AMERICAN BAKING POWDERS AND ALUM.

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From the Scientific American.

Having been appointed Chemist by the United States Government for the Indian Department, it became my duty to submit to chemical analysis, among other articles, the various baking powders offered the department, and as a result of my investigation I found that at least fifty per cent. of the baking powders offered were grossly adulter-

ated. After making this discovery I determined to submit to analysis every baking powder I could find on the market, and to expose such powders as were adulterated, so that the public may be warned from purchasing them in the future. The number of baking powders I have examined amounts to forty-two—twenty-nine of them from various sections of the country having been offered to the department, and thirteen obtained from various grocery stores throughout the city of New York.

Instead of the baking powders of commerce being composed alone of those constituents which have been demonstrated to be perfectly harmless and wholesome, the public have imposed upon them powders largely adulterated with most injurious and hurtful compounds, put up in cans neatly labelled "chemically pure," as if that fact (?) had anything to do with rendering the powders wholesome. Scheele's green (arsenite of copper) is often "chemically pure," but it is always a deadly poison.

It, therefore, becomes necessary for the benefit of the public to examine into the the powders on the market, and to denounce such of them as are composed of constituents detrimental to health.

The best powders are composed of bitartrate of potash (cream of tartar), tartaric acid, carbonate of ammonia, and bicarbonate of soda, held together to prevent decomposition by a little starch.

The injurious powders are composed of alum and bicarbonate of soda, and often contain terra alba (white earth), insoluble phosphate of lime, &c., &c. The effect of alum when taken internally has been shown by Wilmer and others to produce dyspepsia, constipation, vomiting, griping, and even inflammation of the gastro-enteric mucous membrane, as it is a powerful astringent acting chemically on the tissues. These serious effects will not of course be brought about immediately from the small quantity of alum used in one loaf of bread, but it is certain that persons continuing to eat bread containing alum will, in time, suffer from its evil effects, and the weaker the constitution the sooner will the effects be noticed.

Duma speaks to the same effect when he says: "It is to be feared that this salt exerts a deadly action by its daily introduction into the stomach, especially in persons of a weak constitution." And other great authorities, such as Carpenter, Dundas, Thompson, Gibbon, and Normandy, all agree that the continued use of bread containing alum will bring about dyspepsia and other troubles, and such was the opinion of the late Baron Liebig. The celebrated Pereira considered "that whatever may have been the effect in the case of healthy persons, sick persons did really suffer in that way." In the *Lancet* is mentioned a case in whom dangerous gastro-enteritis was apparently induced by a single dose containing between ten to twenty grains of burnt alum. Dr. Parkes, in his work on *Hygiene*, states that from eight to forty grains of alum, and probably more, have been found in a four-pound loaf of bread.

The effect of alum on bread is to tend to whiten it, and to prevent an excess of fermentation (when yeast is used), when the altering gluten or cerealine acts too much on the starch; but while it accomplishes this object, it lessens at the same time the nutritive value of the bread by rendering the phosphoric acid insoluble.

Out of the many baking powders I have examined, I have selected the more prominent ones that are adulterated, giving in each case a quantitative analysis of the

same. The analyses of the last three baking powders given in the first column were made by Professor Robert W. Schedler.

No. 1.

Burnt alum	26·45 per cent.
Bicarbonate of soda	24·17 ,, ,,
Sesquicarbonate of ammonia	2·31 ,, ,,
Cream of tartar	None
Starch	47·07 ,, ,,
	100·00

No. 2.

	19·16 per cent	Analysis by Dr. Mott. 20·03 per cent.
Burnt alum		
Bicarbonate of soda	23·36 ,, ,,	22·80 ,, ,,
Cream of tartar	None	None
Starch	57·48 ,, ,,	57·17 ,, ,,
	100·00	100·00

No. 3.

	29·60 per cent	Analysed by Dr. Mott. 30·06 per cent.
Burnt alum		
Bicarbonate of soda	31·13 ,, ,,	31·82 ,, ,,
Cream of tartar	None	None
Starch	39·27 ,, ,,	38·12 ,, ,,
	100·00	100·00

No. 4.

Burnt alum	22·53 per cent.
Bicarbonate of soda	21·79 ,, ,,
Cream of Tartar	None
Starch	56·68 ,, ,,
	100·00

Not one pound of these powders could be sold in England, as it is against the law to use alum for making bread. Why have we not such a law? A case is reported in the English Law Reports of 1871-2, 7th Queen's Bench, 135, November 15, 1871, where a baker was convicted for using alum in making bread. What would become of the above-mentioned baking powders containing alum if they were introduced on the English market? The answer is simple—they would be swept out of existence.* It is to be hoped, then, that the public, by refusing to purchase them, will bring to them all the same fate.

By exposing these injurious and unwholesome baking powders, the public must not be frightened from using baking powders when properly made—of which I have already stated there are a number on the market. In fact, baking powders are a great convenience, as the constituents are so combined that their use is always attended with success: and there is no danger of biscuits made with them having an alkaline taste, or being impregnated with yellow specks or streaks, as is often the case when ordinary cream of tartar and soda are used. This results from the fact that the ordinary cream of tartar found in market is adulterated from 10 to 90 per cent. with foreign substances; consequently, it becomes necessary to change the proportion to be used with every new lot, which can only be correctly arrived at by a chemical analysis of the cream of tartar.

* We fear the success of the English Act is not quite so complete as Dr. Mott seems to suppose.—[Eds. ANALYST.]

The advantages of using "baking powder" in preference to yeast, are that with the former none of the nutritive parts of the flour are destroyed, a larger yield is obtained, and the result accomplished with a great saving of time, which would otherwise be required to promote the fermentation when yeast is used.

The advantages of using "baking powder" in preference to the ordinary cream of tartar and soda found on the market are not only that it is more economical, but the results are always attended with success, there being no fear, as stated, of producing an alkaline taste or yellow streaks in the product.