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ADDITION TO THE THEORIES ON THE MORPHOLOGY OF HORNS IN COCONUT FRUITS

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In *Cocos nucifera* and a few other species of palms, exceptional fruits bearing one or more horn-like outgrowths varying in size, shape and origin were observed. There is considerable difference of opinion on the morphology of these horns, and four theories based on their origin have been postulated. According to Furtado (1926), these outgrowths are the highly developed staminodes, while in the opinion of Petch (1924) they are the developed supernumerary segments of the gynaecium where such extra carpels were present in some flowers. Horns are also formed as a result of the enlargement of some perianths as mentioned by Masters (1869). One or two separating carpels of an apocarpic ovary may also resemble horns (Costerus and Smith, 1923). During the past decade and a half I have been collecting several horned coconut fruits which support the feasibility of all the above theories. In addition, there is one further possibility for the production of horns in coconut fruits. In Fig. 1 is seen a coconut which I recently examined at Kanyakumari district (Madras) bearing two horns which are formed as a result of the splitting off of portions of the fibrous layers of the pericarp some half way from the stigmatic end. The smooth epicarp surrounds the entire surface of the horns, and this rules out mechanical injury to be a cause of the production of these horns.

On the several horned fruits examined also from *Areca catechu, Borassus flabellifer, Phoenix sylvestris* and *Chrysalidocarpus lutescens*, the frequently observed type of horns seems to be the acrescent staminodes. Under certain conditions, one or more (upto six per fruit) staminodal fringes of the papery ring located between the perianths and the ovary develop into short or long, flat or solid horns. The topmost flower in Fig. 2 removed of its perianths has all the six staminodes developed into horns. The ovary is virtually covered (excepting the stigmatic end at the centre) by the horns at this time of receptivity. Till this stage the horns grew faster than the ovary, but immediately after fertilization of the flower, the ovary outgrows the former. The middle flower in Fig. 2, one month after fertilization, has four visible horns and the ovary is enlarging speedily outgrowing the horns. After a further period of about a month, the ovary clearly emerged from the level of horns and developed in to a young fruit. Most horns of this category produced in two rare coconut palms were stout, and often possessed the three layers of the pericarp. In some, the endocarp even enclosed a cavity though devoid of a seed. However, similar horns met with in *Borassus flabellifer* and *Areca catechu* remained as thin and flat structures resembling perianths.

As in the case of certain very rare dioecious or monoecious palms producing bisexual flowers or partically developed carpels in the male flowers, the production of horns in palm fruits has to be regarded as atavistic.

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Fig 1
Coconut fruit with two horns

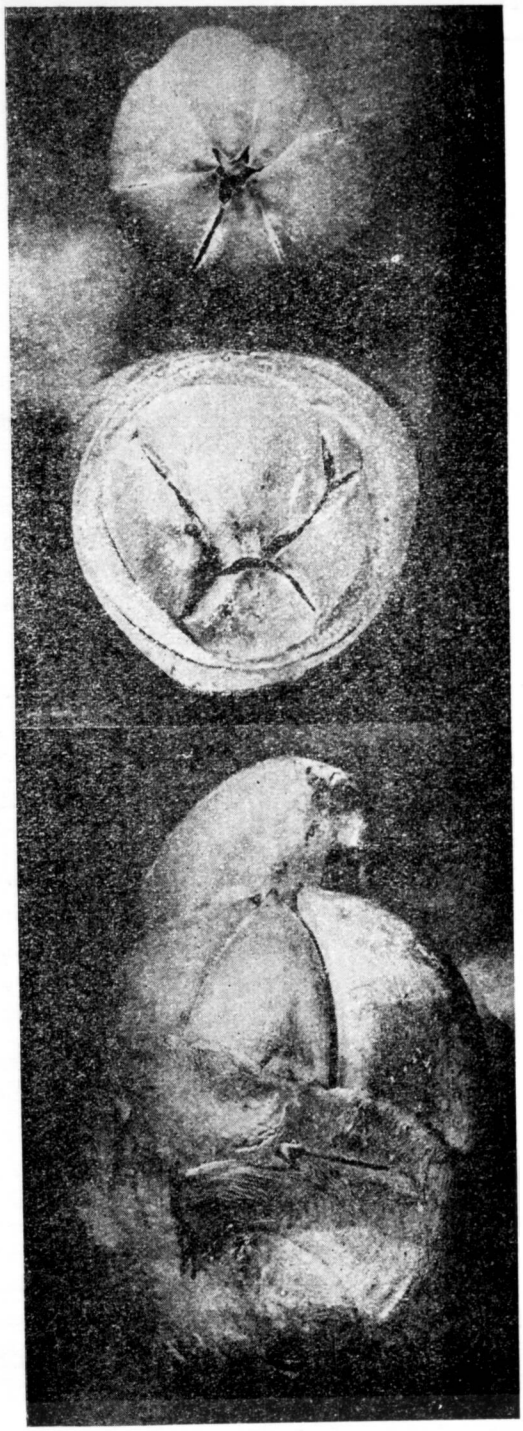

Fig. 2

Young coconut fruits—at receptivity, one month and two months after fertilization. The staminodes in these fruits have developed into horns.