

on the tongue, or at least an absence of bad taste, and, before dissolving in the mouth, shows an adhesiveness to the tongue; when mixed with water it should give a white milky fluid, without any particles of dirt floating on the top, and should settle down quickly, forming a solid hard mass at the bottom of the fluid. As a trial for its thickening powers a quantity may be boiled with water in the usual manner; two proportions should be taken, one thicker than is generally required, and another thinner—for instance, one trial at one pound to the gallon, and both boiled with the usual precautions. The manner in which it behaves on boiling, as well as its appearance when boiled should be observed. A good starch will thicken gradually and evenly throughout, not in lumps; it will keep smooth all the time with only a moderate amount of stirring, and when boiled will be of a clear, transparent, gelatinous appearance—not milky and opaque, nor breaking off short when lifted with a stick. At two pounds per gallon it ought to be pretty stiff while hot, to pour out slowly, and for the most part adhere to the sides of a gallon mug, when this is inverted for a short time; at one pound per gallon it should flow smooth and oily, without appearance of water or breaks in it. When cold, the thick trial should be very stiff, and feel tough and solid in the hand; the skin should be of a tough leathery nature, and no water should be floating about—it will not be so clear as when hot, but still should be partially transparent; the thinner trial should be also of increased consistence, and not show any water; it should be smooth and not containing lumps. There are besides these characters a great number of others, too minute to record, which are combined in forming the opinion as to the quality of a sample of starch. It is a practical question, and nothing but a number of trials, upon all kinds of starches, will enable any one to form a correct opinion upon this matter.

“Starch is sometimes adulterated with mineral substances, as gypsum, sulphate of baryta, or mineral white, China clay, etc. The existence of these substances make a starch boil rough and opaque; they can be discovered by burning some of the starch in a proper manner—if much earthy matter be left as a residue, it will be a sign of adulteration. It is sometimes understood that starch for finishing contains mineral matters, and a proportionable reduction in price is made, but oftener there is only one party cognizant of it; at any rate a starch containing added mineral matter ought not to be used in mixing colors, however good it may be as a finishing starch. Inferior qualities of starch, under the names of seconds, slimes, and hair powder starch, are extensively used in the trade, and may be economically and easily employed in numerous cases; for it is not necessary, in making colors, that a starch as pure as is required for domestic purposes should be used; what is required is a good sound article, free from adulteration, not injured by acids or fermentation, and, if otherwise good, it does not matter whether it be in powder or in crystal, perfect white or a little grayish. Starch is sometimes injured by some of the gluten or the flour being left in it. Such a starch does not keep well, soon goes watery, or putrefies, emitting bad smells. By scattering a little of this kind of starch upon a red hot iron plate the gluten makes itself apparent, by giving off a disagreeable animal smell, like burning woolen, or leather, or the hoofs of horses. This kind of starch has never a good color, and, if in crystals, has a flinty hardness. Good starch does not contain more than ten or fifteen per cent of water; the latter is the largest quantity it should lose in drying, at moderate temperatures.”

THE EXHIBITION OF THE AMERICAN INSTITUTE.

The annual exhibition of this association is to be held in the Empire City Skating Rink Building, corner of Sixty-third street and Third avenue, New York city. The building was opened for the reception of articles and machinery to be exhibited on the 1st September, and is now well stocked with a large variety of things, comprised under the following departments, which will be more fully noticed in subsequent issues of our paper.

1. The Department of Fine Arts and Education, consisting of paintings on canvas, glass, etc., engraving, lithographs, photographs, sculpture, musical instruments, specimens of printing and bookbinding, philosophical instruments, etc.

2. The Department of the Dwelling, comprising apparatus for warming, lighting, cooling and ventilating, cooking stoves, kitchen utensils, carpets, oil cloths, tapestry, cabinet furniture, table furniture, ornaments for parlors, building accessories, mantels, grates, etc.

3. The Department of Dress and Handicraft, including wearing apparel for both sexes, sewing machines, artificial limbs, wigs and hair-work, jewelry, trunks, umbrellas, etc.

4. The Department of Chemistry and Mineralogy—soaps, toilet preparations, acids, leather, furs, india-rubber and gutta-percha preparations, paints, dye stuffs, sugars, confectionery, minerals, ores, apparatus for making gas, natural stones used in building, etc.

5. The Department of Engines and Machinery—machines for making wood, metal, and all tools used by artisans or in factories, not otherwise provided for.

6. The Department of Intercommunication, containing locomotive engines, cars, carriages, wagons, sleighs, models of ocean or river vessels, electric telegraphs, etc.

7. The Department of Agriculture and Horticulture—specimens of plants and flowers, fruits, vegetables, butter, cheese, plows, cultivators, mowers, reapers, churns, cheese presses, hemp, flax, cotton, etc.

Each of the above departments is to be divided into seven groups, articles of like nature being kept together. In addition to this there is the display of the National Association of Wool Manufacturers.

The main building is 350 feet in length by 170 feet in width, giving an area of 59,500 square feet. A new building has been erected at the easterly end of the Rink, 200 feet long by 50 feet wide, for the exhibition of machinery driven by steam. Two engines, of 90-horse power each, furnish the motive power for the machinery on exhibition, among which there are pumps, engines, a file cutter, lathes, planing machines, Merrill's tilt and atmospheric hammer and drop press, spinning machines, steam hammers, a Bullock printing press, Lyall's positive motion loom, and many other of the newest inventions for divers uses. The steam boilers for driving this mass of machinery are located in the rear of the new building. A large blacksmith's forge of new invention is also placed here, and is in constant operation. There are also many minor mechanical improvements on record, which will be noticed more in detail hereafter.

The exhibition is likely to prove a very successful and interesting one, and will doubtless be largely attended.

Editorial Summary.

**WARMING CHURCHES BY GAS.**—The following method has been patented in England. A brick chamber is made beneath the floor of the building, and a grating is placed over it to allow of the passage of hot air. Beneath this chamber an air flue in connection with the flooring, and covered with an iron grating, is introduced. By these means a current of air is made to pass into the building, and this air is brought into contact with a ring gas burner, which is supplied by an ordinary main by means of a spanner, by which the amount of heat can be regulated. Underneath this ring-burner is placed a small cistern made of fire-clay, filled with water; the heat from the gas burner acts upon the water, steam arises, and this is passed through pumicestone contained in a cylinder above the cistern; the use of this vapor is to moisten the atmosphere contained in the reservoir. Around this is a circular cylinder made of fire-clay, to contain heat. The whole is covered with a dome of fire-clay. This dome is worked by a lever for the purpose of lighting the ring-burner. By these arrangements, it is said that a pure heat, free from smell or smoke, is obtained, and that with a very small consumption of gas.

**A NOVEL NUT CRACKER.**—Two inventors in England have taken out a patent for cracking palm nuts, in order to remove the shell previously to submitting the kernels to the action of the press for extracting the oil; but it may also be used for the purpose of cracking any other kind of nuts that are required to be cracked in large quantities. A revolving fan is used for producing a blast of air which throws the nut with sufficient force against an iron or metal target to crack them without injuring the kernels. The fan is inclosed in a sheet of iron, or other suitable case, having an entrance passage, provided with a hopper for the introduction of the nuts, and a discharge pipe through which they are driven by a current of air, and discharged against the iron target, by striking which they are broken.

**STEAM ENGINEERING AT THE FRENCH EXPOSITION.**—We are indebted to the courtesy of William S. Anchincloss, C. E., Honorary Commissioner to the French Exposition of 1867, and author of an able work on "Link and Valve Motions," recently noticed at length in this journal, for a copy of his report on Steam Engineering, as illustrated by the Paris Universal Exposition of 1867. An extract entitled Transmission of Power, published in another column, is one of the many good things we find in this interesting work. It is to be regretted that so limited a number of copies of this report have been published, as the information it contains is of high value to American Engineers. We shall make some other extracts from this valuable report.

**TARPAULIN.**—A new method for making a durable and useful tarpaulin, consists in boiling gas tar, one hundred weight, until it becomes hard, and at the same time boiling in a steam-jacketed pot fourteen gallons of Stockholm tar spirit, ten pounds of American resin, and one gallon of resin oil. When these ingredients are completely dissolved, they are mixed together, and in about ten minutes after, two ounces of oil of vitriol are added. This compound is found to preserve tarpaulins, sail cloth, and other fabrics. By the addition of proper pigments it can be made to receive different tints of dark colors, such as reds and browns.

**TOOTH BRUSHES.**—There has lately been introduced into the market a porous form of vulcanized india-rubber, called india-rubber sponge. It is proposed to substitute this material for bristles in the manufacture of tooth-brushes. A piece of india-rubber sponge is fixed to a handle of bone or ivory, and ridges are formed on the surface of the spongy material. Other brushes are made in a similar manner by fixing spongy-vulcanized india-rubber to a rigid back or handle; or, in some cases, as for horse brushes, a rigid back only is required. In some cases, the spongy india-rubber is checkered or cross-grooved.

**POISONING BY CORALLINE.**—M. Landrin has reported experiments to the French Academy, tending to show that pure coralline does not exert any poisonous action on the human skin. M. Tardieu rejoins, that the coralline-dyed stockings which he examined, and which did produce such effects, did not contain arsenic, lead, mercury, or other mineral poisons, but he cannot say whether or not the stockings were colored with coralline only. So the question stands in a position of uncertainty as to the real cause of the mischief imputed to this pretty dye.

**NEW GAS BURNER.**—A new French invention is a gas-burner, the object of which is in part to do away with the flickering of the flame, so as to render the light steady, also to cause a more perfect combustion of the carbon. It consists of a metal piece having several openings, through some of which gas issues, and through the others atmospheric air, which mixes with the gas. It appears to be a modification of the ordinary Bunsen burner.

**STEEL FISHING RODS.**—It is proposed by an English inventor to make fishing rods of iron, steel, or German silver, instead of pliable wood or cane. He constructs the rods as follows—either in one or several pieces, connecting them together by joints in the usual way or by any other means better adapted for the purpose. He uses either solid or tubular metal with the view to obtaining lightness and flexibility.

NEW PUBLICATIONS.

THE AMERICAN ENTOMOLOGIST, for August, completes the first year and the first volume. It has been admirably conducted, and is worthy of the most extensive support. The present number contains a fine colored plate of the Royal Horned Caterpillar and Moth, life size, together with about twenty other engravings. Commencing with the new volume the work is to be enlarged from 24 to 33 pages, the price remaining the same; namely, \$1 a year. Monthly. R. P. Studley & Co., Publishers, St. Louis, Mo.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The quarry property at Cromwell, Conn., is now valued at \$100,000. Three years ago it could be bought for \$30,000.

Ground has been broken at Portland, Maine, for the construction of the Portland and Ogdensburgh Railroad.

The Supreme Court of Nevada has decided that the telegraph is a branch of commerce, and, as such, is under the control of Congress.

The navigation regulations of the Suez Canal state that the canal will be open for vessels of all nationalities with a draft of less than 24 1/2 feet.

The quantity of amber lately found at the Kurische Haaf in Eastern Prussia, is said to be so great that the market price of the article has fallen.

The new iron bridge over the Cape Fear river, to connect all the railroad lines centering in Wilmington, North Carolina, was opened on the 28th of August.

The Imperial Insurance Company of London has paid \$100,000 losses for the whiskey destroyed at the late Philadelphia First street fire, and will soon pay \$200,000 additional.

Illinois is to have a new Capitol at Springfield. The plans, specifications, and estimates of the Commissioners have been officially approved. The cost, exclusive of foundation, is limited to \$3,000,000.

The colossal bust of Humboldt, which was modeled by Professor Blüser, has been successfully cast in bronze by Howard, in Brunswick, Germany. It is intended for New York and will cost about 17,000 thalers.

The English papers complain of the continued emigration of Cornish miners, which is not caused by want of work, but by the low rate of wages paid them. The men who have left are of the best class of miners.

The exhibition of the Pennsylvania State Agricultural Society is to be held in Harrisburgh, opening on Tuesday, the 28th of September, and continuing until the 1st of October. The premium list amounts to \$10,000.

The oil excitement at Parker's Landing and about the mouth of the Clarion river still continues to increase. Twenty-three derricks are up on the Clarion county side, and many more on the Armstrong side of the Allegheny.

It is said that the town of Warren, Jo Daviess county, Illinois, offers a bonus of from \$2,000 to \$3,000 to any responsible person who will go to that town and erect and run a custom steam grist-mill, which is needed in that place.

The dome of the Invalides at Paris, is at last completed, and presents a magnificent appearance, sparkling with gold. It was gilded for the first time by Louis XIV., for the second time by the first Napoleon in 1806, and now for the third time by Louis Napoleon.

A California paper says that 50,000 tons of wheat were lying in sacks along the banks of the Sacramento river, in Tehama, Butte, Sutter, Colusa, and Yolo counties, on the 1st of August, and that 60,000 more were to follow, making 110,000 tons as the yield of five counties.

A crib 300 feet long, being one section of the whole length of 900 feet, to be used in the construction of a wharf at North New York, for the Harlem River and Port Chester Railroad, has been towed to its position. The balance of the crib is progressing rapidly, and a steam dredger is constantly at work deepening.

The present production of the White Pine mines is about \$86,000 a week, and for the whole district about \$100,000 a week. In a month or two the production will be increased to the rate of six millions a year, and the yield for 1870, it is confidently believed, will reach ten million dollars.

A Chicago paper says that there are over 20,000,000 gallons of water consumed daily in that city. It discusses the estimated future consumption and the limited facilities for supplying the demand, and contends that the lake tunnel will be inadequate to supply the city five years hence.

A heavy snow storm prevailed at the summit of Mount Washington, on Aug. 31. The telegraph wires were broken in several places by the ice, which accumulated to the thickness of two inches, or more. The thermometer stood at 28 deg. The Times says it snowed in this city on the 1st of September.

The Ames Works, in Chicopee, Massachusetts, are engaged on the bronze fountain for the Central Park, New York. An immense bronze basin is to be cast, which will rest on sixteen columns. The whole is to be octagonal in shape, and a number of curious jets and streams will be worked into the design at various points.

From the annual report of the Street Superintendent of San Francisco it appears that city has 102 miles of paved streets and 255,329 feet of sewerage. The cost of street work from July 1, 1868, to July 1, 1869, has been in round numbers \$1,520,000; and the average cost has been nearly a million a year for ten years past.

The State Line Lode, Nye county, Nevada, according to the report of the United States deputy surveyor, is a gold-bearing vein, composed mainly of ferruginous and friable quartz. In many places the entire vein is so friable and crumbly as to be easily removed with the pick alone. A working test of 600 pounds gave a yield of \$176 per ton. The improvements on the mine have cost about \$2,000 coin.

The following is said to be an excellent imitation of the jet black China varnish for boots and shoes. Dissolve 10 grms. of shellac and 5 grms. of turpentine in 40 grms. of strong methylated spirits, having previously dissolved 1 gm. of extract of logwood, with some neutral chromate of potassa and sulphate of indigo, in the spirits. The varnish should be kept in well stoppered bottles.

New Haven, Conn., is becoming anxious about its water supply. The water is now pumped into the reservoir by water-power, wasting ten millions of gallons each day in pumping two and a half millions. The company propose to put in steam pumps, which will enable them to supply a city of two or three hundred thousand inhabitants.

A Belgian has lately had a steamer of diminutive proportions constructed in England. This craft is twenty-four feet long and six feet wide. Her boiler is about the size of a teakettle, and the engine might be put in the