

nearly been reached with 1·74 tons. It is evident, then, that if cane-growing has qualitatively as well as quantitatively improved, as is reputed, then manufacture must have deteriorated; on the other hand, if manufacturing methods have made progress, as they are also said to have done, then obviously cane-culture must have gone backward. Accordingly there is a great incongruity and anomaly in the reputed development of the Queensland cane-sugar industry as a whole, which admits of only one conclusion—viz., that during the last twenty-five years, the output excepted, it has made very little or practically no progress at all. It must not be overlooked that this refers only to that industry as a whole, in a manner as statistical averages admit of doing. It is well known that there is quite a number of modernly-equipped mills in Queensland, which would scorn with derision the imputation of such small yields as the above statistics indicate. This circumstance, however, only emphasizes the fact that there must be a large number of small primitively-fitted mills which cannot possibly work remuneratively, and must succumb.

Before leaving to consider the general conditions of the Australian cane industry, the following calculations will prove highly instructive in view of the facts to follow in pursuing the subject herein dealt with. According to New South Wales statistics for the past ten years, 1884–93, the average yield of sugar-cane per acre has been 25·08 tons; Queensland official data not recording the corresponding quantity, it will not be inadmissible to apply the New South Wales average, of, say, in round figures, 25 tons, to the northern colony. As reliable data, referring specifically to the quality of Queensland or New South Wales cane-juice, are also wanting it cannot be considered unfair to call statements of authorities to aid in this respect. Unfortunately, there is in this respect a difference of opinion amongst them, and a selection of their verdicts will be best made by averaging their figures. Thus the mean quantities of sugar contained in cane-juice are given by authorities as follows:—

E. W. Vincent, in his "Chemistry applied to Arts and Manufactures" ...	18·20 per cent.
"Encyclopædia Britannica" ...	14·55 "
Thorpe, "Dictionary of Applied Chemistry" ...	19·64 "
Payen, "Chimie industrielle" ...	18·20 "
Mean sugar in cane-juice ...	17·65 per cent.

According to the general opinion of authorities, cane contains "about 88 per cent. of juice, of which best mills express only 60 to 65 per cent." (Thorpe). Adopting 60 per cent., it would follow that a crop of 25 tons per acre yields 15 tons of juice containing the above mean of 17·65 per cent. of sugar—that is, 2·64 tons per acre. The highest result obtained during the last twenty-five years in Queensland (see previously quoted table) has been in the 1890–91 season—viz., 177 tons per acre. Hence there appears an enormous theoretical loss of 0·87 tons of sugar per acre, which is equal to no less than 22·42 per cent. on the total theoretical quantity contained originally in the cane—viz., 3·88 tons of sugar per acre—and to 32·96 per cent. on the quantity of sugar—2·64 tons per acre—actually gained in the expressed juice.

Financially, looking at the above, it appears that at the usual price of cane—viz., 13s. per ton—the mill will pay £16 10s. for the 25 tons cropped from 1 acre, which, as above, will yield 1·77 tons of sugar, so that 1 ton of the latter will involve outlays of £9 3s. 5d. for the purchase of the raw material only. Expressed in terms of the latter by weight the sugar yielded amounts to only 7·08 per cent.—that is, 1 ton of sugar was produced from 14·12 tons of cane. The *Mackay Sugar Journal*, 15th September, 1894, states that last year the cost of cane per 1 ton of sugar has averaged £8 10s. to £9.

NOTE.—The preceding calculations presuppose that all the sugar produced is perfectly pure, which in reality it is not. The "finesses" the calculations would involve, were this taken account of, have been purposely omitted in the above consideration.

In pursuing our subject we now arrive at the point of paying some attention to the sugar-beet industry generally. This opens up a very wide field, and for obvious reasons we can only skim, as it were, through its very principal features as past experience of other countries presents them.

It is a well-known fact that beet-sugar has had only a very short life as yet, for it was only in 1747 when the German chemist, A. S. Marggraf, discovered its existence in the humble beet-root. This discovery led to exhaustive investigations, as a result of which the first factory for the production of beet-sugar was established in 1776 at Kaulsdorf, near Berlin, being followed three years later by a second one at Kunnerio, in Silesia; both establishments are in existence up to the present day, although, needless to say, in a vastly different form. Omitting altogether the many varying vicissitudes through which the young industry thus established a little over a hundred years ago had to pass in its infancy, it must suffice to say that it has not only survived all the crushing obstacles encountered on its progressive course, but that its development affords a most strikingly remarkable and thoroughly unparalleled example. The Governments of the various countries soon recognised its importance, and in a praiseworthy manner encouraged and subsidised its growth by wise legislation, as a result of which incalculable benefits have been reaped. Thus it progressed in amazing strides, so that at the present time it occupies the foremost industrial place in all the principal countries of the European Continent.

The importance which attaches to this industry, before quoting some general statistics, may be best gleaned from several verdicts of unquestionable authorities. Thus the great Frenchman, Basset, in his work "Guide Pratique du Fabricant de Sucre," says, "The manufacture of sugar from beet-roots has become one of the most important elements of national prosperity. Based upon agricultural progress and the requirements of an ever-increasing population, allied on account of the cattle which it supports with the production of meat and bread, resting on improving cultivation of the soil, it has rendered to modern society the greatest services, at the same time attaining for itself the highest degree of prosperity and glory to which any industry ever had the ambition to aspire."