

The second method of effecting specific improvements in plants is by cross breeding or hybridisation. The method is to cross two varieties possessing divergent characteristics and selecting from the widely varying progeny those particular individuals which possess in the highest degree the specific qualities which we are seeking. This kind of work can only be done by a scientist and is beyond the possibilities of an ordinary cultivator.

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Jaggery Making at Kunigal.

A pleasant and interesting excursion was recently made by the writer to see a power mill and jaggery boiling plant erected at Kunigal, a village some 45 miles from Bangalore. The improvement consists mainly in the furnace which is so constructed as to possess a high heat efficiency and obviate the necessity for using extra fuel. The pans are arranged in batteries of three, with a fourth reservoir where the juice can be stored. The highest pan, which gets the least heat, is just at the boil; the middle pan receives enough heat to keep boiling briskly, and it is calculated that here about half the evaporation is done before the juice is run into the third pan, where it is finally boiled down to the right consistency. This last pan can be tilted up by means of a pulley and chain, and the thick juice run out into a wooden box from which it is poured into the moulds. The process is thus continuous, a pan being taken about every hour from each battery. Each change of juice fills the pan to a depth of about 5 inches, and the weight of jaggery produced is about 125 lbs.

At Kunigal, at present only one pair of batteries has been erected, though it is calculated that to keep the mill steadily and continuously at work, there should be two pairs. The mill is driven by a 12 H. P. Oil Engine and is a three roller mill of 18 inches width, giving a very good percentage of extraction.

The jaggery made is of the usual type. Skimming is not done, as the owners of the cane prefer that the scum should be left in, and though we saw some excellent samples of jaggery, showing what could be done, most of the stuff was dirty and of a poor colour. The local moulds produce a block of the shape of the Coimbatore block, but with a hollow centre and larger, each block weighing about $\frac{3}{4}$ lb.

Such is the plant: what of its commercial success? It appears that the expense and difficulty of milling cane in the ordinary way is a serious obstacle to the cultivation of cane in these parts. Judging from what was gathered when enquiring about the cost of threshing, this is probably the case, and the cane grower has to spend more than is customary here at Coimbatore, where the problem is not so acute. The cost to the ryot of producing 100 blocks of jaggery was given by the assistant in charge of the plant as Rs. 1-4-0 at the factory, and Rs. 1-3-6 by the ryot himself using bullock mills. That the ryot evidently thinks it worth while paying a little extra for the greater convenience of the factory, was clear from the bundles of cane lying waiting to be milled which were seen there, and by the amount of jaggery which was stored awaiting the payment of the milling fees. These, by the way, are four annas a maund of jaggery.

The profit of the factory is a more difficult matter to calculate. Mr. Chatterton * who is responsible for setting it up, and who has himself designed the arrangement of the pans and the construction of the furnace, states that two annas a maund will cover all expenses. If this figure is correct, it is only a matter of getting enough cane to keep the mill working a reasonable time and this is determined by many factors. In Mysore, the cane is kept on the ground frequently so long as 18 months, and yet may be ready after 12 months, so that it seems reasonable to expect a fairly long season. The distrust with which the plant was first regarded is rapidly breaking down, and recently a rival plant, on a smaller scale and without the mill, has been erected. If the erection of the plant increases the profits which the cane grower will obtain, it will have done well, and will serve as

*(Vide the Mysore Economic Conference Bulletins 12 and 21).

an interesting example of one of the many cases when the Engineer can be of service to the Agriculturist.

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Burnt Earth.

Manure supply is a vexed question in Agriculture. In many districts, particularly in Malabar the manure supply is very limited. The ryots as a class almost everywhere are very reluctant to invest money for the purchase of manure, though the fact remains that the investment of money for the proper manuring of crops is almost the best, one can think of.

To quote an instance, one, Pondiat Kelu Nair of Perungulam (Kottayam Taluk) spent Rs. 10 for manuring $\frac{1}{2}$ an acre of his paddy land with fish. He got Rs. 22 worth of paddy more than the usual yield. His next door neighbour who is not a poor ryot and who has been closely watching the crop of Kelu Nayar, when questioned why he is not copying the practice, says "Well, Sir, fish manure is good. I have no money to purchase it."

The endeavour of all the persons interested in the cause of Agricultural improvement must therefore be to find out the cheapest manure. It must take time before common ryots go in generally for costly manures.

South Canara ryots are famous for shrewdness and careful farming. Burnt earth is one of their most favourite manures. It is prepared in a simple way. Alternate layers of earth, very often clay soil, and combustible matters such as any kind of dried leaf, useless paddy, ragi or any other straw or stumps or chaff are heaped.

The layer of soil will generally be about a span high and there is no fixity about the thickness of combustibles. The total height of the heap is about 4 to 5 ft. and the diameter of the heap about as much. The heap is fired. It burns slowly and well. Very powdery earth, mixed with ashes and unburnt particles of organic matter, thus