

Special Project on:

Nature and form

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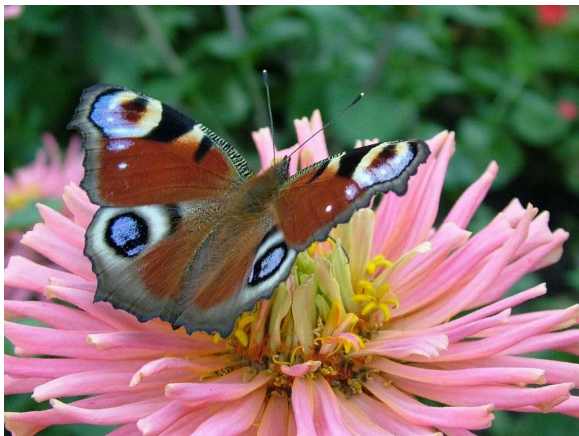
Introduction



Today we live in a world where people work round the clock to earn a living and in the mean time have lost up all the time to enjoy their own life. Busy with his/her schedule, may it be the long list of office work or any other regular chores of work or even the burden of quantity education for the students. In fact this mechanised life has taken toll to such an extent that even the basic activities like enjoying or interacting with nature too is a difficult task.

The project deals with getting out the experience from nature and coming up with a proposition to convert it into a form that regenerates the same moment of experience thus providing a mode of rejuvenation or a moment to get away from the current mechanized scheduled life.

Nature and Form:



As far as the **definition** goes, Oxford dictionary states nature as **‘the way that things happen in the physical world when it is not controlled by people’**. But actually nature is a very complex thing to explain as it can be said to be **a series of interdependent activities** or phenomenon taking place in a space and is bound by several factors as time, space, etc. Nature is said to be a series of activities or phenomenon happening on its own and not having any direct involvement of human.

In general terms the phenomena of sunrise and sunset is one of the part of natures bound activities. Now sunrise leads to several activities like blossoming of flowers, generation of oxygen through green plants due to the presence of chlorophyll in leaves, heating up of the atmosphere, evaporation of water form water reservoirs like sea, river, lake, etc. These activities or phenomenon are not constrained within a confined space but is also dependent on things remotely placed.

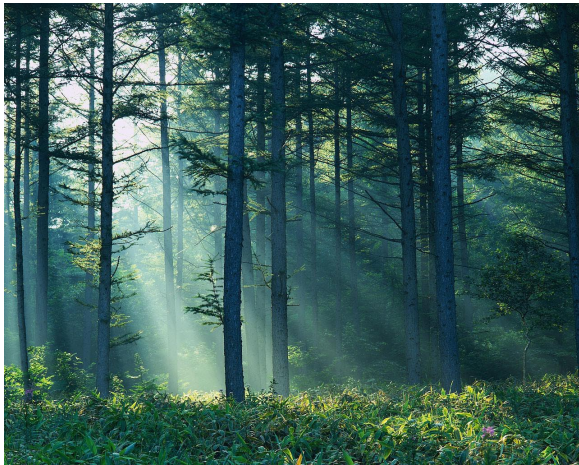
The phenomena of sunrise and sunset are not just confined to earth but also are same for other planets in the solar system and so is gravity which is acted not only inside earth’s atmosphere but also outer periphery of space as this explains why moon is situated at a particular distance from earth and moves around it all the time.

Nature, as mentioned earlier, is a **continuous beautiful phenomenon** and has several things that attracts humans or any other living creatures towards it. At a generalized level we perceive nature based on a combination of elements or factors which can be classified as below:

- 1) Sight
- 2) Sound
- 3) Smell
- 4) Sense/ touch

Generally we take the natural activities/ phenomena for granted and mostly we miss the beauty, the intricacy of things present in each phenomena due to our regular chores but sometimes nature does capture our attention accidently, may be due to uniqueness of the activity or may be due to vibrancy put in front in the form of any of the earlier mentioned elements or may just be due to the need.

Some activities do keep on happening around continuously i.e., blossoming of a flower, transformation of life forms, sun rise and sunset, etc and it's not such that if we don't notice it, it won't take place but that we don't value them in any form over our regular mechanized chores.



Few common and regular events as sunrise and sunset always keep on taking place and is almost impossible stopping it from happening as it is a universal activity and happens at a scale of our universe or rather our solar system. Each and every sunrise is beautiful phenomena, the rich display of colours, the gradual scattering of heat, the spreading of light at all expanse, etc. But at a particular moment why do we feel it to be very attractive?

Why do we get attracted towards a view of a forest? What attracts us towards a green lawn? These are basically due to **the vibrancy of colours** that we generally miss out in our regular life. The **vibrancy, play o f colours, play of forms all lead up to an increases level of interest** towards anything like suppose the Sunrise. Suppose there are few clouds canvassing the horizon and when sun rises up or is about to rise there's an interesting play of colours, vibrant combination of fiery bright warm colours and the cool calmness of the cool colours all over the sky these are what attracts us towards nature. This is what the 'sight' or 'visual' element is. Even in case of the lawns, the vibrant spread of fresh green attracts our visual senses and pushes us towards it to rejuvenate ourselves.



But we don't always get carried over towards nature due to its visual aspects. As visual elements enhance the visual appeal of nature so does sound. Most cases **what drives us from our work place towards nature** is the sweet sound that flows around. Sound like chirping of sparrow, sweet sound of a cuckoo, etc. How many times has it happened that you hear a sound of some bird early in the morning and while tracing it you end up enjoying the beautiful sunrise or beautiful composition of clouds? It surely does happen with me, waking up hearing the chirping of sparrows or the sharp but unique sound of parrots and end up seeing and capturing beautiful formations in the sky.



Sound also plays a major role in enhancing our experience. Assume yourself to be in a beach and enjoying the waves and tides coming towards you, the beautiful horizontal horizon, the breeze, etc, but can't hear any of them. Sound thus becomes one of the major elements in completing up our experience. Without the sound of the waves gushing towards the shore, without the sound of the breeze flowing by, without the sound of the gulls, the experience of being at a beach almost becomes incomplete.



Next element is one of the most important one. I personally feel this to be important one simply because **this is the one that cannot be easily regenerated** as compared to other two elements. Visual aspects can be captured through cameras and can be regenerated in affordable manner through a series of electronic media similar is the case of audible sound. But smell is one that, till now, cannot be easily replicated or reproduced or regenerated.

Smell also plays a major role in attracting us or specially birds and bees. Birds get attracted towards flowers through the smell or scent emitted. Even in our case what attracts us towards flowers especially rose. Is it just the visual beauty or is it the sweet, musky fragrance of it? It is not only the variety of colours that attracts us personally towards rose but also the smell of it which also relates to generate or enhance romance.



As my personal experience goes, whenever I walk along side a road with trees lined along the side and smell the fragrance of burnt wood I recall myself to be in a forest back at my native place and almost experience the things that I enjoy doing of roaming around. Same is the case when I smell the fragrance of wet soil which reminds me or recalls me of the first rain and the raindrops falling all around me and I am getting wet.

So basically it's the combination of all these three elements that make us experience the beauty of nature. But other than these there's one more element, **the element of touch/ sense**. This is what stand apart and makes huge difference between an artificial experience and actual and natural experience.



Though we actually don't consider this to be an essential element but generally, in our daily life how do we know if it's hot or cold atmosphere? Sun rises all the time of year and also are the other events taking place but can we visually distinguish between a hot day and cold day, except it snows during winter or really heats up out of limits in summer. It's the sense of touch that makes us distinguish between a hot day and a cold day, the sense that is generated due to the several micro sensory organs or cells that are placed all around our body/ skin.

Simple example would be the case of breeze. Can we actually see a breeze blowing by? We actually can just listen to the flow of the breeze but it's our sensory system of our body that tells us the direction of flow of the breeze.

So it is in several other cases like the feel of a rain drop falling on our face, the feeling of touching the soft fur of a kitten and several other instances where this element almost puts behind every other element.



Think of standing in the middle of a ground while it's raining. You can see the drops falling on you, you can even hear the sound of rain drops falling on the ground and also can smell the fragrance of the wetting soil but actually cannot experience the wetness or coolness of the raindrops. How odd will be the feeling? That's how unique and important the element of sense/ touch is.

To enliven a natural experience the combination of all these elements matter. All these elements combine and at varying forms help us to live up or go through an actual and natural experience.

Products inspired from nature

These products are abstracted from nature, either the experience or just carrying over of the design elements present in things present in nature



Peepal Tree



A **peepal tree** is a species of banyan fig. Binomially named '**Ficus religiosa linn**' also known as Sacred Fig. It is a large dry **seasonal deciduous tree**. The peculiar characteristics consist of grey coloured texture on its trunk and **has a chordate shaped leaf** (heart shaped) with an extended tip. The leaves of a peepal tree are **very delicate** and rustle with slightest of breeze.

Peepal tree is one of the **oldest known trees** with its **origin** dating back to **3000 B.C. to 1700 B.C.** and its remains are found in the Mohenjo-Daro city belonging to the times of Indus Valley civilization. It is one of the **oldest angiosperm plants**.

Myths and Beliefs



The peepal tree is one of the trees having great religious importance in India especially among the Hindus, Jains and Buddhists. It is believed that **Siddharta Gautama (Lord Gautum Buddha) sat below** a peepal tree before **attaining enlightenment**. According to the Buddha – **'He who worships the Peepal tree will receive the same reward as if he worshiped me in person'**.

The peepal tree carries many mythological stories facts and beliefs behind it. It is supposed to be a **symbol for happiness, prosperity, longevity and good luck**.

In the **Vedic period** the **stocks or branches** were used to **produce fire**.

In ancient **Purans** it is said that when the demons defeated the deities Lord Vishnu hid in a Peepal tree. Also it was said that the tree houses **'Trimurti'** i.e. the **root** being **Brahma**, **trunk** being **Vishnu** and the **leaves** being **Shiva**.

It is also said that **Lord Krishna died** under a **Peepal tree** and then started the Kala Yuga. **Lord Krishna** also supposed to have said, **" Among all the trees, I am Peepal"**.According to Skanda Puran, Saraswati rose from the peepal tree.

In **Upanishads**, a **peepal tree** is believed to be as a **son** for those **who don't have** their own son. The family supposed to take good care of a peepal tree as it to be their own son and is taken complete care till its life time. **Cutting a peepal tree** was a **curse** and was considered to **as big crime as killing a Bhramin** and that it surely leads to a **place in hell**.

It is also believed that during the **ancient mythological period** there existed **two demons** named **Ashwattha** and **Peepala** who used to **disguise themselves as a peepal tree and a saint**, respectively, and the **saint** would **suggest people** to **touch the tree** for their **betterment** and in turn **killed them** when they touched the tree. **Lord Shani** was supposed to **answer the worries** of people and **killed both Ashwattha and Peepala**. This led to a belief that **touching a peepal tree on Saturdays is safe** and also the person would be blessed.



Lakshmi is also said to be **residing in peepal** on **Saturdays** and that **women** who are **not blessed with son** tie a **thread around the trunk** or on its branches asking to **bless her** with a son.

Upanishads also states that a **peepal tree** is **grown in the premises** of a **temple or house** and at the age of **11 or 12 years** an **Upanayan ceremony** is performed for the tree. A **round platform** is built around the tree and of **deities like Narayan, Rukmani, Sathyabhama** are **invoked and worshipped**. Later the tree is **married to a basil tree**.



It was also known that a **peepal tree** is **married** to a **neem tree**. The **fruit of neem** was said to **represent Shivlingam** and the **leaf of peepal** represented **Yoni** hence **female** and the **combination** led to **marriage of the two**.



In the current world, in **Tamil Nadu**, **peepal** and **neem trees** are **planted close** to each other and a **snake idol** is placed **under them** and **worshipped**.

In **Bengal**, **Peepal** and **banyan trees** are **married** to each other for the **welfare of the village** or community.

In **Awadh**, in case a **girl's horoscope** predicts **widowhood**, she is **first married** to a **peepal tree** and **then** the **normal wedding** takes place.

In **Karnataka**, **women** not blessed with **child worship** them and also for the welfare and safety of the family.

It is also believed that a '**Shani**' or '**Hanuman**' **temple** with a **peepal tree** in the premises **bears** special '**Daivik Shakti**' and hence is supposed to be superior and **worshipping** at such temples is always **fruitful** especially for **good health**.

Facts

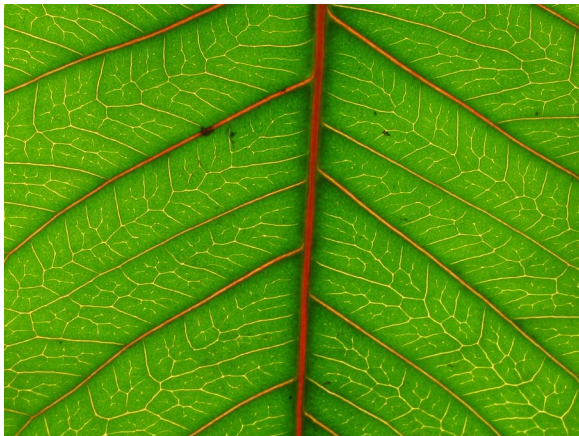
Peepal tree is believed to **release oxygen** all the time including **night time**. Generally where **other trees** start **respiring** during **night time** **peepal trees** still performs **photosynthesis** due to **Crassulacean Acid Metabolism (CAM)**.

CAM is one of the **three** types of **photosynthesis pathways** occurring commonly in plants; the other two being **C3** and **C4** pathways. Of these, **C3** is the most **common** among **land plants**.

CAM occurs primarily in **desert plants** and **epiphytes** i.e. plants dependent on other plants for growth. **Peepal tree** is in fact a **hemi-epiphyte**.

Though the amount of **oxygen released** is very **less** as **compared to** the amount released **in day time**.

Peepal Leaf



A peepal tree has a **unique leaf** with a **chordate shape** and an **extended tip**. The leaves are huge in **size** and cover large area in width. These are **very delicate** when alive and have **vibrant green colour** and rustles easily in the breeze.

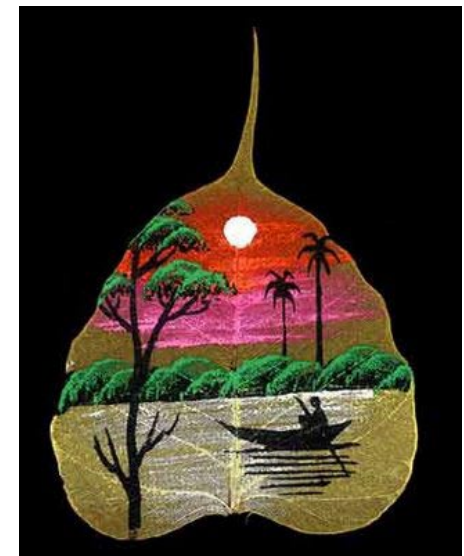
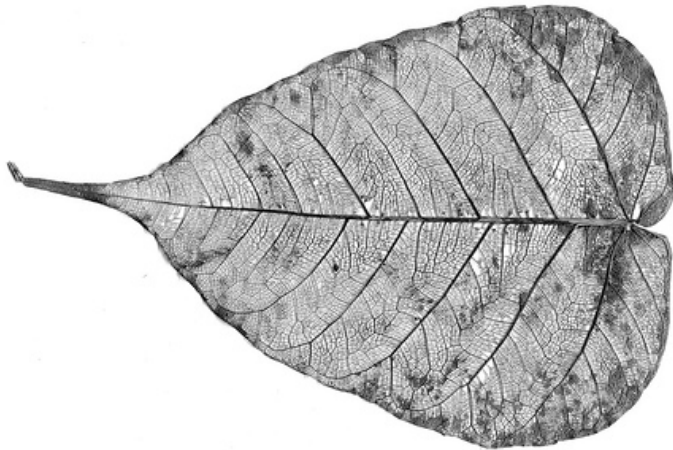
A peepal leaf is an interesting leaf for analysing with whole lots of elements; few of them are as listed below:

1. Strong and prominent veins and branching system
2. Unique chordate shape
3. Massive Size/ wide spread
4. Elongated tip
5. Leaflet patterns on surface
6. Translucent vein structure when green
7. Transparency is most prominent feature whether green or dried off
8. Asymmetric form
9. Translucent and shiny when small and young
10. Weak membrane when green and easily gets destroyed
11. Structural nature prominently noticed when leaf withers off
12. Perforating texture is more prominent when leaf dries off



Strong and prominent vein structure and perforating texture:

A peepal leaf has **prominent vein structure** and is known for its **structural beauty**. Though less prominently visible when green but a dried and withered leaf displays the structural beauty wonderfully. It also has a **perforated texture** prominent in dried ones. This is due to weathering off of the weak membrane after falling off the tree. This makes it unique and valued and is also famous as a collector's item especially the dried ones. These are also used for **art purposes** like using as a canvas for paintings, making artefacts, art items as shown below





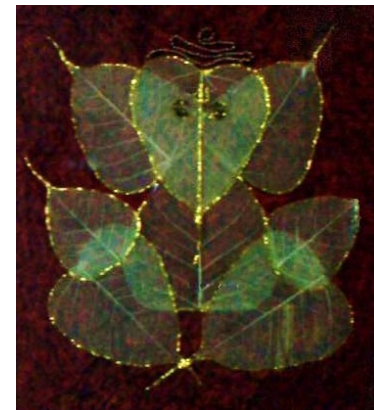
Unique shape, Elongated tip and massive size:

A peepal leaf is most commonly **identified** due to its unique, **chor-date, shape** i.e. heart shaped. It also has an **elongated, extended tip** which also plays as an important element of identification for the leaf.

The overall shape of the leaf almost resembles to a sting ray fish

The leaf is also very **big in size** as compared to other leaves and has a massive width. Being **very delicate** these are known to **rustle** to slightest of **breeze**. This relates well to the myth that demons reside on the branches of a peepal tree.

The unique shape is also one of the reasons for its use in various art forms as the one shown below, extreme right, an abstracted form depicting Lord Ganesha using dried Peepal leaves



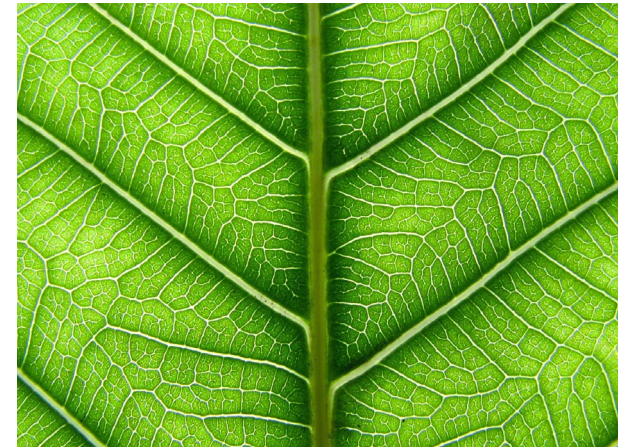


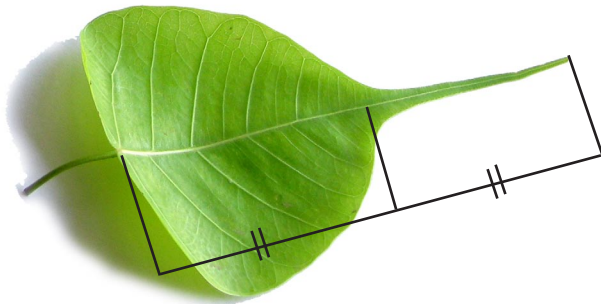
Leaflet Pattern:

An **interesting pattern** flows through the leaf surface which if noticed closely reveals a totally new and interesting shape of the leaf. It looks like a **pattern of leaflets** bearing on a sub branch of a tree similar to that of a bunch of tamarind leaves.

Transparency:

Transparency is one of the **unique characteristics** of a peepal leaf. When fresh and **young**, a peepal leaf is **very glossy** and almost illuminates in vibrant green under sunlight. Also when seen through under high luminescence, the vein structure brighten up due to translucent nature and revealing the beautiful structural nature of the leaf. When the leaf dries off the weak membrane gets weathered out and the translucent vein structure becomes dark thus again retaining the transparency due to absence of elements





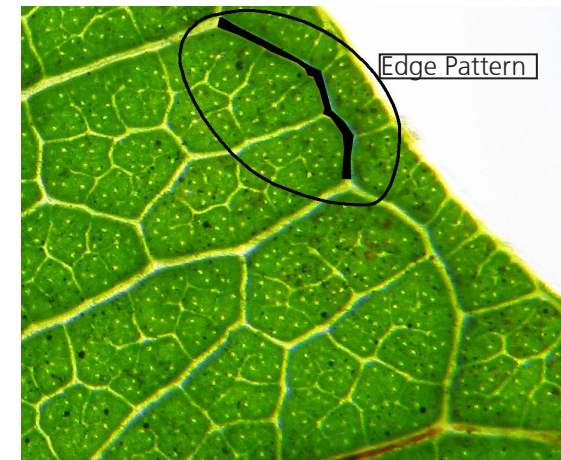
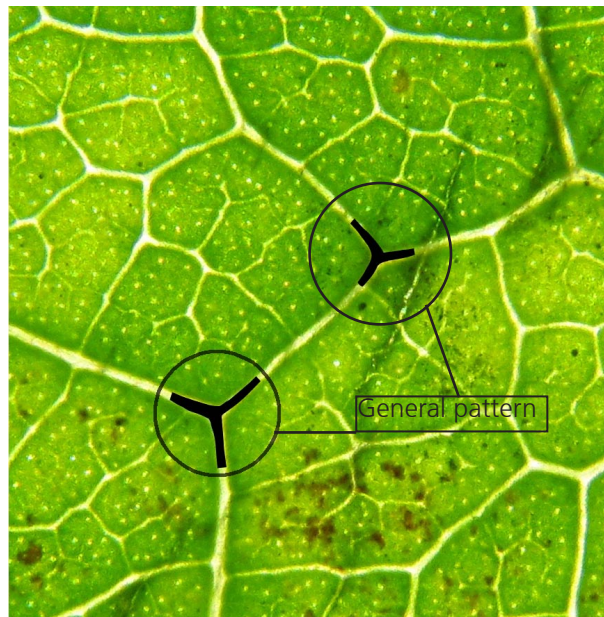
As far as the **proportions** of the leaf go, as one can view in the adjoining image, in case of the **young** fresh leaves, it has a **broad heart shaped surface** and an **extended tip** at the end which have **almost the same** length. But in case of a **well-grown** leaf, the **broad surface** portion is **more prominent** in length where as the elongated tip is shorter in length.

Also is fact that the **elongated tips** in **younger leaves** are much **more prominent** than those in the **older ones** due to the proportions of the width of the tip to the width of the broad section. In case of **young leaves** this **size difference** is **small** and the **elongated tip** looks **pretty strong** as compared to the broad section of it while in case of the **older leaves**, the **broad section** is much **greater** than the **width of the elongated tip** and hence feels very weak as compared to those of the younger ones.



A peepal leaf has a **unique branching and vein structure**. The most **prominent feature** in the **branching structure** is the presence of a **'Y' formation** along the main branching area and also between the sub branches and the further vein structures. This can be prominently seen in the images shown beside. This basic elements form a beautiful pattern of enclosed area all along the surface of the leaf.

At the **boundaries**, however, another **element of 'C'** comes into play and hence **provides a discontinuity** to the patterns along the boundaries.



Applications



As the next phase of the project, the **study of the nature** has to lead to a **proposition** of a form or products. These are to be done on the **lines of the analysis** done and also the **experience developed** in the whole process

The elements identified and analysed can be used up for coming up with a form generating physical or emotional experience.

The **pattern and partial transparency** of the leaf can be considered for making **patterned shades for windows**, in offices or in cars, for not only providing protection from sunlight but also for the **beautiful patterned shadows** generated in different ways depending on intensity of **sunlight** along a day. It would be a great experience to see a play of patterned shadow and also can act as stress buster.

A table top **show piece** or a **display item** can also be made out of **reflective, transparent** material, like acrylic, with **abstracts** of the main **branching structure** made of any **opaque material** while the **vein structure etched** on it. When **sun light** or any other strong artificial light falls on it at an angle the etched **vein structure** will get **illuminated** while the **reflective surface** will cast its **reflection** on the **nearby surface or wall** showing interesting **branching structure** which is dark lines due to no reflections taking place due to the opaque material.



A **lamp shade design** can be made either with direct the **dried leaf** form acting as the **shade** or a translucent material cover with etching it the vein structure or interesting collage of several leaves put along in well composed form. The result would be **eye-catching lighting system** along with **beautiful shades** along the lighting area.

The **transparency** and the **patterns** of the leaf can also be used for making **office partitions** with interesting details coming out of it. These partitions can either be **transparent or translucent**, later increasing the element of interest if provided with innovative lighting system. This will freshen up the work space and also the overall atmosphere. This same can be implemented in hotels and restaurants. The same also can be made out of just **rod welding** representing **dried leaf** or a **collage** of it with **interesting play of negative space**.



The **patterns and vein structure** can be **abstracted** to design **jewellery set** including the perforated earrings and bracelets, just for example. The detailing and intricacy of the patterns will increase elegance of the jewellery and also the value.



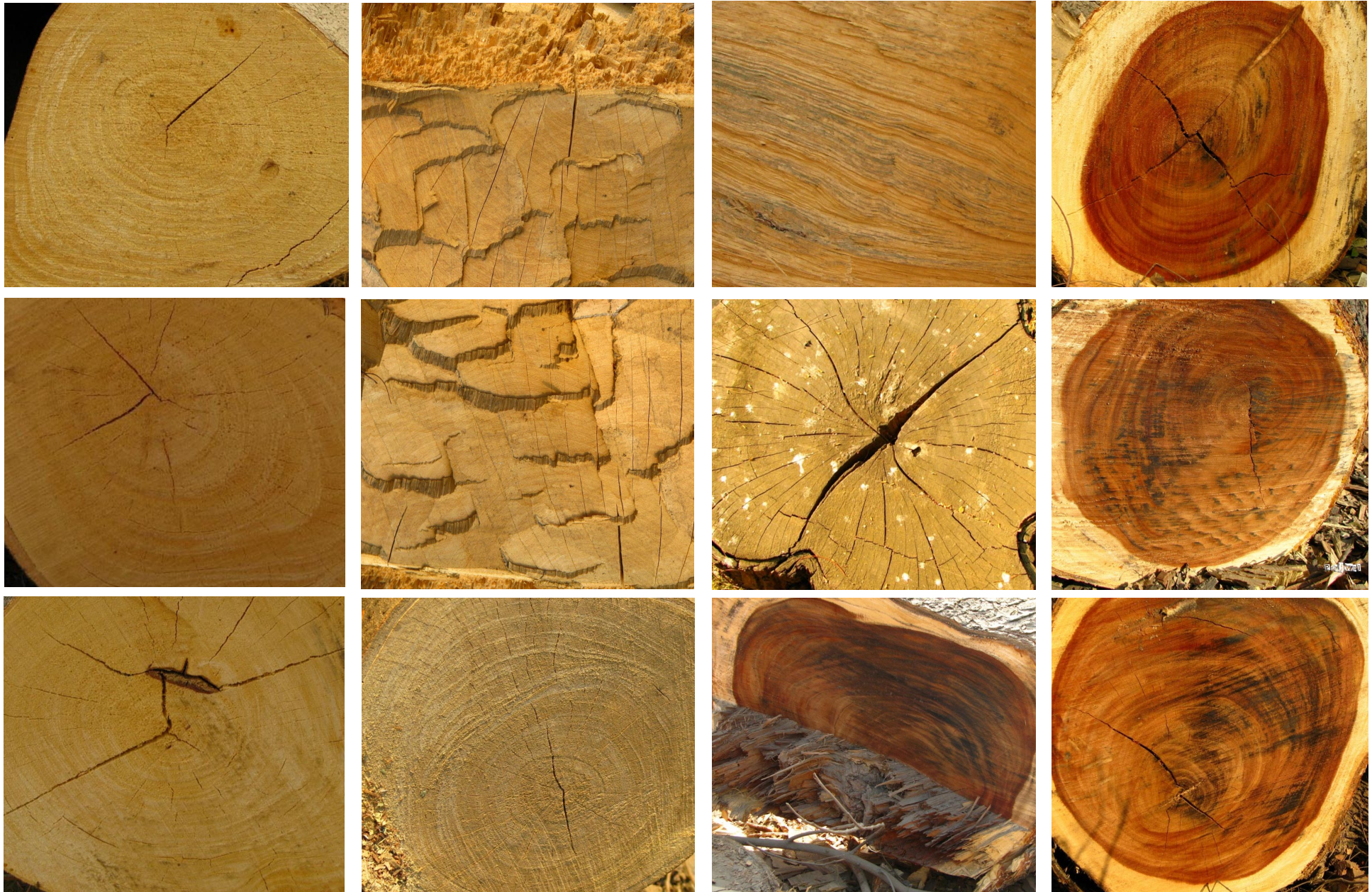
Conclusion

Nature is a very **complicated** and a very **vast frontier** to work upon. It has got a lot of things that can only be **understood** just by **experiencing** them. Thus understanding nature requires going through all depths and also high amount of patience and eagerness for exploring more. It's all about **great details**, even the simplest things end up have great amount of details and interesting elements which we generally miss out or over look upon.

One such incident took place while exploring the natural beauty of IIT campus, this happened during the initial phase while exploring nature. Due to widening of the road outside IIT many of the trees near the road, inside IIT, were felled and the logs of them were kept along road for clearing out later. These logs, though dead, had interesting patterns and structures all throughout and each had its own unique design pattern coming out. The collage of few such images are compiled and put up in the next page.

If we can **understand nature**, or at least few of its features, we could end up with several **innovative forms** that will redefine our approach towards our day to day things. It can make **living** and working around an **enjoyable experience** and leading out for better life.

Dead Beauty: A compilation based on the felling in IIT Campus



References

Books:

Design lessons from nature

Benjamin De Brie Taylor

Elements of Design: Shape and Form

Albert W. Porter

Websites:

www.wikipedia.com

www.flickr.com

www.greenfieldbiocare.com

www.thereligiousproducts.com

www.indianetzone.com

www.experiencefestival.com

www.ecoindia.com

www.buddhath.com

www.salgram.net

www.gurjari.net