"Mr. W. B. Phillips: In the floor under test, (of the Deere and Webber Building) was reinforcement provided at the centre of the span, at right angles to that connecting two columns at the side of the panel? I believe some reinforcement should be provided between the columns in order to take care of the reverse moment, eliminating cracks to which Mr. Lord refers.

"Mr. A. N. Talbot: In so far as I know, such reinforcement is not used in any of the girderless floors. The cracks referred to are minute hair cracks which, when the load is removed, will close up so as not to be visible. . . . . So far as any one knows, they are not detrimental to a structure."

This is the only point on which Mr. Elmont attempts to substantiate his general sweeping criticism and condemnation of flat slab systems.

But this is not a question that can be settled by quoting opinions or citing authorities. It is a question of fact and experimental verification. There are no observed facts whatever in support of any such stresses as Mr. Elmont computes. It is quite true that systems in which the heads of the columns are not sufficiently large and stiff might be amenable to the objections stated by Mr. Elmont, but when he attempts to excite general distrust of the stability and safety of the pioneer system of flat slab construction by saying that "to-day theoretical and practical experience will veto most of those early systems," he speaks without authority because he is not the possessor of any adequate theory, and is not supported by reference to the facts, which show that not only have such slabs satisfactorily passed the test of carrying twice the live load without failure, but have done this for months at a time without signs of distress; a kind of test to which no other form of structure could be safely subjected.

It may be an open question as to what should be regarded as a sufficient and satisfactory test of a given type of structure. But is would seem as though one which no other type of structure could equal should be so regarded.

There is one peculiarity of flat slab construction which makes it perhaps the safest type of structure which it is possible to erect, but it is a peculiarity not ordinarily recognized, viz., its toughness. It will not collapse, nor give way suddenly under any load that it is possible to place upon it. By sufficient over-load or by too early removal of forms, a flat slab may be made to bag downwards and do almost anything, except actually to fall. A gradual yielding without impairment of strength is the worst that can occur under over-load. Lack of recognition of this fact seems to be the background of the attempt here made to awaken distrust in reinforced flat slabs.

In my treatise on flat slabs, rational formulas have been established that agree closely with a large mass of observations on many different slabs made by various experimenters, the details of which are not there given. But the result of a numerical discussion of half a dozen of the most complete of these tests is now accepted and awaiting publication in the Proceedings of the American Society of Civil Engineers, which will entirely corroborate the statement just made as to the agreement between computed and observed values of both deflections and stresses. Mr. Elmont cannot cite any such agreement of his computations with observations, and until such agreement can be established he is not justified in asserting what will or will not happen to slabs whose entire behavior can be predicted by rational formulas.

My present opinion is that not only has Mr. Elmont drawn incorrect and unwarranted conclusions from the analysis he has offered, but has also seriously misunderstood and misrepresented the position of Professor Talbot when he refers to him as having shown "the insufficiency of reinforcing in flat slabs as ordinarily constructed."

I would respectfully ask Mr. Elmont either to substantiate this statement or to withdraw it. I have been unable to find any such thing in Professor Talbot's publications, but, on the contrary, much to make me think that he is quite unwilling to express the opinion that flat slabs constructed on the lines which Mr. Elmont condemns are necessarily unsafe.

Had Mr. Elmont been willing to point out types or specific instances of the kind of weakness which he depreciates, it would have been possible to agree or disagree with him in better spirit than is now possible, when he apparently intends to bring flat slabs in general into disrepute, and especially in case they are not reinforced across the top at the side belts, a view known to be so erroneous by all constructors of flat slabs, Professor Talbot included, as to detract very greatly from the weight that might otherwise be attached to any other views he might express upon the properties of flat slabs.

H. T. EDDY.

Minneapolis, Minn., Oct. 8th, 1913.

[A copy of Dr. Eddy's criticism was forwarded to Mr. Elmont, who furnishes the following reply.—Ed.]

Sir,—It was certainly not the intention in the writer's paper to bring flat slabs into general disrepute, and the writer has difficulty in understanding how Dr. Eddy could read that out of the paper. The writer considers the reinforced concrete flat slab as being a very economical and suitable structure for many purposes, and thinks that great credit is due to Mr. Grashof for his theoretical investigations, to Mr. Matrai for his reinforcing system leading up to the reinforced concrete flat slab, and Mr. Mensch for being the first—to the writer's knowledge—who employed a flat slab in an actual building.

The aim of the paper was to improve the present design of flat slabs. What the writer expressly directed his efforts against was mentioned in the following words:

"In nearly all flat slabs it is found that the positive bending moments and the negative moments over the columns are provided for . . . but the negative moments perpendicular to the sides of the panels are, as a rule, entirely neglected, although they have about the same numerical value as the maximum positive moments."

Dr. Eddy denies (1) the necessity of reinforcing against these negative moments perpendicular to the sides of the panels; (2) that Prof. Talbot's test loadings tend to prove this necessity.

(1) In his above writings Dr. Eddy refers to his book "Reinforced Concrete Floor Slabs." The writer obtained this book, thinking that it was a pure professional treatise, but found it to be mixed up with advertising matters for Mr. Turner's system. If nothing else, the writer had the surprising satisfaction of finding that Dr. Eddy not only arrived at the result that the above-mentioned negative moments exist, but that they have