INTRODUCTION.

The Physiological-Ecological Soil Survey is of considerable value in the acquisition of exact knowledge of the soil requirements of particular crops. In the case of cocoa, sugar cane and coconut plantations for example, estate records show certain areas to be more productive than others: a detailed examination of such soils will afford a useful guide as to whether another soil is likely to be highly productive or, if not, as to how its fertility might possibly be enhanced.

The soil profile method of examination offers a valuable line of approach. This involves the examination of a large number of soil samples, and it is desirable to evolve and apply rapid methods of analysis to determine the various factors such as Index of Texture, Reaction, Carbon Nitrogen Ratio, Rate of Solution of Nutrients, etc. which go to determine fertility.

The relation between available mineral nutrients and exchangeable bases of the soil colloids has been well established, and this factor must have some influence on the available nutrients at the time of sampling and, possibly, also on the rate of solution of nutrients. The determination of exchangeable bases by leaching the soil with salt solutions is often extremely slow, especially in the case of highly colloidal soils. The method of electrodialysis worked out by Mattson and others presents an alternative procedure. The apparatus evolved by Crowther and Basu offers a means of carrying out electrodialysis as a routine method of analysis, consisting as it does of a battery of six cells, the working of which is claimed to be automatic and capable of completing the process within the working day.

The purpose of the work described below was (1) to investigate the working details of the apparatus of these authors, since only a preliminary short report of their research has so far been published, and (2) to determine the conditions under which the said apparatus could be used as a routine method for yielding data complementary to that provided by the evaluation of nutrient supply and rate of solution of nutrients of soils.