Barking up the right tree: *a note on plant identification techniques and their relevance to knowledge*

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One of the most highly developed skills in contemporary Western civilization is dissection: the split-up of problems into their smallest possible components. We are good at it. So good, we often forget to put the pieces back together again.

– Alvin Toffler[i]

Identifying plants

It is quite commonly assumed that the leaves, flower and fruit are essential for the nomenclature of plants. Indeed, most plant keys focus specifically on the flower and fruit; the number of stamens and petals, the position of the ovules in the ovary, and the position of the ovary itself become crucial factors in determining the family of the plant species in question. I spent much time in botanical gardens and was trained in this system.

Such a system of looking at plants is alien to the forest peoples I have lived with (Central India, Borneo) and from whom I learned another way of looking at plants. Though not counting and quantifying plant parts to ascertain plant identities in the Linnaean manner, indigenous plant identification is extremely precise: it has to be, as most of their needs, and even their survival, depends on this. A few examples would help in understanding the kinds of categories that are of daily importance in forest-life.

Indigenous plant knowledge

For instance, one needs to know the basics about toxins. There are several plants used to kill fish: leaves of certain plants, the roots of some, and the fruit of others (*Cansjhera, Derris, Randia*) are used to stupefy or kill fish; these specific plant parts are processed (mashed, dried and powdered) and used to gather the fish that are stunned. Many species of plant foods too have toxins (*Dioscoreas*, some aroids, etc.) and need to be sufficiently neutralized before consumption.

Woods are known according to their strengths as well as their flexibility before being put to use. They are also known for their ability to hold a fire. The latter quality is especially useful when sleeping outdoors. Logs of Terminalia chebula, Anogeissus latifolia, Terminalia tomentosa stay alive and up through the night and are preferred; some logs burn only in the company of the woods just mentioned, and some, like those of Diospyros melanoxylon, are avoided as they are angry and tend to spark! Such knowledge may be categorised as 'wood anatomy.'

There are hundreds of food plants, whose precise identification includes many more aspects than the mere outward recognition of the plant. The depth of the tubers that are dug up, and the processing required before they can be consumed, is species specific. The stage of maturity of leaves when they are harvested is crucial; too old and they don't cook, too tender and they become a useless mush.

There are many common plants used for their fibres. These plants belong mainly to the families *Sterculiaceae, Tiliaceae, Aclepidiaceae* and *Malvaceae*; for specialized needs there are a host of others such as *Bauhinia vahlii* and *Caryota urens*. Another area of plants deal with medicine, not only for humans but also for animals. Plant parts are used in illnesses such as coughs and colds, for bone-fixing, aches, skin diseases, increasing one's appetite and much more; and whether we subscribe to it or not, there is an array of plants known for their efficacy in magic, particularly 'love magic.'

Knowing such a vast amount of plants, intimately, implies much more than just a superficial 'recognition' of an outward appearance, which is all that is guaranteed in modern botany. The indigenous system understands the inner character of the plants that they know and use, or those that they avoid, or those that they call by name, or those that they leave unnamed.

Limitations of mainstream botany

The lack of obsessesion with 'naming' is a particularly remarkable feature of indigenous botany; the tendency of naming a plant, without knowing the least bit of what the plant entails, is one of the most hollow features of modern science. An extension of this craze is the desire of botanists to find 'new' species, so that their name can be known to the world!!

The botanical nomenclature proposed by Linneaus, now popular in many related fields, is also known as the sexual system due to the description of stamens as 'husbands' and pistils as 'wives', and on which the classification depends. This system, though very practical and used by botanists all over the world, was criticised in the 18 th century by Alexander von Humboldt, the father of plant geography. Humboldt, like Immanuel Kant, stressed that botanists should study more than just individual species and their outward appearances; he was interested in the total phenomenon of nature, in finding out the different plant species that grow together, how they are grouped, and the influences of the environment upon them and their interactions:

rather than discovering new, isolated facts I preferred linking already known ones together. The discovery of a new genus seemed far less interesting than an observation on the geographical relations of plants, or the migration of social plants, and the heights that different plants reach on the peaks of the cordilleras. [ii]

Humboldt was much influenced by Wolfgang von Goethe, the great poet and philosopher, who was his friend and with whom he shared many of his thoughts and ideas. Goethe wrote:

Every one thing exists for the sake of all things and all for the sake of one, for the one is of course the all as well. Nature, despite her seeming diversity, is always a unity, a whole ..... a relationship to the rest of the system. [iii]

The pursuit of botanical classification, finding unique characteristics that identify individual species, has had far reaching consequences. Specific and unique markers of identity are usually at the micro-level, focusing on the structure and composition of the ovary. This search for a universal marker for individual species – that is, traits exhibited by all plants of a particular species – has led us further and further away from observing the whole plant or tree.

For the kind of botanical classification that Linnaeus introduced, herbarium specimens are a prime requisite. During much of the year most plants in the wild do not flower or bear fruit, making traditional plant keys, that depend on flower and fruit for identification, quite useless. It is for this reason that research entails the collection of plant

Haldina cordifolia (left) and *Mitragyna parviflora* (right), both under the indigenous (Durva) generic term 'mundi', both members of the Rubiaceae family, with fruit similar in shape but varying in size.

specimens, when the plants flower and fruit, then dried and stored, and then described following botanical norms.

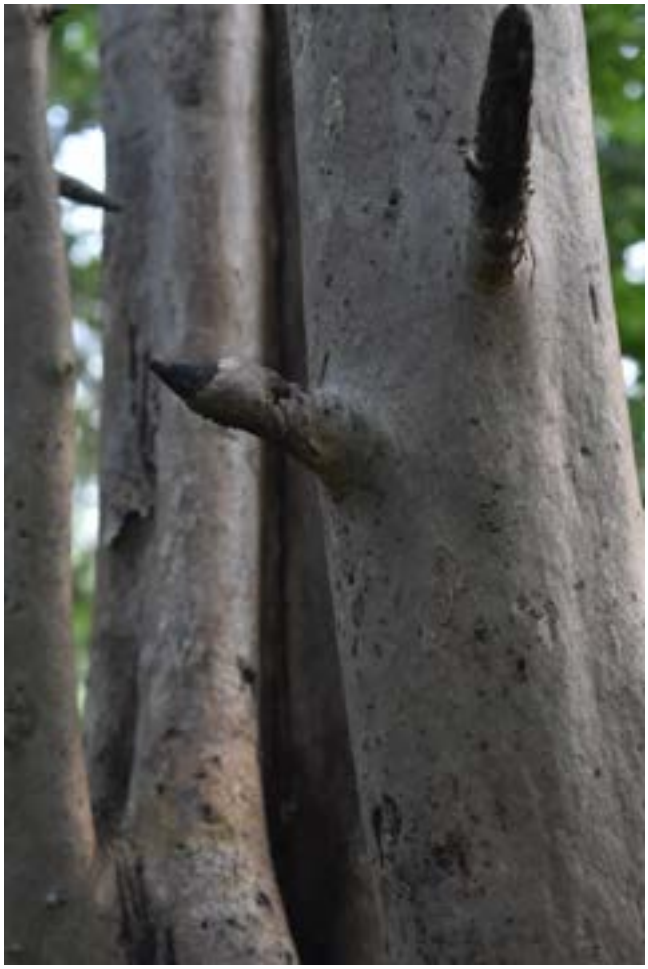
Bark as a prime characteristic in tree identification

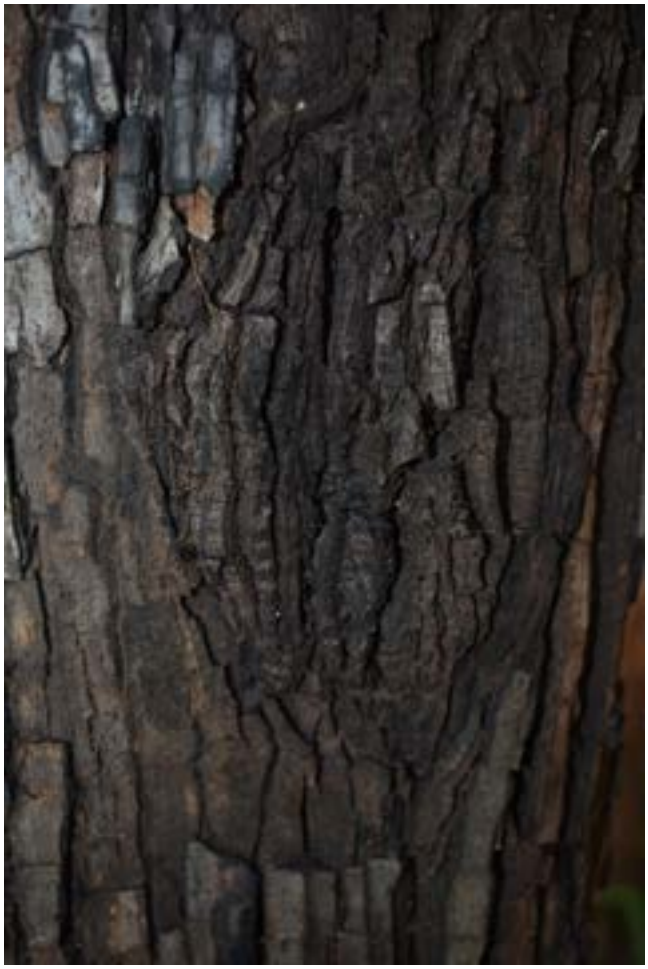
Adivasi tree identification relies mainly on the recognition of the bark. Some tree species have dark or black barks (most *Diospyros*, with the exception of *Diospyros montana*) Many species that grow in open sun-lit spaces have pale or whitish barks (*Anogeissus, Lannea*); some trees, as they age, have 'wounded' barks that exude gums and resins (*Pterocarpus, Shorea*); some trees have thick 'crocodile skin' barks (*Terminalia tomentosa*). Some trees have flaky barks that peel off (*Linoceira ramiflora*); there are papery barks (*Sterculia urens*), prickly barks (*Bombax ceiba*) and so on. Each of these are known and recognized by the adivasi people of the region, who differentiate them with the same ease with which we tell people apart.

Shorea robusta (sal) barks. The right one is attacked by the sal borer (minute holes), the left one exudes resin (white patches).

At times additional confirmation is sought by blazing[iv] the tree; occasionally the leaves are also taken note of. The advantage in this method is obvious when the trees are tall without lower branches, making them cumbersome to climb, and with the leaves, or fruit and flowers well out of reach.

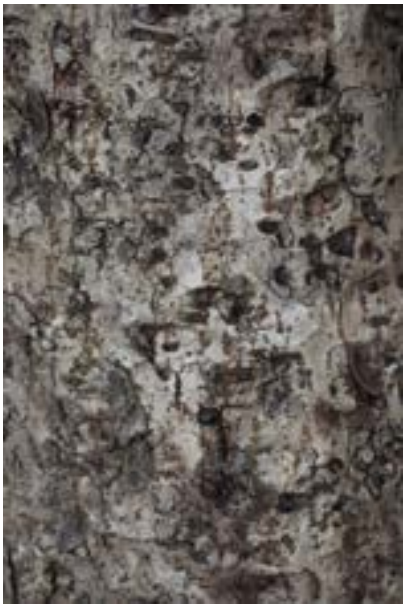
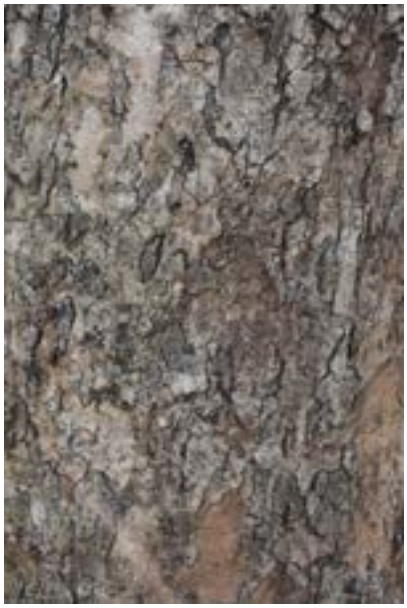
Barks of trees vary considerably within the same species. Age, terrain, and direction, all affect bark texture and colour. The same tree species, at different times, could have barks that appear quite different at a casual glance. The shade of colour, the cracks or fissures, or the natural presence or absence of 'wounds' may suggest that they are different species but an experienced eye is able to factor in the effects of time and terrain on the tree. That nature is not constant, that there are no external features that are unvarying, and that there is an ongoing and continuous dialogue between the various plant species and the environment, is a 'given' in indigenous observation. This notion of doing away with the 'constants' (specific number of floral parts, position of ovules), and tuning one's observation skill to the changes in vegetative characteristics of plants (variations in size or the tomentation of leaves, distortions and texture of the bark) is diametrically opposed to the Linnaean technique perfected in the herbarium.





Diospyros montana (left), one of the few species of the Ebenaceae family that does not have a black-tinged bark. The large thorns of the early years fall off as the tree ages. The right one is *Diospyros melanoxylon*, the bidi tree, with the typical black-tinged bark.

The adivasi ability of identifying tree species, usually by the bark alone, as explained above, is a method that transcends the usual, logical steps used in classical taxonomy. It does away with the binomial technique of step-by-step elimination – for a good botantist these steps may be implicit, but they nevertheless exist – and suggests a spontaneous and lively conversation between people and nature. This relationship with nature is what defines and underlies indigenous 'knowledge' (for want of a better word) about the forest they inhabit. The identification of species, the understanding of the'character' of the plants and hence of the landscape itself, the uses various plants and plant parts are put to, the detailed taxonomy of tubers based simply on the depth they are found in and their taste and texture when cooked, the preferred food plants of animal species, etc., are some of the specialities of such 'knowledge', and what Humboldt may have been tempted to call an 'indigenous plant geography'.

These three barks are of *Lannea coromandelica*, of varying ages, growing in slightly different terrains within a sal (*Shorea robusta*) forest.

In conclusion

I would venture to say that many of our problems with regard to understanding nature and the way we deal with the environment – the classifying, the obsession with naming, isolating and splitting individual parts of organisms, and the underlying arrogance of the 'specialists' in modern culture – are due to a specialization that is unending as well as unnecessary. It has not, and will not, be able to show us a way out of the multiple crises that humanity is faced with today: climate change, food and water insecurity, 'conflicts' between humans and animals, a declining biodiversity, etc., all of which are related and stem from a few very related and common causes. Through the past two years of the covid pandemic, most of the world's indigenous peoples have been able to pull through without the vast support systems that the urban populations demanded. They have also been able to procure their own food from their environments during the lockdowns, and even contributed to neighbouring urban centres that were badly off, as in India.

The indigenous knowledge system – the identification of plants, their uses and roles in the landscape, etc. – is also a system of values. The latter aspect, of values, regulates human behaviour. Without values, 'knowledge' remains ungoverned, with the plants and other natural resources prone to appropriation and exploitation. This is most apparent in the way ethnobotany is usually practiced. Though as an area of study ethnobotany is said to concern itself with the interaction between humans and plants, with the available traditional knowledge, it has come to view plants only for their monetary gain, or individual fame. Pharmaceutical and agro-industries, and plant hunters of most hues, have become predatory in their pursuit of 'knowledge' and explorations, (mis)using indigenous societies and their knowledge systems. Most researchers have done little better, perhaps as their obligations lie with their academic institutions and not with the people whose knowledge they appropriate.

How nature is perceived by a society also reveals the relationship between them, of a people and their environment. This is understood by the way nature is seen and studied: in its entirety, with the landscape as a seamless and undivided space that encompasses forest and rivers and soil and people

or, nature in its individual components, each part split into further divisions and sub-divisions, each with an identity of its own, separate from the whole, and which can be dealt with (or appropriated) independently, devoid of the consciousness that connects and interconnects the stamen to the bee, the leaflitter to the crab, the silkworm moth to the timing of the leaf-fall of the merdengi trees[v].

Modern science has led us to look at, and understand, the components of nature without taking in the broader holistic view. It has been easy to deal with the smaller elements of the landscape, like a species, or parts of a species (roots, bark, seeds, horn or tooth), and best put it to use economically, justified in anthropocentric terms. However, it has led to a consistent and ongoing divorce of knowledge from ethics, and the erosion of values inherent in all knowledge, and justified this divorce by using notions premised on very short-term anthropocentric goals.

The need now is to reverse the process and to instill value into the various 'areas' of knowledge, which are actually one and interconnected, beginning with the first steps in the identification of plants. This will lead to a new perception and relation to the plant-world as well as the landscapes we inhabit. It will open up new ways of approaching our landscapes where the driving force will be the 'inclusion' of factors in the natural world, including us. We have, for too long, split up our world in our quest for knowledge, and it has led us nowhere. It is time to put the pieces back together again.

i. In the Foreword (Science and Change) to Order out of Chaos by Prigogine, I., and Stengers, I.; Fontana Paperbacks, 1984

ii. In Alexander von Humboldt: Personal Narrative; abridged and translated with an introduction by Jason Wilson. Penguin 1995

iii. ibid

iv. Blazing usually entails a cut on the trunk with an axe or machete to ascertain the colour under the bark; any exudation is also observed.

v. Terminalia tomentosa

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