

The Saline Springs of Onondaga, N. Y.

The brine from these springs results from water penetrating immense subterranean deposits of rock salt, made by the natural evaporations of salt water lakes, like the Great Salt Lake, Caspian Sea, etc., which lakes existed in geological periods millions of years ago, the basins forming them being afterward covered up by later deposits. They belong all to the upper silurian era, and are at such great depths that they are perhaps inaccessible to man, but the way the salt is obtained there is so economical that it is far superior to the quarrying done in dry salt mines; it is simply pumped up in solution through comparatively narrow and inexpensive tubes. When we take in consideration that most of the natural rock salt has to be dissolved, filtered, and recrystallized, we see here that nature has done the dissolving and filtering, in fact the brine in Syracuse is so clear that a simple evaporation, either by fire or solar heat, is sufficient to produce a superior article of table salt.

The state owns the springs, pumps up the water, chiefly by the water power of that part of the Erie canal passing through Syracuse, and sells the brine to the manufacturers of the salt. The total quantity of salt obtained in Onondaga county since 1797 is not less than 200,000,000 bushels, half of which was obtained during the last fifteen years. Each bushel contains 56 pounds of salt. Taking now in consideration that one cubic foot of solid salt weighs 140 pounds, 15 cubic feet make a ton. The amount of salt, therefore, removed during the seventy years that the springs have been in operation amounts to 5,000,000 tons or 80,000,000 cubic feet of solid salt. This would form a single excavation in the earth of about 450 feet long, wide, and high; but the salt is not all removed in one breadth and the excavations are certainly distributed irregularly, over a large extent of subterranean territory. As the brine contains about 15 per cent of salt, it took seven times that amount of water to dissolve it; 560,000,000 cubic feet or 5,000,000,000 gallons of water have therefore all been evaporated by the heat applied during seventy years, and probably more, as the brines formerly used were not so strong by far as those obtained later by boring to a greater depth.

Editorial Summary.

GREEK FIRE.—In anticipation of further Fenian demonstrations, a memorandum relative to the treatment of nitroglycerin and Greek fire has been issued in England by order of the Home Secretary. Of the former explosive, the simplest mode of disposal recommended is to sink the containing vessels in deep water without attempting to open them. True Greek fire, it says, is simply a solid, highly combustible composition, consisting of sulphur and phosphorus dissolved in the bi-sulphide of carbon, to which occasionally some mineral oil is added, with the view of increasing its incendiary powers. When the liquid is thrown on any surface exposed to the air, the solvent evaporates, leaving a film of the phosphorus or sulphide of phosphorus, which then inflames spontaneously. The proper mode of extinguishing such a fire is to throw damp sand, ashes, sawdust, lime, or any powder, wet sacking or carpeting, in short, any material which will exclude the air from the fire. No attempt should be made to remove the covering for some time after the flame has been extinguished. The place should afterward be thoroughly washed by a powerful jet of water forced upon it.

CONCERNING FROZEN POTATOES.—Dr. Adolph Ott, a frequent contributor to these columns, has been examining frozen potatoes for the purpose of confirming or disproving the truth of the common theory that the sweet principle of frozen potatoes is due to the conversion of starch into sugar. After a long series of experiments he concluded that this sweet principle was caused, during the freezing and thawing, by the sap bursting the cell and thus destroying vitality; at the same time decomposition sets in, which, though retarded by the cold, is not entirely arrested; the more so as at the season most likely to freeze, and especially during a snow storm, there abounds that powerful oxidizing agent, ozone. The outer portions, no doubt, are first attacked by it, and may thus be transformed into diastase, a body possessing the power of converting a comparatively large quantity of starch first into dextrine, and then, at the temperature of 140° to 170° as in the process of cooking, into sugar.

OBSERVING THE BESSEMER CONVERTER FLAME.—At the Atlas Steel Works, Glasgow, a very neat contrivance has for some time been used for enabling the observer to determine the point when the combustion of the carbon is completed. A square thin frame contains a combination of colored glasses, for instance, one dark yellow and two blue, or any other colors giving together a very dark neutral tint. Looking at the flame through these glasses affords the double advantage of preserving the eye from unpleasant effects of the intense light, and of making all smoke and other disturbing changes invisible. The flame, when thus viewed, looks white so long as the intense brilliancy due to the burning up of the carbon continues, but changes to a deep red at the moment all the latter has been consumed.

UTILIZATION OF SPONGY CELLULOSE.—In the process of making paper from wood, as practiced in Europe, round disks of wood are first subjected to the action of hydrochloric acid to dissolve out the spongy cellulose. This latter has, until lately, been a waste product, but is now converted into alcohol in this way: The wood is boiled for twelve hours in hydrochloric acid, diluted with ten times its volume of water. The acid liquid, which is charged with grape sugar formed from the spongy cellulose, is then withdrawn, the excess of acid saturated with lime or chalk, and a small quantity of yeast is

added, the temperature being kept at about 68° Fah. Fermentation soon ensues, and when bubbles of carbonic acid gas are no longer evolved, the liquid is distilled to obtain the alcohol.

THE POISON OF RATTLESNAKES.—A Philadelphia physician, Dr. S. W. Mitchell, has been experimenting upon the venom of rattlesnakes, and concludes that there is no antidote to the poison, the remedies usually applied being nearly or entirely useless. Carbolic acid applied externally sometimes delays the result merely by affecting the local circulation. He has also confirmed the general belief that the poison is absolutely innocuous when swallowed, it being incapable of passing through the mucous surfaces; also that it is so altered during digestion that it enters the blood as a harmless substance. The venom is not injurious to the rattlesnake itself or to any other of its own species. The doctor attaches considerable value to large doses of alcoholic liquors, especially where the patient was not intoxicated at the time of being bitten.

SMOKE FROM GAS LIGHTS is not usually occasioned by impurity in the gas, but the evil arises either from the flame being raised so high that some of its forked points give out smoke, or more frequently from a careless mode in lighting. When we suddenly open the stop cock and allow a stream of gas to escape before applying the match, a strong puff follows the lighting and a cloud of black smoke rises to the ceiling. Daily repetition gives in time a blackened wall.

GARDINER, in his "Music of Nature," asserts that dogs in a state of nature never bark—they simply whine, howl, and growl. The Australian dog never barks, and Columbus found that the dogs he had previously carried to America had lost their propensity for barking. This peculiar explosive seems to be an acquired faculty, which the animal derives from his associations with man.

TIERS-ARGENT.—This beautiful white alloy, first made by Taloureau, consists of two thirds of aluminum and one third silver. It is now made perfectly homogeneous, and is easily fabricated. Its hardness and lightness are valuable qualities in table furniture. Spoons, forks, goblets, and salvers made of this material are rapidly coming into use in Paris.

LEUWENHOEK has computed that 100 single threads of a full grown spider do not equal the diameter of the hair of the beard, and when the young spiders begin to spin, 400 of them are not larger than one of a full growth, consequently 4,000,000 of a young spider's threads are about the size of a single hair of a man's beard.

M. SALVERTE, in his work on the occult sciences, shows the probability that the ancients defended their buildings from lightning by conductors, and that the Temple of Solomon was thus protected.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

A bill to incorporate the Idaho, Oregon and Puget Sound Railroad Company has been introduced in Congress, petitioning for power to build a railroad from a point on the Union Pacific 113° 30' west longitude, north to Snake river valley, thence northwesterly to Columbia river valley, thence to Portland, Oregon, and finally to Puget Sound. The company ask for every alternate section of public non-mineral lands to the amount of twenty alternate sections per mile on each side of the railroad line; also, United States bonds to the amount of \$16,000 and \$32,000 per mile for level and mountain routes respectively. A branch road is to extend to Montana.

One of the furnaces of the Crane Iron Company, at Catsauqua, Pa., lately turned out two hundred and forty tons of iron in one week; a yield scarcely ever equalled in this or any other country.

The only coal mines which last year were worked within the limits of the Pacific territory, were those of Bellingham Bay and Monte Diablo, while the amount extracted was but 8,816 tons from the former, and 71,322 from the latter, making a total of 80,138 tons, against a product during the preceding year of 90,000 tons. At the Monte Diablo mines increased facilities for transportation to tide water have been created by the construction of railroads, and it is expected that the beneficial results of these improvements will be felt another year.

A well of naphtha has been discovered at Kudaca, in the Caucasus, by boring. The liquid was first struck at a depth of 274 feet from the surface, and the yield for several weeks was at the rate of 1,500 barrels a day. Since then a fresh source has been met and a jet of naphtha, four inches in diameter, rises with great force to the height of forty feet above the ground, affording a supply of 3,000 barrels daily.

The famous Thames tunnel, which for the twenty-five years since its completion has proved an indifferent speculation, is at last to be made of some practical use. It is stated that two railroads on opposite sides of the river propose forming a junction by means of this subaqueous passage-way, and will make gradual entrances a mile distant from either bank. The original cost of the tunnel was over \$2,000,000. It was sold a few years ago for one half that amount, and even at this sacrifice the purchasers have found it to be a very unfortunate investment, the receipts, principally tolls from foot passengers drawn thither by curiosity, averaging but \$125 per week, which have been entirely consumed by expenses. Under the railway management, the tunnel may possibly become a pecuniary success.

The manufacture of salt commenced in the United States at Syracuse, in the year 1797, since which time this locality has produced eighty millions of bushels. Last year's yield amounted to 10,000,000 pounds, or about two thirds of all the salt consumed in this country. A correspondent writes that salt of excellent quality is manufactured in Oneida county, Idaho Territory.

The citizens of Minneapolis are very much concerned over the unpleasant fact that the Falls of St. Anthony are receding up stream at the rate of three hundred feet per year. All efforts to prevent this stampede of the rapids, by protecting the ledge, have proved insufficient, and the inhabitants are fearing the total destruction of the water power upon which their prosperity depends, and the consequent degeneration of the city to the rank of a mere village.

The iron and steel works at Birmingham, Conn., used 4,000 tons of scrap last year, making 3,500 tons of finished iron, 350 tons of imported steel in carriage and truck springs, and made 1,000 tons of iron into axles of all grades and styles.

MM. Carver & Co., of St. Etienne, France, have successfully utilized the gases given off in converting bituminous coal into coke. These gases are collected, drawn off into pipes, and cooled. From the liquids, condensed benzene, naphtha, sulphate of ammonia, and several dyestuffs are made; the uncondensed gas is used for illuminating purposes.

An establishment in Vienna manufactures knives from tungsten steel, which are so hard as to cut glass like the diamond.

A singular gas explosion in an oil well is reported in the Titusville Herald, the like of which, it says, has never been known in the oil regions. While drilling an oil well, near Enterprise, the tools broke through the second sand rock into a crevice where an immense quantity of gas had collected. Thus liberated, the gas rushed out with a loud rumbling sound, tearing out the driving pipe and throwing it upward into the derrick. A loud explosion ensued on the gas becoming ignited from the fire in the engine, and the derrick and engine house were both destroyed.

The manufacture of starch from potatoes is extensively carried on in the Northern and Eastern States. A single firm in New England consumed 25,000 bushels of potatoes for this purpose in 1867.

Recent American and Foreign Patents.

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

WATCHES.—George Frederick Roskopf, Chaux de Fonds, Switzerland.—This invention relates to an improvement in the construction of watches, which consists in having that portion of the mechanism of a watch known as the "escapement," fitted or attached to a plate or frame separate from the frame in which the "train" or other portion of the movement is fitted, the plate or frame to which the escapement is fitted being attached to the frame of the train in such a manner that it may be readily detached when necessary, and any of the known escapements, on a similar detachable plate or frame fitted or applied to the other portion of the movement. It also consists in constructing the detachable plate in such a manner, or arranging the several parts comprising the escapement on said plate in such a way that the "escape wheel" may be readily adjusted in a proper relative position with the pallets or other part or parts which work in contact with the teeth of the "escape wheel," the detachable plate being secured to or in the frame which contains the train, or part of the watch movement, in such a manner that it may be adjusted so that the pinion on the "escape wheel" axle may always be adjusted properly in gear with the wheel of the train in which it is designed to work.

MANUFACTURE OF HATS, CAPS, BONNETS, NECKTIES, AND RIBBONS.—Treflé Garceau and Edward de la Granja, Boston, Mass.—This invention consists in combining paper pulp, india rubber, and paraffin in certain proportions, and thereby forming a composition peculiarly adapted to the manufacture of hats, caps, bonnets, neckties, ribbons, and other similar articles.

CULTIVATOR TOOTH.—M. F. Lowth and T. J. Howe, Owatonna, Minn.—In this invention the tooth is hinged, and provided with a brace, by which the angle of the tooth with the ground can be regulated, and which also operates to prevent the breaking of the tooth or beam by obstacles in the way of the cultivator.

ANIMAL TRAP.—Major B. Marshall, Draw Bridge, Md.—This improved trap is designed particularly to catch animals that travel in paths or leads, and the invention consists in so constructing it that it can be more easily sprung, and will more effectually secure the animal than will the traps hitherto in use.

FLUID METER.—Leicester Allen, N. Y. city.—In this invention a piston is balanced by a spring in such a manner that the piston, actuated by the flow of the water, will open a valve and give free passage to the water as long as there is no back flow, and when there is any back action will close, or partially close the valve and stop the flow. A registering apparatus records the amount that has passed through the valve.

COTTON SEED PLANTER.—A. J. Golig, M. U., Clinton, La.—This invention relates to a machine for planting cotton seed, and consists in a peculiar construction and arrangement of parts pertaining to the seed-distributing apparatus, whereby the seed may be sown with certainty and without the liability of the hopper becoming choked or clogged. It also consists in using in combination with the seed distributing apparatus above alluded to a furrow opener and seed-covering device.

HOLDER FOR RAZOR STROPS.—George Scott, Steubenville, Ohio.—This invention relates to a holder for razor stropps, and to the manner of securing the strop thereto, and consists in making the holder of a metallic spring band, curved or bent in the direction of its length, within the strop, extended between its two ends and there secured, at its full tension or thereabouts, and also in so bending the ends to the band that the strop can be secured thereto without the use of rivets or any additional fastening devices of any nature.

KNITTING MACHINE.—Henry Bögel, Watertown, Wis.—This invention relates to a knitting machine for making plain knit fabrics of any number of stitches. It is of very simple construction, works almost without any noise, and can be easily taken apart for the purpose of removing or replacing needles, and for repairing and cleaning the whole machine. Two sets of needles, each working independently of the other, are arranged in the machine, of which both or either one may be operated at a time, and thus one or two pieces of fabric may be knit at once.

WIND WHEEL.—Wm. C. Day, Mohawk, N. Y., and P. B. Day, Shelby, Mich.—This invention relates to a wind wheel of that class in which vertical wings or sails are employed, and the wheel enclosed within a box provided with doors, by opening or closing which more or less wind is admitted to the wheel, and the speed of the same regulated as desired, and by closing the doors the motion of the wheel entirely stopped. The invention consists in the application to the doors of the box which encloses the wheel, of a chain or cord connected with a windlass, and arranged in such a manner that by operating the windlass all the doors of the box may be opened and closed simultaneously, and the wheel kept running at a uniform speed, or stopped entirely, when required, with the greatest facility.

SUBSOIL ATTACHMENT FOR PLOWS.—Charles Hayden, Collinsville, Conn.—This invention relates to a mode of attaching a subsoil plow or share to an ordinary plow, whereby the share may be adjusted, raised, or lowered, with far greater facility than hitherto,—readily detached when not required for use, so that the plow to which it is applied may be used as an ordinary plow, be simple in construction and capable of being manufactured at a small cost, and be of light or easy draft.

FOLDING BOW DISH FOR SPRING BALANCES.—Richard Murdock, Baltimore, Md.—In this invention the dish or platform upon which the articles are placed to be weighed by a spring balance is supported at its four corners by arms bowed or curved outward and so arranged that they can be readily fixed in position or not, and when not in use, can be folded together upon the dish so as to occupy but little room.

FRAME FOR HOP VINES.—Abram Stoemaker and Wallace Phelps, Conesville, N. Y.—This invention relates to a useful improvement in the construction and arrangement of frames for training hop vines.

HOP PICKING TOOL.—John Dean, Baraboo, Wis.—This invention relates to a new device for picking hops from the pole, and consists in the use of a rake with curved tines and with cutters at the ends which serve to cut the vines as the tool is drawn along the pole.

HYDRANT FIRE PLUG.—T. R. Bailey, Jr., Lockport, N. Y.—This invention relates to a method of constructing fire plugs or hydrants, and the invention consists in operating a cylinder valve in a suitable case and in the arrangement and combination of parts connected therewith.

MACHINE FOR COLLING SPRINGS.—John Freeland and Daniel Ward, New York city.—This invention relates to a machine for colling patent valve and other similar springs while hot, and consists in a frame constructed with head and tail blocks like a turning lathe having suitable driving gear and an adjustable spindle or mandrill around which the spring is colled.

BRIDGE.—Frederick H. Smith, Baltimore, Md.—This invention has for its object to improve the construction of bridges so that any desired part of the bottom chord can be readily adjusted to tighten or loosen any desired part of the bridge or to allow any desired part of the woodwork to be removed and replaced.

ANGULAR SHAFT COUPLING.—John M. Case, Athens, Ohio.—This invention has for its object to furnish an improved coupling or gearing for connecting shafts to each other at any desired angle which shall be so constructed and arranged as to securely couple the shafts, run with less noise, and with less friction than the ordinary bevel gearing, and which shall at the same time require less material for its construction.