

Correspondence.

Baking Powders and Glucose Sirups.

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Although several communications have appeared in the SCIENTIFIC AMERICAN on these subjects, the writer believes they are not yet exhausted of their interest. The possibilities connected with their bearing on health or disease and mortality deserve further discussion, for which I have no doubt you will freely give a few more columns in your highly useful periodical.

The obvious fact is, as proved by the analyses of baking powders by others as well as by myself, that desiccated alum is substituted for cream of tartar in many of our popular "baking powders."

The United States Patent Office has sanctioned this use or abuse of alum by their letters patent, and alum is very much cheaper than cream of tartar; answers equally well to set free the carbonic acid which makes the bread light, and may also make a whiter loaf than that dearer article. The manufacturer can make more profit at a lower selling price, with alum powder; more especially if he mixes them with a large proportion of starch.

The chemical facts are as follows: By heating the ammonia alum to a certain temperature it will be caused to part with its water of crystallization, and will lose part or all of its combined ammonia, according to the temperature and time of exposure to it, leaving simply aluminum sulphate, mixed with more or less free sulphuric acid and undecomposed aluminum sulphate. This mixture when brought together with bicarbonate of soda, in the paste or dough, in the presence of the water will decompose the soda salt, especially when moderately heated, and the carbonic acid of that salt set free will inflate the pastry and make it light and spongy. At the same time the alumina of the alum is separated in the form of aluminum hydrate, and harmless sodium sulphate, or Glauber's salt, is produced.

The nature and results of the chemical decomposition are correctly stated by Professor Doremus, as well as by the patentees of these baking powders. There is no alum in the bread or other article prepared with these powders, but only the products of its decomposition, viz.: Glauber's salt, in too small quantity to be active, and precipitated aluminum hydrate.

But at this point a new question arises, and one of weighty import: Is it not probable that the continued ingestion of aluminum hydrate with our daily food, may, in the long run, induce disease and shorten life?

It is true that when alumina is in combination with silica, as it is in clays, it is not readily soluble or decomposable in weak acids; but alumina combined only with water, or even when the water has been separated by ignition, is much more soluble. The heat which suffices to bake bread will not separate the water from aluminum hydrate, and it hence exists in the bread in a condition readily to form salts with even weak acids. What, then, is the probable action of this aluminum hydrate in the processes of the digestion and assimilation of the food in which it exists as an ingredient? In the stomach, under the action of the acid gastric juice, it is likely to be dissolved, and to form aluminum chloride; but, because of the great affinity of alumina for albuminous and other organic matters as well as for phosphoric acid, it probably enters into combination with these, to a certain extent at least. If these compounds are insoluble in the stomach solution, no other harm will result but a waste of a certain quantity of the essential phosphates and albuminates of our food, which waste may be measurably supplemented by the introduction of some bone superphosphate into the baking powders.

But it is more probable that at least a portion of the albuminous compound is retained in solution in the acid chyme and is absorbed into the blood vessels in the coats of the stomach, to act locally in thickening or otherwise altering their delicate coats; or meeting with the slightly alkaline venous blood, rich in albuminous compounds, to induce a tendency to coagulation, which, however slight, may in the course of time cause obstructions in important glandular organs, especially in the kidneys and liver, interfering with their healthy functions, and in the end causing fatal disorder.

The portion of the albuminous compound which is not absorbed from the stomach will doubtless be decomposed in the duodenum, where it will be rendered insoluble by contact with the alkaline bile; but in the cæcum it will again be subjected to an acid solvent, and a second danger of absorption consequently occurs. These are probabilities of deep import. Aluminum chloride, like tin chloride, forms insoluble compounds with albuminous, gelatinous, and other organic matters, and when introduced into the blood in quantity cause sudden death, and doubtless when taken up in repeated minute quantities, will cause alterations of tissues and coagulations of the circulating fluids resulting in obstructions and disease.

The use of chloride of tin by reckless manufacturers of glucose sirups, etc., proved by numerous analyses by others as well as by myself, is especially to be reprehended, as these products, sold under various names, as "golden sirup," "maple sirup," "sugar-house molasses," etc., or the glucose in the solid form mixed in the soft granular sugars, are in very general use, greatly to the detriment of the general health. The people everywhere should be put on their guard against this insidious slow poisoning and advised

against the use of any sirup, etc., which leaves a metallic taste in the mouth. Three pounds of good pure Louisiana brown sugar, boiled in a clean iron vessel with a pint of water, will make a perfectly wholesome sirup, far preferable to any of the tainted sirups of the present market.

Aluminum and tin salts are both used as mordants by the dyer, because of the strong attraction of the oxides of these metals for organic compounds. Aluminum salts for the same reason are used in preparing white leather, and the observations of Orfila show that when given to animals they cause a thickening of the coats of the stomach and bowels, and an appearance as though they had been tanned.

It is true that Orfila contended for the harmless nature of alum in small doses, and Wibmer and others experimented on themselves by taking it in small doses for some weeks together without any sensible evil results. Very probably the slight impairment of tissue was not sufficient to produce manifest disease. But had they continued their experiments for years at all their daily meals, no doubt the functions of the stomach would have become impaired by the thickening of its coats and the alteration of its glandular tissue under the action of the dissolved aluminum salts, and dyspepsia or chronic inflammation would be the result in time.

That alumina is not friendly to organic life is shown by its almost general absence from the composition of vegetables and animals. In only a very few plants of the lowest order is it found as a regular constituent. The propriety of introducing it into our daily food is not properly to be ascertained by costly and broadly hazardous experiments upon the people at large, or with the object of cheapening the production and increasing the profit on baking powders. Nor is there any necessity for such heroic tampering with the public health. Why lay aside the time-honored yeast or ferment, which, when skillfully and carefully prepared and used, is without injurious influence? Or, if we must have "quick-rising," why not use the pure cream of tartar and good bicarbonate of soda until something equally harmless is discovered?

The writer is informed that there occur many more cases of Bright's disease and other forms of disease of the kidneys than formerly. Are we to attribute this to chloride of tin in glucose sirups and sugars, or to alum in baking powders, or are not both very liable to suspicion?

Even the cream tartar baking powders may come in for some share of guilty responsibility because of the greater amount of alkaline salts determined to the kidneys by their habitual use, and that most chemical of all baking powders, Horsford's, which, with the commendation of Liebig, might seem to be pathologically innocent, as it is chemically excellent, may yet, by a possibility, give to the renal organs too much earthy phosphates to excrete in solution. "Give us," therefore, our "old-fashioned daily bread" until something better is discovered than is found in all the baking powders.

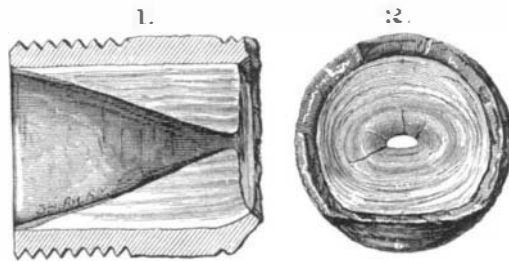
Choked Feed Pipes.

To the Editor of the Scientific American.

I send to you by mail a 3/4 inch nipple that was taken from the feed pipe of a ten horse power portable thrashing engine.

The engine was brought to the shop to have a new check valve put on, as the one that was on was badly worn. To remove the old one, we cut off this nipple close to the boiler, and were surprised to find that the pipe where it entered the boiler had been reduced in area to about 0.01 of a square inch, by deposits of lime.

The persons in charge of the engine said that they had had no trouble in keeping the boiler well supplied with water, and had used it several days this season, before bringing it to the shop, using the steam at 100 lbs. pressure.



The pump plunger was attached to the cross head of the engine. Had the pump been driven by a belt they would have experienced much trouble in driving it.

Several months ago, a man owning a saw mill brought his force pump to be repaired. He said that he could not drive it with an eight inch belt, while it used to be driven easily with a four inch belt. After examining the pump, I told him that it was all right, and could do nothing for it, that the pipes from the pump to the boiler might be filled with lime (as the water passed through a heater before it came to the pump), thereby obstructing the passage of the water. He did not think much of the idea, but went home with his pump. The next day he returned with the pipes; some of them had become so filled with lime that the passage remaining was not more than one tenth of a square inch in area.

Yours respectfully,  
IRA CARNES.

A Model New England Farm.

Mr. Burnett, the owner of the three hundred acres in Southboro, Mass., known as Deerfoot farm, makes a specialty of breeding, raising, and fattening hogs, and converting them into various articles of food, and of the products of

the dairy. The conversion of the carcasses into hams and bacon, and the manufacture of sausages and lard are carried on in the most systematic manner and on an extensive scale, extra pains being taken to produce for the private consumption of customers in Boston, New York, and Philadelphia, the choicest and most palatable articles. Mr. Burnett raises about 350 hogs annually, and purchases from the farmers of Vermont 1,500 fat Berkshires, which make the best pork. After being dressed the hogs are kept in a refrigerator for forty-eight hours, when they are cut up, the hams and bacon cured in the most approved manner, the lard dried out and canned free from adulteration, and the pork packed in kegs of 15 and 25 lbs. weight; the sausage meat chopped by machinery and seasoned with the best quality of sage and pepper that can be obtained, and then made into sausages. Mr. Burnett's bacon has taken the place of imported English bacon in the Boston market, and become so popular in Philadelphia that one dealer has offered to take the entire product of Deerfoot farm, which amounts to 300 sides a day, while 3,000 hams are cured annually. The product of sausages averages about 1,000 lbs. a day. Another specialty of Mr. Burnett is the canning of pigs' feet, which are sold largely in the season to yachting parties. The piggery at Deerfoot farm is an extensive affair, located at some distance from the main buildings, and consists of a building 80 by 40 feet, with a wing 60 by 20 feet, containing pens, in which were seen about 250 swine of all ages, from the sucking pig to the hog ready for the scalding vat. The animals are fed twice a day, on a cooked mixture of two thirds corn meal and one third ground oats, which Mr. Burnett has demonstrated to be the most profitable food for fattening hogs. In the dairy the Devonshire process of producing clotted cream is used. New milk, scalded, is placed in long, large pans, which are placed under a refrigerator, where it is cooled rapidly, the temperature being reduced in three hours from 160° to 32°, and cream raised to the thickness of three fourths of an inch, which ordinarily required forty-eight hours. This cream will keep sweet several days, and is sold for 60 cents a quart to Boston families. Mr. Burnett also manufactures from 250 to 300 lbs. of butter a week from the milk of fifty cows, of which 25 are thoroughbred Jerseys. The butter sells readily at 75 cents a pound.—Boston Transcript.

Defeat of the Cochrane Ring.

It is our pleasing duty to record two defeats which the American Middlings Purifier Company has sustained. The first was in the injunction suit brought by the ring against Messrs. Vail & Shotwell, of New York city. As our readers remember, this case was argued before Judge Blatchford last summer, and the supposed proofs of infringement were collected by the plaintiffs with the greatest care. Judge Blatchford has refused the injunction on the very sufficient grounds that infringement was not proved by the plaintiffs. In the course of the hearing Judge Blatchford made a very important and sensible ruling in regard to the former decisions of the United States Supreme Court. He held that the decision given by that court last winter, when the millers made their motion to restrain the Cochrane patents, virtually destroyed the previous decision of the court in the case of the American Middlings Purifier Company vs. Deener, Cissel & Welch, so far as precedent was concerned, and that suits brought under the Cochrane patents must be tried as new cases in all respects.

The other victory is of equal importance. In May, 1877, in their first flush of success, while the first decision of the United States Supreme Court in their favor was still fresh in the minds of millers, the ring brought suit against the Haxall-Crenshaw Company, of Richmond, Va., proprietors of the famous "Haxall Mills." The claim of infringement was made and the damages claimed were placed at the modest sum of \$100,000. The hearing was before the United States District Court for the Eastern District of Virginia, and the case was dismissed by the court during the past month. In a letter of recent date to the Hon. George Bain, of St. Louis, Mr. Philip Haxall, Vice-President of the Haxall-Crenshaw Company, says: "We have intended to take the first opportunity to advise you that we have gotten the suit of the Cochrane ring against us dismissed from court, and presume they will let us alone henceforth. It has been evident to us for some time that they did not wish it brought to trial, and we suppose they will put off their suits against Western millers in the same way until they have collected all the money they can from small millers."

There can be no doubt that Mr. Haxall is correct in his surmises as to the future policy of the ring. The result in his case undoubtedly foreshadows the outcome of all the suits which are now pending against millers, but the ring will certainly try to make the most of their time by terrifying millers whose means are limited into paying royalties rather than go to the expense of a legal trial. The Defense Association is to be congratulated on its victories, and we hope soon to chronicle the crushing defeat of the ring at St. Louis.

The final hearing of the cases at St. Louis is waiting solely upon the convenience of the judges, Judge Dillon's engagements having prevented him from going to St. Louis to try the cases. It is proposed to have both the St. Paul suits (American Middlings Purifier Company vs. J. A. Christian & Co., of Minneapolis) and the St. Louis suits argued at the latter place, in which event Judge Nelson, the District Judge for Minnesota, would sit with Judges Dillon and Treat.—American Miller.