

## RESEARCH ITEMS

**Tobacco Leaf Curl in Northern India.**—Owing to leaf curl disease, a serious menace to the growing of Cigarette tobacco in Northern India, the leaves become puckered and thickened with prominent veins and are rendered unfit for flue-curing in barns. While in normal years only about 5 per cent. of the plants are affected, entire fields are devastated during epidemic years. Paul and Tandon (*Ind. J. Sci.*, 1937, 7) have studied the incidence and epidemiology of the disease. They found that the time of sowing has an influence on the incidence of the disease, the early June planting being more affected than the late August planting, probably due to the activity of the insect vector during the monsoon months. Five types of leaf curl have been differentiated. Inoculation of healthy plants with juice from diseased plants always failed to produce infection, but the disease was transmitted by graft infection.

Most of the experiments were carried out by the authors with the variety *Pusa H. 142*, which was found to be less severely attacked than the American types, viz., *Harrison special* and *Castle*. The removal of diseased plants early and replacement with healthy ones is recommended by the authors who have recorded nineteen per cent. less disease in treated plots than in the untreated ones. The possibility of controlling leaf curl by spraying the nursery against the attack of the insect vector and by breeding resistant varieties is indicated. M. J. N.

**The Artificial Colouring and Ripening of Fruits with Ethylene.**—*The Monthly Bulletin of Agricultural Science and Practice* of the Institute of Agriculture for the month of March 1938, is a number of particular interest to the fruit industry, as it contains a comprehensive account of the use of ethylene gas in the artificial colouring, ripening and storage of fruits and vegetables. The history of this interesting process, the production and properties of ethylene, its influence on the biochemical process of maturation and on the different fruits and vegetables, the actual technique of using the gas, the various factors affecting the process such as the concentration of the gas, the temperature, moisture and ventilation in the storage chambers, the time of storage, etc., together with a description of the methods as applied to the different fruits like bananas, citrus fruits, dates, apples, pears, melons, tomatoes and so on, are dealt with in all their essential aspects. An exhaustive list of references is also appended. It is interesting to recall that this method is only an extension of nature's own process, for the discovery that ethylene is produced when fruits are stored and that it accelerates the ripening of the backward ones has been the starting point of all the later investigations that have led to its commercial application.

The results of much experimental work show that independently of the factors temperature and relative humidity, the action of ethylene varies considerably according to the variety of the fruit and for the same variety according to the stage of its ripeness; its action is however definite and unquestionable in changing the green colour into yellow by the decomposition

of the chlorophyll into colourless substances, a decomposition which enables the yellow pigments of the skin (carotins and xanthophylls) to show up; the ethylene has no effect on these pigments. In the majority of fruits the ethylene accelerates to a more or less considerable degree the digestion of the starch and the formation of compound sugars; the inversion of sucrose into invert sugar, the removal of tannins; the digestion of the constituents of the cell walls—in fact the sum total of the ripening changes. The action on the acidity is however an exception, as the change is not always uniform. Of much interest to India especially, is the finding that in regard to mangoes, oranges, papayas and bananas, the use of ethylene opens to these fruits a very extensive market, as it is possible to dispose of them in distant markets in perfect condition. Mangoes acquire a ripe colour in 3 or 4 days, and the quality of the fruit does not suffer. Citrus fruits colour to perfection in 2½ to 5 days and the method is specially valuable in the case of oranges which are excellent in quality but are patchy or poor in colour. This we may remark, incidentally, is a special drawback of some of the important orange tracts at all seasons and of most orange groves in certain seasons. It is true that some primitive indigenous methods for colouring fruit are known and practised in our country but the use of these scientific methods under conditions capable of perfect control and the certainty of a uniform result open out a promising prospect for the fruit trade, as it will enable it to cater to distant and profitable markets. A. K. Y.

**Temperature and Locust Activity.**—Mr. M. Hussein's work, carried out in London and published in Cairo, on the effect of temperature on the activities of three species of locusts, viz., the African Migratory Locust, *Locusta migratoria migratorioides*, R. & F., the Desert Locust, *Schistocerca gregaria*, Forsk., and the Red Locust, *Nomadacris septemfasciata* Serv., constitutes the first comprehensive work on the subject under carefully controlled laboratory conditions (*Bull. Ministry of Agriculture, Egypt*, No. 184; Govt. Press, Bulâq, Cairo, 1937). Various stages of locusts were kept in chambers which were either gradually cooled or heated, and their behaviour noted. The author recognises eleven stages in their behaviour, ranging from Cold Stupor (stage 0) to Normal Activity (stage 5). Excitement (stage 7) and finally Heat Stupor (stage 10) beyond which (51.7–55.6° C.) death supervenes after very short exposures of 5–15 minutes. It is further recognised that three main factors govern the reaction of the individuals to temperature. These are: (i) Size of body and duration of exposure to the different temperatures; (ii) Length of period intervening from previous moult; and (iii) state of sexual development of adults. Mr. Hussein's contribution is not only of considerable theoretical interest but also of practical import in locust control work since the broadcasting of poison-baits is best done shortly before the commencement of feeding which, in its turn, is largely governed by the temperature of the environment.

M. L. ROONWAL.