

## APPENDIX No. 1

samples in two different seasons and have found very little difference between bread made in September from new flour and bread made in January from the same wheat, ground in the month of December.

## ARTIFICIAL BLEACHING OF FLOUR.

For the artificial bleaching or so-called ageing of flour, various-processes have been tried, and various bleaching agents but there is only one agent which is commonly used at present and that is nitrogen peroxide. This gas is generated either by decomposition of nitric acid, or electrically, from air by what is called a flaming discharge of electricity, which causes the combination of some of the nitrogen of the air with some of the oxygen. The air which has been thus treated and which contains a little nitrogen peroxide is passed through a rotating cylinder where the flour is kept in constant motion. The flour is subjected to the action of this air for about fifteen seconds. Bleaching is practically instantaneous. It is claimed that bleaching produces the effects of a certain period of storage, how long a time is not stated, and that the flour is improved in baking strength as well as in colour. The amount of change in colour depends on the proportion of nitrogen peroxide in the air as used and perhaps somewhat also on the length of time it is allowed to act on the flour. A considerable part of the yellowish or creamy tint which is natural to most flours—especially when new—is thereby removed. The claims of the company owning the patents (the Alsop Process Company) are supported by various investigators, the best known of whom perhaps is Prof. H. Snyder, formerly chemist of the Minnesota Agricultural Experiment Station. He has gone into the question very fully, and has shown conclusively that the bleaching action does not render the flour in any sense undesirable as food. He does not, however, demonstrate clearly whether the bleached flour is improved in any other way than in appearance.

Q. What chemical change takes place?

A. The colouring matter in the fat is bleached.

Q. It is oxydized?

A. That is what is believed to occur.

As a result of the action of the nitrogen peroxide there is left in the flour a very small amount of some nitrite-reacting material, probably ammonium nitrite. Some chemists maintain that minute quantities of nitrite are naturally present in flour; but whether this be so or not, the quantity found after bleaching is quite negligible. Furthermore this nitrite is destroyed in bread-making. There can, therefore, be no fair objection to the artificial bleaching on the ground that it introduces any deleterious substance into the flour. It seemed important to determine whether or not bleaching causes any change in the baking qualities of the flour or its moisture content. Prof. Snyder's bulletin gives very little information on these points. He does not seem to have determined the moisture in his samples, and certainly did not take it into account in the figures derived from the baking tests. The baking results are therefore of very little value.

Toward the close of his paper Prof. Snyder draws the following conclusions:—

'Flours bleached with small amounts of nitrogen peroxide generated by electrical action are in all respects similar to flours bleached and cured by storage, except that the electrically bleached flours contain a trace of nitrite-reacting material which is removed during the process of bread-making.'

The latter part of the sentence I have no doubt is quite correct, but the first part is entirely an expression of opinion, because the author does not appear to have made any baking tests with naturally aged or naturally bleached samples of flour. As the relationship between naturally aged and artificially bleached flour is a matter of importance, it seemed advisable to obtain some experimental basis for an expression of opinion.