

*On the BAMBOO and DURIAN of BORNEO; by A. R. WALLACE, Esq.,
F.L.S. (In a Letter to Sir W. J. Hooker.)*

Two vegetable productions particularly attracted my attention in Borneo,—the Bamboo, most useful of plants, and the Durian, king of fruits.

Different species of Bamboo abound in all tropical countries, and wherever they are found the natives apply them to a great variety of uses. Their strength, lightness, smoothness, straightness, roundness, and hollowness,—the facility and regularity with which they can be split,—their different sizes, the varied distance of their joints, the ease with which they can be cut, and with which holes can be made in them,—their hardness outside, their freedom from any taste or smell, their great abundance, and the facility with which they are propagated,—all make them fitted for a hundred different purposes, to serve which other materials would require much labour and preparation. They are at once the most wonderful and the most beautiful production of the tropics, and the best gift of Nature to uncivilized man.

I shall briefly mention the uses to which they are applied by the native tribes of Borneo, which have fallen under my notice, and which have struck me the more forcibly, because in the parts of South America I have visited, Bamboos are comparatively scarce, and where found, but little used, their place being taken, as to one class of uses, by the great variety of Palms, and as to another, by Calabashes and Gourds.

The Dyak houses are all raised on posts, and are often two or three hundred feet long, and forty or fifty wide. The floor is always formed of large bamboos, which are split into four or five strips, so that each may be nearly flat, and these are firmly tied down with rattan to the rafters beneath. This, when well made, is a delightful floor to walk upon barefooted, the rounded surfaces of the bamboo being very smooth and agreeable to the feet, while at the same time affording a firm hold. But what is more important, they form, with a mat over them, an excellent bed,—the elasticity of the bamboo, and the undulating nature of the surface, being far superior to a more rigid or flatter floor. Here at once we have a use which cannot be supplied so well by another material without a vast amount of labour, all Palm stems and other substitutes requiring much cutting and smoothing, and not being equal

to bamboo when finished. Some tribes however prefer a flat and close floor, and they make bamboo-boards for the purpose, by splitting open a large bamboo on one side only, and flattening it out, so as to form beautiful slabs, eighteen inches wide and six feet long, with which they floor their houses. These, with constant rubbing and daily smoke, become dark and polished, so that their material can at first sight be hardly recognized. What labour is here saved, to a savage with only his axe, who, if he wanted boards, must hew them out of the solid tree, and, with all his labour, could never produce a surface so smooth and beautiful as the bamboo, thus treated, affords him. Again, if a temporary house or shed is wanted, either by the traveller in the jungle or by the native in his paddy-fields, nothing is so convenient as the bamboo, with which a house can be constructed with half the labour and in half the time, than if any other material is used.

The hill Dyaks in the interior of Sarawak make paths for great distances, to their cultivated grounds, in the course of which they have to cross rivers and numerous gullies and ravines, or sometimes to avoid a long circuit, to carry the path along the face of a precipice. In all these cases the bridges they construct are of bamboo, and so admirably adapted is the material to the purpose, that it seems doubtful whether they would ever have made them had they not possessed it. The Dyak bridge is simple but well designed. It consists merely of bamboo poles, crossing each other at the roadway like the letter X, and rising, sometimes on one side, sometimes on both, three or four feet above it. At the crossing they are firmly bound together, and to a horizontal bamboo, which forms the only footpath, with another higher up, serving as a hand-rail. When a river is to be crossed, an overhanging tree is chosen, from which the bridge is partly suspended, and partly supported by diagonal struts from the banks, so as to avoid placing posts in the stream itself, when liable to floods. In carrying a path along the face of a precipice, trees and roots are made use of for suspension, from every little notch and crevice struts arise, while immense bamboos, of fifty or sixty feet long, are fixed on some bank or tree below. These bridges are traversed daily by men and women carrying heavy loads, so that any insecurity is soon discovered, and, as the materials are close at hand, immediately repaired. When the path goes over very steep and slippery ground, the bamboo is used to form steps. Pieces are cut, about a yard long, and opposite notches

being made at each end, holes are formed, through which pegs are driven, and a ladder or staircase is produced with the greatest celerity. It is true that much of this will decay in one or two seasons, but it is so quickly replaced, as to make it more economical than using a more durable wood.

One of the most striking uses to which Bamboo is applied by the Dyaks, is in climbing the loftiest forest-trees, either to gather fruit or to obtain wax. The honey-bee of Borneo very generally makes its nest on the branches of the "Tappang," a tree which towers above all others in the forest, and whose smooth cylindrical trunk rises a hundred feet or more without a branch. Bees'-wax is one of the most valuable products of the forest, and the Dyaks climb these lofty trees at night to obtain it, by means of bamboo pegs driven into the wood. These pegs are formed of thick, old bamboo, split to about two inches wide. Each is cut above a joint, which forms a solid head to bear the blows of the mallet, and the point is flat and broad, cut away carefully to the siliceous outer coating. To the head of each is strongly tied a strip of the tough rind of a water-plant. The climber carries forty or fifty of these pegs in a basket by his side, and has a wooden mallet suspended round his neck; he has also prepared a number of strong, but slender bamboos, each from twenty to thirty feet long. One of these he sticks firmly in the ground at the foot of the tree, and close to it; he then drives in a peg as high as he can reach, and ties it firmly by the head to the bamboo; climbing up upon this, he drives in and ties two other pegs, each about three feet from the one below it, passing his arm between the tree and the bamboo, to hold the peg which he is driving in. He soon reaches the top of his pole, when another one is handed up to him, and being bound to the one below, he ascends in the same way another twenty feet. When his pegs are exhausted, a boy brings a fresh basketful up to him, and a long cord enables him to pull up the bamboos as he requires them. This mode of ascent looks perilous, but is in reality perfectly secure. Each peg holds as tightly as a spike-nail, besides which the weight is always distributed over a great number of them by means of the vertical bamboos. Trees which branch at forty feet or less, are often ascended by pegs alone, which, besides being dangerous, requires much skill and activity in the climber, as he must grasp the middle peg firmly with his hand to hold himself up, and has but one hand at liberty to drive in the pegs. I have seen trees as-

cended by both methods, and admired the excellent qualities of bamboo, as well as the ingenuity of the Dyaks in taking advantage of them.

Split and shaved thin, bamboo is the strongest material for baskets; conical fish-traps, hencoops, and birdcages are made by splitting a piece up to the joint which forms the top, gradually-increasing circles of rattan being inserted below; rough fruit-baskets are also rapidly made in this manner. Aqueducts are formed by large bamboos split in half, supported on crossed poles of various heights. They are the Dyaks' only water-vessels, and are in fact superior to earthen vessels, being clean, light, and easily carried. A dozen water-bamboos stand in the corner of every Dyak house. They also make excellent cooking utensils; vegetables and rice are often boiled in them. They are used to preserve sugar, vinegar, honey, salted fruit or fish,—in fact, they answer every purpose for which jars and bottles are used by us. In a small bamboo case, prettily carved and ornamented, the Dyak carries his *sirih* and lime for betel-chewing, and his little long-bladed knife has a bamboo sheath. His favourite pipe is a huge hubble-bubble, which he will construct in a few minutes by inserting a small piece of bamboo for a bowl, at an acute angle, into a large cylinder, about six inches from the bottom, which contains water through which the smoke passes. In many other small matters the bamboo is of daily use, but enough has been here mentioned to show its value, as a substitute in many cases for iron, and in enabling the natives to dispense with a variety of tools and utensils.

The second object of my especial admiration is the Durian, a fruit of which we hear little in England, where all praise is given to the Mangosteen, while the Durian is generally mentioned as a fruit much liked by natives, but whose offensive smell renders it disagreeable to Europeans. There is however no comparison between them; the Mangosteen resembles a peach or a grape, and can hardly be said to be superior, if equal, to either: the Durian, on the other hand, is a fruit of a perfectly unique character; we have nothing with which it can be compared, and it is therefore the more difficult to judge whether it is or is not superior to all other fruits.

The Durian grows on a large and lofty forest-tree, something resembling an Elm in character, but with a more smooth and scaly bark. The fruit is round or slightly oval, about the size of a small melon, of a green colour, and covered with strong spines, the bases of which

touch each other, and are consequently somewhat hexagonal, while the points are very strong and sharp. It is so completely armed that if the stalk is broken off it is a difficult matter to lift one from the ground. The outer rind is so thick and tough that from whatever height it may fall it is never broken. From the base to the apex five very faint lines may be traced, over which the spines somewhat curve and approximate; these are the sutures of the carpels, and show where the fruit may be opened with a heavy knife and a strong hand. The five cells are silky-white within, and are filled with a mass of firm, cream-coloured pulp, containing about three seeds each. This pulp is the eatable part, and its consistence and flavour are indescribable. A rich custard highly flavoured with almonds gives the best general idea of it, but there are occasional wafts of flavour that call to mind cream-cheese, onion-sauce, sherry-wine, and other incongruous dishes. Then there is a rich glutinous smoothness in the pulp which nothing else possesses, but which adds to its delicacy. It is neither acid nor sweet nor juicy; yet it wants neither of these qualities, for it is in itself perfect. It produces no nausea or other bad effect, and the more you eat of it the less you feel inclined to stop. In fact, to eat Durians is a new sensation worth a voyage to the East to experience.

The smell of the ripe fruit is certainly at first disagreeable, though less so when it has newly fallen from the tree; for the moment it is ripe it falls of itself, and the only way to eat Durians in perfection is to get them as they fall. It would perhaps not be correct to say that the Durian is the best of all fruits, because it cannot supply the place of subacid juicy fruits such as the orange, grape, mango, and mangosteen, whose refreshing and cooling qualities are so grateful; but as producing a food of the most exquisite flavour it is unsurpassed. If I had to fix on two only as representing the perfection of the two classes, I should certainly choose the Durian and the Orange as the king and queen of fruits.

The Durian is however (in another way) dangerous. As a tree ripens the fruit falls daily and almost hourly, and accidents not unfrequently happen to persons walking or working under them. When a Durian strikes a man in its fall it produces a fearful wound, the strong spines tearing open the flesh, while the blow itself is very heavy; but from this very circumstance death rarely ensues, the copious effusion of blood preventing the inflammation which might otherwise take place.

A Dyak chief informed me that he had been struck down by a Durian falling on his head, which he thought would certainly have caused his death, yet he recovered in a very short time.

Poets and moralists, judging from our English trees and fruits, have thought that there existed an inverse proportion between the size of the one and the other, so that their fall should be harmless to man. Two of the most formidable fruits known, however, the Brazil Nut (*Bertholletia*) and the Durian, grow on lofty trees, from which they both fall as soon as they are ripe, and often wound or kill those who seek to obtain them. From this we may learn two things:—first, not to draw conclusions from a very partial view of Nature; and secondly, that trees and fruits and all the varied productions of the animal and vegetable kingdoms, have not been created solely for the use and convenience of man.

The unripe Durian makes a very good vegetable, and it is also eaten raw. In a good fruit season the Dyaks preserve quantities of the pulp salted in jars and bamboos, in which state it will keep the year round, and is much esteemed as a relish with their rice. They seem hardly to appreciate the ripe fruit in its perfection, from the quantities they gather unripe, and from the small value they place upon it, as compared with the Jack and some other fruits. In Borneo great numbers of Durian trees have been planted on the mountains occupied by the Dyaks, and on the rivers' banks in the interior. In the jungle are found two varieties with much smaller fruits, one of them of an orange-colour inside; and these are probably the originals of the large and fine Durians which seem never to be produced in a wild state. In the tropics as well as in our colder climates, fruits always seem to be improved by cultivation.

*On some Undescribed Species of MUSCI belonging to the Genera MNIUM
and BRYUM; by W. MITTEN, Esq.*

(Plate XI. *A, B.*)

1. *Mnium insigne*, Mitten; dioicum, caulibus sterilibus procumbentibus, fertilibus erectis subsimplicibus elatis, foliis oblongis nervo excurrente cuspidatis marginatis serratis basi parum angustatis longe lateque decurrentibus, perichæatialibus exterioribus longioribus interioribus brevibus subulatis angustis, theca longe pedunculata ovali pendula, operculo conico obtuso, peristomio normali.