## The Poisoning of Birds by Cassia bicapsularis.

The Queensland Agricultural Journal Vol. XII, December, 1919 contains an account of the poisoning of birds by two species of the genus *Cassia* (*Leguminosae*). One of them *Cassia bicapsularis*, Linn., a native of tropical America is not unfrequently introduced into cultivation on account of its rather large masses of bright yellow flowers. Specimens of this plant in the Singapore Gardens' Herbarium were collected on the Race Course Road, Penang, and it is quite possible this species is growing in cultivation or as an escape in other localities.

Mr. White concludes his account with the remarks that "In the cases here quoted, there seems no doubt that the species of *Cassia* referred to could definately be blamed as the cause of the deaths of the birds in each; and it would further seem that the fairly numerous charges of stock poisoning made against various species of *Cassia* in Queensland may be more correct than previously imagined. This, however, is a matter that can only be ascertained by future investigations."

T. F. C.

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## A New Source of Plant Food.

Under the above somewhat misleading title an article in the "Journal of Heredity" Vol. X, No. 7 draws attention to plants which gather nitrogen and store it after the well known manner of the bacterial nodules of the *Leguminosae* plants. In the present case however the plants are members of the *Rubiaceae* and store the nitrogen in small nodules in the leaves instead of on the roots. The leaf nodules contain colonies of a non-motile, nitrogen bacterium, known as *Myco-bacterium rubiacearum*. The two plants quoted *Psychotria bacteriophila* and *Pavetta Zimmermanniana* are not recorded from Malaya but it is stated that probably other Rubiaceous plants have the same habits. The article continues, "These bacteria almost invariably inhabit the micropyle of the young seed, and, when the latter germinates, grow through certain stomata of the young leaves and into the intra-cellular spaces formed in the leaf-tissues around these stomata. Cavities are formed through the growth of the epidermal cells which later close entirely and make bacterial nodules which are deeply imbedded in the leaf tissues. A single leaf may have several dozen of these symbiotic bacterial nodules. Faber was able, by treating the seeds with hot water and a sublimate solution to kill the inhabiting myco-bacteria, and later, to infect part of the seedlings grown from these seeds with pure cultures of the bacterium. The artificially infected seedlings grown in soil free from combined nitrogen grew well and remained healthy for four months whereas those not so infected turned yellowish-white and died in three or four weeks. The plants from unsterilized seeds produced leaves bearing many more bacterial nodules than did those from sterilized seeds which were later artificially inoculated.

"In view of the fact that these Rubiaceous plants with nodule-bearing leaves occur in many parts of the tropics, and that in India the value of their leaves has long been recognized, and considering the importance of nitrogen-fixing legumes as soil enrichers, the suggestion of Faber that we may have in these trees and shrubs plants of positive agricultural value deserves the serious consideration of tropical planters. If they can be grown as subsidiary crops beneath plantations of rubber, cacao, coffee, or other important tropical cultures, and their leaves allowed to accumulate upon the ground to serve as a mulch and as nitrogenous fertilizer, they may have great value. They differ from the leguminous cover-crops in that they are perennial in habit, and will not need to be replanted every year. It might be possible to prune them severely every year and utilize the clippings as fertilizer. The subject is one which opens up a new field in connection with tropical agriculture, and one which offers remarkable possibilities."

As the Rubiaceae are well represented in this part of the world it will be of interest to ascertain if any local representatives are provided with these leaf nodules.

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## Paper.

The sources from which paper pulp can be obtained are continually being discussed especially with a view to seeing what products of tropical forests or open country that are at present wasted can be turned to good account. The results of investigations on bamboos, grasses, etc. are given in Bulletin No. 16 of the Philippine Bureau of Forestry.

The following interesting account of the manufacture of paper pulp from "lalang" or "blady grass" (*Imperata arundinacea*, Cyr.) is taken from the Queensland Agricultural Journal, Vol. XII, November 1919. "It takes three tons of green blady grass to manufacture 1 ton of crude pulp, while it takes, at least, 7 to 8 tons of sugar-cane to make 1 ton of brown sugar. Delivered in the Southern Paper Mill, the pulp is worth, at least, £21 per ton a value equal to that of one ton of sugar. Under present conditions the cost of manufacturing the pulp is greater than that of making sugar, owing chiefly to the fact that chemicals are dear and the machinery and appliances have not been perfected; but Mr. Campbell can show not only how to make good use of local crude alkalis, but, also, how to bring the application of his method up to sugar mill standard, thus greatly decreasing the cost of manufacture. This would mean that a higher price should be paid for the grass—in fact, a price equal to that of sugar cane, say £2 per ton green—making 1 ton of hitherto useless blady grass (considered a pest and a curse by the cane-farmer) growing without cultivation, equal in value to 1 ton of the best cultivated sugar-cane.