and not much greater than allowed by the best specifications for structural steel.

It is often asserted, that even when the cement and aggregates are carefully selected and the workmanship good, unexpected weak-