

# The Beet Sugar Industry in Nebraska



Great industries as a rule do not spring up in a day or a year, but are the product of gradual evolution and growth. Such has been the history of the beet sugar industry in Nebraska, which, though it is now on a sound footing, is still in its infancy.

The first sugar factory was erected by Henry T. Oxnard at Grand Island in 1890 and was the result of several years of agitation and experiment by men in that community who had come from the beet sugar producing sections of Europe. The following year a factory was built at Norfolk and here the growth stopped until last season the one at Ames was erected.

Several causes have prevented a more rapid increase in the number of factories. It has been settled beyond a doubt that the soil of most, if not all portions of Nebraska, is especially adapted to the culture of the sugar beet. The cultivation of sugar beets, however, was a matter which worked a revolution in the entire system of farming from the extensive operations, all carried on by machinery, to the more intense methods and a large amount of hand work. Without a knowledge of the proper methods of cultivating the beets the product was unsatisfactory. The yield was often disappointing

and its water supply is obtained from artesian wells varying in depth from 230 to 1,260 feet. The flow from some of these wells rises to a height of fourteen feet above the surface, in the standpipe, and the quantity is ample for all purposes. The quality is pure and, it may be noted in passing, this company is the first to secure a satisfactory flow of artesian water in the Platte valley.

Only a little more than one-half the capacity of the plant is being utilized at this time, as the machinery could not be started until January 8, and only about 15,000 tons of beets were available, a large part of last year's crop having been shipped to Norfolk. Next fall the managers expect to handle 60,000 tons of beets and the "campaign," as the working season at the factory is called, will last about 100 days. This will mean about 600 tons of beets per day of twenty-four hours (beet sugar factories run day and night during the "campaign"), 300 wagon loads or about forty carloads. It will mean the employment of from 225 to 250 men, the consumption of 100 tons of coal per day, sixty tons of lime and ten tons of coke. The net results should be 120,000 pounds of granulated sugar per day and 300 tons of pulp, all of the latter being used in the feeding of cattle and sheep.

### Value of the Industry.

The value of such a crop to the farmers will be at least \$250,000 and about an equal amount will be paid out in wages and supplies for the factory, making a total disbursement for one season of more than \$500,000. The value of the sugar should be nearly \$600,000, and it is well to remember



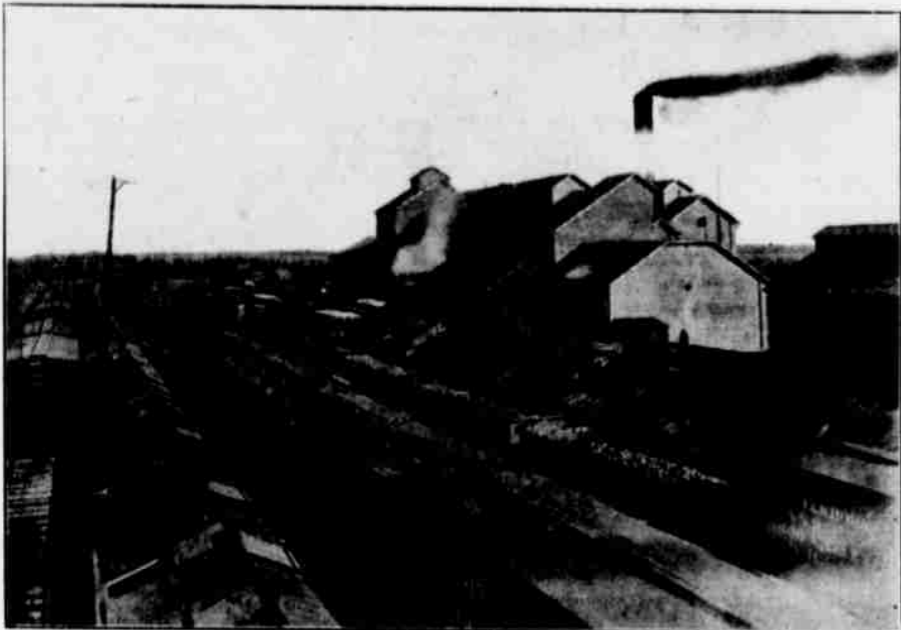
BOYS AND GIRLS AT WORK IN BEET FIELDS.



THE MEN BEHIND THE HOES.



THE CULTIVATOR BRIGADE.



TRAIN LOAD SHIPMENTS OF BEETS TO NORFOLK FACTORY.—Photo by I. M. Macy.

and sometimes when this was satisfactory the beets were deficient in sugar.

These failures had a tendency to discourage the farmers and for a few years it was with difficulty that the factories could secure enough beets to keep them running. The proprietors of the factories set about to educate the farmers in the proper method of cultivating the beets in order to secure a good yield and produce beets of the required richness in sugar. This accomplished the farmers found the raising of beets profitable and the way is now open to the more rapid growth of the industry.

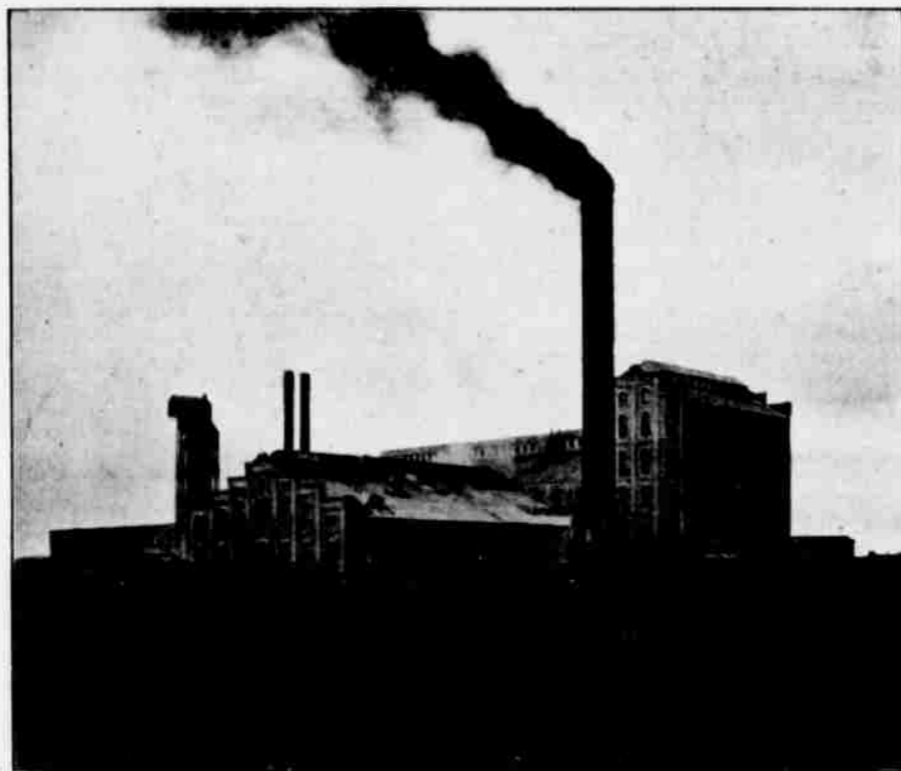
The legislature of the state in 1891 passed a law granting a bounty to beet raisers, but it was later repealed and the industry is now dependent solely upon its own merits for its success, and the fact that capital was willing to invest the large amount necessary to erect a third factory in Nebraska during the last year is the best evidence of its permanency. While the production of sugar from beets is only a small part of the resources of the state there is plenty of room for expansion and the best of reasons for believing that within a few years the number of factories will be largely increased and Nebraska become one of the greatest sugar producing sections of the world.

### Description of Factory.

The latest factory to be erected, the one at Ames, is equipped with the most modern machinery and appliances known for converting the juices of the beet into sugar. It is also the largest of the three. It will cost, when completed, nearly or quite \$750,000, and is one of the largest and best equipped in the world. The main building is 83x263 feet and 103 feet from the ground floor to the gable, a great structure of brick and steel. It has a capacity of 500 tons of beets per day of twenty-four hours. It is so constructed that this capacity may be easily increased to 1,000 tons and it is worthy of note that 90 per cent of this machinery is of American manufacture, the remaining 10 per cent not being obtainable in this country at the present time. The main structure, however, is only a part of the factory, there being a large boiler house containing eight 250-horse power boilers and four engines, with a combined force of 1,600 horse power; a commodious warehouse, a lime house 40x100 feet, where all the lime used in the factory is burned, a fully equipped machine and blacksmith shop, besides extensive sheds and several rows of cottages for the use of laborers during the season.

The factory was erected by the Oxnard Construction company, which is entirely different from the Oxnard sugar companies, and has no further interest in the company at Ames.

The factory has its own electric light plant



BEET SUGAR FACTORY AT AMES.

acres of beets were grown on the land of this company, and this year arrangements are being made to handle 3,000 acres. Farmers in the surrounding country will probably plant nearly as much more, so that the total acreage tributary to the factory should be about 6,000, and the value of the crop from \$250,000 to \$350,000. The yield of beets per acre from all plantings at Ames, from 1893 to 1899, has been from ten to twenty tons, making an average of fifteen tons, and the cost has been roughly estimated at \$25 per acre for a yield of twelve and one-half tons of beets and from 75 cents to \$1 more for each additional ton. As the price for test beets is \$4 per ton, it

is apparent that sugar beets can be made a profitable crop. It is asserted by those who ought to know that an experienced man can handle ten acres of beets without extra help, except at time of thinning and first hoeing, with very little special machinery and without interfering with other crops. At an average yield of twelve and one-half tons per acre this small crop should bring in \$500 cash. Not a bad addition to the average farmer's income and derived from the surest crop he can plant in Nebraska, as it will stand more drouth than any other, with the possible exception of alfalfa.

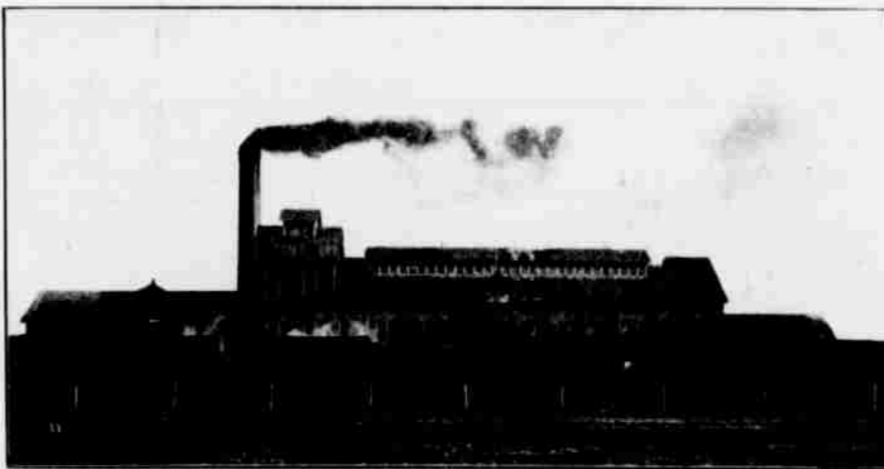
Each year Nebraska factories offer additional inducements for the raising of sugar

sugar camps, built great fires under huge kettles and watched the boiling down to sugar through the day or the long hours of night. What stories were told and what pranks were played while the firelight danced among the trees and ghostly shadows dodged here and there about the lonely camp! The sap simmering slowly down to golden syrup and the sugar which later granulated in rich brown cakes never lost its flavor of the forest, and its dainty aroma of the wildwood, once known never forgotten, will still bring back to many a western pioneer fond memories of boyhood days. But the Nebraska boy who watches the making of Nebraska sugar will miss the romance and the fun which were and are still a part of every old-time sugar camp. He will not see the firelight dancing on the trees, but if he visits the factory at night he will see a glare of electric light on rushing wheels and racing belts, a great building filled with costly, and to him, complicated machinery, and a force of busy men; he will see an endless stream of beets coming in at one end of the building and at the opposite end a man sacking snow-white granulated sugar, ready for the market or your morning coffee. The process is clear and simple enough to the initiated; to the uninitiated perhaps a brief description, without too many technical details, may be interesting.

### Process of Making Sugar.

Outside the factory are rows of bins filled with beets, from which a constant supply is drawn into the building by means of miniature canals of running water. As each wagon or carload is delivered to the bins a few samples are selected and tested to ascertain the per cent of sugar content and the purity, or proportion of sugar to other salts. This test determines the price per ton which shall be paid for the beets. Entering the building the casual visitor is struck by a peculiar odor arising from the fumes of boiling beet juice, commingled with the dust of lime, of which large quantities are used. It is not wholly a pleasant odor and carries no suggestion of new-mown hay or crushed violets, but is soon forgotten in matters of greater interest.

The beets are first washed by machinery running in flowing water, weighed automatically and dumped into the cutting machine, where they are sliced into a peculiar shape by rapidly revolving knives having fluted edges. These ribands, called cosettes, are fed into the diffusion battery, where the process begins. This battery consists of twelve cells, resembling upright steam boilers, each charged from the top and having a capacity of three and one-half tons. After being charged, water is admitted first into one, then through an intervening heater into another, and so on until this water has completed the circuit, when it will have become so saturated with juice as to be almost equal in density to the expressed juice itself. This first water is followed by other supplies until all the sugar has been washed out that is commercially obtainable; then the exhausted ribands are discharged through the bottom, compressed and stored for cattle food. This residue, or pulp, from high grade beets, contains only about two-tenths of 1 per cent of the sugar originally in the test. It is proper to state at this point that a greater



BEET SUGAR FACTORY AT NORFOLK—Photo by I. M. Macy.

beets. The price for 1900 has been fixed at \$4 per ton for average test beets and the factories will pay the freight on all shipments within a distance of 150 miles.

### Opens Another Field.

There is yet another industry open to the farmers and seed men of Nebraska. All of the sugar beet seed planted in the United States, several hundred tons annually, is imported from France and Germany, and sold here at 15 cents a pound. It can be grown here; a few experiments and a little experience will open a wide field. In Europe the sugar beet has been bred up to its present high standard by a careful selection based on sugar content and coefficient purity, size, density, shape and color, a survival of the fittest as it were, and each year a higher test has been obtained. In this country California beets have shown the highest tests so far, but there is no good reason why great improvement cannot be made in Nebraska. The next step should be into the new industry, the supplying of American-grown beet seed to the American grower of sugar beets.

Those who are familiar only with the simple process of extracting sugar in its crude state from the sap of the maple tree or the juice of the sugar cane are but illy prepared to understand the costly machinery and the intricate processes by which sugar is extracted from the beet. Many old settlers of Nebraska have tapped the sugar maple "down east" and on frosty mornings of early spring have collected the sap in the