

steady improvements. In the third place, the foregoing table demonstrates the tendency of the beet industry towards being carried on on a large scale, which may be gathered from the following figures, calculated out from the data quoted: In 1836-37, each factory put through, on the average, 208 tons of beet in the season; 1840-41, 2,100 tons; 1850-51, 4,001 tons; 1860-61, 7,963 tons; 1870-71, 10,068 tons; 1880-81, 18,990 tons; 1890-91, 26,166 tons.

Such tendency of the industry to large-scale work may be still better shown by the appended data, which are derived from another as reliable source, and refer to the quantity of beet-roots put through on the average by every German factory in twenty-four hours during the last few years, thus: In 1872-73 each factory has worked up, in the average, per day 73 tons of roots; 1875-76, 91 tons; 1880-81, 154 tons; 1884-85, 214 tons; 1891-92, 245 tons; 1892-93, 294 tons; 1893-94, 331 tons; and during the present season this quantity will be higher still. It is nowadays, indeed, a firmly-established principle, which is unrefutable, that no financial success can be expected from sugar-beet factories operating on a small scale. Authorities are most emphatic on this point. Thus:—

Dr. H. Claassen, of Madgeburg, says, "Necessity requires the greatest capacity for any individual factory."

The *Central Journal for the Sugar Industry* (Berlin, 14th June, 1894), "This industry can only exist by large factories and most modern working principles."

Mr. Savile Grant, of Paris, says, "Beet-root sugar-making cannot be conducted practically on a small scale profitably."

The same, in another place, "Beet-root sugar-factories can only hope to succeed when carried on on a large scale by competent persons, and with the help of machinery and chemical appliances requiring the command of considerable capital."

Dr. U. Schwarzwaller, a great German authority, states, "The time of small sugar-factories has passed."

The tendency referred to prevails also in other countries, especially in Austria, where the average daily capacity of factories is considerably higher than in Germany; while France affords a most striking example, the number of works there having dwindled down from 518 ten years ago to 368 in 1893, and yet their combined sugar output has been steadily on the increase. The same is the case in Russia, where originally they have started on a very miniature scale. In that country in 1859-60 there were no less than 424 factories, producing the small total of 26,519 tons of sugar, while last year 650,000 tons were manufactured in 262 establishments.

At this stage a brief glance at the inner working of the beet industry in California (the country to which we rightly like to look for examples) will not be out of place. General statistics of the industry in that country as a whole are not yet available; but we have the return of individual factories, which for our purpose will be just as valuable, and perhaps more so:—

1. The Western Beet-sugar Company's factory at Watsonville, the first properly-installed factory in California, during its first campaign in 1887-88 produced 1,640 tons of raw sugar from 14,077 tons of beet-roots (polarising in the mean 14·65 per cent.). This is equal to a sugar yield of 11·65 per cent.—i.e., 1 ton of sugar has been produced from 8·58 tons of beet-roots.

2. The same factory in 1893 handled 65,396½ tons of beets, from which 7,768½ tons of sugar were made—that is, it took 8·42 tons of beets for 1 ton of sugar, being equal to a yield of 11·87 per cent. This factory was in 1887 erected for a daily capacity of 230 tons of roots. Since then it has been annually enlarged, and during the present season it is working up the large quantity of 1,000 tons of beets per day.

3. The Chino Valley Beet-sugar Company's factory in Southern California, in its third campaign of 1893, has put through 51,311 tons of beets, at the rate of 600 tons per day; and the output of raw sugar was 6,746 tons, which means a yield of 13·16 per cent., or 1 ton of sugar requiring 7·60 tons of roots. This factory was originally installed for 300 tons of beets per day. For its third working season it has been enlarged to 600 day tons, as stated; while at the present time, after another expansion, it too is consuming daily the enormous quantity of 1,000 tons of beet-roots every twenty-four hours.

It will be seen from these facts that California has closely followed the experience the beet industry of Germany is teaching. Their sugar yields come up to those of Germany at the present time, and shortly, no doubt, they will surpass them on account of the more favourable Californian climatic conditions. They have, irrespective of the large outlays connected therewith, adopted the large-scale work (the Chino factory now represents an investment of £150,000); and they have most positively succeeded, whereas (see above) small factories had previously met with disasters in that country. These facts from a country to which this colony bears such a close resemblance in every respect are very significantly instructive for our own case. We will not go wrong if we follow the example set by California.

So far the manufacturing aspect of the beet industry has been principally dealt with, and it remains now to look at the sugar-beet from a grower's point of view. We will omit the consideration of claims which systematical beet-culture lays upon the numerous beneficial influences it exercises—we will take them for granted; but we will inquire into the question briefly as to whether it will prove a remunerative crop to our farmers, who are well aware that our land and climate will produce most excellent sugar-beet in satisfactory quantities. In pursuing the subject it will be well to again look to California for parallels, which will be best illustrated by figures:—

1. Mr. George C. Moore, of Chino, San Bernardino County, Southern California, in 1893, has planted 36 acres of beets. He did the team-work and a large part of the labour upon the crops himself, hiring no more than he could avoid. He is an energetic, painstaking, and careful man, and his care has been well rewarded. In making a statement of his expenses on the crop, he included his own labour and that of his teams. His actual expenses in money were, therefore, much less than the figures given. His account on the 36 acres stands as set out in the first