

Some Aspects of Cotton Growing.

THE great importance of the cotton crop in certain countries has led to special attention being paid to the deterioration in yield and quality that occurs in certain areas and to methods whereby improvements may be effected.

In Egypt (Bull. Imperial Inst. 19, No. 2) the decline in yield may be attributed chiefly to degeneration of the productive power of the soil, the ravages of insect pests, and to agrarian disturbance. To give satisfactory crops cotton, should be grown only once in a three-year rotation, but this limit has frequently been exceeded, with the natural result that the soil ingredients have been drawn upon unevenly, thus upsetting the balance of fertility. This could have been remedied by the judicious use of fertilisers, but for various reasons this has not been carried out. Even where manures have been used much harm has been done by the introduction of noxious substitutes by unscrupulous dealers. Excessive cotton cultivation has also been encouraged by the practice of leasing land for short three-year periods, the highest rents being paid to landowners who permit the greatest amount of cotton to be cultivated within the period of the lease without insisting on the re-establishment of the fertility of the soil for future tenants.

Another harmful factor is the prevalence of water-logging. Since the Assuan Reservoir came into use, more water has been available for irrigation, and in addition the water table has risen, so that the drainage is now imperfect, and the roots of the cotton plant suffer from asphyxiation due to the consequent lack of air supply. The damage is aggravated by harmful salts which are now brought into solution near the soil level, and by surface evaporation remain within the area of growth of the cotton roots.

Until about 1912 the cotton worm was the most serious insect pest, but was eventually brought under control. Of recent years the pink boll-worm, first discovered near Alexandria in 1911, has become of paramount importance owing to its rapid spread through nearly all the cotton-growing countries of the world. Its life-history and habits rendered impossible the production of late-maturing cotton, as the late-formed bolls are badly attacked and the lint rendered useless for spinning purposes. Legislative measures are now in force for the uprooting and burning of the cotton plants before the end of the year, and for the treatment of the seed by hot air, whereby the resting worms are destroyed while the germinating power of the seed is not affected. It is hoped that the attacks of each pest will thus be reduced, and that the yield of cotton will, in consequence, be increased.

Agrarian disturbances have also caused much

trouble, as the cultivators joined in the destruction of the means of transport, whereby difficulties arose in marketing the cotton and also in connection with seed distribution for the next season's crop.

Deterioration of quality has been considered in the case of Cambodia cotton (*Gossypium hirsutum*) grown in India (*Agric. Journ. India*, vol. 16, part 3). For some years after its introduction in 1907 the quality of its lint was good, but of late years it has been asserted that the lint is shorter, weaker, and much more stained than was the case at first. The weakness and staining are attributed to attacks of the pink boll-worm, and the loss can only be cured by the reduction of the pest. The shortness of staple, however, is due to the fact that the first seed distributed included a mixture of types. The early and more vigorous types, with poorer quality staple, were the better suited to the climate and to the rather haphazard methods of cultivation, and therefore flourished at the expense of the better quality types with longer staple. The line of improvement it is proposed to follow is that of isolation of types by means of single-plant selection and self-fertilisation, followed at a later stage by hybridisation to produce a type combining in itself all the most useful characters. If a more productive type can thus be produced and the loss caused by insect pests be controlled, considerable increase of yield per acre may be secured.

In this connection attention may be directed to an article on the commercial utilisation of cotton stalks (Bull. Imperial Inst. 19, No. 1). Enormous quantities of stalks are available after the crop is harvested, and as they afford harbourage for insect pests their destruction is of much importance. Locally the stalks are used as fuel, and in some districts supplies would not be available for other purposes. A fibre resembling that of jute, however, can be obtained from the bark, and possibly the longer fibre might be used as a substitute for the lower grades of Indian jute, and would probably realise rather less than half the price of Bengal jute.

Preliminary paper-making trials indicate that when treated by the caustic soda process, Indian cotton stalks yield paper pulp of fair quality which can be bleached to a pale cream tint, and the results are promising enough to deserve further consideration on the spot in India. Distillation experiments have also been carried out both in Egypt and England; good quality methyl alcohol and acetate of lime have been produced, but the charcoal and tar are of less value. In India the feasibility of distilling cotton stalks successfully would depend upon finding local markets for the products, particularly the charcoal and tar.

The Geographical Distribution of the Palm *Pritchardia*.

THE Bernice Pauahi Bishop Museum of Honolulu has recently issued (Memoirs, vol. 8, No. 1) an elaborate monograph of the palm genus *Pritchardia* by the late Prof. Odoardo Beccari and Prof. Joseph Rock. It is mainly the work of Prof. Beccari, and forms part of a larger monograph which he had prepared for later publication in the Annals of the Calcutta Botanic Garden. The material for the monograph has been largely supplied by Prof. Rock, who has discovered twenty-one of the thirty-three species described.

The study of the genus is of special interest from the point of view of geographical distribution. It is one of the most characteristic genera of palms of the Polynesian flora, but has attained its greatest

development in the Hawaiian Archipelago, where it is the only palm found. It also supplies one of the most interesting problems in the geographical distribution of the family in the existence of a single species in the New World, namely, in Cuba and the Isle of Pines. This may be compared with the presence in South America of a representative of the African genus *Raphia* and of the solitary representative of the typical American *Coccoloba*, namely *Jubeopsis*, in South Africa. How the fruits of the progenetrix of the Cuban species were enabled to cross the wide space of ocean between the nearest Polynesian islands and the American continent is a mystery. Prof. Beccari suggests the possibility of the transfer of fruits by means of the violent volcanic phenomena which

must have occurred during the elevation of the Andean ranges; at such a time a water communication may have been established between the two oceans and the fruits of a Polynesian *Pritchardia* deposited on an island in the Caribbean Sea.

The fruits, which are plum-like in structure, but with comparatively little flesh, vary in the different species from the size of a large pea to that of a date. The smaller ones would attract pigeons, which, though now unknown in Hawaii, may at some time, when greater land connections existed between the remoter islands of eastern Polynesia and those of Papuaia

and western Polynesia, have contributed to stock the islands of the Hawaiian group. But there is still the difficulty of explaining the presence of large-fruited *Pritchardias* on the most inaccessible summits of the mountains of Hawaii. Prof. Beccari suggests that these represent a surviving element of the vegetation which covered the plains before the cataclysms which resulted in the elevation of the present mountains and broke into fragments the originally much more extensive land area. The monograph is illustrated by twenty-four plates, mainly reproductions of photographs taken by Prof. Rock.

Agricultural Experiments at Ithaca, N.Y.

THE Report of the Agricultural Experiment Station of Ithaca, N.Y., for 1919 contains a number of memoirs of considerable interest, especially from the botanical and entomological points of view.

Work on the stimulation of growth by various chemical compounds indicates that treatment with potassium permanganate may result in a very marked increase in the root-growth of various woody cuttings. Other compounds of manganese, iron, and boron may show at times a slight stimulating effect, but nutrient solutions are, as a rule, injurious to the root-growth of cuttings. In another paper the effect of manganese compounds on soils and plants is discussed. The general conclusion reached is that with wheat, manganese salts presented in high concentrations exert a toxic effect, but in lower concentrations a marked stimulation is observable. When added to soil, manganese salts were found to form manganese dioxide in proportion to the basicity of the soil and to develop a power to oxidise organic matter.

In genetics two papers deal with chlorophyll inheritance and aleurone colour in maize, and another with the weak awn in certain *Avena* crosses. In some crosses of awned and awnless varieties (as Burt and Sixty Day) there is an almost complete dominance of the awnless condition, the factor for awning being apparently prevented from operating by an inhibition which is closely linked with the factor for yellow colour in the variety concerned. Environment seems to affect the production of awns, and observations suggest that an increase in the moisture-content of the soil and of its organic matter and nitrogen tends to decrease the number of awns.

Soil conditions are dealt with in memoirs on the translocation of calcium and on the reversibility of the colloidal condition of soils. In the first case it was found that the translocation of calcium through a clayey silt loam soil with a rather large lime requirement is extremely slow, since in the experiment no upward or downward movement of this element was perceptible twelve months after various amounts of calcium salts had been applied to the soil. In the second case it was demonstrated that drying a surface soil once produces as much effect in the colloidal

material as repeated dryings alternated with moistenings, the drying producing a change in the colloidal material from which it does not immediately recover on being wetted. The drying indirectly affects the reversibility of its colloidal condition, the change being directly produced through biological and chemical action.

On the bacteriological side attention is directed to the effect of low temperature on soil bacteria and to the number and types of bacteria found in ice-cream during storage. In the soil there appears to be no change in the bacterial flora due to freezing, the bacterial activities being influenced only in so far as the physical properties of the soil are affected. The concentration of the medium, the length of time of exposure, and the degree of cold are the three important factors that determine the power of resistance of the bacteria to low temperature. The death of the bacterial cell when exposed to low temperature seems to be due to the withdrawal of water from the semi-permeable membrane or outer layer of the cell.

An outline is given of the life-histories and methods of control of various insects injurious to the hop in New York, special attention being devoted to the hop grub (*Gortyna immanis*, Guenee) and the hop redbug (*Paracalocoris Hawleyi*, Knight). The hop grub causes considerable financial loss, and in years when the insects are plentiful they may cause an almost total loss to some growers. The larvæ damage various parts of the vine, working in the buds, stem, and roots, thus weakening the plants in various ways. For control, clean cultivation is advised, with a ploughed border several yards wide round the field. The use of carbon bisulphide as an insecticide is unsatisfactory, but paradichlorobenzene has been successful when added to the soil of each hill in May.

The plant-lice injuring the foliage and fruit of the apple (*Aphis pomi*, de Geer, *A. sorbi*, Kaltenbach, and *A. avenæ*, Fab.) are described and fully illustrated, and the first part of a detailed systematic account of the crane-flies of New York is issued, dealing with the distribution and taxonomy of the adult flies.

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The Lhota Nagas.

AT a meeting of the Royal Anthropological Institute held on March 14, Dr. W. H. R. Rivers, president, in the chair, Mr. J. P. Mills, of the Indian Civil Service, read a paper on the Lhota Nagas of Assam. He said that in spite of its long contact with the plains of Assam, this tribe has retained its primitive dress and customs. It occupies a portion of the Naga Hills lying to the S.E. of the Brahmaputra Valley, and numbers some 18,000 souls. Like the Angamis, the Lhotas trace their origin to a mythical hole in the earth near the Kezakenoma stone. In dress they resemble closely their neighbours, the Aos, the men wearing a small apron and

body cloths of various patterns, and the women a small skirt of very dark blue, with a light blue median band. Warriors in full dress wear human hair tails, elaborate baldricks with fringes of goat's hair dyed scarlet, and bear's hair wigs ornamented with hornbill feathers.

The villages, which are permanent, may contain any number up to 300 houses and are built on the tops of the ridges. The highest is at about 5000 feet. Each village contains one or more "bachelors' halls" in which boys and unmarried men sleep. In the middle of the village stands the head-tree, usually a *figus*, on which heads taken in war were hung. Under it are