MANUFACTURE AND USES OF STARCH.

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The fermenting process of wheat to obtain starch is objectionable from the length of time which it requires, the noxious products which arise from it, and the destruction of about 30 or 40 per cent of useful substance, which passes off as gas. A process to obviate this waste was invented, about twenty years ago, by M. Martin, of Paris. He first kneaded the flour into a dough, then introduced it into a wooden cylinder in which a series of cutters were revolving on an axis. In this cylinder there were openings covered with fine copper gauze, and while the starch was washed through these by a copious stream of water, the gluten was retained inside and saved. This, when dried and pulverized, is now sold in London under the fictitious name of *somolina*. By adding such gluten, obtained in the starch manufacture, to common flour, the latter is very easily made into macaroni and similar flour pastes.

Wheat starch is extensively used by calico printers for thickening those colors in which free acids form part of the composition. A similar class of starch is also obtained from Indian corn, rye, barley, oats and buckwheat. Good, dry wheat flour contains 73.2 per cent of starch, 13.4 of gluten, 5.6 of sugar, 0.2 of dextrine or gum, 11.1 of water, 2.2 of fatty matter. Gluten is composed of glutine, fibrine, and albumen. It is found that 100 parts of wheat give white flour, 58 per cent; brown flour, 14; bran, 26; loss, 2.

Potato starch, sometimes called farina, is extensively manufactured on the continent of Europe. The best potatoes contain, by analysis, 74 per cent of water; 20 of starch; pectates of lime, soda, and potash, in skin, 1.65; salts, albumen, and sugar, 4.35. The potatoes are first washed, then grated to a pulp in a machine; the pulp is then washed through sieves, by which means the starch is separated by passing off with the water, and is afterwards secured in shallow wooden boxes lined with felt. It is subsequently dried on floors of plaster-of-Paris, which absorb the moisture; and, finally, it is dried in a warm room. Potato starch, thus prepared, is suitable for linen, but not for food, as it has a rank taste and an unpleasant smell. These, however, are removed by washing it with a weak solution of carbonate of soda, and, thus treated, it is manufactured into artificial arrow-root and tapioca. Many persons who pay for the latter substances only get potato starch. Deceptions of this character on the public are quite common. The famous "Glenfield starch" is made from potatoes, by mixing with the potato starch a very minute quantity of sulphuric acid, which converts all the insoluble starch into soluble dextrine, so that when this is boiled in water it forms a clear fluid, which gives to fine muslins and cambrics a transparent appearance. A process has lately been patented in England to effect the same change with oxalic instead of sulphuric acid.

An interesting application of starch has lately been made by M. Sorel, by which an artificial substance is produced, capable of being a partial substitute for horn, ivory, and gutta-percha. This new plastic material is made by mixing potato starch with chloride of zinc, in a solution of such a strength as will swell it out without dissolving it. The mass afterwards becomes hard and tenacious. To this some sulphate of baryta, in powder, is added, which renders it tough. An oxyd of zinc will effect the same object, but the latter renders the composition opaque, while the former does not affect its translucent appearance.

About 30 years ago gum arabic was almost exclusively employed for thickening the colors of calico-printers, but the great extension which took place in the production of such goods, in England, by a removal of the excise tax on the home produce, led to the demand for a cheaper substitute. It was discovered that by exposing moist starch in an oven heated to 250° and 300° Fah., it was converted into a soluble substance, which was at first called "British gum." This was the very thing wanted, and it at once took the place of gum arabic for mixing with the more common colors. This change in the condition of starch is entirely a molecular one, as both the raw and the roasted starch have the same composition, but the latter is soluble, the former is not. Another remarkable difference between them is that the raw starch gives a blue color with iodine, while the roasted starch gives a purple color. If to 400 parts of dry potato starch one part of nitric acid, mixed with a sufficient quantity of water, is added, so as to form a hard paste, and dried slowly, then exposed for 20 hours in an oven to a heat of 200° Fah., a white starch gum is obtained, which is preferable, for some purposes, as the common kind is of an amber color. A most minute quantity of acid produces the molecular change in starch. Soluble farina (dextrine) can also be made from starch, without changing its color, by subjecting the moist starch in a cylinder (kept warm on the outside with steam) to the action of muriatic acid gas, conveyed by a pipe into the starch. White soluble farina may be employed as a substitute for gum arabic for almost every purpose. The dextrine called British gum is made from wheat flour, and it differs from that made from potatoes inasmuch as it is only soluble in water at a boiling temperature.

[To be continued.]

THE CURCULIO.

MESSRS. EDITORS:—There seems to be considerable talk about coal tar for fruit trees. One of your correspondents (C. F. R.) says that a ring around a plum tree will protect the fruit from the curculio. Now I would as soon believe that a ring of coal tar around a cherry tree, would preserve the ripe cherries from the robins as that a ring around a plum tree would protect the plums from the curculio. The curculio flies from one tree to another, and from the ground up into the tree, and I cannot conceive how a ring around the trunk could keep it from the plum tree. It looks about as reasonable as a powder that a certain man from your city circulated through the country, last spring, to protect plums from the curculio and other insects. It was to be put in a little incision made in the bark of the tree. This looks to me just like a man taking a dose of fly poison to keep the flies from alighting on his face while asleep.

G. W. C.

Morenci, Mich., Feb. 22, 1860.

SALT, SNOW AND DIRT.

An ordinance passed by the Common Council of this city, prohibiting the use of salt to melt the snow, received the signature of the mayor a few days ago. After the snow season is over and the warm weather begins to set in, *then* our enterprising authorities bestir themselves with their accustomed vigor to protect the citizens from injuries arising from the abominable practice of salting our streets, whereby they are converted into a sea of cold, briny slush! Many of the side streets leading to the rivers are almost impassible from the piles of filth which have been suffered to accumulate in them during the winter, and every considerable rain washes a vast portion of it into our docks, and thus our harbor is gradually being allowed to fill up through the imbecility and corruption of the city government. Verily, no other city in the world is so wretchedly governed as this.

AN ENEMY TO THE BRITISH OAK.—For some years past, a silent, unsuspected enemy has been invading the oak forests of England. In all the south-western counties *galls* (like those which we get from the Levant for dyeing black) have been making their appearance, and annually increasing in quite a geometrical ratio. On several occasions the subject has been adverted to in our columns, especially in the year 1855, when Mr. Westwood published a figure of the gall, and a few months later by a correspondent at Worcester. Since that time the mischief thus caused has increased so alarmingly that, unless some effectual stop can be put to the evil, the landowners of Devon, Cornwall, Dorset, Somerset, and even Gloucestershire, will have to abandon all hope of raising oak timber. The trees have ceased to grow, acorns no longer appear, but in their stead the branches are loaded with hard, dry balls.—*Gardeners' Chronicle.*

USES OF PHOTOGRAPHY TO INVENTORS.—It is proposed to photograph copies of drawings sent from the Patent Office, instead of tracing them, thus very much reducing the expense of supplying them to inventors and others who need them. Why not photograph the copies of *specifications* also? This is certainly cheaper than copying them with pen and ink. A good draftsman can, on the average, trace a patent drawing while a good copyist can reproduce a page of the accompanying manuscript. And by this process all mistakes would be avoided. It is likely that, by making the original specification on one large page, in a clear handwriting, a photograph considerably reduced would still be very legible; by a proper arrangement, the drawing, specification and all, could be copied at one operation.—*Railway Review.*

A COLUMN OF VARIETIES.

Rain purifies the air by absorbing, as it falls, the carbonic acid and ammonia which is always floating in the air. Snow absorbs a still larger quantity of these impurities, hence the peculiar purity of the air after a snow-storm. When cakes are mixed with snow and baked, these gases are expanded by heat and form the little cells in the dough which make the cakes light. They are wholesome in the stomach though injurious in the lungs. .....Ammonia consists of nitrogen and hydrogen in the proportion of 14 lbs. of nitrogen to 3 lbs. of hydrogen ($N H_3$). There is no mode known of producing this combination by artificial means. Only one force in nature can effect it—that of life, either animal or vegetable.....Water absorbs 670 times its own volume of ammonia, which is condensed so much in assuming the liquid form that it constitutes only 32½ per cent of the water of ammonia.....The amount of gold thus far received from Pike's Peak is, as nearly as can be ascertained, $460,000. Of this $250,000 is at the Philadelphia mint, and the director of the mint says it will average .825 in fineness, and is worth $17.50 per ounce..... The swiftest horse ever known was "Flying Childers;" he performed 4 miles, 380 yards, in seven minutes and a half, which is at the rate of over 33 miles per hour..... Vertigo or giddiness in sheep is occasioned by the presence in the brain of a parasite, known as a *hydatid*—the *cœnaris cerebralis*. It is most observable among lambs, whose ages vary from two to twelve months. The adult animal usually enjoys immunity from the encroachments of this peculiar parasite.....At the commencement of the Crimean war, the French goverment had 80,000 horses; at its termination they could only muster 10,000.....The large planet now seen in the evening in the western horizon is Venus, making three planets now visible in the evening—Venus, Jupiter and Saturn. Mars rises about midnight.....Some years ago Professor Mapes laid a trap for the merchants and lawyers who monopolized the talking at the meetings of the farmer's club in this city, and succeeded in getting them to expend a whole evening in discussing the mode of telling the ages of cows by their upper teeth.....By *blood* in horses is meant the blood of the English race horse, and it is said that every animal of this stock has more or less of the blood of the Godolphin Arabian in his veins. This famous sire was imported into England about 110 years ago.....In trotting, the American horses have been for many years superior to those of all other nations..... Denmark has 45 horses to every hundred inhabitants, which is more than any other European country. Great Britain and Ireland have 2,500,000 horses; France, 3,000,000; Austrian empire, exclusive of Italy, 2,600,000; Russia, 3,500,000. The United States have 5,000,000 horses, which is more than any European country. The horses of the whole world are estimated at 57,420,000.....There are two things which the Americans, with all their ingenuity, have never been able to make equal to a Frenchman; one is a boot, and the other a loaf of bread....Lines have been made on a metal plate with a diamond point so fine that over 49,000 were contained in an inch; that is over 6,000 in the eighth of an inch! Of course they could only be distinguished by microscopes of high power.....Eli Whitney, the inventor of the cotton gin, was born at Westborough, Mass., Dec. 8, 1765. He worked his way through college and graduated at Yale in 1792.....Mr. Fothergill has mentioned a case where, in consequence of too highly superheating the steam employed to work a large factory engine, the condensed water from the engine became charged with rust to such an extent as to spoil a large quantity of goods, for washing which the water was saved. .....It is well known that steam may be highly superheated whilst in contact with water. In the lofty steam domes of some varieties of marine boilers, the steam, heated by the heat passing through the uptake, is often at a temperature of from 340° to 400°, when that of the water is only 260°.....The resistance to motion in a fluid of a cylinder with hemispherical ends is but about three-fourths that of a sphere of a diameter equal to that of the cylinder. In some experiments the resistance to such a cylinder at a given speed was 46·29 lbs., whilst that of the globe was 64·87 lbs.....In working superheated steam in condensing engines, it is found that but about two-thirds as much injection water is required as when ordinary saturated steam is worked.