ON A SUBSTITUTE FOR ALUM IN MAKING BREAD.

BY C. ESTCOURT, F.I.C.

ABOUT six months ago my attention was called to the use, by bakers, of a compound (in a liquid state) which, it was said, would replace alum completely. As is the case in connection with all trade secrets, there was a difficulty in obtaining any definite information which would enable one to form a judgment upon the matter. It happened, however, that about the time named I received from a baker a small bottle of this liquid, together with a loaf in

which I was informed it had been used. The loaf, upon analysis, gave alumina equal to 21 grains alum per 4 lb. loaf; so I drew the not unfair inference that some ingenious person had introduced to the baking trade some compound of alumina, not alum itself, and could therefore assert that no alum had been used in the compound.

A qualitative analysis of the liquid showed Al—Ca in small quantity, Mg—NH₃—Na in large quantity, whilst the acids present were found to be phosphoric, HCl. and H₂SO₄, but principally H₂SO₄, which it was assumed was used to keep the phosphates in solution.

Upon the evidence of the Al found in the loaf I gave the opinion that the use of the liquid would be improper and unsafe.

Since then, upon various occasions, I have received samples of liquid said to be (in the principal constituents) like the one I had examined, but said to be so improved as to contain no alumina. All these samples, however, differed one from another so much, that I advised the persons consulting me it was unsafe to use them without guarantee that no fresh changes would be made in them by the vendor. During the past month I have again had submitted to me for examination, by a large baker here, a sample of the liquid, together with a loaf in which it is said to have been used. The sample is now declared by the inventor to be perfection, and certainly practically gives no alumina in bread in which it is used.

I give below the result of quantitative analysis of the liquid :—

Sp. gr. at 60 = 1174.

	In 100 parts by measure.
Free Phosphoric Acid, calculated as H ₂ P ₂ O ₅	14.58
Magnes. Pyrophosphate	6.94
Ditto Sulphate	6.39
Sodium Chloride	traces.

The compound is therefore mainly magnesium phosphate kept in solution by phosphoric acid.

The bread sent was said to have been made from poor English flour, which would not, owing to deficiency in gluten, have made a presentable loaf without alum. It was found to be beautifully white, firm, and yet well aerated. The air spaces of the loaf, shown when it was cut through, were very numerous and of a uniform size. The total amount of alumina found in it equalled rather less than 10 grains of alum per 4 lb. loaf, which, as will be remembered, does not much exceed the quantity allowed for by some analysts as being naturally present.

Whether or not such a compound can be safely used in bread is a question of vital importance, both to the general public and the baking trade. If the compound is declared by competent medical authorities to be innocent in its results in the small quantities used, there is no doubt it will be a great boon. Wet harvest times result in large quantities of wheat, which wheat, when ground, cannot by itself be made into presentable food for man without the use of the admittedly injurious drug—alum. Thus this quality of wheat is not available for use by bakers who prize a good name; but if the use of this compound can be proved to be innocuous it would render possible the use of such flour to the mutual advantage of both the public and the agriculturists—the one obtaining cheaper bread, and the other being saved from that partial ruin which is so often the result of a bad harvest. I am making experiments as to quantities used, and will give the results in a future paper.