

C 27083

Rec'd June 15, 1918

THE MANUFACTURE OF BEET SUGAR.

The culture of the beet root as a commercial source of sugar commenced in the early part of the 19th. century, although the discovery of sugar in the beet antedates this by half a century. The history of the development of the industry to its present proportions is a fascinating romance. Within the past fifty years the production of sugar from the beet root has increased from an insignificant total to a point where it dominates the sugar industry of the world.

The beet root in temperate climates is a biennial plant, and like all biennials stores food during one season to sustain it during the subsequent year. The stored food in this case is sugar, and the manufacturer steps in at the end of its first season and appropriates the sugar for his own uses. The seed supply is obtained by allowing selected beets to complete their cycle of life throughout the two seasons of growth.

In Colorado, the planting of the seed for the annual beet crop is done in the months of April and May. Special drills are used for planting, one drill planting usually five or six rows simultaneously, the rows being about 20" apart. About fifteen (15) pounds of seed per acre are required, but the number of beet plants produced from this amount is far in excess of the number needed. While the plants are very young, they are "thinned" down to the required stand by hand labor. In doing this the most vigorous plants are left in place, and the weaker ones removed in such manner that a 10" to 15" interval remains between plants. The growing crop is given extensive care in way of hoeing, cultivation, and irrigation. One acre properly cared for yields about twelve to fourteen tons of beets which contain about sixteen percent sugar by weight.

The manufacturing process is one of extraction and purification as the sugar actually exists as sugar in the beet. The roots, after digging and removal of tops, are delivered to an adjacent factory, where they are stored in large bins until they are needed. Conveying to the factory from the bins is accomplished by a current of water flowing thru a "flume". This "fluming" process moves the beets as fast as they are required, and also tends to soften and remove dirt and trash which clings to the roots. The washing is completed in a large open tank called a "washer" in which a large quantity of beets accumulate. Here they are agitated by a series of paddles which keeps them rubbing against each other, removing practically all adhering particles of earth and gravel. From this "washer" they are elevated to the top floor of the factory, and discharged into an automatic scale. This scale weighs accurately approximately 1000 pounds each time it dumps, and it records exactly the number of pounds weighed. The scales discharge into a hopper which supplies the "slicers".

Here they are cut into long "V" shaped shreds about 3/16" wide and from 3" to 9" in length. These are called cossettes. It is essential that the size and shape of the cossettes be kept under careful control to facilitate the subsequent extraction. The slicers discharge directly into the "diffusion battery".

The "diffusion battery" consists of a series of cells or cylindrical tanks (usually 14 in number) which can be made air tight. These cells are filled consecutively with cossettes, and heated juice is circulated through these cells consecutively. Sugar is extracted by the phenomenon known as "osmosis", whereby sugar passes outward from the plant cells into the circulating juice until the concentration in the cell is equal to that in the juice. Thus, the circulation brings repeatedly juice of diminishing density in contact with the cossettes under extraction until practically pure water is used, and all but