already been asked to give an option on the property to a strong mining and smelting corporation.

This has been refused as the owners have great faith in the property and wish to acquaint themselves more thoroughly with it before binding themselves to any bargain.

REINFORCED-CONCRETE STRUCTURES.

Three papers presented at the Engineering Conference of the Institution of Civil Engineers, dealt with various phases of this subject. We give below extracts from some of the more important paragraphs.

The form of the section of the bars, provided the area is sufficient, is of little moment, the friction of the steel in the concrete varying but little in all cases. A little rust on the bars is no objection, as it increases the friction.

The round bar offers the most facility for getting the steel thoroughly imbedded in the concrete.

The stirrups, or iron bands for holding the round steel bars in place, must be so formed as not to give until the limit of elasticity has been reached.

It is necessary to crush the aggregates of the concrete small enough to pass through a mesh ⅞-in in diameter, in order to permit the concrete to get in all the interstices of the steel framework, and in order to insure this, the concrete should be well rammed in with suitable shaped rammers. The ramming of the concrete does not have much effect on its strength after it has been made for twelve months. Experiments on blocks 12-in. cube prove this.

The ratio of cement to aggregates should be between 5 and 6 to 1 for ordinary beams and floors, and 4 to 1 for piles and colums to carry heavy weights. In the upper end of piles, for a length of 1 ft., it should be 3 to 1.

For driving into rough gravel or ballast the piles (ferro-concrete—Hennibique) should be at least six weeks old, and should have a tube down the center for for the application of a high pressure water-jet.

The deterioration of the steel in the concrete, provided the latter be properly made, is a negligible quantity.

Ferro-concrete is to be preferred to timber for marine structures, as it is immune to attacks of the sea worm; on the other hand, timber is easier to repair when damaged by collision.

As regards structures on land, ferro-concrete is preferable to timber as it is absolutely fire-proof, and can be made as strong as steel in buildings and stagings, provided weight is not an objection. For large buildings it works out cheaper that stone, and is much lighter—a consideration when the foundations are defective.—Charles Scott Meik.

What evidence is there that the material used for reinforced concrete is not liable to corrosion? As far as the information I have goes, it has been found that, unless the bars are very rusty, the oxide or iron in the bars when placed in the concrete produces ferride to a very slight extent around the bars and practically makes the bars quite clean. I am told of instances where piles have been cut off, and, after lying about in water, have been broken up, and the bars have been found to be quite bright and clean. On the other hand, should the concrete surrounding the steel or iron be faulty, water gets in, and I am certain, from experience of iron-slag concrete in the sea-water, that some chemical action would take place which would propably render ferro-concrete practically useless. Charles A. Harrison.

Dealing first with settlement of foundations, it may be said that steel concrete is a rigid material, and the foundations of a structure of this substance ought to be designed in such a way that they cannot settle. This can always be done even on soft ground, either by piling or by spreading the weight over a large area, on a strong reinforced concrete base.

Reinforced concrete is undoubtedly a first rate fire-resisting material. It would seem that for fire-resisting purposes it is best that the steel should consist of many bars of small section in preference to a few bars of large section, as the first arrangement forms close net-work, which prevents pieces of concrete from dropping out and so reducing the strength of the building. It is also important the concrete aggregate should be crushed small. The ideal composition for the aggregate would seem to be a strong flint or granite for the hearting, with an outside skin of cinder concrete to act as a good non-conductor. It is essential, too, that in a building, the walls, floors, and posts should be well tied into one another.

With reference to damage by earthquake, Captain Sewell, in a recent magazine article ("Concrete," of September 1906), gives an excellent account of its behaviour at the San Francisco earthquake. He mentions the museum building at the Leland Stanford University, which had three wings, one of reinforced concrete and two of brickwork. One building received a very severe shaking, and while the brick wings were in a state of collapse, the damage to the steel concrete wing was insignificant.

We have had enough experience of concrete to know that, if good it is practically unaffected by atmospheric changes. At one time it was feared that the steel might rust, especially in structures under water, but this fear seems to be groundless. Some recent experiments on the permeability of concrete by Mr Baldwin Wiseman show that, if well made, it is one of the most water-tight materials known, and that it rapidly becomes less and less porous when water is forced through it. Moreover, some experiments quoted by Mr. Marsh in his work on "Reinforced Concrete" seem to show that cement has some chemical action on iron which prevents rust.

If reinforced concrete is to be used for marine work, it must be carefully fendered at all parts where it is likely to be struck. In most systems of reinforced concrete the steel is placed within an inch or two of the surface, and if the structure is not protected by timber cushions, this concrete skin is easily knocked away, leaving the steel naked and liable to rust. At the same time it is true that steel concrete does not spall easily from blows, provided they do not fall directly on the concrete; and it will stand a wonderful amount of shocks, and bending due to shocks, if a wooden fender is interposed.—Francis E. Wentworth-Sheilds.

The demand for homes of a moderate size at Vancouver is far ahead of the supply, and there is no doubt a great opening for an enterprising firm or building syndicate to erect a number of dwellings in the western part of the city.