### Starch Gum---How to Make it.

Starch gum is closely allied to gum arabic; and this is still more the case with reference to its practical applications. The extensive use of gum arabic in the arts is mainly attributable to the properties which it shares with starch-gum, of producing with water a sticky, mucilaginous, chemically indifferent, slightly colored or colorless solution. Since the invention of the process for the production of gum from starch, and more particularly since the improvements introduced by the French, the expensive foreign gum is gradually giving place, in manufactories, to the cheaper starch-gum, the fabrication of which is rapidly increasing.

Starch-gum occurs in three different forms in commerce; sometimes in the shape of small transparent particles, in imitation of gum arabic; oftener as a thick syrup; but generally in the form of starch, more or less colored.

At the commencement of the production of this gum, the starch was converted into gum by simple heat, or by roasting. This method, though simple, is not without its own peculiar difficulties. When all the starch is to be converted into gum, without leaving any portion unchanged or over-burned, all the grains must be heated to a temperature neither above nor below 284°—320° Fah. A slow but gradual rise of temperature effects the object in view in the surest manner, as it is thus most easy to prevent over-heating; but the process is too tedious for the manufacturer. When the heat is applied more rapidly, there is great danger of over-heating the starch; and any degree above the temperature indicated gives rise to the production of empyreumatic products. This is the most common case in practice.

Starch is often roasted on the level surface of an oven, of the same construction as an ordinary baker's oven, over which it is spread out in thin layers. British gum is prepared in a similar manner, with several iron plates, one above the other, upon each of which a layer of starch is strewn. In this manner, relatively, large quantities are made in a short time; but the temperature is regulated with difficulty, and the gum can only be obtained as a yellowish-grey, or dark-yellow flour. A safer method consists in spreading out the starch upon hurdles, in a kind of drying chamber, which is heated by the waste heat from another firing. This indirect heat renders the temperature more uniform, and easy of regulation.

Boilers over an oil-bath are better calculated to afford a good product. These are constructed flat, and with a double bottom; the space between the two bottoms is filled with oil, which, with the aid of a thermometer, can be regulated to a fixed temperature; and this constitutes the chief value of the apparatus. The starch is placed in the interior, upon the upper bottom, and is kept in constant agitation by a stirring apparatus, that each granule may come into contact with the metallic sides of the vessel, and thus become heated to the proper temperature. An excessive heat cannot possibly occur under these circumstances. In order to hasten the process, however, the temperature must be raised higher than is absolutely necessary for the conversion of the starch into gum.

The contrivance in most general use is the roasting cylinder. This consists of a large drum or roller of tin-plate, placed in a special oven, and revolving on its axis at any required speed, resembling, in short, the common coffee-roaster. The revolution of the drum performs the same function as the rouser or stirring apparatus, in the foregoing plan, and effects the change of position of the individual grains much more effectually. Drums present the additional advantage that they can be speedily emptied, when the roasting process has attained the proper stage. In all these cases, the yellow or brownish color produced by incipient decomposition is not to be avoided, and the tint of the starch is indeed the chief criterion by which the completion of the roasting process can be ascertained. On the other hand, it is well known that the color is altogether foreign to the nature of the gum, and attributable to small quantities of empyreumatic matters, which can easily be removed by alcohol. This color, however, is retained by the solution of the gum, and it transferred to all the objects treated with it; and so detrimental is it to the lighter colors in calico prints, that starch-gum cannot be used in those cases. For these reasons, improved processes were introduced; it is founded upon the principle of aiding the action of a low temperature by that of acids, in such a manner that the original form of the starch is retained.

Starch is moistened throughout its entire mass in cold water, in such a manner that it easily forms itself into balls, and to this water 1-400th of the weight of the starch, of nitric acid (sp. gr. 1·40) is previously added. The object of this moistening is to disseminate thoroughly the small quantity of acid through the comparatively large mass of starch. The moistened mass is first dried in the air in lumps, weighing about 25 lbs. each; the lumps are broken, after a short time, into smaller pieces, which are then dried in a drying chamber by a current of air. The temperature is gradually raised to 140°—194°, when all the moisture is removed. The thoroughly dried lumps, which are not yet converted into gum, are finely ground and sifted, the meshes of the sieves being so small that only single starch granules can pass through. The starch is thus brought back to its original form, and is then again placed on the drying-stove upon hurdles, and the temperature raised to 212°—248°. The change is effected in fifteen or five minutes, according to the temperature; the more nearly the temperature is retained at 212°, the whiter the product; this product is named Leiokom, and can only be distinguished from starch by its pale-yellow color, and its complete solubility in cold water. The separate granules have not been altered in shape, as may be seen under the microscope.

Sulphuric and hydrochloric acids have been employed in place of nitric acid, but not with such signal success. Sulphuric acid renders the leiokom deliquescent, and consequently difficult of preservation.

### Medical.

Heart Diseases.—The New Jersey Medical Reporter has an article on the Action of Whey Baths, either pure or in a state of mixture with sulphuretted water. It is translated from the French of Dr. Niepce, who relates several successful cases. A number of patients came to him for various diseases of the heart, and he observed that most of them, when immersed in the bath, had their pulses reduced in a remarkable manner. He has collected data from 217 invalids, who made use of the whey baths at his residence, in Allevard, France, during 1849–51. In 69 cases the pulsations were reduced to 34, in 93 cases to 38, in 31 cases to 42, in 24 cases to 45. It is to the lactic acid in the whey that he attributes the moderation in the circulation. The most numerous cases of disease of the heart were nervous palpitations. Here, then, in our country places, there is an opportunity of laboring to arrest that common disease, palpitation of the heart. It is more prevalent among females than males; the cure is a simple one, indeed, and is worthy of repeated experiments.

Collodion in Erysipelas—Collodion has been used successfully for arresting erysipelas by Dr. West; he had used the nitrate of silver first, on a lady, and having found that it did no good, he shaved her head and applied a thick coating of collodion over it, and for an inch over the healthy surface. The burning ceased almost instantly, and the disease ceased to spread. He also applied it to a case of a child of eight years, and after three applications it recovered entirely.

Antidote for Phosphorus.—The Northern Lancet contains an account of a new treatment for those who may be poisoned by phosphorus. As soon as a person has been poisoned by phosphorus taken in a solid state, an emetic should be given at once to throw it off the stomach, ere it has time to act. If it has been swallowed in a diluted form, the patient should drink large quantities of water in which decarbonized magnesia has been dissolved. If magnesia is not at hand, soda dissolved in the water, will answer about as well. It is very dangerous to swallow any portion of phosphorus, as it will burn the stomach. The above plans are old; the following is the new antidote, calcined magnesia, 2 grains, chlorine water 8 grains, distilled water, 122 grains. This is administrated in copious draughts.

### Recent Foreign Inventions.

Bending and Annealing Glass.—F. H. Thomson, and George Foord, of London, Patentees.

The invention consists in combining means and apparatus for bending and annealing sheets of glass, so as to obtain the same in concave forms, suitable for reflectors and other uses, according to the shape of the moulds employed.

The moulds used in carrying out this invention are made, by preference, of cast-iron, with a small hole or air-passage through the centre of each; and, on the under side, they are suitably formed to admit of being fixed upon an upright axis within the muffle or oven in which the glass to be bent is heated. The muffle or oven has a fire on each side externally, the heat and flame from which ascend and enter at the upper part of the muffle, by a long opening, extending from front to back, on either side thereof; so that the flame and heated products from the opposite fire-places meet in the middle of the arch or roof over the muffle, and pass off through openings in the arch or roof; and, by this means, the greatest heat will be at the upper part of the muffle. The door of the muffle has an opening or sight-hole in it, through which the workman can see when the glass is sufficiently heated. Through a hole in the bottom of the muffle projects an upright axis, which is capable of rising and falling, and has a rotary motion given to it by suitable gearing.

The operation of bending and annealing the sheets of glass is as follows:—The workman places on the upright axes, within the muffle, a mould of the proper shape and size for the circular sheet of glass to be bent; so soon as the mould has become heated to such an extent as would cause it to present a slightly red appearance in the dark, he removes it from the muffle, and places the circular sheet of glass just within the upper part of the mould; and then he replaces the mould upon the upright axis, which is at this time to be at its lowest position, in order that the sheet of glass may be subjected at first to the lowest degree of heat. The axis is kept constantly rotating, and is raised by degrees, so as to bring the upper part of the mould and the sheet of glass nearer the top of the muffle; and, when the workman sees that the glass has arrived at the bending heat, he presses upon it a convex surface or piece of cork or soft wood (previously dipped into water), fixed at the end of a handle; whereby, as the axis rotates, the glass is pressed into and caused to assume the form of the interior of the mould. The mould and glass are now removed from the muffle, and another mould introduced to be heated, in order that a fresh sheet of glass may be operated upon. The hot mould, containing the bent sheet of glass, is to be covered, when taken from the muffle, with a cover of sheet-metal; and the bent glass is to be allowed to cool down with the mould; whereby it will be partially annealed. The annealing is completed by placing a number of such bent sheets of glass in an annealing muffle, wherein the glass is heated and cooled down in a suitable manner for effecting that object.—[Newton's London Jour.

New Solvent for India Rubber.—G. E. M. Gerard, of Paris, patentee.

This invention consists in certain improved means of dissolving india rubber and gutta percha.

The patentee commences his specification by remarking that heretofore all solutions of india rubber, whether clear or thick, have possessed great coherence and elasticity,—the solvent, whatever it may have been, has always expanded the gum to a great extent; and as it is not until after this has taken place that the real act of dissolving the gum commences, a large quantity of the solvent is consequently required. To remedy these inconveniences, and to obtain a thick solution, the india rubber has been expanded in the solvent and afterwards pressed by means of cylinders; but the solution thus produced possesses great cohesion and elasticity. Now it is stated that, by the patentee's process, he obtains caoutchouc or gutta percha, or the two combined, in a state of solution, as thick and concentrated as may be required; and, however thick it may be, it loses its tenacity and elasticity, and will assume the form of paste after the evaporation of the solvent, and will retake all its former properties.

The new process consists in mixing with the solvent (of whatever nature it may be) a certain quantity of alcohol, and macerating therein the caoutchouc or gutta percha, which will expand very little; and at the end of twenty-four hours it will be in the state of paste, suitable for being moulded into any desired form. The patentee prefers to employ as a solvent sulphuret of carbon, chloroform, sulphuric ether, naphtha, essential oils of coal, or turpentine, and to add thereto from five to fifty per cent. of alcohol. The caoutchouc is mixed with the alcoholized solvents in all proportions, varying from equal parts to thirty parts of the latter to one of the former, according to the thickness of the solution required; and, after one or two days, the paste is submitted to the ordinary process of masticating, if the solution is made of equal parts, or when it is made with small quantities of the solvents; in other cases this is not necessary. The patentee adopts the same system when treating gutta percha. He dissolves it in the alcoholized sulphuret of carbon, and dilutes it until it arrives at the consistence of thick syrup of sugar; in this state he permits it to remain for three or four days, during which time the impurities will be precipitated or will rise to the surface; and then he draws off the gutta percha in a state of complete purity.

The character of the invention is the mixture of alcohol with the solvent used for dissolving caoutchouc and gutta percha. As alcohol is the liquid which most quickly precipitates caoutchouc from its solutions, the patentee avails himself of this property by causing the alcohol, by means of a solvent, to enter into the interior parts of the caoutchouc, or to detach all the adherent atoms which form the mass of the caoutchouc. By the addition of alcohol the particles are rendered less adherent among themselves, and are easily separated by pressure, retaining the form resulting from this pressure, and not returning to their ordinary form. On the solvent and the alcohol being evaporated, the caoutchouc will return to its original state. The patentee states, that all liquids which possess the properties of alcohol may be mixed with the solvents.

### The Wheeling Bridge.

The good citizens of Wheeling, Va., are going to accomplish a victory over the decision of the United States Supreme Court, which ordered the bridge to be taken down, or alterations of a most expensive character to be made. The people of Wheeling having appealed to Congress to legalize the structure; the Senate and House of Representatives have passed the bill by a large vote. The steamboats on the Ohio must shorten their pipes, and it is our opinion they can do this without any injury to their speed. We took the ground, when the decision was made, that the U. S. Supreme Court exceeded its authority by making such a decision; this was the opinion of Roger Tanney, Chief Judge, and his reasoning appeared to us so clear for dissenting from the decision of his brethren on the bench, that we could not but coincide with his conclusions.

### A Long Tunnel.

One of the longest tunnels in the world is now approaching completion. It is situated in Hungary, and leads from the shore of the river Gran, not far from Zarnowitz to the mines in the Schemnitzer Hills. It is about ten English miles long, and is intended to answer the double purpose of a channel to drain off the water accumulating in the works, and of a railway to transport the ore from the mines to the river.

No less than four hundred and seven of our fellow beings have lost their lives by public, accidents since the fourth of July. Our country is infamous for such wholesale slaughtering; the great reason why there are so many, is owing to the ease with which criminals get off because the laws are badly enforced.