

The Democratic Sentinel

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BEET SUGAR MAKING.

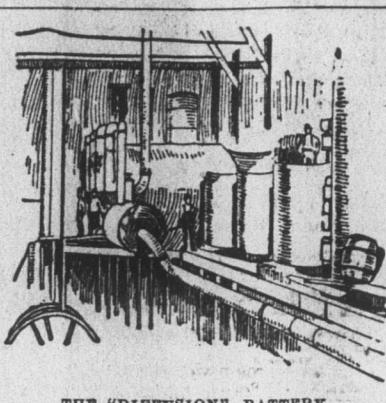
HOW SWEETNESS IS STOLEN FROM SUNBEAMS.

Beets furnish 60 per cent. of all the sugar used—No difference in taste—Extent of the industry in this country—Converting the raw material into fine table sugar.

Process of Manufacture.

In a recent number of the *Cosmopolitan*, H. S. Adams has an excellent article on beet-sugar making. The writer says that while the average person, if asked to name the source of his sugar, would respond, "Sugar-cane, of course," this juicy reed and all other sources combined, save one, supply only about 40 per cent. of the world's product; the remaining and larger portion has been stolen from sunbeams, drawn through the veins of myriads of leaves, and stored up in the tapering roots of one of the most unassuming members of the vegetable world—the beet; a plant that hides its light under a bushel, that even in culinary art comes to the front only as spring-salad and boiled beets—in short, a dweller in tilled fields of which but little might be expected. Yet the whole world is under lasting obligations to this erstwhile garden-truck for its abundant ability in supplying what has come to be considered one of the prime necessities of life. Tell this same person that he

of sugar, the grains, which resemble ordinary beet seeds in size and also in point of containing several germs, are planted as soon after the first week in April as the weather will permit, quite thickly, in rows eighteen inches apart, the soil, which must be of the best, having been plowed at least a foot in depth



THE "DIFFUSION" BATTERY.

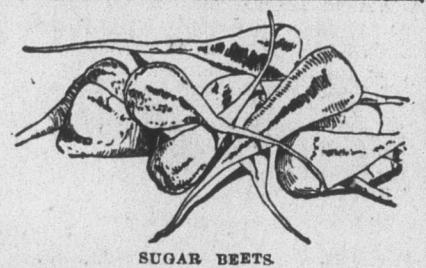
allow the tap-roots to penetrate as far as they wish, otherwise a deformed beet would result if the top appeared above ground and the roots accumulated undesirable amounts of salts. The roots should be of as perfect shape as possible, the best type being a long, tapering form with a marked twist, resembling that of a cork screw. When the young plants show four leaves, they must be thinned out immediately, one being left every six inches or so. After repeated cultivation the weeds will have disappeared and the broad leaves spread over the ground. The crop must then be "laid by," it being very essential that the foliage remain unbroken so that the full complement may be ready to absorb the sugar that the sun showers down in a reckless multitude. From now on each root system that is basking in solar splendor the honeyed substance is mingling with the arterial fluid, and flowing on, seeks the subterranean storerooms. When sufficiently ripe they must be topped and carried to the factory as soon as possible.

Arrived at the factory, the wagon or car loads are weighed, tared, and as soon as a sample basket for analysis has been selected, the roots are stored in sheds constructed for that purpose. The latter are V-shaped and connect with the sugar-house by means of conduits through which a moderate flow of water carries the beets. Into these they tumble hour after hour, day in and day out, more rapidly, for a beet-sugar mill must never lag, during its necessarily short season—say one hundred days' run each year. The hapless beets are borne along to their doom

large cells, within whose walls the juice is extracted by what is known as the diffusion process—in other words, the withdrawal of it by soaking in water. Briefly, a current of warm water is turned on the contents of No. 1; this circulates through the mass of cossesets, passes out by means of a false bottom into a pipe which enters the top of No. 2, the mixture of juice and water being forced along by a flow of cold water which follows it constantly. The temperature of the water is maintained by steam-chambers attached to each cell. The same process continues with the other vats until No. 12 is reached, when the circuit is ended, as one cell must be filling all the time and an empty one stands ready always to take its place. No. 1 is then emptied by removing the bottom, the wet mass being carried to presses, where the surplus moisture is removed, the pulp going out of doors to be used as fodder. No. 2 then becomes first in a new circuit, and so on, the cossesets in each cell receiving twelve saturations.

After making the round, the fluid, which on separation from the vat has become a deep purple color, is carried to a measuring tank near by, from which it flows to a mixer, where it is defecated with lime and then pumped into a huge carbonation tank in which the lime and whatever foreign matter it may take with it are rendered insoluble, by means of carbonic-acid gas forced through it.

Now the carbonated juice is pumped to the filter-press room, where, by means of an elaborate series of frames, hung with heavy cloths, it is filtered and becomes a transparent fluid of a pale-yellow hue. The lime thus re-



SUGAR BEETS

leaved possesses about the same consistency as putty, and is conveyed at once into the yard, to be used the following season as a mild fertilizer. The process of mixing, carbonation, and filtration is then repeated with a second set of machinery, less lime being used this time.

This finished, the juice is treated with sulphur fumes, filtered by means of mechanical filters (bags being used instead of folded cloths), passing into the quadruple effect, four great boilers in which the larger part of the water contained in it is evaporated by the use of steam. With a repetition of the sulphur treatment and mechanical filtration the chemical part of the manufacture ceases, and the liquid, now called "chick juice," is ready for crystallization.

This syrup is boiled in the vacuum-pans, a receptacle containing a copper coil heated by steam, until the proper crystals are obtained, which, with the uncrystallized sugar, forms the "massé cuité," an unprepossessing mixture, which the centrifugals are able to render into white sugar in the brief space of a few minutes. These machines make about a thousand revolutions a minute, the centrifugal force driving the molasses through the porous walls of the receiver, leaving a solid layer of sugar clinging to the sides. After being sprayed with water, the damp sugar is released and conveyed to the driller, an immense tumbler whose heated walls remove all moisture. It gradually works to the other end, the crystals falling like spray from a mountain waterfall as they make their rough journey, and, arriving there, drop through various-sized sieves into chutes under which yawn the open mouths of sacks. These are filled, and the sugar is ready for the market.

How was it possible that Lord Russell, the impregnable bulwark of the abolitionist cause in England, had become in 1862 an opponent of American abolitionists? It was always with bitter sadness, though never angrily, that Mr. Sumner expressed himself regarding the existing relations between the United States and Great Britain. To his mind that nation was guilty of a great moral wrong, and owed those who had suffered thereby a manifest atonement.

Such was the feeling which inspired his speeches, at times eloquently passionate, on the existing intercourse between the two Anglo-Saxon powers. On reading them one can readily understand what explosions such fiery words would provoke on the other side of the Atlantic. A challenge of war was thought to be concealed under them. The orator was even accused of exciting the worst of feelings and of appealing to the darkest of hatreds. But in all this English public opinion was mistaken. Mr. Sumner only considered that Lord Palmerston, Lord Russell and their colleagues had wronged the United States, and it was by appealing to higher sentiments that he demanded justice of their successors.

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Two decades and a half then passed before any move toward reviving the industry was made, when a plant was located at Chatsworth, Ill. It managed to struggle on for several years, but finally went to the wall. It was moved to Florida and later to Black Hawk, Wis., with only failures as the result. At last it found itself in Fond du Lac, in the same State. Here its establishment was attended with a measure of success; but the enterprise being hampered by insufficient capital, and the opportunity occurring to increase the latter, it was once more removed, this time to Alvarado, Cal. Again disaster, and Soquel was chosen for a site, but after a time abandoned. Then the factory at Alvarado was revived and a success, due to the efforts of the man who had founded it to this date, was reached. Later the plant at Watsonville was erected.

There is a vast belt stretching from the Atlantic to the Pacific, and of no mean width, which invites the culture of the sugar-beet and promises success almost from the start, if experiments thus far made can be relied upon. Soil and climate are there; careful culture will come when farmers realize that the brain must be used in tillage. As for the sunbeams, the great illuminator is not far away.

The unfortunate dog was blown to atoms, but the man escaped with a severe shaking up and a disposition to fish in the future with a hook and line.

Intellectual Item.

It is said that a man does not reach his full mental power until the age of 25, and the development of talent is most marked between the ages of 20 and 45.

OUR DEBT TO RUSSIA.

What the United States Owe to the House of Romanoff.

That we are under tremendous obligations to the House of Romanoff is recognized by every American who knows the history of this country, says the New York Sun. Whatever may have been the motive which led Catherine II. to join the so-called league of neutrals, the result of the act was to complete the discouragement of the British Ministers, to break the stubborn will of George III., and to compel the acknowledgment of American independence. Whatever, again, may have been the purpose controlling the mind of Alexander I. when, braving the anger of Napoleon, he refused to enforce the Berlin decrees against the American vessels thronging the Baltic ports, there is no doubt that he rescued from ruin our commerce. We accepted redemption at his hands; we profited by his protection, and it behooves us to thank him.

The services of the House of Romanoff to the American Republic culminated in the stand taken in our behalf by Alexander II. at a crisis when our national existence was at stake, the French Emperor having put forth all his influence at Westminster to persuade the British Government to join him in intervening on the side of the Southern Confederacy. Then it was that the Czar who freed the Russian serfs caused his ambassadors at Paris and London to announce that, if France and England undertook to assure the destruction of the American Union and to perpetuate the regime of slavery in the Western Hemisphere, they would find Russia arrayed against them. Nor was the friendly intervention of Alexander II. confined to words. Simultaneously with the utterance of diplomatic warnings a Russian fleet was directed to proceed under sealed orders to the harbor of New York, and a Russian squadron was dispatched to the Bay of San Francisco. For us, for the American republic, for the consolidation of our Union, the Czar made known his willingness to fight; and there is not the shadow of a doubt that his willingness averted a catastrophe.

A GOOD MAN'S ANGER.

Charles Sumner's Resentment of England's Attitude During the War.

But especially toward Great Britain. Mr. Sumner felt his strongest, possibly his most bitter, resentment. Reared in the study of her history, filled with respectful admiration for her great men, learned in all the details of her constitutional existence, sincere follower of the liberal school from which her greater glories spring, and, so to speak, enamored of those abolitionists who, long before his day, had trodden the path upon which he had walked unflinchingly, Mr. Sumner, it may be said, felt, as regards that nation, which had well-nigh openly declared its hostility to the Union's cause, a sentiment of love.

Explain the words fort and fortress. A fort is a place to put men in, and a fortress a place to put women in.

Hydrostatics is when a mad dog bites you. It is called hydrophobia when a dog is mad, and hydrostatics when a man catches it.

Few People Satisfied with Money Alone.

As a matter of fact, the chief impression produced by great wealth, even in America, is simply curiosity, not admiration, hardly even envy. There are many things that people really value more than wealth at any time—perhaps, thinks Harper's Bazaar, valuing wealth only as a means for these things. In youth people prize amusement, pleasure, love; and wealth is thrown away recklessly for the sake of such ends. After the mature tastes are developed, people have no objection to wealth for the sake of other aims which it may promote, but it is not a substitute for those aims. An artist loves art, the man of science loves science, the student loves study, the inventor loves invention, the domestic man loves home. Even the man of action loves action mainly as a thing attractive in itself. He would readily accept wealth as a means of achieving his other purposes, but he would not sell those purposes for wealth. The proof of this is that he does not, indeed, he often impoverishes himself for his own pursuits. "Beyond a very moderate account," wrote Coleridge, "I regard money as a real evil." The man of other pursuits knows that one cannot possibly be very rich and carry on those other pursuits also, so engrossing is the mere care of property, and so difficult and absorbing is the wise use of it. Many a prominent artist or author has been simply ruined for the purposes for which he was created by becoming heir to a large estate; not that it de-moralized him otherwise, but it left him no time for his natural work. Volumes have been written on the suppression of genius through poverty, but very little has yet been said on the wrecking of genius through wealth.

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