ABSTRACTS

Propagating sorghum by cuttings.—H. E. Rea and R. E. Karper (*American Journal of Botany*, 1932, Vol. 19, pp. 464–476). The authors believe that propagation of sorghum by cuttings would prove useful for research workers and plant breeders in increasing rare sorghum selections, importations or hybrids. Experiments carried out with twelve types and varieties of sorghum and one variety of Indian corn show that these could be readily propagated from cuttings (especially from the many-node cuttings heeled in the open green house bed). The broom corn variety appeared to be best adapted to propagation by cuttings. The sorgo group showed considerable variation, while the grain sorghums produced the lowest percentage of satisfactorily rooted cuttings. (C. N).

A. I. V. Silage:—Communication from the Imperial Bureau of Animal Nutrition, Aberdeen (*The Scottish Journal of Agriculture*, 1932, Vol. 15, pp. 252–261). This paper describes the patented method of Dr. Artturi I. Virtamen of Finland for making silage without any appreciable loss of the nutrients (called the A. I. V. method for silaging). This is based on the fact that when the material to be silaged, is brought immediately to a pH of 5 or lower by the addition of acids (like hydrochloric acid), proteolytic and other enzymic decomposition is prevented and the material is preserved in almost its original condition. The paper gives full details for packing the silage in pit-silos and tower-silos, the amount of A. I. V. liquid to be used (10—12 lbs per ton green weight) and the choice of raw material for ensilage. In order to prevent the formation of mildew in the top layers, 0·001% of allyl mustard oil is added (one third of an ounce for a pit or elevator 16½ feet in diameter). The silage can be used after 2 months and is very much relished by cattle. Analysis of fresh timothy grass and the A. I. V. silage prepared from it showed almost the same composition, both containing about 14·8% crude protein, and 12% true protein on the dry matter (which was about 21% in both) showing very little loss by silage making. Feeding trials with cows gave an increased milk yield of 7% in favour of silage-fed cows, though the latter were fed with 56% less oil cake and 48% less oat meal than in the normal groups. About 90 lbs. A. I. V. fodder (containing about 20% dry matter) formed the daily ration for milk cows of average yield. The health of cows fed on A. I. V. silage was good, and the butter prepared had the rich yellow colour of summer butter. The cost of making the silage was the same, if not less than making hay. (C. N).

Available plant food in soils:—New Bio-chemical methods of estimation.—A. M. Smith and R. Coull (*The Scottish Journal of Agriculture*, 1932, Vol. 15, No. 3, pp. 262–271). Methods for the determination of the fertilizer requirements of soils are of 3 kinds. (a) methods based on the chemical analysis of the soil (b) methods based on the response of the plant to application of fertilizers including an analysis of the plant and (c) bio-chemical methods involving a measurement of the biological activity in the soil. The authors consider that the first two methods involve special laboratory facilities and apparatus, and hold the third method to be more convenient for routine determinations. They describe a plate-count-method for measuring the growth of the nitrogen fixing organism *Azotobacter Chroococcum* in the given soil medium and a gravimetric method for measuring the growth of the mould fungus *Aspergillus niger* in the soil medium—the principle in both cases being that the limiting nutrient of the soil for plant growth (potash or phosphorus) is also the limiting factor for the growth of the lower organisms. Comparisons are made in each case between the soil taken as control and samples of soils to which K_2O or P_2O_5 have been added; and from the increased growth of the organisms, the fertilizer requirements of the soil are inferred. The authors find good agreement between the biological methods and other standard methods e. g., Neubauer's. (C. N).

Further Experiments in Electro-farming:—S. S. Nehru (*Bulletin No. 61 of the Dept. of Agri. United Provinces*). These experiments are in continuation of those reported previously in Bulletin No. 53 of the Dept. of Agri. United Provinces, and aim at demonstrating the beneficial effects of electro-magnetic currents on plant growth and the practicability of the methods recommended The author has compared six different methods of applying electrical energy to plant growth viz., (a) high tension spark at 500 volts; (b) planting in radio-magnetic bed with a cradle of wire netting in contact with a long radio aerial with a view to capturing magnetism and transferring it to the bed; (c) enclosing in a magnetic collar i. e., a small horse-shoe magnet, with cover; (d) connecting with a wireless aerial by placing the pot in a wireless aerial jacket placed over an insulated stand (e) placing in a radio-magnetic bed; the pots are placed over the wire netting on a metal plate. (f) X-ray treatment. The growth of various flower plants, straw-berry, cotton, barley, various hill crops, cereals, tomato and sugarcane as affected by the electrical treatments has been examined. Radio magnetic cradle treatment was found consistently efficient in accelerating growth; and its importance in hastening the growth and improving the yield of paying vegetable crops is emphasised, especially as the method is cheaper in cost of working, than the others. The pamphlet ends with selected criticisms of the method by Sir J. C. Bose, Senator Marconi, Dr. Drane and others. (C. N.)

Inheritance of lint colours in upland cotton—J. O. Ware (*Jour. Am. Soc. Agron.* 1932, Vol. 24, pp. 550—562):—The author has crossed against the white-lint variety of upland cotton, four coloured lint varieties e. g., dingy-brown borne by the Algerian Brown lint variety; bright green, borne by the Argentine Green lint variety; yellowish brown, borne by the Nankeen variety; and rust-coloured brown, borne by the Texas Rust variety. It was found that the lint colour of the F1 generation of each cross was intergrade between that of the respective coloured parent and the white parent, showing that the coloured-lint was incompletely dominant over white-lint. In the F2 generation, the crosses segregated in the Mendelian ratio into three classes (a) the coloured parental type, which is homozygous, (b) the white parental type, also homozygous, and (c) an intergrade coloured type, which split up again into 3 classes as did the progeny of the first generation. It is concluded therefore that in upland cotton, each of the four lint colours, rust, dingy-brown, yellowish brown, and green is a clear-cut monohybrid character and when crossed with its white allelomorph produces an intergrade lint color type in the F1 generation and in the heterozygous groups of all subsequent generations. It was also noted that fine silky texture of lint appeared to be completely linked with full green lint color and coarse lint was dominant over fine lint. (C. N.)

Ensliage—(Arthur Amos and H. E. Woodman, *Bulletin No. 37 of the Ministry of Agr. & Fisheries*):—This bulletin, intended to explain the chief methods of ensilage and render the process of "ensiling more popular in the British Isles than it is to-day," gives a good account of the different kinds of silage, and the conditions under which they are produced e. g., (1) "Sweet", dark-brown silage, produced when the temperature rises above 113°F, especially in stack—silage, the contributing factors being a comparatively dry crop, capable of producing more heat, intermittent stacking or ensiling, and exposure of the outside of the silage to air, as in stack silage, so that air can blow through the stack. (2) Acid, light brown or yellow-brown silage, generally found in tower-silos when packed with crops containing 25—30% of dry matter. The maximum temperature reached varies from 86° to 104°F. The silage has an acid though pleasant smell, due to the presence of acetic acid. (3) Green fruity silage obtained with crops of medium stage of maturity, the maximum temperature reached being 86°F. The silage has a green olive to olive green colour and a delicious smell, and is greedily

eaten by stock. (4) Sour silage, of a dark brown or olive colour and a pungent and very unpleasant smell due to the presence of butyric acid. It is formed when immature and succulent crops are ensiled which are closely packed, preventing rise of temperature and proper fermentation. (5) Musty silage, full of moulds due to the ensiling of over-mature crops and over-heating. Of these 5 kinds of silage, the authors perfer (2) and (3) and condemn (4) and (5). Experiments with oat and tare crops (with and without peas and beans) containing 26 to 34 % dry matter showed that acid-brown silage and sweet silage can be made in tower-silos with a loss of dry matter no greater than 8 % of that contained in the green crop. In the case of " green fruity " silage, the loss is slightly greater, due to use of crop at an earlier stage of maturity containing 23 to 26 % dry matter and consequent draining away of some of the juice; the loss in dry matter under favourable conditions amounts to about 9 %. About the same degree of loss was also obtained in hay making. Feeding trials showed that well prepared silage had about the same digestibility as green fodder or hay in regard to dry matter, protein and carbohydrate. The oil fraction shows highest digestibility in the case of silage; digestion coefficient of the fibre is almost the same for silage and hay (57 to 58 %), while it is lower for green fodder (47·6 %). Actual feeding trials show a superiority in favour of silage and 6 lbs. of silage are generally equivalent to about 10 lbs. of root plus some hay. The authors give full details for the making of different kinds of silos like tower silo, clamp silo, stack silo, pit silo etc., and of the different crops suitable for ensilage. (C. N.)

The Feeding of Dairy Cows (*Bull No. 42 of the Ministry of Agriculture and Fisheries*, London 1932, Price 9 d. net.):—This is a popular exposition of the important topic of the proper feeding of dairy cows and comes from the pen of Mr. James Mackintosh of the National Institute for Research in Dairying, Reading. The opening paragraphs deal with the principles of animal feeding like the nature of food constituents, digestibility coefficients, nutritive ratio etc. after which follows a brief exposition of feeding standards for maintenance and production of dry, in-calf and milch cows. The importance of mineral and vitamin supplies is stressed. The pamphlet is mainly intended for British farmers and its most valuable portion is contained in the later chapters, wherein the author deals with the suitable selection of rations from among the bulky foods and concentrates commonly used in England, with special reference to the nutritive ratio and the economics of feeding. Several bulky foods like hay, straw, roots, silage, sugar beet tops, potatoes and wet grains, are dealt with in detail and the concentrates are divided into three groups (I). Foods containing over 30 % protein like decorticated cotton cake and meal, decorticated and undecorticated groundnut cake and meal, soya bean cake and meal, linseed cake, sesame cake, dried yeast and fish meal; (II) Foods containing from 17 to 30% proteins like undecorticated cotton cake, palm kernel cake and meal, coconut cake, maize gluten feed, been meal, malt culms etc.; and (III) Foods containing below 17 % protein and rich in carbohydrate (over 50%) like oats, barley, wheat, maize rice meal, tapioca meal, treacle etc. A number of selected rations are suggested for dry and in-calf cows and cows in milk. A useful feature is the addition of tables giving the average live weights and maintenance requirements of the different English Dairy breeds, the production standards per 10 lbs. in respect of milk of varying qualities, and the composition of the common bulky and concentrated foods in terms of dry matter, starch equivalents and protein equivalents.

A similar consolidated pamphlet giving details of the maintenance and production requirements of Indian Dairy breeds, and the average composition and digestion coefficients of feeding stuffs and fodders commonly used in India is an urgent desideratum. (C. N)