the rains. It is quite a good soil binder, and has been found to be an excellent protection for bunds and edges of foot-paths and slopes of terraces at the Coconut station and elsewhere.

3. The Coconut palm — (*Cocos nucifera*) — This is too well—known to need any special introduction. The different parts of the palm, alive or dead are put to a variety of uses. But curiously enough, few people seem to realise how effective and useful its root system is in preventing the erosion of the soil. A few seedlings planted at the surface of the soil at a distance of 3 to 6 feet along a channel or a river bund which is subject to periodical breaches effectively check the damage, as the plants grow up and spread their roots. In grown up trees thus planted, the root system will be found to be as effective as a concrete embankment. At the same time the trees may be made to yield well by thinning off the weaker ones, by leaving one every ten feet or so. As the primary object of the planting is for protecting the soil, thinning the trees may be done only when the palms are about seven or eight years old, by which time the root system is thickly spread and well established and the trees begin to yield nuts. Further the husk of the coconut is also a useful material in controlling surface wash which is sometimes inevitable through water vents. If such places are partially blocked by a few layers of coconut husk, the soil that is being washed off is caught up in the fibres of the husk and water alone is allowed to escape slowly.

The palm that protects bunds.

It is, therefore, highly desirable that we make use of the common plants described above and protect the 'good earth' from erosion and its consequent evils.

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Hybridisation in Sweet Potatoes

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The Crop: The sweet potato (*Ipomea batatas. Lam*) is a quick growing high yielding crop grown in a small scale througout the Presidency. Though not an important cash crop, as a combined vegetable and food crop, it is an important supplement to the food supply of the Province. Because of its merits it is grown in all the tropical and extra-tropical regions of the world. The cultivation and technology of the crop are very advanced in other countries e. g. Java, Philippines, Southern United States and West Indies. It has not been intensively studied and its cultivation developed in India, probably due to its low economic status, but is now attracting considerable attention owing to the present food crisis.

Varieties and Breeding: Though the genus *Ipomea* is a large family of climbers spread all over the world, the crop has originated in tropical America and thence spread to other countries. There are many varieties in Sweet Potatoes and the clones are classified on the basis of tuber characters. Thomson (5) lists about 40 varieties based on North American collections. The plant is bound to have undergone further variation under cultivation in Asia. A similar crop called 'Kumarah' grown in New Zealand is considered a different species by taxonomists. The crop has attracted the attention of plant breeders and Mendiola (3), quotes the success of Dutch workers in Java in increasing the yield of local crop by 100% by breeding and selection. Therefore it can be claimed that there is scope for improvement of this crop for our Province, by importation, clonal selection and hybridization. The modern trend is to renew vegetatively propagated crops like sugarcane and potatoes periodically, by seed-produced forms. The present note deals with observations on hybridization and seed setting in this plant, based on studies made at Benares, Coimbatore and Bapatla.

Self Sterility: A salient feature of this crop is the difficulty of seed setting. In countries like Southern United States of America, it is reported that the flowering is sparse, though at Benares it was found to flower freely. The varieties differ in the extent of flowers. For example, of four clones grown at Bapatla one strain gave only two flowers from vines covering about two cents in area. Both at Coimbatore and Bapatla, it was seen that flowering and chances of seed setting are optimum during the cool months from December to February. Even if the vines flower freely, no seed may set as there is a high degree of self-incompatibility. Only pollen from a different clone can normally fertilise a flower. In this connection, occurrence of seed setting reported from Agricultural Research Station, Pattambi is probably due to presence of different clones in the same area, and cross pollination by insects. Mendiola (3) considers that the honey bee may be the insect concerned.

Material and Methods: Because of the self-sterility pollination technique was simplified. No bagging or emasculation was attempted. Pollen grains were not collected separately, but the burst authers were merely rubbed on the stigma of pistillate parent. It was observed that all the flowers were open by 8 A. M. with brust authers, and all whithered the same day. All pollination was done between 8 and 10 A. M. The material consisted of six unnamed clones. These clones, differed in the presence or absence of purple colour in stem leaves and tubers as well as in the shape of the leaves.

Results: It was found that even with the simple technique used hybrid seeds can be obtained. A trial with four seeds showed all four to be viable, all sprouting in two days when the seed coat was scarified. The seeds form only when morphologically distinct varieties are crossed. Hitherto

seeds were formed only in crosses between purple pigmented and non-pigmented types. At Coimbatore four capsules were obtained from twenty flowers pollinated. At Bapatla ten capsules set in 180 flowers cross pollinated. At Bapatla it was found that the pigmented types gave proportionately more capsules than unpigmented clones. An attempt was made to correlate differences in flower structure with cross compatibility. The results were inconclusive owing to small number of crosses made. The feature concerned is in the height of anthers in relation to style and stigma, or a type of heterostyly. Mendiola (3) recognises five phenotypes. In the five epipetalous stamens, the filaments are unequal. In the different phenotypes, the tallest anther may be distinctly below the stigma, just touching the stigma, or projecting above the stigma. By measurements, two lengths of style were noted, one about 14 mm. total length and the other about 16 m.m. The present observation is that similar stylar types can be crossed. Incidental to this study it was found that varieties differ in the development of fine hairs on and around the ovary, the pappus being well developed, slight or absent. After getting crossed seeds, the expectation that the parent types will be heterozygous was verified. Two seeds from one capsule gave one purple coloured and one geen seedling.

Discussion: It is apparent that hybridisation and breeding of this crop is practicable and easy. A good case can also be made out for commencing improvement of this crop. It is also apparent that the genetics of colour, of leaf lobing, of heterostyly, of compatibility and of pappus development, will be of great interest and can be analysed incidental to breeding work. Because of the high number of chromosomes in this species ($2n = 90$) it is doubtful if cytogenetical line of improvement will be practicable. Interspecific hybridisation with *Ipomeas* other than 'Kumarah' of New Zealand will be difficult—vide King and Bamford (2).

The small percentage of capsules formed in the total number of flowers crossed can be explained. The reason is probably cytological and not to faulty pollination which was done without any injury to floral parts. Satyanarayana. Rao (4) has shown that meiosis in the anthers shows abnormality. This abnormality does not seriously reduce pollen production, but can cause sterility of ovules. For pollen mother cells are many per anther while megaspore cell is only one per ovule.

In view of the discrepancy in the chromosome number counted in this species—84 according to Kano (1) and 90 according to Rao (4) occurrence of aneuploids in the crop varieties is possible and may account for sparse flowering of some varieties.

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GLEANINGS

Contagious Abortion.

A vigorous campaign against contagious abortion (Brucellosis) in dairy herds is to be launched in South Australia. The executive of the South Australian Dairymen's Association has approved a comprehensive and carefully designed plan for the vaccination of heards on the Murray Swamps. Operations will be under the direction of the State Agriculture Department. Vaccination will be confined to female calves 4 to 8 months old. Local committees will be set up in each district by the Dairymen's Association to distribute and collect application and agreement forms, and collect fees. Cost of inoculation will be one rupee a calf. The vaccine to be used is called "Strain 19" — a very weak one of the causal organism, which does not spread readily to other cattle, and rarely causes abortion. Inoculated calves build up in their bodies a resistance to the disease which enables them, when they reach breeding age and become pregnant, to withstand an infection which would produce a high proportion of abortions in unvaccinated heifers. Abortion is only one of the sequels to the invasion of a dairy herd by Brucella abortus. There is also an upset in the breeding plan, decreased milk yield, a high incidence of retained membranes, and subsequet temporary or permanent sterility, Hither to the only means of control has been by a blood test, and slaughter or segregation of infected animals. Research work has only recently given to the dairying industry the new method of calf vaccination.

D. D. T. Successes.

In Australia initial results of D. D. T. tests have proved encouraging against:— Aphids (except Grey Aphid of cabbage); Bean Fly; Green Vegetable Bug; Tomato Leaf Hopper; Cotton Jassid; Cabbage Moth and Cabbage White Butterfly; Climbing Cutworms (e. g. Corn Ear Worm); Potato Moth; Beet Worm; Codling Moth; Pear Slug; Sorghum Midge; Buffalo Fly; Cattle Tick. Tests are proceeding, and official recommendations for control of these pests are due soon. D. D. T. has not proved effective against the various mites, e. g. Red Spider, Bryobia Mite.

Australian Rice Production is Mechanised.

Leberal use of fertilisers, lavish use of water and mechanisation from ploughing to harvesting make Australian rice cultivation the most efficient in the world. Overall rice yield per acre is 1·75 tons, but many farmers produce 2 long tons of 4,480 lb. per acre and crops of 4 tons to the acre have been taken under ideal conditions. Mechanisation is the secret. With mechanisation it has been possible to develop the largest rice farm in the world at Wakool where 4,100 acres are under cultivation. From this mammoth farm, 8,000 tons of rice was harvested in two months by 81 men using machinery. The first step in establishing an Australian rice farm is a close contour-survey of the land. Substantia