Use of Electricity in Agriculture

CONFERENCES on the immediate problems of crop production are held periodically at the Rothamsted Experimental Station. The twenty-first report* is on the use of electricity in agriculture. The completion of the Grid system and its subsidiary lines in Great Britain is bringing many rural areas within reach of a supply of electricity. While generally admitting its convenience, farmers require more information about costs as compared with internal combustion engines.

There is also some confusion in the minds of consumers as to the reasons which lead the companies to ask for guarantees, minimum charges, two part tariffs, etc. Mr. M. M. Harvey, in a paper on the best way to use electric power, gives explanations which appeal to the agriculturist. Discussing the extra cost of rural distribution over town distribution, he explains that if a farmer retails a 100 gallons of milk daily from vans in a few streets, two or three vans can deal with this retailing, and the delivery costs per gallon are low. It is obvious that if he has to retail to the same number of consumers the same number of gallons over the whole of his county, the distribution costs per gallon would be many times his town delivery costs, and he would have to obtain a higher price per gallon to cover this. Similarly, farmers ask why they are having to pay at a higher rate for having a large transformer than for having a small one; apparently they are being penalised for occasionally making a larger demand on the supply system. The explanation given is that if a purchaser take 50 gallons of milk daily as a maximum, then they could budget for sufficient cows to give this supply. But supposing the purchaser said he required 200 gallons on one day of the year, then the farmer would have to keep a larger herd simply to supply this one day's demand. He would therefore be justified in charging extra for the availability of a larger supply of milk occasionally.

Everyone admits the great convenience of electricity for light and power. It saves a great deal of labour when a piece of work can be started and finished simply by pressing a button. Modern electric motors are so good, and their moving parts so well enclosed, that a breakdown is a very rare occurrence. The supply companies are willing to test them periodically. A farmer who contemplates installing electricity will find in Mr. Harvey's paper data about farms of all kinds, some of which will doubtless be like his own.

In a foreword by Sir John Russell, it is pointed out that the experiments made at Rothamsted show that for the same grinding rate and fineness of grinding, 4·6 units of electricity per hour were equivalent to 2·3 pints of Diesel oil per hour. At the price paid (1·42*d.* per unit), electric power came out a little more expensive than paraffin, when overhead costs were neglected. When such costs were taken into account, however, electric power was cheaper than paraffin, although a little more expensive than Diesel oil. Electric power in its ease of application and cleanliness possesses many advantages. No attempt to estimate the value of these advantages has been made.

In the present report nothing is said about electrical ploughing or electrical discharges over crops. The latter is now believed to have little, if any, value. The Conference discussed only the practical applications of electricity. In future conferences, horticultural possibilities such as obtaining early crops by heating the soil will doubtless be discussed.

* Rothamsted Conferences, 21: The Use of Electricity in Agriculture; being a Report of a Conference held at Rothamsted on January 29th, 1936, under the Chairmanship of Sir Bernard E. Greenwell. Contributions by Sir E. J. Russell, M. M. Harvey, B. A. Keen and G. H. Cashen, F. E. Rowland, C. A. Cameron Brown and others. Pp. 77. (Harpenden: Rothamsted Experimental Station, 1936.) 2*s.*

Organisation of Plant Cytoplasm

A VERY valuable summary of modern views on this difficult subject will be found in two little monographs* by Prof. A. Guilliermond of the Sorbonne, dealing respectively with the 'chondriome' and 'vacuome'. These two names are given by the author to two distinct types of morphological unit which can be found in varying form in the cytoplasm throughout the life of the cell. The cytoplasm itself is regarded as an optically empty colloidal solution of long colloidal thread molecules (proteins, etc.), which have imbibed so much water that their refractive index approximates to their aqueous medium. They thus give the properties of a viscous sol to the cytoplasm, but the thread molecules link up at any surface to form an elastic solid plasma membrane.

The vacuome and chondriome systems can be distinguished by their behaviour to vital stains. The vacuome system stains heavily when the living cell is in dilute solutions of neutral red. In the meristem cell the vacuome system thus revealed is a concentrated colloidal solution dispersed in small drops or threads amongst the cytoplasm, but cell expansion is largely determined by the entry of water into this system, which then coalesces in stages into the well-known 'vacuole', in which the colloidal substances are dispersed in dilute solution and precipitate as red-staining granules in the presence of neutral red.

The chondriome system does not stain *in vitam*, but subvitally will take up Janus green; thus

*Exposés de biologie (embryologie et histogenèse). Par Prof. A. Guilliermond. 2: Les constituants morphologiques du cytoplasme; le chondriome. Pp. 128. 20 francs. 3: Les constituants morphologiques du cytoplasme; le système vacuolaire ou vacuome. Pp. 108. 18 francs. (Actualités scientifiques et industrielles, 170, 171.) (Paris: Hermann et Cie, 1934.)