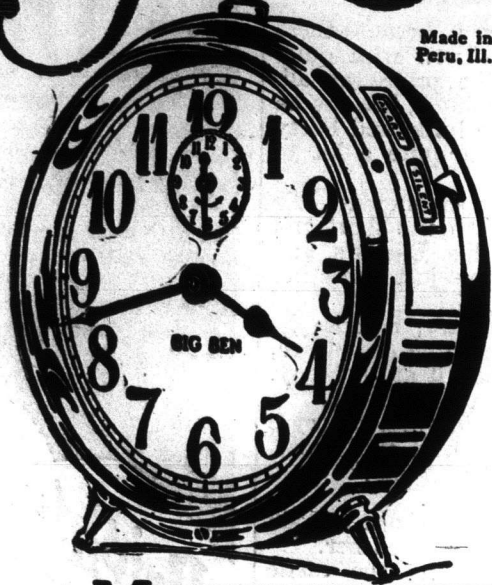


Big Ben

Made in La Salle and Peru, Ill., by Westclox



—best Man on the Farm

To start the chores ahead of the sun, and keep the work ahead of the seasons — Big Ben.

For a good full day's work according to plans, and plenty of time for dinner—Big Ben.

He will get you up and get you out—either way you say—with a steady call, or ten successive half-minute taps.

His price is \$2.50 in the States; \$3.00 in Canada. If your dealer hasn't him, a money order to "Westclox, La Salle, Illinois," will bring him to you postpaid.

Camp—the goes-furthest-costs-least Coffee

One spoonful of 'Camp' to one cupful of boiling water. No dregs, grounds, or waste. And you couldn't have a better cup of coffee if it cost twice as much.

Don't the Children look forward to their 'CAMP'!

Always have 'Camp' in the house. It's so easy to make—and so good!

Put 'Camp' on your grocery order to-day

R. PATTERSON & SONS, LTD.
COFFEE SPECIALISTS,
GLASGOW.



HARNESS

SEND FOR NEW CATALOGUE OF "SQUARE DEAL" HARNESS.

Sold Direct to Users. No Agents

THOS. McKNIGHT, 160 Princess Street, WINNIPEG, Canada

I Want Men

Like YOU, Who Want To Make \$3,000 A Year, or More



We need a good, live man right now in your territory to handle real estate deals for us. No experience or capital necessary. We teach you the Real Estate Business and appoint you our agent in your locality. Easy work; large profits. We operate everywhere. Write for free book.

MORDEN REAL ESTATE SCHOOL
228 Palace Bldg., Minneapolis, Minn.

FREE

Big lever action air rifle for selling either 20 Pictures or 20 plans. Post Cards at 10c. Gates Mfg. Co. Dept 941 Chicago

The Western Home Monthly

Winnipeg, Canada

Enclosed find \$.....for.....

year's subscription to The Western Home Monthly.

Name

Town

Province

How Beet Sugar is Made

A Visit to the Factory of the Knight Sugar Co. Ltd. at Raymond

Written for W.H.M. by Max. McD.

The manufacture of beet sugar is a process of considerable interest. The raw beet goes into the factory at one end and comes out at the other end the perfected sugar of commerce.

From the storage bins the beets are allowed to fall into a flume of running water which floats them into the factory and into the beet wheel by which they are carried to the washer. Here they are subjected to a thorough washing, after which they are automatically ejected into another elevator which carries them to the third floor, where they fall into the slicer. The slicer consists of a driving pulley that operates the shaft carrying a circular frame, which holds the knives. Here they are cut into long V shaped strips about five and a half inches wide by one-eighth inch thick and of various lengths. These slices are called cosettes. From the slicer the cosettes (or beets) are transported by gravity through a hopper into a chute to a diffusion battery. The vessels for diffusion are mostly upright iron cylinders with flat or arched bottoms, having a large opening capable of being tightly closed for receiving the slices. A number of such diffusers connected together is called a battery. In order to keep the contents at the required temperature, there is connected with each diffuser, or cell, a so called heater which reheats the juice before being admitted to the next diffuser in line. The vessels are connected by pipes in such a manner that the same portion of liquor can be distributed throughout the entire battery. The driving power is hydrostatic pressure and is obtained from a tank in the upper part of the sugar house, giving a pressure of from fifteen to twenty-five pounds per square inch. Here the sugar is extracted by a series of bleedings with hot water, the sugar being held in solution in the cells which also contain most of the impurities.

Albuminoids Coagulate Before Pressure of Lime

The object of the diffusion process is to obtain the sugar with as few impurities as possible. When sufficiently concentrated the juice is drawn off in measuring tanks, enough being taken to extract the sugar without too great dilution. This is accurately measured, and a record kept of the time, number of cells and density. This juice is pumped into a calorimeter where it is heated. This is important as it is necessary to coagulate all the albuminoids before the presence of lime. From the heater the juice flows to the carbonators, which are covered tanks heated by closed steam. Here lime in the form of milk of lime is admitted to the heated juice. The lime combines with the greater part of the impurities and forms an insoluble precipitate. The lime also combines with the sugar forming a calcium sucate, which if not decomposed will be lost in filtration. This is done by injecting gas which is made by burning the lime used in clarification. Thus an insoluble precipitate of calcium carbonate is formed.

Just enough gas is admitted to break up this combination of lime sugar. Care is taken not to carry the operation too far, as after the calcium sucate is destroyed the carbonic acid attacks the compounds of calcium and in time will liberate all impurities again. The process is closely watched and samples are taken every few seconds. As the operation approaches completion samples are taken in test tubes. The proper point at which to stop the flow of gas is indicated by the formation of a granular precipitate showing clear liquor between the particles. The gas is instantly shut off, a test tube is sent to a table nearby where a chemist's assistant is stationed and the percentage of lime in the juice determined by filtration with standard acid.

Juice is Filtered in Presses

After clarification, or carbonation as it is called in a beet sugar house, the whole contents of the carbonate juice and precipitate are drawn off and forced through filter presses by means of a pump. The presses are composed of alternating solid and hollow openings, to allow the juice to pass from one to another. The solid

frames are covered with two thicknesses of cloth manufactured especially for this purpose. When these alternating solid and hollow frames are clamped by means of a screw, and the carbonator juice pumped through a valve, it is readily seen that the cake will accumulate on the cloth in filling the hollow frames, and clear juice run through the cocks into the troughs.

When the press is full of cake, hot water is forced through the cake, thus washing out any remaining juice. The press is opened by releasing the pressure of the screw, the apron is removed and the cake dropped through a hopper underneath and conveyed outside the building. This refuse can be used as a fertilizer. The physical condition of the precipitate is important. If the operation has been carried on properly the juice will filter rapidly through the filter presses, leaving a hard porous lime cake, that is easily washed and cleaned from the presses. The juice from these filter presses is received in another set of carbonators where milk of lime is again added. This time there is not so much danger of overcarbonating. Gas passes through the juice until there remains no trace of lime in the juice. This is determined by actual test each time. The juice is then boiled to precipitate the double carbonate that may be in the solution and again forced through another set of filter presses.

Sulphur Fumes Clean Juice

The clear strained juice which is now a light straw color is pumped to the sulphitators. The operation here is performed in tanks of precisely the same construction as the carbonation tanks, the sulphur fumes being forced through the perforated pipes into the juice instead of gas as in carbonate process. Here sulphur fumes are forced through the juice by means of an air pump, which decolorizes the juice and precipitates the remainder of the lime. This juice which is now water-white is allowed to flow through mechanical filters which eliminate whatever mechanical impurities remain in the juice.

At this stage the juice, while comparatively pure, is diluted, containing only a small amount of sugar. This depends on the quality of the beets worked. It is desirable to concentrate it and this is done in a multiple effect evaporator. This consists of four bodies each of which is arranged with steam chambers and tubes with room for the vapor to disengage. The upper part of the vapor chamber is connected with a steam chamber in the next body, so that the vapor from the boiling liquor may pass into the steam chamber of the next. The juice in flowing through the effects becomes more condensed as it passes along, going in at a density of about one hundred and coming out somewhat higher. This not only concentrates the sugar but also the impurities. The product which is now technically called thick liquor, is again submitted to the sulphur fumes which neutralize it and destroy the waste material.

Thick Liquor is Crystallized

The thick liquor is again passed through mechanical filters, which removes any foreign solid matter, after which it is boiled in the vacuum strike pan where the sugar is crystallized. This pan is a closed cast iron vessel about eleven feet in diameter and fourteen feet high holding from thirty to forty-five tons of melada (sugar molasses) when full. In the lower portion are situated a number of copper coils through which the steam passes to the condenser and the pump draws off the non-condensable vapor. During the operation a vacuum is maintained in the apparatus, the mass boiling at a low temperature, which prevents burning. When the operation is completed the whole mass, known as melada, is concentrated until it contains in composition about seventy-five per cent of sugar and twenty-five per cent of molasses. The melada is then removed into a large iron tank with propeller arms constantly revolving which is termed a mixer. Attached to and directly underneath the mixer are a number of centrifugals.