

I. INTRODUCTION

The diffusion process for the manufacture of cane sugar has, up to the present time, had very limited application. In fact, Egypt is the only cane sugar producing area which has practised this process commercially, although the maceration system applied to the bagasse, in Australian factories, is in principle, a diffusion process.

Many factors contributed to the unpopularity of this process. In the first place, it is an error to use for sugar cane, equipment developed for the treatment of sugar beet, which is a soft fleshy material, whilst the sugar cane has a relatively hard fibrous structure. One of the main difficulties, is the preparation of the cane for the diffuser. It is much more difficult and expensive to slice cane than to slice beet. Cane, unlike beet, cannot be stored for long periods without considerable deterioration and moreover, the supply of cane to a factory is often irregular. Since a diffusion battery is not as flexible as a milling unit, it must therefore be operated at sub optimal conditions.

However, although there are many difficulties, the diffusion process has some advantages over standard milling practice. A cane sugar factory usually reaches an average extraction of about 94%. As Willcox (1951) points out, an increase of 5% in the amount of recovered sugar, would be very useful economically. Furthermore, the disruption of the cells by milling releases various non-sugars; whereas in the diffusion process, a higher purity juice might be expected, since the cells remain intact and not all the impurities will be able to diffuse out.

An attempt is made in this thesis to investigate the problems of diffusion with a view to applying the results to one of the modern continuous diffusers.