

the sugar produced; but as slave labour may cease in that island at any moment, and in that case for a time there would be a serious diminution in the crop, and as in most tropical countries the cane crop is dependent on hired Coolie labour, the supply of which is becoming both more costly and more uncertain, the growing increase of beet sugar is a matter not only of great interest, but of great moment. The countries in which it has made most progress are France, Germany, Austria, Russia, Belgium, and Holland. It is in those parts of these countries which most resemble our south-eastern counties in climate that it has best succeeded. The middle and south of France are too hot for it. In the last four years the progress in these countries has been as follows, in tons:—

	1867.	1868.	1869.	1870.
France	224,767	213,904	285,146	300,000
Germany	165,014	208,140	215,407	250,000
Austria	124,068	101,601	152,205	175,000
Russia and Poland	112,500	87,500	132,500	135,000
Belgium	31,039	37,078	43,552	50,000
Holland, Sweden, and Italy	7,500	10,000	12,500	15,000
Totals	664,888	658,223	841,310	925,000

The first three columns give the ascertained produce; the fourth, that of last year, is the estimated produce, the actual produce not yet having been ascertained. Of the total produce of 1870 nearly one-twelfth was imported into the United Kingdom. Is there any reason why we should not grow sugar in this country? It is clear, from the rapid and extensive production of beet sugar on the Continent, that it can successfully compete with cane sugar. Is there anything, then, in our climate or the cost of production, that should prevent a large portion of England from growing sugar with the same success as France or Germany? The first consideration is climate. Can the root, in an average of seasons, be depended on for an equal yield of sugar with that of the Continent? The analysis of English roots given by Professor Voelcker shows that it can; and the experience of Mr. Duncan at Lavenham, in Suffolk, in the manufacture of 4,500 tons of beet last year, has proved it a commercial success. This was the third year's trial, and each year considerable improvements were made both in machinery and processes, and errors of inexperience in the details of working were carefully corrected. One great difficulty is the want of trained managers in this country, which time and experience alone can supply. It is not enough to have sufficient capital and an abundant supply of roots of good quality. There must be the adequate chymical and mechanical skills to treat the roots so as to extract the sugar without waste, and the business knowledge to carry on with economy the labour of unskilled people. The climate of Suffolk and the soil of Lavenham have in the last three years given a beet as rich in sugar as the continental average. That essential point being settled, what are the respective costs of production? Coal is a large item in the cost; 900 tons were used last season at Lavenham. They are cheaper here than on the Continent. Labour is about the same; certainly no dearer in England. Land in Suffolk is cheaper, both to buy and to rent. Roots are, however, about one-tenth dearer. So much for the costs; let us look at the value of the produce. Sugar is dearer here, and so are meat and milk, the result of the "pulp" with which fattening cattle or milch cows are fed. There is, therefore, no doubt that in those English and south-eastern Irish counties where the climate and soil are like that of Lavenham in Suffolk, beet sugar may be cultivated with profit. It seems very doubtful whether it will answer in the moister parts of the country, the roots from Devonshire having hitherto proved very poor in sugar. But, as its progress must necessarily be gradual, experience will show in what quarters this new industry may with safety be extended.

Whether sugar beet can be grown with advantage in Ireland is a question of some importance. The experiment has been tried during the last two years by Mr. Agar Ellis on various farms, on Viscount Clifden's estate, in the County Kilkenny, upon deep heavy soils on limestone or marl. The average amount of crystallized sugar yielded by analysis from nine specimens grown in 1869 was 7·5 per cent. In 1870, the average of ten specimens gave 12·8 per cent. In 1869, the best gave 10·9, the worst 5·3; in 1870, the best gave 14·8, the worst 9·8. It would seem clear, therefore, that 1870 was a much better sugar year than 1869, though the difference is not due entirely to season, as the farmers in 1869 tried to grow the roots as big as they could, and roots beyond a certain size are seldom rich in sugar. The climate of Kilkenny and the adjacent counties is much drier than the average of Ireland, and therefore in that quarter success may more certainly be anticipated. He had said nothing about the distillation of the root for the production of spirits, but it might be advisable in the erection of factories in that part of the country to make provision for this, as in years when the yield of sugar was small the beet could then be converted into spirits, a yield of sugar-beet sufficient to pay a profit in spirits being sometimes too small to give any profit as sugar. The kind of soil most suitable is a deep, good soil, not peaty, all the better if on chalk; deep, and inclining to heavy, and thus possessing resources of potash. It is necessary to be close to a railway, as roots will not bear the cost of carriage beyond a very few miles. The factory should be placed in the centre of a sufficient supply of roots, close to a village population, and it must possess the command of a water supply of 100 gallons a minute. The capital required for the smallest factory that will pay is £9,000. There must be the means of converting the syrup into sugar, as the syrup is not always advantageously saleable. £12,000 to £15,000 and £20,000 may be found necessary if the supply of roots is good, the profit increasing to a certain point with the size of the factory. If a factory making 6,000 tons yields a profit of 6s. a ton, a factory of 7,000 tons should give a profit of 7s., and a factory of 8,000 a profit of 8s. This, of course, will soon reach its limit, as the carriage beyond a certain distance becomes unremunerative to the farmer. To overcome this, a plan has been successfully tried in France of extracting the juice on the farms where the beet is grown, and then conveying it by iron pipes to a central factory. It is very possible that this system, which exactly resembles the principle of cheese factories, may gradually supersede that of many small factories, there being so obvious an advantage in concentrating at one point that part of the process where skill and delicacy of management are most wanted, while at the same time getting rid of the carriage beyond the farm where they are grown of the roots and pulp.