requests for information addressed to the Public Works Department at Ottawa. Mention is made of these matters in order that the complaints, if well founded, may receive attention at the proper hands.

CONCRETE AS A FIRE RESISTANT.

IN the last number of the ARCHITECT AND BUILDER we published a description of the method being adopted to render the new building in course of erection in Toronto for Mr. Robt. Simpson, as a departmental store, fireproof by means of concrete. The article has called forth a letter from "Architect," which appears elsewhere, in which he asserts very positively that concrete is not a fire resisting material, and that it is unsafe to use it where it will be subject to the action of great heat, which would have the effect of causing it to crack and disintegrate.

This is one of those cases where "doctors disagree," and when such is the case, who is to settle it? We have, since "Architect's" letter came into our hands, taken some pains to ascertain the views of different architects and experts on the subject, and find they are as widely apart as the poles. We shall be glad to have the matter discussed in our columns, for it is an important one, in view of the better class of buildings which are being constructed in our cities, and which their architects and owners are desirous of rendering as indestructible as possible.

The quality of concrete depends of course very much on the way it is prepared. If gravel containing limestone pebbles is used the application of heat will slack the lime contained in them and cause disintegration. If, however, slag or screenings are used (and slag, when obtainable, forms the matrix of the concrete used by the Simpson building contractors) disintegration would not occur to the same extent.

We have been shown the results of some very severe tests to which this concrete has been subjected, and assuming that they were fairly applied, they seem to indicate that it is what its supporters claim—absolutely fire resisting. The Board of Fire Underwriters of Alleghany County, Pennsylvania, which includes the city of Pittsburg, lay down the following specifications of a test, which will be required on all non-combustible floor construction before the same will be passed by the board:

"Enclose a space of eight feet square with a brick wall, having a protected steel beam in the center of same, thus having two half spans of floor arch enclosed; said beam must not rest on enclosure wall, but must be a 12-inch 32-pound beam with a span of 16 feet between supports.

Enclosure must be so arranged as to have a flue outlet and a door opening at the other side by which to feed fuel to fire bed.

Place furnace bed 4 feet below bottom of arch and maintain a mixed coke and wood fire at as high a degree of temperature as is possible for at least one hour, then beam and arch must be drenched by a plug stream of water, hose to be two and one-half inch, with a one inch nozzle, under a pressure of 65 pounds.

While fire is in operation the span of the floor must have a load of 750 pounds to the square foot resting on same.

The test must be witnessed, and in charge of an officer of this board."

The concrete appears to have stood this ordeal. The Board of Underwriters gave this certificate:—"As a result of the test of your concrete construction, witnessed by us on the 21st inst., I beg leave to say that we are satisfied with that type of construction for fire-proof buildings." This was signed by Mr. Biggert, assistant secretary of the Board, and addressed to the Columbian Fire-proofing Co., which has the contract for the work at the Simpson building. We understand it is the intention of the company to make some tests in Toronto, and that they desire to make it competitive, so that the relative merits of their system and others may be compared.

An important inquiry is about to be instituted in New York with the object of determining the value of various so-called fireproof materials, which will throw new light on the subject.

Some of the architects whose opinions we have sought say that their knowledge is only theoretical, but they cannot see why concrete, made with slag, should not be a good fire resistant. One, who used concrete for a hearth in a private dwelling, had an experience which rather surprised him, and which showed that it is not a good non-conductor of heat—a fact not very favorable to its fireproofing qualities. Others declare terra cotta, or preparations of clay, to be the only fire-resistants which can be depended on.

A recent test in Glasgow goes to show that concrete made with diatomite, which comes from the island of Skye, and consists of fossilized aquatic plants, will successfully resist fire.

It is claimed for concrete that in addition to being fire-resisting in itself, it possesses a great advantage so far as strength is concerned. And here let us correct a slight mis-statement in our former reference to the Simpson building. The spaces between the floor beams are filled in, not with hollow blocks of concrete, but with two thicknesses, having a space between. There are no joints—the concrete forms a monolith—and it is formed around iron bars which give it great strength. In this respect an advantage is claimed over terra cotta, in that the latter has to be put in place block by block, and being brittle, if one block is broken away, in a fire or otherwise, those beside it are liable to be dislodged. Certainly the tests applied to the concrete, as indicated in the Underwriters' requirements referred to above as well as other tests, show it to be possessed of great strength.

The ARCHITECT AND BUILDER simply seeks to give the facts, with a view of determining, as far as possible, what is the best fire-resisting material for buildings. That point it seems to be difficult to settle. The School of Practical Science at Toronto, part of whose work it is to test structural materials, is at present engaged with the matter, but has not as yet arrived at any conclusion. As a thoroughly disinterested investigator the result of its experiments will carry much weight. Would it not be well to employ more freely the facilities which that institution offers for testing materials about the merits of which there is great difference of opinion?

As the authorities differ on the point which has been raised by "Architect's" letter, we shall be pleased to have more light thrown upon it in the form of further discussion.

WHAT IS A FIREPROOF BUILDING?

To the Editor of the CANADIAN ARCHITECT AND BUILDER.

SIR,—Having read an article which appeared in the last number of the ARCHITECT AND BUILDER, referring to the method of construction adopted in connection with the new Simpson building, Toronto, I desire to protest against some of the statements contained therein.

The article states that "the building is practically indestructible by fire," and then proceeds to describe the method of fireproofing which is being employed, which consists of covering the beams with slabs of concrete, and surrounding the columns with the same material. I quite agree with the writer of the article when he states that "so-called fire-proof buildings have shown that they are not such in great conflagrations," and I have little hesitation in saying that should the Simpson building again become the object of a conflagration, it would prove to be no exception to the above mentioned rule.

Concrete in itself is not a fireproof material, and therefore a building in the construction of which it is used as such cannot be fireproof. It is a well known fact to those familiar with the nature of concrete that its character is changed by the action of fire, which burns out the lime in the material and also causes it to crack and disintegrate, as the result of contraction and expansion. No doubt concrete used in the manner described is in some degree a protection against fire, but it is valuable for this purpose only to a limited extent. A fireproof building should mean an indestructible building, and such a building cannot be constructed of iron covered with concrete.

I have made a careful study of the nature and adaptability of this material, and as a result I never use it in close proximity to steam boilers, or in any other position where it would be exposed to the action of intense heat. For such positions I use hard burned brick, or fire brick. So far as my experience goes, clay is the only material which will withstand the action of fire, and porous terra cotta is the only material which can properly be called fireproof.

I call attention to this matter with the object of endeavoring to dispel some of the ill-founded opinions which exist on the part of architects and the public, with regard to this subject. It is quite time that both architects and the public should clearly understand what constitutes a fireproof building. Only evil can result from misconception of facts, such as there is every reason to believe exists at the present time.

ARCHITECT.

THE fourth annual meeting of the Association of Ontario Land Surveyors will be held in Toronto, commencing on Tuesday, Feb. 25, 1895.