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॥ ved vigyan vaibhav ॥

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Editor's Desk

"तथैव तत्त्व विज्ञानं अस्तुते मदनुग्रहात् " is the tag line of 'Jagatguru Shri Devnath Institute of Vedic Science and Research'. While Guru and Shishya interaction in ancient times, this was a request made by one of the shishya to his Guru which means that please tell me the principles in the "विज्ञान" with the help of which I would lead my life. I believe that ancient Indian literature contains all the science which is still hidden in some or the other way and should be decoded for the benefit of the society.

The Patron of this project, P.P. Acharya Shri Jitendranath Maharaj, elucidates the importance of science in ancient Indian literature. Under his divine guidance, we are carrying out research in this domain.

This E- Magazine is based on science in ancient Indian literature. Many scholars have worked tremendously hard to unveil the treasure from our Vedas, Upanishads, Aagams etc. The articles included in this magazine contain work done by those scholars. I am glad to tell everybody that we are publishing the first issue today. This trimonthly magazine will have interesting facts in the upcoming issues and will be useful to further generations.

In general, articles displayed here are written by various scholars in this particular field. We are collecting their articles which are already published and assembling them on this platform.

THIS E-MAGAZINE WILL BE PUBLISHED EXCLUSIVELY ON www.jsdivsr.in

***Krusheeshastra or* Biological Sciences**

Part One -Vrikshavidya- Botany

Trees, birds, animals and humans, all living things have to go through four stages i.e. birth, rearing, growth and death. Hence sage Bhrugu grouped all under one head i.e. Krusheeshastra.

वृक्षादिप्रसवारोपपालनादिक्रिया कृषि: ॥ भृगुसंहिता अ.१

Vrikshavidya – Botany: Indians had deep knowledge about botany since ancient time. Unlike western botany, one can find very appropriate names for trees. Wood was used since ages for chariots, carts and columns and beams of houses. Ancient texts like Mayamat, Brihat Samhita Sakaladhikar etc contain names and description of more than 150 names of tree which are still available in many parts of India.

Indian Botanical Classification: Western Botanist divide trees into two classes viz.; 1) Endogenous or growing from inside and 2) Exogenous or growing from outside. Former is harder outside while latter is harder in the central core. Ancient Indian texts (*Mayamat, Manushyalaya chandrika* etc) however mention four classes of trees viz.

- *Nissar* – Trees having no hard core. Nissar trees are *Ashwathha, Nyagroth* and *Udumber*. However thick these trees grow they form no core. Their flowers are closed. Fruits are bunch of flowers, e.g. *Nissar*- Ashwath, Bilwa, Udumbar ,Nyagroth or Vat.
- *Antassar*- Trees having hard core inside. Antassar trees (Exogenous trees as per western Botanist), are *Aamra, Panus, Nimb* tree and other trees.

- *Bahhissar* – Trees having hard core outside. Bahhissar trees, Endogenous trees as pre western Botanist, are *Nadwat, Nariker, Poog* and others of this class.
- *Sarvassar*- Trees having core throughout their cross-section. Sarvassar trees are hard throughout the cross-section. *Tintini, Shak, Shirish* and *Bhallatak* tree are the examples of this class.

Ssar (core / pith) is the hard portion of tree composed of cells, which have ceased to live or carry juice, and therefore those trees which have no such core or portion composed of dead cells, are called immortal trees (*Amar*).

Out of these four classes, trees having a core either on outside or inside are suitable for engineering works. As these trees have some portion of the section harder than other. Thus failure of softer part gives an indication that tree is failing and sudden collapse and danger to life is avoided. Trees having no harder portion are useless for engineering works. Trees having hard section throughout, deteriorate simultaneously, a sudden collapse is therefore possible. Ancient Indian texts specify that such trees should not be used for building purposes but should be preserved for firewood. Trees with no cores (*Nissar*) should be used as shade giving trees or sacrificial trees. These trees are very altruistic and any other tree can be planted on them without any injury to them. Thus following trees are Unsuitable for building purposes

Ancient Classification Systems of trees: The trees were classified in accordance to age, imperfections (gray shades) and gender.

A- Age: The age of trees is considered to be 103 year. Trees were classified as child, Young or old as explained below.

- Child **-** Less than 16 years.
- Young**-** 16 to 50 years.
- Old**-**More than 50 years.

The timbers obtained from trees having age between 16 to 50 years are considered good for construction.

To ascertain the stage of life of a tree, a bore through the stem, at 60 cm above ground is made. This test is called formation test. The age of the tree is indicated by,

1. color of the core,
2. hardness,
3. Juice oozing from the bore.

If a tree is already cut, instead of juice, the sound produced by tamping with a heavy rod, will the stage of age.

B- Gray shades: The signs such as a flag, umbrella, cone, sphere etc. found on the cut cross-section of tree, were considered good. But signs such as a women, spiral, snake, headless person, partridge, vulture etc. were considered bad indication for construction (*Vishwakarma Prakash* .91.116-120).Timber should be free from pores.

Pores on wood it were termed as,

- *Nishkut* - big pores
- *Kol*- medium pores
- *Dhrushtinetra*- pores circular or elliptical (like eyes)
- *Vatsak*- pores of irregular shapes
- *Kalabandhak* - pores made by insects
- *Sushir*- micro-pores (like those in an earthen pot)

The timber with pores is not suitable for building construction.

C- Gender: The gender trees were classified as Male, Female, or Neutral. This type of classification is explained below.

Masculine- Trees have uniform cross-section from top to bottom, strong vertically or in compression. These trees have deep roots, fragrant flowers,

and leafs smooth to touch. Masculine trees should be used as columns. Male Trees are Ajkarni, Arjun, Ashok, Bakul, Chandan, Deodar, Dhanwan, Khadir, Kshirni, Padma, Pindi, Pindi, Pishit, Punnag, Rajadan, Sal, Saptak, Shami, Shishap, Simha,Statak, Vanhi etc.

Feminine - Trees have broad and narrow cross-sections at bottom and top respectively. Such trees have very fragrant flowers or fruits, Leafs are cool when touched and rich in fluids. These are strong laterally or in tension. Feminine trees should be used as beams. Female Trees are Aasan, Bhouma, Ek, Gawakshi, Kak, Katfal, Likunch, Neem,Panus, Saptaparna, Shirish, Timis, Tishrit etc.

Neutral- Trees have broad and narrow cross-sections at top and bottom respectively and have weak roots or branches.Neutral Trees are Bilwa ,Chinchini , Kadamb, Kovider, Kutaj , Lodhra, Mahadrum, Nyagridh or Vata, Palash or Kinshuk , Parijatak, Pilu, Ashwath , Plaksh Saptaparna , Shirish , Shlemantaka ,Udumbar etc. For pegs of tents etc, above trees are recommended. Any hard wood is also allowed.

The timbers of masculine trees are best, feminine are of medium quality and neuter are of least quality.

Refer Mayamat, Manushyalaya Chandrika and Yuktikalpataru for more details.

Selection of trees

A- General -As already noted above, a tree consists of hard and soft portions. In this connection the engineer has to take following precautions.

- Bottom of the tree, which has accustomed to bear the weight of the upper portion and being older than rest of the tree, is always stronger. Therefore bottom portion of tree should be used as bottom of the post.

The bottom of one tree should be joined with upper portion of another tree to increase the length.

- The bottom portion should be used as lower portion of the post. The harder portion should be in compression and softer portion should be in tension.
- The portion expected to weather, should be on the outside and used for mortise. The non exposed portion should be used in tenon.
- All pegs, nails or dowels should be of harder wood. Only wooden pegs should be used in wood work.
- The lightweight variety of wood should be used for boats, balloon and such other things
- In carts and other works where sudden jerks have to be borne, the stronger variety should be used.
- In joinery similar woods should be used to avoid unequal expansion or contraction.
- Seasoned and un-seasoned, old and new wood should not be used.
- Iron nails should not be used in wood sap. Nails should not be used in sea going boats.
- A tree grows for eight months and rests for four months which are suitable for cutting of a tree.
- To differentiate bottom portion of tree from top portion, the wood is allowed to float on water. The portion which sinks is bottom portion.
- In mortises the hole should be smaller than the tenon to avoid loosing of joint by contraction of tenon during drying with age.

B - Rejection of trees**:** Texts such as *Rajvallabha, Shilpadipak, Goubhil Gruhyasutra, Paraskar Gruhyasutra, Sukhananda Vastu* and *Brihatsamhita* gives various symptoms of trees which should NOT selected for construction.

Brihat Samhita (58.54-58) specifies that following trees should not be used in engineering works. A Tree;

- in the vicinity of religious place
- struck by lightning (The trees loose its strength after the stroke)
- scorched by fire.(Fire softens the wood)
- Grown in covered area or grown along the roadside (It gives shelter to passengers) or grown in unhygienic conditions.
- Broken by wind or impact of animals (vehicles).
- entangled by other trees or wound by creepers
- Grown in anthills or supporting honey beehive or grown on cremation ground or which harbors vultures or owls.

C- Selection of trees for timber**:** Following trees are suitable

- Strong, fat trees, and having age neither more nor less, straight, sacred mountain, forest and timber found in remote worship places etc.
- Having enchanting appearance those timber are better for making poles.
- The timbers obtained from trees having inside portion white in appearance are best and if red, yellow, black colors then they are lesser good. Straight, strong, desired
- Not affected by rain also where there is plenty of water then, the timber obtained from trees growing in that area are good.
- If water or milk like fluid comes out, after cutting the tree then the timber obtained that tree is good if the fluid reasonable red in color then the tree is worth abandoning.

Worshiped Trees - Not used in construction: holy trees such as Aamalak, Abhayaksha, Agaru, Aribhed, Ashwamari, Badari, Bakul, Dunduka,

Kantaka, Kapittha, Karanj, Karpur, Karskar, Padmak, Patali, Pindi, Putrajeev,

Tilak, Varun etc are prohibited . Ref. Mayamat ,Shilparatna , Vishnudharmottar Purana, Samarangana Sutradhara ,Vishwakarma Vastushastra.

Few important reference books on Vrukshya vidya (Botany)

- Arthashastra (Kautilya)
- Brihat Samhita (Varah Mihir)
- Goubhil Gruhyasutra
- Mahabharata (3000BC)
- Manushyalaya Chandrika
- Mayamat (Maya muni)
- Paraskar Gruhyasutra
- Rajvallabha
- Samarangana Sutradhara
- Sarangdhara Samhita
- Shilpadipak
- Shilparatna (Sri Kumar)
- Sushruta Samhita (6th Century BC)
- Upavanvinoda
- Vishnudharmottar Purana
- Vishwakarma Prakash
- Vishwakarma Vastushastra
- Yuktikalpataru

Introduction to Yantrarnav –

"Yantrashastra or Ancient Indian Mechanical Engineering"

By Late K.V.Vaze

Abstract: The paper introduces an ancient Indian text known as Yantrarnav. The text is not available now in India. The author and the period of publication of this text Yantrarnav (Nectar of mechanisms) is also unknown. However when this book would be available in future, it would be a boon to students of Yantrashstra.

1- Introduction: Late K.V. Vaze was the first to find six torn out pages of the text. Vaze used the available text to add a separate chapter on Yantrashastra, in his Marathi book "Prachin Hindi Shilpshastrasaar – Essence of ancient Indian Shilpashastra". Vaze has quoted many original Sanskrit verses from the ancient texts such as Bhrugusamhita and Yantrarnav in this chapter.

This article is a brief translation of the chapter, and suitably edited for clarity and continuity.

2. Mantra, Tantra and Yantra: These are common words found in most of the ancient Indian texts. But Yantrarnav gives the definitions of these terms.

All actions (or reactions) are of two types namely Savitri or Srushti. The prime mover of any action is termed as Savitri and the work done by the prime mover is termed as Srushti. (Ref. Fig.1).

क्रयातु व्दिविधाज्ञेया सावित्री सृष्टीरेवच।
मानवी पाशवी वापि शक्तिस्तंत्रमितिस्मृतं॥
यंत्रार्णव

Fig.1- Savitri and Srushti

Mantra- Mantra means control of physical elements (wind, water, fire etc) to get the work done.

The person who has the knowledge of Mantra is known as Matradnya. Such knowledge was compiled in poetic forms known as Chanda. Therefore the compilers were known as Chandarshi.Ref. Fig.2.

मंत्रज्ञा ब्राम्हणा: पूर्वे जल वाय्वादिस्तंभनै:
शक्तेरुत्पादनं चक्रुस्तन्मंत्रमिति गद्यते॥
यंत्रार्णव
पुराकृतंतु यत्तज्ञैस्तद्ब्रम्हेति प्रचक्षते।
निच्श्रित्य मनसा ब्रम्हतपोभिर्बहुभि: स्वयं॥
छंदासि वर्तयन्येते छंदऋषित्वेनकीर्तिता: ॥
भृगुसंहिता

Fig.2- Matradnya

Tantra- The physical energy of all living things is termed as Tantra (technique). The person who gets the work done with his own hands is called Swatantra (Independent).

Yantra- Yantras are mechanical contrivances to get the work with less effort and in less time.

3. The five basic physical elements (Panchmahabhutas): According to Yantrarnav each machine

(Yantra) is associated with one or more of the following five basic physical elements.

- Pruthwi (Earth) - Gravitational force.
- Jala (Water) – Hydraulic power.
- Vayu (Air/ Wind) –Wind power
- Tej (Fire) – Heat/ light energy
- Aakash (Space/Ether)

4. Basic parts of a machine: The five basic components of any Yantra (machine) are listed below. Ref.Fig.3.

I. Danda- Lever /Rod

II. Chakra- Wheel/pulley

III. Danta- Toothed wheel (gear)

IV. Sarani- Inclined plane)

V. Bharan-Screw

दंडैश्चक्रैश्च दंतैश्च सरणिभ्रमणादिभि:।
शक्तिरूत्पादनं किं वा चालनं यंत्रमुच्यते॥
यंत्रार्णव

Fig.3- Five basic components of machine

The text Yantrarnav further describes details of these components. Ref. Fig.4.

आधाराधेय न्यायेन दंडानसंकल्पयेत्सुधी:।
आधारमध्य वृत्तयद्देडस्य परिवर्तनं॥
तच्चक्रमिति विज्ञेयं यथा दंडस्तथैवतद।
चक्राव्दहिर्नि: सृताये परस्पर समाश्रिता:॥
तेदंता:कीर्तिता स्तज्ञैर्यथा दंडस्तथैवते।
गच्छन्नधोयो यत्सत्वं कर्षयत्याश्रितंवसु॥
उच्छ्रेययत्समफलं तदाहु:सरणिर्बुधा:।
घंटापथानुसारेण सरणे: परिवर्तनं॥
मेरेरारोहणंतावद भ्रमभित्युच्यते बुधै:।
चक्रानुलंबीय: पाशौ मालाकारो सयत्रित:॥
अनंतत्वास्तु सप्राक्तो ब्रम्हपाश इति स्मृत:।
अनंतभ्रमशीलोय: चक्रदंतानुसारत:॥
ब्रम्हभ्रमंतु तत्प्राहु: यंत्रशास्त्रविशारदा:।
दंडसूत्रप्रपाज्ञो यांत्रिक: प्रोच्यतेबुधै:॥
मंत्रज्ञोमांत्रिकंप्रोक्त: तंत्रज्ञ:कर्मकृत्स्मृत:।
यंत्रार्णव

Fig.4- Details of basic components

4.1 Danda (Lever): To use lever (rod) there must be a strong support. The force is applied at the end of lever. The machines based on this element are discussed below.

Bhu-yantras- (related to earth) are of four types

Rhuju –Bhagna (Straight –Bent): a crow bar is straight but pick axe is bent.

Yugma-Ayugma (pair or single): Nut cracker, nose-pliers scissors etc consist of pair of levers joined at the end or at middle. Handles of many appliances or a walking stick contain a single (Ayugma) liver.

Sama-Vishama (Equal-Unequal): Pans of a balance are equidistant from centre of beam. But some balances such as compound balance the levers are not of same length.

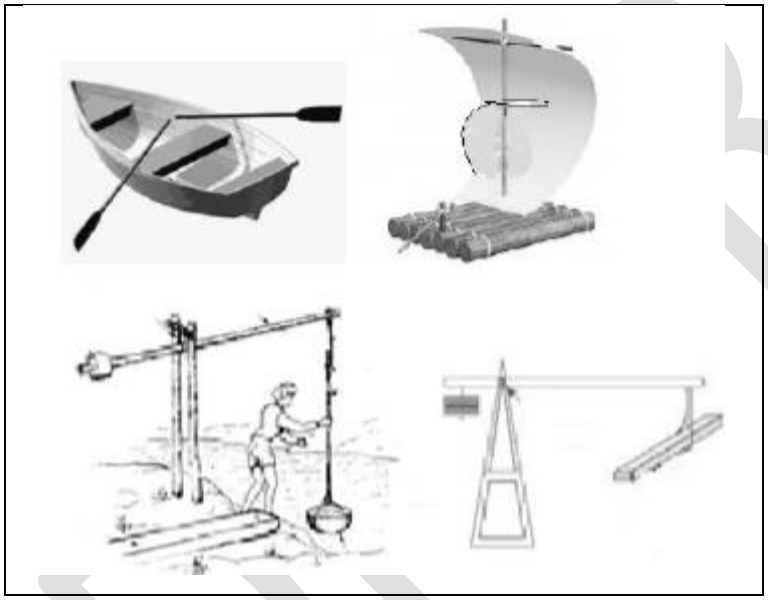

Fig.5- **Bhu-yantras-** (machines related to earth)

Jala-yantras- (related to water) are;

- Aritra (Oar) - for navigation of a boat. Number of oars may be 1 to 100 (boats used in boat race).
- Matsya-danda (Fishing rod/line) for catching fish
- Lat (cranes) – used on ships for loading or unloading cargo.
- Tari (Rafts) - used for water transport.

All the above jalayantras are base on lever principle.

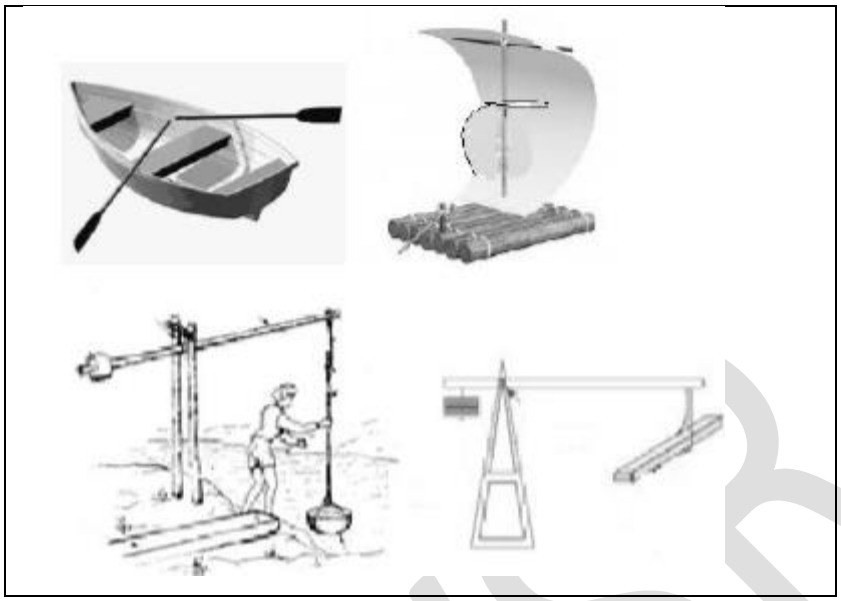

Fig.6- **Jala-yantras-** (machines related to water)

4.2- Chakra (wheel): A wheel rotates about an axis at centre or away from centre. Wheels were grouped under three heads;

I. Chala-Achala (Moving-stationary)- two wheels of flour grinding wheels are the examples of these types.

II. Sama-Visham (Equal-unequal) – Sama wheel rotates around its concentric axis but Vishama wheel rotates around its non-centric axis.

III. Abheda-Putabheda (Pliner-Non-plainer) –Abheda wheels rotates in a single plane but Putabhedana wheels rotate in two different planes. Lime grinding mill is a good example of Putabhedan wheels.

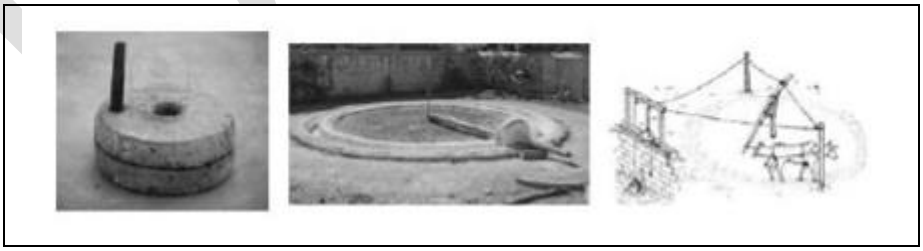

Fig.7-**Wheels**

4.3- Danta (Geared wheel /Gear): Such wheels work in pairs. The diameters of these wheels may be same or different. In some machines the gears are connected with chain.

Fig.8-**Gears**

4.4. Sarani (inclined plane): Sarani is a device in which one part goes upward and another part goes down by same distance. In ancient water lifting device water bucket was attached to a rope pulled by oxen moving on a sloping ground to reduce the load. Same principle is used in rope and pulley system in which load is lifted by inclined rope moving around a pulley.

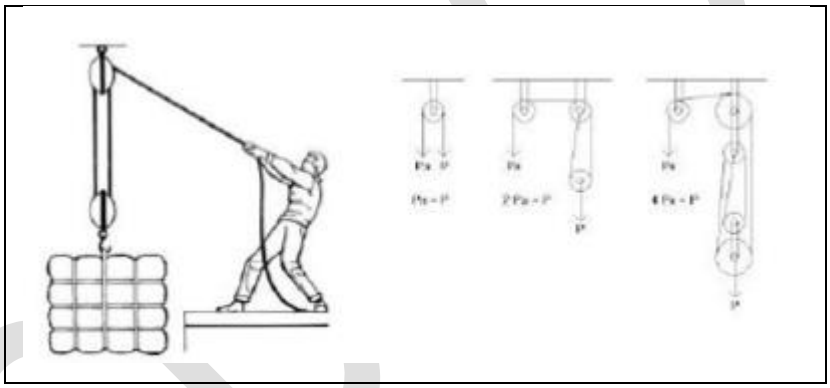

Fig.9- **Rope & Pulley**

4.5.Bramani –Screw: In such device load is applied by a plate attached to a screw to move the plate towards or away from objects. The common examples of Bramani are screw jack (for changing the car wheel), screw press used by book binder or table vice used in a workshop.

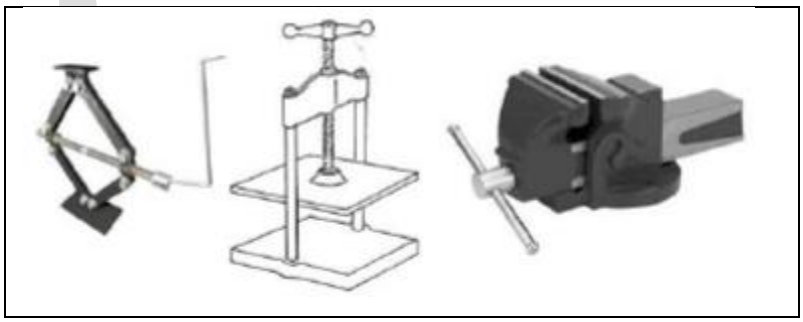

Fig.10-**Screws**

5. Conclusion: The contents of the ancient text "Vatrarnav" are presented in this article and the article is based on Late Vaze's book. Many quotations from YantrarNava were published by Vaze in a series of five articles in the Vedic Magazine (Lahore) under the heading "Story of Mechanics from Indian Engineering Books".

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Method of plastering walls for painting

(सुधालेपविधानम्)

By

V.V.Sharma

Published in I.H.Q. , March 1927, page 53-59

This is an old booklet connected with "Fresco Painting" which was so much in vogue in India from Buddhist period. The booklet contains only 46 stanzas (shokas) in anushtup metre. The manuscript was obtained from T. Shankar rao Tantri. There was a Malayalam commentary also appended to the work. The work deals with the preparation of materials and the method of fresco-painting on, the walls of temples, Gopurams, palaces and other permanent structure of public interest and utility.

The subject can be divided into three parts, the first part describes the method of plastering the walls before painting, the second describes the way how to prepare the several colors for painting, and the third part explains the process of painting the walls.

The booklet will be of interest to those who wish to revive the old art which is about to disappear. A free English rendering of the substance is also appended to the Sanskrit text for wider publication.

The method of plastering the walls (Sudha-Lepa), on which pictures are to be painted, is describedbelow.

Sudha (Chunam) is the powder obtained by burning conch, mother of pearl or shells.

Take the powder and drench with solution of molasses and a decoction of one forth the quantity of small peas (mugda). Add quarter part sand and with unripe plantain-fruits, boiled and beaten well into pulp.

Put this mixture into wooden dug-outs wherein it should be kept for two months, mixing the same daily. At the end of two months, take the mixture in small quantities and, placing the same on a granite slab, sprinkle solution of molasses on it and grind it into paste soft as butter.

In the meantime, level the wall well and smoothen its surface. Take a piece of coconut husk and with one end cut square and well beaten into a brush. Dip this beaten end of the brush into solution of molasses and rub the solution on the wall, Leave the wall, after the application of the solution, undisturbed for 12 hours and the plaster the same with the mortar prepared as above.

Level the plaster by means of trowel of convenient size made of copper, pewter, iron or wood. Care should be taken that surface does nowhere protrude or fall in. When leveling is over, the surface should be rubbed with cold water by means of trunk-brush.

Whitewash the surface when it gets dry. But no whitewashing is required for painting on a wooden surface. Such surface needs only be leveled and smoothened before applying colors.

Here I shall describe the method of color-painting and manufacture and blending of various colors. White, yellow, red, black and blue are the primary colors, while the rests are all mixtures of two or more of them.

The white paint to be used for whitewashing the walls just before painting is manufactured in the following manner. First of all, powders as finely as

possible, conch, mother of pearl, shell, or chalk. Put this fine powder in a mortar of wood not liable to discolor or granite according to the convenience.

Mix and pound it well into paste, treating the same with the milk of tender coconut. Dissolve the paste in warm water and when dissolved, filter and allow the solution tp precipitate the white paint. Whitewash the wall with this paint before the pictures are painted on it.

To make the outlines of the pictures of different objects, a pencil of the following materials should be manufactured. The pencil is call kittalekhani and is manufactured by mixing powdered tiles and powdered cow dung (the former in a lesser and latter in a greater proportion) with a quantity of Tulsi leaves and grinding the whole well into a soft paste, then take small quantities of the paste and roll them into thin round sticks , 2.5, to 3.5 inches long.

Draw roughly on the whitewashed surface the several objects as Gods, upadeva, man, beast, bird, tree, creeper, mountain, ocean etc. fixing these images as seen or heard or read from book, as well as your mind. Whenever wrong lines fall, efface the same by rubbing the lines with unbleached cloth and rewrite afterwards. Outlines being finished, take a piece of Pullaran and begin to draw the picture with it.

The preparation of this yellow color (Pullaran) is as follows: collect from mountains or riverbeds yellow mineral (pitadhatu), wash the same in cold water and when dry, powder the same finely. Pour some water into the powder and grind it into paste. Take the paste and mix the same in plenty of water using a large vessel for this purpose. When the mixture has stood for some time, the mud and other matter will precipitate and can be thrown off while the surface water can be retained. Pour this water again into another vessel and allow it to stand for some time and throw back any more precipitate which the solution may hold. Repeat the process several times till

you get a clear solution. Rub the solution on to an earthen pot (bhinnamrdbhanda) and dry the pot in the sun.

Collect raktadhatu (red mineral) also in the same way and treat the same in the above manner. When clear, rub that also on another pot and dry the pot in sun. Then take a lamp (Gingili oil lamp) supplied with oil and clean wick, and then light it under inverted new earthen pot, taking care to see that pot has no crevices

The soot formed on the inner surface of the pot should be then collected, placed in an earthen or other vessel and well mixed. Add a quantity of pure water thith the soot and make it into paste. This paste should be kept in sun light and then dried. All these three colors should be mixed in pure water, and adding Nimbatoya to it, the whole should well beaten and mixed.

Brushes for drawing pictures are broad, medium or pointed, as the case may be. They are 4.5,4 or 3.5 inches long. The width or thickness at the face should be 6 yavas , but at the back end it should be only one sixth of the above. The form of the brush may be octagonal or round. The face should be bound by copper band.

The broad brush is prepared with the hair about the ears of calf-buffalo, the medium with the hairs on the belly of a sheep and pointed with the hair at the tail of a squirrel. fit in these hairs at the copper band of the brush and fix them there by the aid of lac or yarn thread. Each color should have three such brushes. There should be three brushes each under broad, medium and pointed quality. These can be named broad-broad, broad-medium, broad-pointed and so on for two kinds also. That will make nine brushes in all for each color.

Apply yellow color (pitadhatu) with medium brush and draw the picture effacing all unnecessary marks by unbleached cloth. But taking care that the

lines of pencil (kittalekhani) is left there intact. Apply the other colors with the broad brush. All protrusions and depressions as also roundness of objects should be shown by means of less or more color.

Make the painting beautiful by regular lights and shades. Whenever the yellow, black or red color is lightly applied, mark their extremities by pointed brushes steeped in lamp-black. Where finger nails or other white objects are to be shown, just scrap the paint in that portion by means of a sharp knife or other instrument, and thus paint the walls whenever necessary.

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Alchemy in ancient India

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Introduction- Ancient Indian Chemistry originated from Alchemy, the science of converting mercury into silver or Gold. Manasollas by King Someshwara (early 12th Century A.D.) is an authentic text on Alchemy. Word by word translation is presented in this paper. Modern scientists do not believe this science. But some experimentation has to prove its utility or otherwise.

धातुवादप्रयोगैश्च विविधैर्वर्धयेद् धनम् ।
ताम्रेण साधयेत् स्वर्णं रौप्यं वंगेन साधयेत् ॥३७७॥

With the help of alchemy wealth can be earned. Copper can be converted into gold and Tin can be converted into silver.

शुष्कपुष्पपलाशस्य पुष्पं संशोष्य चूर्णयेत् ।
छागदुग्धेन तच्चूर्णं त्रीन् वारान् परिभावयेत् ॥३७८॥

Crush completely dried flowers of Palash (flame of forest), mix with milk of she-goat and apply it for three days to complete the process.

वंगषष्ठांशचूर्णेन पिष्टेनैतत् पलेपयेत् ।
पुटपाकेन तद् दग्धं तारं भवेति शोभनंम् ॥३७९॥

Smear the Tin surface with the powder (one-sixth in proportion) and the heat it till it becomes beautiful like silver.

श्वेतब्रम्हतरो: पुष्पं स्वरसेन विभावयेत् ।
तालं व्दात्रिंशतं वारान् तेन वंग प्रलेपयेत् ॥३८०॥

Apply a juice of white lotus on Tin for thirty-two day

पुटपाकेन तद् दग्धं वंगं व्रजति तारताम ।
मार्दवं कालिमां गंधं वंगं त्यजति निश्चितम् ॥३८१॥

Heat the smeared Tin or lead and heat it till the black color and smell is removed and it becomes silver like.

श्वेतब्रम्हतरोर्बीजतैलेन परिभावयेत् ।
गंधकं सप्तकृत्वोऽय तेन ताम्रदलानि च ॥३८२॥

Smear an oil (of seeds of white lotus) and sulphur seven times to copper surface.

लेपितं तत्पुटे दग्धं शुल्बं कांचनतां व्रजेत् ।
दाहच्छेदनिघर्षादिकर्मयोग्यं भवेत् तत: ॥३८३॥

Copper is then heated. With such process copper becomes gold and it can be heated and cut for further applications

तस्य तैलेन दरदं गंधकं पारदं तथा ।
मर्दयेत स्वल्पपाषाणे यावत् तत् कल्कतां व्रजेत ॥३८४॥

The oil (mentioned above) can be mixed with vermilion, sulphur or mercury .The decoction can be used for rubbing the metals.

लेपयेत् तेन कल्केन वंगपत्राणि सर्वत: ।
दग्ध्वा दग्ध्वा पुनर्लिम्पेद् वारान् व्दात्रिंशतं बुध: ॥३८५॥

The decoction should be applied on tin plates and should be fired again and again for thirty-two days (by wise person).

ततो वंग भवेत स्वर्णं रञ्जितं सरदादिभि: ।
व्यवहारक्षमं कर्मयोग्यं भवेच्च तत् ॥३८६॥

The Tin becomes gold which is soft and can be further used for different purposes.

निर्यासं शाकवृक्षस्य श्लक्ष्णवस्त्रेन. गालयेत ।
समूलशिग्रुचूर्णेन निर्याससहितेन च ॥३८७॥

Filter with fine cloth powdered resin of teak tree also the dry powder of drumstick roots.

परितस्ताम्रपत्राणि दग्ध्वा दग्ध्वा विलेपयेत ।
दाहै: पंचभिरेतत् कांचनं जायते शुभम् ॥३८८॥

Coat a copper plate with such powder and heat it for five times so that it becomes gold.

फलानि शाकवृक्षस्य पक्वान्यादाय भावयेत् ।
तद्रसेन रसेनापि मंजिष्ठासहितेन च ॥३८९॥

Mix the juice of teak tree with Manjisha.

तेन कल्केन पत्राणि शुल्कजानि प्रलेपयेत् ।
दहेच्च पुटपाकेन यावद् भवति कांचनम् ॥३९०॥

.Apply the mixture on copper and heat it till the copper becomes gold.

सञ्चूर्ण्य वल्कं शाकीयं तद्रसेन विभावितम् ।
करवीररसैर्युक्त् तेन पत्रं विलेपितम् ॥३९१॥

Crush barks of teak to get juice of it and mix with juice of roots of oleander (Karveer) and apply to copper plate.

ताम्रं तज्जायते तारं पुटपाके प्रतापितम् ।
गारोत्तरं भवेत् सम्यग्व्यवहारक्रियोचितम ॥३९२॥

The copper becomes silver by smearing of mixture and becomes workable for other works

एवमादिभिरन्यैश्च वादग्रंथक्रियाक्रमै: ।
कारयेत् कनकं तारं धनवृध्दयै नरधिप: ॥३९३॥

Such are the processes mentioned in alchemy books to increase the wealth with gold and silver

सुवर्णै रजतै रत्नैर्वस्त्रैराभरणैस्तथा ।
पूर्णो व्ययसह: कार्य: कोशो नित्यं महीभुजा ॥३९४॥

A king increases his wealth in treasury by gold, silver and precious stone etc.

इति धातुवाद–रसायनम्॥

End of description of process of Alchemy

Glossary of terms used in Dhatuwad (Alchemy)

Sanskrit	English	Sanskrit	English
धातुवाद	alchemy	पक्वान्यादाय	
वंग	tin or lead	संशोष्य	complete drying
छाग	she-goat	परिभावयेत्	Becomes or about
पिष्टेनैतत्	flour It is not so.	पलेपयेत्	smearing
पुटपाकेन	subliming Or a particular method of preparing drugs	तारं	shrill silver
शोभनंम्	beautiful	श्वेतब्रम्हतरो:	Flower of white lotus
व्दात्रिंशतं	thirty-two	सप्तकृत्वोऽय	week

व्रजति	undergo	दाहच्छेद	burning amputation
शुल्बं	copper	दरदं	red lead vermilion
निघर्षादि	rubbing	निर्यासं	juice Or tree resin
सरदादिभि:	modest	गारोत्तरं	swallowing
विलेपयेत	smear or anoint with	महीभुजा	King, earth- enjoyer
मंजिष्ठ	A creeper (roots) Rubia cordofolia	करविर	Oleanders

Reference

1. Manasollas by King Someshwara(8th Century A.D.),chapter 4-63

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