

disengaged. The alcohol thus formed is changed to acetic acid, thus constituting what is called the acetous fermentation. Finally the destructive fermentation begins, which speedily breaks up all the compounds not yet unchanged, and total decay is the result. Conserving fruit is the prevention of these changes for a greater or less period, by the use of *cane sugar*.

The mechanical structure of fruits has, however, much to do with conservation. If you peel an orange carefully and then dissect it, it will be found to be made up of divisions, each of which contains a seed or the rudiments of one. Each of these divisions is covered with a continuous skin of cellulose which, although it would not totally prevent the absorption of liquid sugar would greatly retard it. If one of these divisions be dissected, it will be found to contain numerous sub-cells of irregular form, having the same cellular tissue for a covering. It is at once obvious, therefore, that an entire orange would need to be kept much longer in a mass of liquid sugar, in order to become saturated, than one separated into the single divisions above described; and the latter would also be slower in saturation than slices of orange, in which large numbers of the cells would be severed. It follows that it is necessary to consider the structure of the first in order to consume it in the best manner.

Three results are to be attained in the proper conservation of fruits, viz: They must look well; they must taste well; they must keep well.

The latter result depends upon the removal of air from the cellular structure of the fruits, replacing it with, and enveloping the fruit in liquid sugar; by which means, if properly done, further danger of fermentation by the action of the atmospheric oxygen is obviated for a considerable time; although if the air be excluded by mechanical means (self-sealing jars), the fruit may be preserved much longer than without. In the latter case a solution of sugar may be employed, instead of concentrated sugar. This is much the best plan, as by it the natural taste of the fruit may be preserved if other proper precautions are taken.

The putting up of fruits in concentrated sugar is rapidly going out of use for most domestic fruits, and it is to be rejected at, for a more ill-looking, ill-tasting compound than many of the old-time preserves, would be hard to find.

The first thing to be done, in successful conservation, is the selection of the fruit. From what we have already said of the constituents of fruits and their chemical changes, it will be seen that it should be ripe, but not mellow or stale, of good size and fair surface. The next thing is the sugar, which should be the best white lump sugar obtainable. It should be perfectly dry, and should be destitute of foreign odors. Frequently a musty smell may be detected in sugar. Sugars sometimes also acquire the smell of kerosene, etc., by being placed in the vicinity where the latter is kept.

The fruit and sugar being selected, the nature of the fruit should be well considered. Fruit looks very well when put up whole, but if in order to do so they require boiling until the pectose is changed to jelly, and the fruit is so cooked as to drive off its delicate flavors, you have paid dearly for the privilege of having your fruit whole. Beside, long boiling is sure to darken the color and thus damage the appearance. Apples should be quartered unless very small. Pears should be halved, unless quite small; the little Secklers may be put up whole. Peaches may be put up whole or halved, with the pits removed: the last is much better, as the prussic acid in the pits gives otherwise too strong a flavor to the fruit. All fruit having thick dense rinds should have the rind removed or punctured. Puncturing may be done by setting a number of very fine needles in a piece of pine wood which serves as a handle. The use of an ordinary fork for the purpose is barbarous, as it makes the fruit appear as though it had had the smallpox and was just recovering. The fruit should be peeled or punctured only the shortest time possible before it is put in the sugar, otherwise it will become discolored, therefore the sugar should be first prepared. If, however, fruit when peeled or punctured be placed under cold water and kept until the sugar is ready its color will not change.

If hermetically sealed jars are used only enough sugar is needed to make the fruit palatable this should be put into a brass kettle with a little water, and allowed to melt slowly, and then the heat should be gradually raised to nearly the boiling point. The fruit properly prepared is next put into the jars, from which it should not again emerge until wanted for the table. The amount of sugar proportioned to the fruit by weight, established by previous experiment, should then, after being cooled, be divided as equally as possible between the jars, and the remaining space nearly filled with pure water. The jars should then be placed in a kettle containing cold water, pebbles being used to prevent contact with the bottom and consequent cracking of the jars, and the whole raised as quickly as possible to the boiling point and kept there about ten minutes. Too long boiling alters the taste and color of the fruit, and changes the pectose into jelly. It should be borne in mind that all the heating is intended to do is to expel the air, not cook the fruit. Whatever space is left in the jars should now be filled with hot water, and they should be immediately sealed. We have eaten fruit put up in this way that, after two full years' keeping, could scarcely be distinguished either in color or taste from that freshly prepared and placed by it on the same table.

The old method of cooking fruit in sugar, pound for pound, is a relic of barbarism. The sugar needs to be boiled by itself in this process, else it will crystallize upon standing. Care is also necessary not to cook the fruit too long, else a gummy, sticky, dark-colored mass will be the result, as much inferior to fresh fruit as molasses is to nectar.

In making jellies the boiling is for the most part too protracted. The pectose, as we have seen, is the jelly principle of

fruits, and it requires heat to cause it to form a jelly, but too much heat causes it also to lose this quality. It is this that gives the granular consistence often seen in jellies which have been too long boiled.

Fruit, after it is conserved, should be kept in a dry, cool, and dark place. All these requisites must be observed if you desire perfection. The action of light discolors the fruit. Heat promotes fermentation. Dampness, strange as it may appear, also favors a sort of sub-fermentation, which greatly deteriorates quality. We can give no reason why outside dampness should affect fruit inclosed in hermetically sealed jars; but our own experience and that of others whom we have consulted on this point, warrant the assertion that it is a fact.

Much, however, depends upon experience in this as well as other arts, but if the directions we have given be intelligently followed, in the light of the chemical principles involved, a good degree of success is sure.

THE GARD BRICK MACHINE.

In volume XIV, page 238, and Vol. XVI, page 132 of the SCIENTIFIC AMERICAN, we published illustrations and descriptions of the above machine and subsequently we saw it at work in this city, and found that the machine, much improved in its construction, fully corroborated the favorable opinion we had conceived from an examination of the model. More than sixty bricks per minute can be turned out by this machine, each perfect in form and so well pressed that it may be hacked at once. The clay is used direct from the natural bank, no preparation being required except occasionally the addition of a little water previous to throwing it in the pug-mill. The quality of the bricks is very superior, the faces being smooth, the corners sharp and the sides just rough enough to hold the mortar firmly. The only limitation to the capacity of the machine is that of the attendance necessary to remove the bricks as they are made. The simplicity, strength, and durability of the machine, having no parts to get out of order, the rapidity of its operation, and the superiority of its products entitle it to the notice of every builder and brick manufacturer. Over 14,000,000 of bricks were manufactured by these machines in Chicago, alone, the past year.

The machine may be seen, for a time, in operation at the rear of 59 Ann street, New York city. Mr. Gard's manufactory is at Nos. 116, 118, 120, and 122 South Clinton street, Chicago. For the present he may be addressed at the Astor House, New York.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

A Pennsylvania exchange says an old mill, built in 1844, under the authority of the Moravian church, was burned last week in the town of Bethlehem, in that State. It had an historical interest. It was owned by David and Anthony Luckenbach, whose family have held possession of it ever since it was erected. In the olden time it was a central point to which farmers and others gathered from great distances. The building was of stone, massive and strong. The first miller employed was Christian Christianson, who was placed in charge under Count Zinzendorf. He was a man of skill, and projected the plan of the water works at Bethlehem, said to have been the first works of the kind built in the State.

The artesian well of St. Louis, which has reached a depth of nearly three thousand five hundred feet, and is still going downward, is said to be two degrees colder than at the surface. How is this? Have the philosophers been wrong in the opinion that the temperature of the earth increases toward the center.

It is said that the coal dealers in London are obliged to have their carts or wagons so made that each of them is ineffect a weighing machine. By the use of a lever near the wheel the load of coal is placed upon the scale, and the true weight immediately and easily ascertained.

Engineers are now testing the bed of Detroit river with a view to a railroad tunnel connecting the Great Western railroad of Canada with the Michigan Central Michigan Southern, and Detroit and Milwaukee roads. Tough clay is the result on the Michigan side of the river.

The Shah of Persia has recently granted to English capitalists the monopoly of railroad building in that country for twenty years.

The yield of the coal mines in Prussia during 1867, was 105,000,000 tons of coal from 426 mines, and they give employment to 102,773 men and 175,229 women and children.

A flag made entirely of California silk is to be presented to the State for the new Capitol at the next session of the legislature by an extensive silk manufacturer.

A Boston firm have received an order from China for 600 cases of boots and shoes. This is supposed to be the first order of the kind ever received in this country, and will probably lead to a larger demand for this line of goods.

About 80,000 tons of ice, mostly for transportation, have been stored in Gardiner, Maine, this winter. Three hundred vessels will be engaged in taking it away next summer.

NEW PUBLICATIONS.

THE LADIES' REPOSITORY for February is at hand, with an unusually rich table of contents. This magazine is the representative of the highest type of intellectual taste and culture to be found among American women. Were it to crowd out the trashy publications filled only with fashion plates and silly love stories, now the only literature, especially designed for women, to be found in many homes, and occupy the place of the latter, it would be "a consummation devoutly to be wished." It opens with a graphic description of Surrey Chapel, in which the Rev. Newman Hall officiates, and of his work and method as the head of a peculiar ecclesiastical organization. This article is followed by a large number of most excellent essays, poems, and miscellanies, forming one of the most attractive collections to be found in any of the monthlies published in this country. This magazine is doing good work, and we wish it most heartily to go on. Published by Hitchcock & Walden, Cincinnati, and Carlton & Lanahan, New York city.

HEARTH AND HOME is the title of a new weekly of sixteen quarto pages, which has made its appearance with the advent of the new year. Edited by Donald G. Mitchell and Harriet Beecher Stowe. It is specially designed for families situated in rural districts, and is largely devoted to agriculture and horticulture. It contains also well-selected miscellanies and stories from the best and most popular story writers in the country, among whom are J. T. Trowbridge, Mrs. Stowe, Grace Greenwood, and Mrs. Mary E. Dodge. The first number contains the beginning of a story entitled "Life in the Ice," by Trowbridge, which is to be followed by a novel from the pen of the gifted authoress of "Life in the Iron Mills." It also has a department devoted to the "Boys and Girls," filled with amusing and instructive matter. It is illustrated profusely, and in the best style. A good paper. We wish it success. Published by our neighbors, Pettengill, Bates & Co., extensive advertising agents, 37 Park Row, New York. Single copies \$4 per annum, in advance.

Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notices exceed Four Lines, One Dollar and a Half per line will be charged.

Velocipedes.—Working drawings, scale 3 inches to the foot, with specifications and details enabling any person to construct one. Price 50c. Sent by mail to any address. G. F. Perkins, Haydenville, Mass.

Lubricators, oil cups, and gage cocks—"Broughton's" are the best. For circulars address H. Moore, 41 Center st.

Wanted—address of makers of lath saws, pump augers, wood lathes, and wood-working machinery generally. G. & A. Lockhart, Bryan, Williams county, Ohio.

Wanted—the address of D. F., of Nova Scotia, (see Sci. Am. for Jan. 9, 1869, Answers to Correspondents,) and of all others who want a sure scale-preventive. C. P. G., 46 Washington st., Boston, Mass.

Who has a machine that will mash and temper clay for bricks which contains hard lumps and stony substances, neither of which will water soften? A. V. Hurd, Oskaloosa, Iowa.

Valuable mill site and country residence for sale. Address J. C. McCarty, Rhinebeck, N. Y.

Glynn's anti-incrustator for steam boilers—the only reliable preventive. Causes no foaming, and does not attack the metals of the boiler. Liberal terms to Agents. Address M. A. Glynn & Co., 735 Broadway, New York.

Peck's patent drop press. For circulars, address the sole manufacturers, Milo Peck & Co., New Haven, Ct.

Woodworking machinery.—Persons having machinery suitable for planing mill and sash factory, can hear of a purchaser by addressing G. B. Wilson, Clarksville, Tenn.

W. J. T.—We think the patent asbestos roofing manufactured by H. W. Johns, of this city, is the best substitute for tin or slate. It is cheap and easily applied.

Inventors and patentees wishing to get small, light articles manufactured for them in German silver or brass, address Schofield Brothers, Plainville, Mass.

Tempered steel spiral springs. John Chatillon, 91 and 93 Cliff st., New York.

Two saw mills for sale. C. Bridgman, St. Cloud, Minn.

Rockwood, 839 Broadway, N. Y., photographs architectural or mechanical drawings and plans to a scale. Also, photographs of machinery.

For solid wrought-iron beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

Scientific Purchasing Agency.—Scientific, Mechanical, Mining, and Agricultural Books, Instruments, etc., for sale at publishers' or manufacturers' prices. Address Sattiel & Co., Postoffice Box 448, New York city, or 37 Park Row.

Change Gear-wheel Tables.—See Walter & Son's advertisement.

Punching and shearing machines. Doty Manufacturing Co., Janesville, Wis.

Specialties in the Machinists' line. Parties desiring work of a special character address S. W. Gardiner, 6 Alling st., Newark, N. J.

"The greatest attraction in the Mechanics' Hall, at the New York State Fair, was the wonderful scroll saw exhibited by J. W. Mount."—See New York Times, Oct. 16, 1868. All who are interested in scroll saws should address the exhibitor at Medina Iron Works Medina, N. Y.

Ericsson's Caloric Engines.—Where a light, safe, economical power is required, these engines—of late greatly improved in construction as well as reduced in price—answer an admirable purpose. Apply to James A. Robinson, 164 Duane st., New York.

Ask for Olmsted's oiler,—the best made. Sold everywhere.

The manufacture and introduction of sheet and cast metal small wares is made a specialty by J. H. White, of Newark, N. J.

For descriptive circular of the best grate bar in use, address Hutchinson & Laurence, No. 8 Dey st., New York.

An experienced engineer, who for years has been engaged as superintendent and mechanical draftsman in a machine shop, wishes a similar position in some establishment. Good references given. Address Engineer, Postoffice Box 343, Boston, Mass.

American Needle Company, general needle manufacturers, and dealers in sewing-machine materials. Hackle, gill, comb, card pins, etc., to order. J. W. Bartlett, Depot 569 Broadway, New York.

"Broughton's" oilers are the most durable and effective.

Responsible and practical engineers pronounce the Tupper Grate Bar the best in use. Send for a pamphlet. L. B. Tupper, 120 West st., N. Y.

Iron.—W. D. McGowan, iron broker, 73 Water st., Pittsburgh, Pa. N. C. Stiles' pat. punching and drop presses, Middletown, Ct.

Winans' boiler powder, N. Y., removes and prevents incrustations without injury or foaming; 12 years in use. Beware of imitations.

The paper that meets the eye of all the leading manufacturers throughout the United States—The Boston Bulletin. \$4 a year.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

WINDOW SASH LOCK AND SUPPORTER.—William Lee McKibbin, Buck Valley, Pa.—This invention has for its object to furnish an improved lock and supporter for window sashes, which shall be so constructed and arranged as to hold the sash securely locked when lowered, and to securely support it in any position to which it may be raised.

MOLDERS' RIDDLES.—James C. Ward and Joseph Hudson, Peekskill, N. Y.—This invention has for its object to furnish an improved riddle for molders' use, simple in construction, strong and durable, not liable to break and not liable to burn out when used to receive and screen hot metal.

SASH CLAMP.—Elijah F. Dunaway, Cincinnati, Ohio.—This invention has for its object to furnish an improved machine, by means of which sashes may be quickly, conveniently, and accurately shaped, and the joints tightened and squared ready to be pinned.

HARVESTERS.—William Michael, Murrysville, Pa.—This invention has for its object to improve the construction of harvesters and mowers, so as to make them more effective in operation and more reliable in the various places, and under the various circumstances in which they may be used, and which shall, at the same time, be simple in construction and not liable to get out of order.

HORSE HAY FORK.—Samuel Miller, Mohawk, N. Y.—This invention has for its object to furnish an improved horse hay fork, simple in construction