

Probability in Paradise

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Peacefully answering a call of nature in the gardens of Paradise, the hazards of paradisiac life loomed large. Swish: the first warning. WHOOSH: confirmation. THUDD. Rather too close for comfort, the coconut lay. A narrow escape? Well, probably a rather wide one: the probability of death by coconut collision must surely be small?

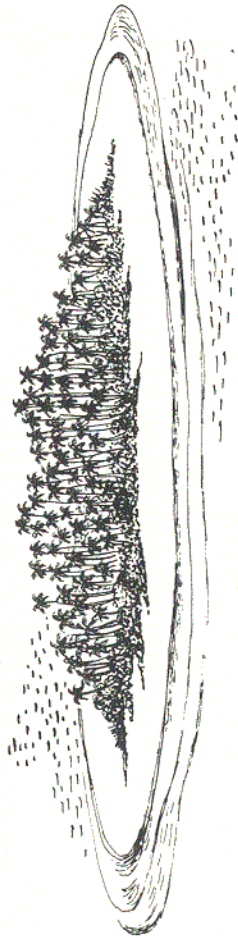
It takes seven years before a coconut tree produces any coconuts at all, and then a further year before the coconuts are brown and dry (fit for pigs or copra or the voyage to faraway places like England). Surely some of these trees must be benign; but a quick eye-ball survey suggests that all trees are mature, all have coconuts, some of which are dry. Only dry coconuts fall, except in hurricanes when green ones may be blown down, as indeed may the whole tree. But these are normal paradisiac times: the probability of a hurricane can be safely ignored.

A quick estimate suggests that a coconut tree bears an average of 25 dry coconuts a year. Since coconuts are not seasonal, it can be safely assumed that over the whole garden the rate at which coconuts fall is constant over time. In these paradisiac gardens, each tree covers an area of about 25 square metres and no area is left uncovered. Though coconuts grow close to the tree trunk, the extent to which trees sway in the breeze means that it can be assumed that no point on the ground is more likely than any other to receive a fallen coconut. On average, therefore, one coconut per square metre falls per year.

Death by coconut collision involves the unfortunate victim being hit on the head. Once hit, death must surely be certain. On the assumption that the average head covers an area of 250 square centimetres, the probability of death by coconut collision is 0.025 per year if the person stands - or squats - under the trees all year. For two minutes - the average length of squatting time - therefore, the probability of death by coconut collision is $0.025 / (365 \times 24 \times 30) = 0.95 \times 10^{-7}$.

Remarkably small, and accounting for the fact that on-one on this paradisiac island has been killed by coconut in living memory.

Remarkably small or not, I'm getting out of here



Addendum : Work hazards in Paradise

After having been sensitised to paradisiac hazards, a journal article (P. Barss, Injuries due to falling coconuts, J. Trauma, Nov. 1984) caught my eye. Of trauma admissions to a provincial hospital on another paradisiac island, as many as 2.5 per cent were due to falling coconuts striking the head, shoulders or back, whilst a further 7.5 per cent were due to falling branches and tree-climbing injuries other than falls (which accounted for 27 per cent of admissions). Mature coconut trees may be 24 to 35 metres tall, and since an unhusked coconut may weigh up to 4 kilos, blows of a force exceeding one metric ton are possible. Surprisingly, not all head victims die : some get away with a craniotomy !

