Health Series

Traditional Family Medicine

Coconut, Supari, Kikar and Catha

HEALTH SERIES :
TRADITIONAL FAMILY MEDICINE

Coconut, Supari, Kikar and Catha

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The information contained in these pages has been culled from various sources. This information is solely meant to create an interest about the wondrous qualities of our medicinal plants. On no account should this be utilised in a lay manner. Help of a trained physician is necessary.

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INTRODUCTION

Coconut is called botanically *Cocas nucifera* Linn and *supari* or betel nut, *Areca catechu* Linn. Both belong to the family of palms or *Palmae* to which many other important plants like date palm and the rhattan palm or the cane yielding palm also belong. This is a large family of plants having 200 genera and 1,500 species widely distributed in the tropical as well as the subtropical regions of the world. Many of them are of multifarious use to mankind, the best example being the coconut tree itself. *Kikar* is known as *Acacia arabica* Willd or more popularly the babul tree while *catha* or Catechu or Black Catechu is *Acacia catechu* Willd. Both of these belong to a still bigger family of plants called Leguminosae to which many familiar plants like tamarind and beans belong.

A. COCONUT PALM

There is an elaborate story in the Puranas explaining as to why this plant received its Sanskrit name *narikela* (*nariyal* in Hindi). The tree was the creation of the great and the powerful sage Vishwamitra as he challenged to bring forth a counter creation of the worlds. After this tree was developed, the mighty sage also arranged to produce human child from the fruits of this tree. The Divine Creator Lord Brahma got worried at this unseemly utilisation of the spiritual powers by the sage and desired to dissuade him from doing so. So he came in person along with Lord Vishnu, the Sustainer and the Great God Shiva, the Destroyer. As the spokesman of the Trimurtis, Lord Vishnu argued thus: "O Vishwamitra, if your intention of creating human child from the fruit of your tree succeeds, it will cause a havoc in the whole world and a terrible imbalance. An explosion of human population will come about and very soon there will be a great congestion in this world. It will be beyond the capacity of the Mother Earth to feed so many additional mouths. The different nations of the world will then come in conflict with one another for want of food. An all consuming and catastrophic war will engulf the whole world. Supremacy of beast like men and war mongers bent on sucking human blood will be established on the earth and there will be no room for either religion or the religious. With the intention of doing good, you will actually cause a great mischief in

the world, in this way. Please therefore desist and give up your idea of creating the human child from out of the fruit of a tree." This reasonable argument of Vishnu found a sympathetic chord in the heart of the sage and Vishwamitra agreed to refrain from creating human child from the fruits of the tree. Lord Vishnu in turn was pleased with this responsive consent and said: "We shall pay due regard to the tree you have produced for the purpose of creating the human child". You planned to create *nara* or the human being, man; we are therefore bestowing on this tree the name of *narikela* the coconut fruit. Henceforth, its fruit will be acknowledged the best of the fruits in the world. No other fruit on the earth will be its equal. The person who will be eating this fruit daily will become a great genius like you and he will be as highly spirited and as great a sage as you are. The fruit will also be filled with sweet water. This delicious water will quench the thirst of the thirsty and will also cure many of the ailments of the patient".

The legend probably stresses the following: 1. The uncanny resemblance between the coconut and the face of man: the way in which it is mostly used is to remove the outer husk fully and retain the inner hard shell with but a rather pointed luft of husk at one end. The husked end would then represent the hair of the head, while at the opposite end, there is a "face" with three "eyes" of the dark spots and the ridge of the "nose" in between. 2. The highly useful nature of the fruit of

this tree as a rich, nourishing food and also as an invaluable article of medicine, in its flesh as well as the water. 3. It is also likely that sage Vishwamitra was the first to discover the uses of the coconut plant and thus brought its invaluable properties to the notice and utility for the benefit of mankind.

Whatever may be the legendary nature of this and such other fames of this tree, there is no denying whatsoever of the immensely significant role that this coconut tree plays in the life and culture of India. The plant is also called a "Kalpa Vrisksha" a wish fulfilling tree and there is literally no part of the plant that does not find some useful application or the other, as a food, as an industrial product, as a medicine, as a roofing and thatching material and so on. The whole economy of many islands and a great share in that of many a modern State rotate around the coconut tree.

There is no religious or auspicious function in India where the coconut fruit and also its leaves do not find a place of pride. Exchange of coconut fruits is a must for most ceremonies and the figures of coconut fruits, the *purna phala*, the perfect and the complete fruit are quite commonly carved or painted on important and sacred places. Worshipping at temples and welcoming of the great people and the honoured guests do need a coconut fruit. And, the cultivation of the tree is always associated with many traditional beliefs. It is advised in Tamil Nadu that the owner of a house should never plant a coconut sapling himself; it

should be got planted by somebody else. The first fruit of the tree is greeted with a ceremony: of worshipping the tree and a distribution of curds rice. All pandals as well as their further decoration in the South are carried out with a liberal use of its huge leaves. Even the flowers and fruit bunches form inviting door ways. The tender leaves are woven in fascinating patterns and hung as decorative garlands or *toranas*. Beautiful patterns are etched on the dried copras and these are set as inviting articles in a marriage ceremony or to greet the bridegrooms and specially so in Maharashtra and North Karnataka for the newly married couple. There is a whole festival called Nariyal Poornima, the Moonlight Function of the Coconut, utilising the coconut tree as its principal point of interest.

Names

The name in English viz. Coconut as well as *Cocos nucifera* (nut bearing) in Botany are derived from the name term for the tree in the languages of the South Seas which is the native land of the plant viz. *kukui* in Ahanta, *kokosi* in Krobo and *coco* in Philiphines.

Sanskrit calls this by a large number of very significant terms. Some of them are: *dakshinatriya* (from Southern parts); *dridhanira, dridha phala* (fruits firmly attached and yielding a water), *karakambha*; *kaushikaphala* (the fruit of Kaushika a name of Vishwamitra), *Vishwamitra priya narikela, narikari* (refer to the legend retold above);

kurcha shekhara, kurcha shiraska (with a brush like tuft of leaves at the head); *maha phala* (with great fruits); *mriduphala* (with soft meated fruit); *mangalya* (auspicious); *payodhara* (bearing milk); *phalamunda, shiraphala* (with heaps of fruits borne in a clump at the crest); *rasaphala* with (juicy fruits); *sadaphala, sada pushpa* (with fruits and flowers always); *toyagarbha* (with water in womb), *shubhanga* (a plant that is sacred all over the body); *trina raja* (the king among the plants), *trayaksha phala, trayambaka phala* with fruits that have three eyes like the Lord Shiva), *ucchataru* (a lofty tree), *varaphala* (bearing sacred fruits), *rasayana taru* (a tree which yields elixir like fruits).

Of these, *narikela* is the most popular and the basic name. The name in most of our regional language is related to this specific term.

The plant is called *narakel, narikel, nariyal* in Bengali; *naliyer, naryal* in Gujarati; *nariyal* in Hindi; *naral* in Marathi; *narla madde* in Konkani, *tenginakayi* in Kannada: *tenkayi chettu* in Telugu; *tenga* in Tamil; *ten* (*ten* in all these meaning, coming from the South) in Malayalam.

Arabic calls it as *sharjatuna narajila* while Persian refers to it as *drhakat narejile*. In Urdu it is *nariyel*.

The dried inner portion of the fruit is called copra in English after its name in Kannada viz. *khobbari*; Kannada has one more name for this i.e. *gitaku*.

Botanical Aspects

Coconut palm is one of the most important plants of the world economically. It is just indispensable in the daily life of millions of people in the South Seas and the tropics of the old World specially. The tree is believed to be a native of the Malay archipelago but it has been carried to and cultivated luxuriously in tropical and even subtropical regions of all the world now.

It grows best near the seashore but occurs even upto the altitude of 5000 feet and much in-land. It is one of the most beautiful, graceful and picturesque plants giving a characteristic and striking tenor to the whole landscape specially as it grows gregariously. This is displayed with most telling effect by the grace of Kerala vegetation, the land of coconuts now, though this was not so even in the recent past.

It has a tall unbranched rather slender stem marked through out by annular or ring like scars of the fallen leaf bases and bearing a clump or tuft of huge leaves at the head. The base of the slender stem is often swollen and the whole tree often shows a characteristic leaning habit. The leaves are very huge, their lamina or the leaf blade is plicate or folded like a fan when tender but splits into long leniar feather like or pinnate individual leathery leaves as it unfolds. The leaves are 6 to 10 feet long and 18 inches wide and are borne in a cluster at the top of the stem. Flowers are unisexual, stalkless and borne on fleshy branched

panicles or spadix in the axil of a huge, woody, fibrous bract called spathe. Male flowers are small and unsymmetric. Female flower is large and borne at the base. The fruit is a three sided drupe. Its wall or the pericarp consists of three distinct layers: a smooth thin rind or exocarp which is green to start with but reaches a brown or a reddish brown hue on maturity; a brown fibrous massive middle region or the meso carp which forms the husk; and, a hard stony endocarp which forms the coconut shell that encloses the seed within. The seed is single and most of it consists of a huge endosperm or the food of the future plant or the embryo which lies insignificantly at one end, just below one of the three eyes of the shell. The endosperm is massive and divided into two portions viz. the outer fleshy region - the kernel or the coconut meat and the inner water which is one of the purest and the most nourishing and valuable waters of the World. Ultimately the insignificant, microscopic embryo develops utilising this luxurious food or the endosperm provided for it by the fruit. The fruits are plucked when full grown, if they are meant for the utilisation of the kernel. If on the contrary it is the coconut water that is neeed, they are plucked at a tender but a well formed stage so that the endosperm water is in abundance but not the kernel which is still thin and slimy but extremely delicious no doubt. Coconuts as they reach the market consist of the endocarp or the shell and its contents.

The fruit is typically adapted for distribution in the salt waters of the sea near the coast. Its fibrous husk makes the fruit light which can therefore float on in the water for long distance travels nicely protected in its resistant massivity. The fruit will strike root when it reaches a favourable spot. It is believed that this is one way why the coconut trees have spread all along the sea coast and from island to island before man intervened on a large scale. Now it is his prerogative to cultivate this great gift of nature as *he* finds convenient.

The great utility of coconut plant can be discussed under three different but rather overlapping heads: as a food, as a medicine and as a raw material for industry, cottage and otherwise.

Coconut as Food

It is the fruit mainly that has the food value. Its water is a refreshing, pleasant and nourishing drink. The fleshy kernel may be eaten raw or shredded and used as such or dried to form dessicated coconut much preferred for candy and confections. The kernel is often ground, mixed with water or not and pressed through a piece of cloth. The resulting coconut milk is very palatable and a good substitute for cow's milk since it contains several vitamins. The chief commercial value of the kernel however is for making copra as the source of coconut oil and oil cake.

Apart from the kernel, the unopened inflorescence is also of a considerable food value. It

is rich in sugar and yields a sweet liquid which is converted into palm sugar or palm gur or jaggary, or drunk as such in the morning before fermentation as an energising *nira* or fermented to produce palm wine, arrack or vinegar.

Coconut oil is one of the most extensively used among the fatty oils, which are also known as fixed oils as they do not evaporate like the essential or the aromatic oils of lemon for example. They also cannot be distilled like the latter without decomposition and have to be secured only by pressure. Chemically the vegetable fatty acids are close to animal fats and consist of glycerin in combination with a fatty acid. The fatty oils are bland and do not have the strong taste and odour or the antiseptic qualities of the essential oils. As such, they are the most important edible substances containing both liquid and solid fats. The demand for edible oils is so much that several processes (for e.g. hydrogenation) are invented and adopted to convert the non-edible oils into an edible stuff.

Coconut oil is secured from the copra by pressure. The oil is pale yellow or colourless and becomes solid below 74°F. The resulting oil cake is again pressed under hydraulic press to secure some more oil. The yield is roughly 65 to 70 per cent. It has also been seen that if instead of the dried copra, the fresh kernel is itself pressed, the yield is 80 per cent or even more. Refined coconut oil is immensely edible and is used extensively for

preparing food products, for instance, margarines or imitation butters. This is specially suited for the purpose as it is solid at ordinary temperature and is almost indispensable for making candy bars and many other confections.

Coconut oil has many industrial uses as well. Its use has been prevalent since long in the preparation of the best of the soaps, the cosmetics, the salves, the shaving creams, the shampoos, the hair oils and a variety of other cosmetic and toilet products. It is the only oil that is used in marine soaps. The oil is also a good illuminant for lamps.

The oil cake is an excellent cattle feed.

The coconut is basically a tropical plant and thrives best within the actual tropical areas. It can grow in any kind of soil but prefers fertile and somewhat sandy areas. Mature nuts are planted in nurseries first and covered only slightly. They germinate in a few months and the seedlings are transported when about a year old. Nowadays there are many Research Stations to took after good Commercial production and offer invaluable advice to the cultivators and there are big plantations of coconut also. There also exist many horticultural varieties; one of the most important variety being a hybrid between the Tall and the Dwarf of variety, which yields quickly and abundantly though for a shorter span of life. Coconut growth is always improved by proper spacing, clean cultivation and good irrigation as well as periodic manuring. The plant yields flowers

and fruits continuously and ripe fruits can be had almost every month. They are usually plucked every two months. The yield and size of the fruit vary with spacing and the variety planted. It has been estimated that it takes 3500 to 7000 tons of coconuts to produce 1 ton of copra, which yields 1200 pounds of coconut oil and 800 pounds of oil cake. One thousand nuts yields 165 pounds of coir fibre.

The dried flesh or copra which is the chief commercial product is prepared in many ways. The nuts are broken into two and dried in the sun or on racks over fires made by coconut shells. A few days after, the kernel shrinks away from the shell and can then be easily removed. Copra prepared this way is dark coloured; its oil content is around 50 per cent. Plantation copra is dried within 24 hours by utilising the sun during the day and heat from fires in drying houses during the nights. This copra is white and its oil content is 60 to 65 per cent. Dessicated coconut which is used by confectioners and candy makes and also for cooking is prepared from the best grade of the nuts. These are cured for several weeks, carefully cracked and the meat removed while still fresh. This is washed and cut into threads and dried in a vacuum for an hour at 160°F. Sri Lanka produces most of the dessicated coconut.

India and Philiphines are also leading centres in coconut products. Coconut is however a commercially important crop in many countries.

Some of the chief countries are India, Sri Lanka, Indonesia, Malaysia, Philippines and the Islands of the South West Pacific Ocean and Polynesia. Many of these countries also produce abundant copra which is sold and often exported on a large commercial scale. In India, Kerala and Nicobar Islands produce maximum crop. Next come Tamil Nadu, Karnataka, Andhra and West Bengal.

The richness of coconut as a food can be realised when we note that its chemical analysis reveals that in every 100 grams of the kernel there are 4.5 grams of protein, 41.6 grams of fat, and 13 grams of glucose sugar, besides, several kinds of mineral salts like those of calcium, phosphorus and so on. No other food or fruit contains such a combination of so many valuables that our body needs.

Here is a comparative evaluation of coconut milk along with a few other milks in use. This refers to the percentage of the contents in the milks in question.

	Proteins	*Fats*	*Glucose*	*Mineral salts*
Coconut milk	0.90	7.10	1.80	0.55
Mother's milk	1.0	3.9	7.0	0.1
Cow's milk	3.3	3.6	4.8	0.7
Powdered milk	38.0	3.6	51.0	6.8

Of all these milks coconut milk is the nearest equivalent to the mother's milk and is the only appropriate substitute therefore to children who are deprived of their mother's milk. Protein is a little less in coconut milk than in that of the mother's milk but it contains more mineral salts and fat. Mineral salts aid in proper growth of the body and also keep it free from diseases while fat makes the body stout and strong. Powdered milk is no doubt much richer in protein but too rich a protein diet is actually injurious to the children. In order to expend the extra amount of protein in the food, spleen and kidneys and other organs have to turn out more work unnecessarily. No food with excess of protein is actually advisible to children. Cow's milk and goat's milk contain three times more protein than mother's milk, and, no other milk contains so low an amount of protein as does the coconut milk. Cow's and goat's milk are given mixed with water to the infants but it is done so rather unavoidably in the absence of any other alternative. However coconut milk is decidedly the best here. Coconut milk is greatly helpful in recovering the lost health and also in prevention of premature death of children whose liver and spleen are damaged due to high protein food or baby food of the powdered milk. The old people specially when afflicted with acidity of the stomach and flatulence etc. cannot digest ordinary milk; coconut milk is a nutritious food for them as well as a medicine; this is not so either with the cow's milk or the goat's milk.

To secure coconut milk, smash well or grind the shredded fresh kernel, mix with warm water and then strain through a cloth. This milk is as fluid as the mother's milk and should not be made thicker at all like either the cow's or the buffaloe's milk. If the grinding, the mixing with warm water and the straining are all properly done, a big sized coconut will produce as much milk as is equivalent to two *sers* of mother's milk.

Tender coconut water is also a highly beneficial drink like coconut milk, nutritious, delicious and medicative; it also contains proteins, fats, glucose and all kinds of mineral salts in greater quantity than in milk. It is highly thirst quenching and constitutes a favourite road side drink in the whole of South and nowadays not uncommon even in the North, specially in the metropolitan cities. This is particularly advised for patients of cholera, recent abortion and the convalescent; it is quite common nowadays to see heaps of tender coconuts available for sale just in front of the hospitals. Both coconut milk and water are highly useful beverages for patients and all those who are unable to digest coconut kernel. When the kernel starts growing, the water inside becomes more delicious and beneficial.

The State of West Bengal preponderantly uses broken milk, *channa* and casein which is very rich in protein for many of its sweets such as *sandesh* and *rasgulla*. As these sweetmeats using such milk products are prepared in great abundance, this

cuts into the milk supply. In order to overcome this shortage, a law was enacted once in this State forbiding the use of *channa* for these typically Bengal sweets. As a result, preparation of them with soyabean butter or coconut kernel was resorted to. But the former will necessarily have its characteristic wild smell but the latter does not. It has been suggested that if *sandesh* is prepared after coconut kernel is ground fine and mixed with a little cow's milk, this will become more delicious than the *sandesh* made of *channa* and also eliminates the percentage of sugar needed for sweetening. Moreover, the latter (i.e. *channa*) is excessively rich with the protein while the former (i.e. coconut milk) is not so and therefore more desirable.

Coconut milk is so good that there is an argument in some quarters that in areas where milk availability is short, people are best advised to take to this habit of taking coconut milk. Eastern India for instance is very short of milk supply. Abundant coconut cultivation here is best suited in more sense than one, for coconut tree has many and a varied use that can boost up the economy of the area to a great extent. Moreover, it is not that the soil and climate of the area are unsuitable for coconut cultivation. With some care this can become a successful project.

It is also claimed that coconut milk is the best suited food for brain tissue, while curds and milk come next and the much acclaimed pulses, the

vegetables and the fruits occupy only the third place here.

The richness and the desirability of coconut in our routine diet is so much that its use should always be encouraged in any way and in any form. It actually occupies an indispensable place in most South Indian kitchens.

Medicinal Uses

Constituents

Coconut contains enzymes such as invertase that inverts cane sugar, oxydase and catalase that reduce hydrogen peroxide. Fresh kernel contains nitrogenous substances, fat, lignin, ash, palm sugar (glucose and cane sugar) and inorganic substances. The coconut milk contains sugar (mannitol), gum, albumen, tartaric acid and mineral water. Ashes of the leaves contain a good amount of potash. Coconut oil comprises of free caprylic acid and also glycerides of luric, myristic, palmitic and stearic acids.

General Actions

Coconut milk is refrigerant (i.e. cooling and refreshing), nutrient, aperient (mildly laxative), diuretic (promoting ample urination) and anthelmintic (counteracting worms). Coconut water is cooling, refrigerant, demulcent (soothing and allaying irritation) and in large doses, aperient. Fresh kernel or the tender pulp is soft, nourishing, cooling, diuretic and also much refrigerant. Meal of

the ripe fruit is hard and not easily digested. Terminal buds of the plant are nourishing and digestive, their fresh juice is refrigerant and diuretic, refreshing and laxative. The fermented juice forms the toddy. Oil from the shell is a rubifacient that causes a reddening to the skin and is antiseptic or killing to bacteria; it is used externally. Even the root of the coconut is diuretic.

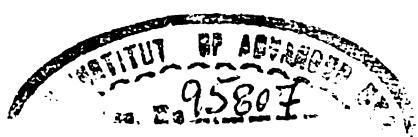
Uses

Juice extracted from the flowering panicle is made into a palm wine or toddy or arrack and also vinegar and a coarse sugar somewhat different from cane sugar. When fermented and distilled, a clean spirit results which is suitable and much used in pharmaceutical purposes viz. for making medicines. The unfermented juice or *neera* taken in the early morning twice or thrice a week by the pregnant, has been seen to have a marked effect on the colour of the infant; the latter will be of fair complexion. If it is of lighter coloured patients, the child will assume the fairest of the complexion. Tender coconut water is useful in thirst, fever and urinary disorders. It is particularly useful in quietening the vomitings of bilious or *pitta* fever. Coconut milk has a medicinal use also. It is applied with benefits along with *kalijeera* or black cumin for the freckles on the skin. This milk is useful in debility or general weakness, incipient pthisis i.e. initial stages of tuberculosis and also cachexia (a bad, depraved state of body and mind). It is given in doses of 4 to 8 ounces thrice daily. If

the dosage is larger, it acts as a laxative. Kernel is extensively used in curries, *sambar*, savouries, sweet - meats and so on.

From the kernel three types of oils are prepared. These are called cobrel, avel and muthel. A tarry and a rather irritating oil is produced from the shell which is also used as a rather specific medicine for the ringworm infection. This is how it is prepared. A clear shell or its portions are burnt in a fire and while still red hot covered over by a stone cup. The oil gets deposited on the inner lining of the cup. This is also a good substitute for acetic acid and creostoe. Fresh oil prepared from the milk of coconut is a very useful application in baldness as it promotes the growth of hair. It is also useful in burns. Coconut oil prepared from fresh kernel is utilised as a substitute for codliver oil in American Hospitals in wasting, highly debilitating pulmonary diseases for e.g. consumption in children. The dose advised is from 20 to 30 minims gradually increased to a drachm thrice daily. This has good effects but the only drawback is that it is rather hard for digestion. For this purpose it is the olien component that is used; this is secured by pressure, then refined by treating it with alkalies and then washed repeatedly and finally distilled with water.

Root of the coconut is diuretic and is used in urinary diseases. It is also anthelmintic. In forms a beneficial astringent gargle for sore throat. Ashes of the leaves also find a use in medicine. In South



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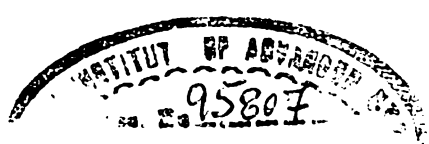

Africa, this is a popular remedy for tape worm infection. The "almond" (viz. the developing embryo) of coconut is scraped from the interior of the kernel and administered first and this is followed in three hours by a dose of castor oil. The worm gets expelled in two hours afterwards.

The tender leaf is used like a cabbage. When boiled it is a delicate vegetable and it is actually eaten raw as a salad or pickled or made into conserves with sugar. The spathes or the huge bract of the inflorescence region yields the sweet liquid from which palm sugar, palm gur or jaggery, vinegar and arrack are prepared. Dried kernel or copra is used for making butter, margarines and most extensively for oil extraction. Giving a piece of copra and jaggery to children is a healthy and much desired procedure, a habit that was quite prevalent among the Indian mothers till only the other day.

A more detailed medicinal evaluation of the parts of the coconut tree is as follows. Coconut fruit is sweet, cooling and much oily. It is indigestible, fattening and tonic and also a laxative. It is aphrodisiac (stimulating the urge of sex), cardiotonic (tonic to the heart), and useful in thirst, biliousness diseases of the blood, burning sensations and also leprosy as well as tuberculosis. But it causes *kapha* or phlegm and intestinal worms. The flower is cooling and useful in diabetes, dysentery, constipation and also urinary disorders and leprosy. The dried fruit or

copra improves the taste, but it is fattening and constipative and also an aphrodisiac. The coconut milk is cooling, oleaginous or oily, appetising, aphrodisiac and laxative. It is useful in biliousness, bronchitis, tumours and the aggravations of *vata* and *kapha*. The fermented juice is also oily, intoxicating, aphrodisiac and anthelmintic. It causes biliousness. The coconut oil is indigestible and is useful in urinary complaints, asthma, bronchitis, consumptions and ulcers.

The bark is good for teeth and also scabies. According to the yunani physicians the fruit is sweet, aphrodisiac, diuretic and useful in fever, paralysis, liver complaints and piles. It enriches the blood and increases the weight of the body. But it causes pain in the kidney and lumbago in persons of cold constitution. The fermented juice is good for stomach and anti helmintic.

Coconut is said to promote the growth of hair and hence it is much used as hair oil or a shampoo and as a local application by the bald and also in cases of loss of hair after fever and any other debilitating disease.

In Jamaica the oil is given in plethora or bleeding at nose. It is given while fasting, warmed and with a little sugar; this procedure is also adopted in influx or discharges from the mucous membrane. An emulsion of the oil and the kernel is prescribed in coughs and pulmonary diseases in general. For this purpose, pound the kernel with water, keep it undisturbed for some time to let the

Africa, this is a popular remedy for tape worm infection. The "almond" (viz. the developing embryo) of coconut is scraped from the interior of the kernel and administered first and this is followed in three hours by a dose of castor oil. The worm gets expelled in two hours afterwards.

The tender leaf is used like a cabbage. When boiled it is a delicate vegetable and it is actually eaten raw as a salad or pickled or made into conserves with sugar. The spathes or the huge bract of the inflorescence region yields the sweet liquid from which palm sugar, palm gur or jaggery, vinegar and arrack are prepared. Dried kernel or copra is used for making butter, margarines and most extensively for oil extraction. Giving a piece of copra and jaggery to children is a healthy and much desired procedure, a habit that was quite prevalent among the Indian mothers till only the other day.

A more detailed medicinal evaluation of the parts of the coconut tree is as follows. Coconut fruit is sweet, cooling and much oily. It is indigestible, fattening and tonic and also a laxative. It is aphrodisiac (stimulating the urge of sex), cardiotonic (tonic to the heart), and useful in thirst, biliousness diseases of the blood, burning sensations and also leprosy as well as tuberculosis. But it causes *kapha* or phlegm and intestinal worms. The flower is cooling and useful in diabetes, dysentery, constipation and also urinary disorders and leprosy. The dried fruit or

copra improves the taste, but it is fattening and constipative and also an aphrodisiac. The coconut milk is cooling, oleaginous or oily, appetising, aphrodisiac and laxative. It is useful in biliousness, bronchitis, tumours and the aggravations of *vata* and *kapha*. The fermented juice is also oily, intoxicating, aphrodisiac and anthelmintic. It causes biliousness. The coconut oil is indigestible and is useful in urinary complaints, asthma, bronchitis, consumptions and ulcers.

The bark is good for teeth and also scabies. According to the yunani physicians the fruit is sweet, aphrodisiac, diuretic and useful in fever, paralysis, liver complaints and piles. It enriches the blood and increases the weight of the body. But it causes pain in the kidney and lumbago in persons of cold constitution. The fermented juice is good for stomach and anti helmintic.

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oily layer settle and skim off the cream. This is preferable to the usual expressed oil.

In Sri Lanka the oil is applied over the head as a cooling agent and the pulp of the young tender fruit is given in cases of sun stroke. The root is said to strengthen the gums and often forms an ingredient of country tooth powder.

Cambodians use the roots, the milk, the oil, the kernel and the wood medicinally. The roots are diuretic; its decoction is prescribed in blenarrhagia or excess discharge of mucus, bronchitis and liver complaints with or without jaundice. The milk is purgative and given in haemoptysis or vomiting of blood and also in eruptive fevers. The oil is chiefly employed in preparing ointments and is applied locally for scabies and ring worm. The kernel is taken internally along with other drugs as a cure for cutaneous ulcers and specially for the ulcer formation in the mucus membrane of the nose. The wood is prescribed in treating piles.

Coconut in Ayurveda

Ayurveda specifies the actions and uses of the plant in the following terms. Coconut kernel is heavy for digestion, oleaginous, sweet in taste, cool in virility and sweet in post assimilation effect. It is regulatory to digestive tract (*anulomana*) and thus laxative and contractive of the tissues and thus healing. It is good for heart (cardiotonic *hrdya*), purificatory to the bladder, strengthening as well as nourishing in general, but causes *kapha*. This

pacifies pains, consumption, thirst, and burning sensations. It overcomes the vitiation of the blood and is employed in consumptions, lesions, fever arid so on.

Tender coconut water is good for colouration of the skin and quietens the burning sensations. It is laxative, cooling, stimulative of digestion, a purifier of blood, a remover of hiccup, a quencher of thirst, and, is employed in aggravation of *pitta*, difficulty in urination, abnormal colouration of urine, vomiting, loss of consciousness, bilious fever, typhoid fever and so on.

Coconut water is employed to wash the small pox scars; this will remove the burning sensations as well as the dots. Sniffing it is presumed to be curative of hemicrania or the headache of one half. This is very much in use in Bengal for stomach upsets though there also exists here a presumption that hydrocele (water collection at the scrotum) arises if the drink is in excess. There is a difference in the qualities of the water of the tender coconut as compared to the water of the ripe coconut. The former is laxative, cooling and wards off vomiting and bilious fever. The latter is constipative, heavy for digestion and cooling.

We shall list below some uses of coconut in specific diseases.

Coconut Water and Its Uses

Difficult urination and bleeding in nose: Mix the powder of the fruit of *nirmali (Strychnos nux*

vomica or the Clearing nut), country sugar (*khand*) and cardamom in coconut water and then drink. This drink will prove beneficial if there is *rakta pitta* also in addition. Adding jaggery and coriander powder in this water and then drinking will mitigate the burning sensation during the difficult urination and also *rakta pitta.*

Liver and Spleen complaints: Make an opening in the tender coconut, fill its water within with as much *saindhav* salt as possible, close the opening with one inch thick of mud and cook this whole coconut on a charcoal fire. When the mud above becomes red, remove, cool it and take out the water within. Add 1 or 2 *mashas** of *pippali* powder in 1 to 3 *mashas* of water. This drink will cure the complaints of all the three vitiations, *pitta, kapha* and *vata.*

Acidity and Stomach pain: Take about 10 *sers* of coconut water, cook on fire till it thickens like a confection; in this, add equal quantities of nutmeg, the three pungents (pepper, ginger and *pippal mul*) and nut mace. Store in a bottle. Administer every day in the morning and evening 1 to 2 *tolas* and do so for 14 days.

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* (The modern equivalents of the traditional units of measurement in the Text henceforth are as follows: 1 *ratti* = 1 *gunza* (a seed of Abrus precatorius), 8 *gunzas* = 1 *masha*; 10 *mashas* = 1 *tola*; 24 *tolas* = 1 *ser*; 1 *tola* = 10 grams.

1 drachm = 1/12 of an ounce. 1 Ounce = 1/2 a pound troy = 480 grains.)

Cataract: In 4 *sers* of this water, add 5 *tolas* of *daruhaldi* (*Berberis asiatica*), 15 *tolas* of *triphala* and 5 *tolas* of *mocharas* (the exudation of the root of the red silk cotton tree). Cook on a well tinned vessel till its quantity is reduced to half, remove from fire, cool, strain and then again cook till it thickens, to some extent. Cool, strain again and cook once more till it thickens still further. Now add one *tola* each of *saindhav* salt and *bhimseni kapur*, 1/2 *ser* of good honey and store. Apply this as a colyrium morning and evening. If cataract is in early stages, this medicine works like a magic. But in older cataracts, its effect is seen only after a delay.

An alternative is to add in place of *mocha ras*, 10 *tolas* of the root of red *punarnava* (*Boerhaavia diffusa*) and 5 *tolas* of *Strychnos* nut powder.

Loss of Consciousness and Mental Confusion: Add *sattu* (a meal of parched rice) and an equal quantity of country sugar in the coconut water. Drinking this will ward off these two afflictions as well as thirst, biliousness and *kapha*.

Rakta prameha, Urinary disorder with blood discharge: Take a tender coconut filled with water, make an opening, let only 20 *tolas* of water remain within, add in this 3-4 *mashas* of *fitkari* (alum), close the opening, and keep it outside at night into the open air. Shake this well next morning and administer.

Milk of the half ripe kernel of coconut and the tender kernel: Both are heavy for digestion, cooling and constipative. The fresh milk is appetising, oleaginous, strengthening, sweet in post assimilation, slightly hot in quality and is useful in *vata* and *kapha* aggravations and also in splenic complaints and cough. This is good in the initial stages of tuberculosis. Eating the kernel of a whole fruit or its milk early in the morning on an empty stomach is believed to be expelling to hook worm. This milk if given before surgical operation is presumed to result in less discharge of blood. The milk is useful in gonorrhoea as well as cholera.

If the vomitings of cholera do not stop by any medicine, giving the tender coconut kernel will definitely stop it. In dry cough, the kernel is steamed, ground and the juice taken and given in a dosage of 1-1/2 *tolas* thrice a day. It proves beneficial.

In cases of one sided head ache, camphor is added to the coconut milk and applied over the forehead. And, the drops of coconut water are administered to the nose.

Eating coconut kernel along with sugar candy regularly will render the pregnant free from any trouble at labour and the child born will be well nourished and fair complexioned.

Seizure of the chest and heart disease: Take the tender pulp, enclose it within a piece of cloth and squeeze out the milk. Take 5 *tolas* of it, mix with it

a rubbing of a roasted turmeric horn and also 2 *tolas* of ghee. Drinking this will prove beneficial.

In all cases of vata aggravation: Take 7 *tolas* of coconut milk, add 3 *mashas* of *triphala* powder and 2 *mashas* of black pepper powder and administer twice a day. Adding only black pepper will also serve the purpose.

Itching, eczema and ring worm: Take the juice of the kernel, add a little of *amalasar gandhak* (i.e. a sulphur) and cook. When the watery portion gets fully evaporated and the oily stuff only is remaining, take it out from the fire. Take now the solid residue remaining in the pan, half of it is to be given for eating and other half to be rubbed against the part concerned. At night apply the oil and slightly rub in.

Burns and baldness: Mix half the quantity of linseed oil in coconut milk and cook till all the watery portion evaporates and the oil alone remains. Applying this oil over burns and scalded regions will be particularly beneficial.The same oil is applied for bald patches to promote hair growth.

Affliction of lu or hot wind: Mix grounded black cumin seeds is this coconut milk, make a paste and apply all over the body. The patient will quieten down soon.

The differences in the qualities of the kernel of the tender coconut, the ripe coconut and the dry coconut are as follows: The first is quickly beneficial in many ailments such as bilious fever,

disorders of blood, thirst, vomiting, burning sensations and plethora or *rakta pitta*. The second causes burning sensations as well as *pitta* aggravations and is heavy, it is obstructive of *mala* or stools, but it gives taste and is sweet, strengthening and virilifying. The last one i.e. dry coconut gets digested only with difficulty; it causes burning sensations and is heavy, viscous, obstructive of stools, but augments strength, virility and taste.

The Kernel of a Ripe Coconut

If this is fresh, it is beneficial in bilious fever and complaints, disorders of the blood, thirst, vomiting, burning sensations and *rakta pitta*. This is specially useful in cases of the bilious complaints of the digestive tract and the acidity in the latter. As it is regulatory, it wards of flatulence or gas collection accompanied with bloating. It purifies the bile as it is slightly laxative; infact it wards of the pains of liver complaints, well. This also proves beneficial in general debility and emasciatedness. It cleanses the bladder and also augments and strengthens the body.

If the pulp is fully ripe, it is sweet, strengthening, promotive of virility, heavy for digestion, causes *pitta*, constipative and hot in effect. It is aphrodisiac and promotes menstruation.

The dried and the old fruit is difficult to be digested, causes burning sensation but it is

oleaginous, appetising, strengthening and promotive of virility though constipative.

After delivery and to assuage the pains of the uterus, the kernel or its preparations are given for eating, or a decoction is made out of 5 *tolas* of this kernel and 2-1/2 *tolas of* sesame. For breast feeding children, if the mother keeps eating this kernel, violence of the small pox in the children gets much reduced.

Sangrahani or intestinal malabsorption: Take 5 *tolas* each of the coconut kernel, the kernel of *bael* fruit and dry ginger. Powder to a fine degree. Mix it in a syrup of 15 *tolas* of jaggery and prepare sweet balls or *laddus* of 1 *tola* each. Taking one such *laddu* along with buttermilk morning and evening for a month would banish even violent forms of *sangrahani.*

Headache: Fill the hollow of a coconut kernel with ghee and place it in the *khichadi* being cooked. When the latter is ready, remove the kernel, add 5 *tolas* of country made sugar and 6 *mashas* of black pepper and pound. Take 2 *tolas* of the final product morning and evening along with milk, for few days. This will quieten headaches of varied types.

Or, make a hole in the kernel top, fill the hollow with *isabgol* powder, close the opening with the removed part of the kernel add a bit of flour, and then fry in ghee of a mild fire. This is pounded on cooling and then mixed with fried flour. The two

together are then made into sweet meats (*panjiri* in Hindi). Taking them would remove even very chronic headaches.

Or, take 20 *tolas* of cooked coconut kernel, mix this well with a mash of pumpkin (*kaddu*), and prepare sweet balls (*modak*) in a syrup of 10 *tolas* of jaggery. Taking one *modak* in the morning along with goat's milk will remove headaches, *vata* aggravations of the headache and pain in the eyes.

Injuries and pains: Take an old coconut, pound its kernel well, mix turmeric powder in one fourth of its quantity, prepare packets of this and warm up on the fire. These are then tied in the regions concerned. Relief is quite quick.

Inflammations due to marking nut and rat poison: Grind the kernel, burn and apply and give the kernel for eating also simultaneously. For rat poison, old copra is ground with raddish juice and applied.

Flowers of Coconut

These are cooling in quality, constipative, mitigatory to plethora (*rakta pitta*) and useful in dysentery and specially so in dysentery accompanied with blood and in excess of urination.

The freshly extracted juice of the flower is heavy for digestion, promotive of virility, very oleaginous, causative of *kapha* and *pitta*, quickly intoxicating and destructive of worms and *vata*.

In diseases following delivery: Here is a rather elaborate procedure but much recommended. Take an unopened flower bud, remove the outer hardish coat, pound the inner part well in a wooden mortar. Add 1 *tola* each of nutmeg, nutmace, clove, black pepper and dry ginger and also one and half a *tola* of *keshar* (saffron) - all powdered well and strained. Do so in the same mortar adding a little of coconut milk. Prepare 14 pellets. These will prove very beneficial. One pellet is to be taken in the morning and then another in the evening along with cow's milk. The diet advised is just cow's milk only; if not possible, good quality rice and little bit of wet ginger for taste can be taken. No water should be given at all. In case of thirst, only cow's milk should be given. This can be continued to 7, 14 or 21 days depending upon the condition of the patient. Even after the regimen is over, no water should be given, not even for bathing. After this, both the quantity of milk and rice can be gradually increased. And, the giving of water can also be commenced in a very gradual manner.

By this procedure, hunger will increase, milk gets digested well, blood formation and circulation are both improved. The very face will show the sign of grace, health and lustre. The effect is seen in the first week itself. If hunger starts and the patient can digest 4-5 sers of milk a day and the signs of the disease are lessening presume that the treatment has worked well. If started in the very initial stages, the effect is very good.

This treatment is good in cases of *sangrahani* (malabsorption), consumption and feeble digestion also.

Urinary Stones: Take the dried flowers of coconut—those that fall down by themselves. Prepare a chutney from them with 3 *mashas* of water. Add 1 *masha of javakhar* or burnt *banana (i.e. banana alkali). This is to be mixed with 20 tolas of cold water, stirred and drunk in the morning. This will remove very quickly the stones of the bladder and the kidney; the acute pain and distress common in this affliction will also disappear. This is a very successful and safe procedure.*

Abortion: Take fresh flowers, the fruit of *gular (Ficus glomerata) and nagar motha—all in equal parts. Prepare a decoction which can be given to reduce the chances of abortion.*

The Oil of Coconut

This oil is heavy for digestion, good for health, destructive of kapha and worms and is employed beneficially in cases of cough, breathing difficulty, obstructed urination, prameha and itches and eczema. It is highly nourishing to the emasciated and heals and fills up the lesions and injuries.

Pure coconut oil can be employed like ghee when it augments the growth of the body and also acts as an aphrodisiac. This is an excellent substitute for cod liver oil with an added advantage of not

having the foul smell of the latter. It is therefore most beneficially utilised in initial stages of consumption. But it is rather hard for digestion. It is thus given in a dosage of 20 to 30 drops to start with and going upto a drachm; the net dosage can be distributed over many times a day. This augments memory power and also heals the injuries. However consuming it for a long period would lead to dysentery. It is to be noted here that if the oil is prepared by boiling the coconut milk, such an oil does *not* lead to either dysentery or indigestion.

Coconut oil is much better than the animal fat or grease. Even in preparing ointments this is more preferable. It is also an ingredient that will remove the aggravations of *vata.* Infact, powdered black pepper is mixed with it and utilised for that purpose very usefully. Even here the oil secured from the coconut milk is better.

Take about 5 *sers* of the coconut juice, cook and while it is being cooked add 4 *rattis* of salt and 2 *mashas* of turmeric powder and go on stirring well. When this is thickened well after a long boiling, a solid residucim remains below and an excellent fragrant oil is secured above which can be stored safely in a bottle. After a few days this oil may become slightly acidic, but it will never suffer in its quality. This is applied on syphilitic sores by means of a cotton swab. This also heals all types of wounds very well. It forms an effective application in burns and scalds.

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The oil secured from dry copra by pounding is cooling. This is applied and massaged on the head to cool down as "heated" brain. This is also applied beneficially in any regions of injury on the body. The wound will heal well and a purification of blood will occur.

In cases of eruptions, itchings, eczema, boils and other skin afflictions, camphor is mixed with this oil and applied.

The Fibres of the Coconut Fruit

Hiccup and vomiting: The fibres at the tuft of the coconut are put in *chilam* and smoked in, like the tobacco in *hooka*; or these fibres are burnt, the ashes are mixed with honey and licked up like an electurary. Or, the ash is mixed with water and drunk. All of these are effective in stopping hiccup. Or, mix 3 *mashas* of this ash in milk prepared with *dashamul* and administer.

If there is too much of vomiting, burn the fibres and secure their white ash. Burn similarly betel nuts into charcoal. Mix them together in equal quantity, take 4-6 *rattis* of this mix, give it 3-4 times in 2 to 3 hours along with honey. All types of vomiting will stop.

Bleeding and Breathing Difficulty

In any injury where bleeding is taking place applying the ash of fibres there, will stop the blood flow.

Fry the fibres on a pan (*tava*), powder, give in a dosage of 4 *rattis* along with honey. This gives quick relief in breathing difficulties.

The Coconut Shell and its Uses

Ring Worm: Burn the coconut shell, take this in equal quantities of fried borax (*suhag*), camphor and sulphur. Treat this mix in lemon water and then prepare a dry powder. Add neem leaf, take ghee washed 100 times in boiled water and mix. Apply this on the ring worm spots. The cure is sure.

Piles: Burn the shell along with the fibres, powder them fine and administer in a dosage of 1 *tola* followed by a glass of cow's milk. Continue to do so for a few days and during this medication, oil, sour substances, jaggery and red chillies should be avoided.

This will be useful in piles of both the types, bleeding and the dry.

Neera

Neera refers to unfermented sugary juice extracted from the flower tops early on the morning. This is heavy for digestion, sweet, highly viscous, rather quickly intoxicating and virilifying. By afternoon, however an amount of acidity sets in here. This augments both *kapha and pitta*; it is stimulative, digestive, germicidal and somewhat virilifying. This is given as a drink in vomitings of cholera with quick, beneficial results.

To make the child in the womb beautiful: Two to four times a week, neera is given as a refreshing drink to the pregnant. If this is continued to be given so, it is followed by a beautiful and fair complexion in the child in comparison with that of its parents.

From this *neera*, a type of jaggery, vinegar and a kind of alcoholic spirit are also prepared.

Roots of Coconut

Even the roots of coconut have their medicinal applications.

The young, tender roots are diuretic and are useful in gonorrhoea and liver complaints.

Obstructed urine: A thick application of a paste of these roots prepared by grinding them with water over the bladder region externally will result in a free flow of urine. Simultaneously a decoction of the roots is also administered.

Difficult urination, bronchitis and liver complaints: A *fanta* (cold infusion) or a decoction of the roots is found beneficial in all of these conditions.

Throat inflammation: Gargling with the decoction of the roots proves very beneficial.

Leaves of Coconut

It is not much known but true that the young, tender leaves of coconut are perfectly edible. They are boiled and utilised as a delicious vegetable,

much like cabbage. Since they are sweetish, they are edible even as raw much like a salad material. They are also used in preparing *raitha* (with curds) or *murabba* (a sweet preserve). This is paliative to *pitta* aggravation.

A General Note

An usual drawback put forth in using coconut, specially its kernel is that it is rather heavy for digestion. But this can be overcome if coconut is eaten along with sugar or better, sugar candy or jaggery.

Coconut in Yunani

Yunani system of medicine also has many active applications for coconut. Its kernel is considered very nourishing but as it is heavy, its digestion and assimilation are both much delayed. This is augmentative and virilifying. It gives great strength to the natural digestive fire and confers heat and energy to the whole of the body. The old copra destroys the worms of the stomach, specially the small intestinal worms which will get expelled along with the faeces. For the intestinal worms particularly, copra that is as old as three years is employed in a dosage of three *mashas*. The principle effect of coconut in the body is to promote pure blood formation and is also an aphrodisiac agent. For the latter purpose, copra is used along with sugar employed in making the special aphrodisica sweet meats (majun). The oil secured from excellent copra is a good substitute for ghee.

Such an oil is an augmentor to the growth of the body and is also an excellent aphrodisiac. Massaging with such an oil is a good antidote to the pains of cold. Applying it to the scalp will promote hair growth and also render the latter glossy, soft and glistening.

The two disadvantageous effects of using coconut kernel is that it is obstructive of free flow and gets digested only very slowly. Sugar and sugar candy are the two counteracting agents.

The freshly extracted juice of old coconut is highly nourishing. Dried coconut or copra is wormicidal. Coconut water is good in gonorrhoea; it will promote free flow of urine and will also ward off the associated burning sensations. This water is given also to stop vomitings during cholera.

Coconut bark is beneficial in cases of dental health and skin afflictions like scabies and itchings. The coconut kernel is much useful for persons of cold constitution specially for the *vatic* pains at the loins and the pains of the kidney.

The roots are diuretic and are also employed in the form of decoction to stop inflammations of the throat. They are effective in preventing blood flow during haemorrhage. In cases of injuries due to friction and the bites of leech, the coconut young roots are employed beneficially.

Coconut as a Household Remedy

Coconut is one of the regular and almost constant article available in Indian kitchens,

specially in south India. It is therefore desirable to know some of its very common uses as a kitchen remedy. A few of them are listed below.

Coconut is an excellently nourishing food. For persons who are involved in fatiguesome physical labour this is a particularly strengthening tonic. Raw coconut rather than dried copra is preferable to all medicinal purposes and restorative consumptions.

Tender coconut water is one of the most refreshing drinks. This quenches thirst, removes tiredness, obviates laziness and makes one lively and alert. Among the many medicative actions that this possesses, its effect is very well and quite quickly seen in cases of urination accompanied with burning or in obstructed urine. However, tender coconut water is contra indicated for patients of indigestion, cough, breathlessness and asthmatic bouts. If pregnant ladies find that there is an excruciating pain during urination, they are best advised to consume as much of tender coconut water and barley water as they desire. This always proves greatly relieving. Another simple recipe to get rid of the burning sensations during the passing of urine is to consume tender coconut water twice a day adding to it a little bit of jaggery and half a teaspoonful of coriander powder.

There are many more uses of this tender coconut water. Washing one's face with it daily will remove the pimples and the black freckles on the face and also confer a soft and lustrous skin to the

face. In cases of a feeling of burning sensation at the soles of the feet and the palm, apply a mixture of this water and lime water in equal proportion, adding a pinch of turmeric powder to it. Relief would come about quite soon.

On all accounts, tender coconut water is a very cooling drink. This is particularly beneficial to patients of heart diseases, liver complaints and kidney disorder. This is a sure measure to assure efficient urination. In cases of dysentery, diarrhoea and particularly the choleric dysentery as well as in excessive vomiting, body looses its water content to a great extent and it will also suffer from a loss of nutritive salts. An excellent measure to obviate this disturbance very quickly is to give such patients this coconut water after adding to it some lemon juice. It is an excellent drink even to infants who need such a treatment particularly urgently. Specially for such infants who are prone to vomit out the milk that they have just taken in, giving them milk mixed with coconut water is a useful measure. Vomiting will stop and the milk is easily taken in; it gets well digested and also assimilated. Administering this water is quite medicative and very essential to patients of contagious diseases; such a drink will enable them to assimilate the medicines given and they will soon regain their health. For young children, giving them a drink of coconut water in which a well ripened banana fruit is mashed well is a very nutritious diet; it very much equals milk in its nourishing ability. To stop persistent vomiting give a cupful of this water in

which three to four pinches of cardamom powder and a big spoonful of honey are added. This measure is to be adopted thrice a day for two to three days together.

The thin flesh of the tender coconut fruit is to be mashed well along with a well ripened plantain fruit. This is to be first mixed with milk and then taken in. It becomes a very easily digested and nourishing food. It is also strengthening and very much likeable—in fact an invaluable food for children, and for the chronic patients of digestive system. Another delicious dish which is also equally medicative is prepared as follows. Grind the gratings of coconut flesh into a smooth paste using a cupful of coconut water. Add powdered sugar candy and cardamom. Taking this once a day is very beneficial in cases of chest pain, bronchitis, hiccup, sleeplessness and gastric ulcers.

We shall now see a few interesting uses of coconut milk which can be obtained by squeezing well the gratings of its flesh into a cup.

Giving this milk along with tender coconut water is a particularly health promotive measure for aged persons. This is an excellent liquid food likeable by all from infant to the very much advanced in age. This drink proves highly beneficial to children suffering from rickets.

Mixing this milk along with glycerine and applying it them all over the body will render the

skin soft and smooth. This is a proven cosmetic utility of coconut.

Grind poppy seeds *(khas khas)* well after soaking them sufficiently in water. Mix this milk with liquid with an equal quantity of coconut milk. Take this daily at night along with honey. Such a measure will ward off the persistent coughing born of excessive smoking of cigarettes, chest pain, sleeplessness, dysentery and diarrhoea.

Take the gratings of a well matured coconut flesh. Grind them fine with a little quantity of water. Squeeze the coconut milk now directly into a stainless steel vessel, strain it well into a vessel kept on low fire and boil this milk in that way for some time. It will soon come about that the watery portion gets separated from the milk and pure coconut oil would alone remain in the vessel. Store this oil safely in a bottle with a tight lid. Applying this oil frequently is a very efficient remedy to get rid of persistent and recurring sores of the mouth, the apthae. Chewing dried copra along with sugar candy is another simple cure for such sores on the mucous membranes of the mouth.

Giving raw coconut flesh and a little piece of jaggery to children is a good practice. This will ensure hard and durable gums and will also prevent dental caries.

Coconut oil can cure the very painful distressing complaint of whitlow. For this purpose, take a piece of clean cloth and soak it in lime water.

Warm well a little quantity of coconut oil and dip this cloth about in such a hot oil; you will hear a crackling sound. Remove the cloth piece afterwards and tie it as a bandage over the affected part when it is still rather hot. This will reduce the distress and cure the complaint. Squeeze a few drops of lemon juice into coconut oil. Mix such an oil with an equal quantity of lemon water. Applying this mixture all over the body will render the skin smooth, soft and lustrous. This is a very good cosmetic treatment to skin. Wrinkles will not appear on a skin treated this way and the shine of the skin remains persistent. The skin gains in health as well. The preparation is also a good hair tonic. It will stop premature hair fall, increase the health and render the hair long, dense, glossy and lustrous.

Take a clove of garlic and fry it in coconut oil. A few drops of this oil let into the aching ear which is also discharging pus will stop the pain and cure the affection.

Coconut oil is an ideal medium for massaging. In the seventh month of pregnancy, it is quite frequent to suffer from back pain. Massaging the back with coconut oil or castor oil and then taking bath in hot water will lessen this pain much and will give a welcome relief. For infants, massaging with coconut oil and cow's butter and letting them play in light sun and then bathing them is a very salutary measure for their over - all health and energetic development.

Even the dry hard shells of coconut have their own use. Char some pieces of the shell and powder them well. Add to this, powdered salt and pepper in a requisite proportion. You will secure an excellent toothpowder. Set fire to these pieces to such an extent that they become converted into ash. Take a teaspoonful of the ash, add it to butter milk and take in. This is a curative measure for dysentery, diarrhoea and also the collection of morbid gases in the stomach or flatulence.

The coconut coir has also been used medicinally. Burn some amount of this coir into ashes. Take a teaspoonful of the ash, mix it well in tender coconut water, add a small quantity of sugar candy and administer this drug twice a day for young girls who suffer from excessive discharge during menstruation. This proves quite beneficial. The same measure has also proved an excellent remedy for gastric ulcers and bleeding piles.

Prepare a decoction from out of the coir, add a teaspoonful of honey to a cupful of the decoction. Administer this to patients. It is a sure for infection due to round worms and flat worms.

Non-medicinal Uses of Coconut

The coconut tree has many important non-medicinal uses also in great abundance. The fibres of coconut husk form the basis of coir and rope making both of which are of great commercial value. The term coir is applied to the short, coarse and rough fibres of the greater bulk of the coconut

fruit. For this purpose unripe coconuts or the husk removed during the peeling of the nut are soaked in salt water for several months to loosen their fibres. They are then beaten to separate the fibres which are then washed and dried. The use of coir is multifarious. In tropical Asia and the South Seas they are the source of sennit braid which is used for houses, cables and cordage. Coconut fibres are superior to all others for this purpose as they are very light, elastic and extremely resistant to water. Coir is also used in making bristles for brushes, doormats, floor coverings, sacks, coarse textiles, upholstery, stuffings for the bearings or railroad cars and as a substitute for oakum or the ravelings of hemp fibres. Coir as a mat material and an interior decorative has become a fashionable stuff in recent years. Kerala and Sri Lanka are good commercial centres for coir products. In Puerto Rico, coir is prepared for use in horticulture as a peat substitute. Coir has also been used as a raw material for paper making.

The hard shell or endocarp is an excellent fuel as it contains much oil content. It is also a vessel or a container, a laddle or a source of a fine grade of charcoal. Since it takes an excellent finish as well as good polish, there is a flourishing industry of decorative pieces and attractive household articles utilising the discarded shells of coconut. For this again, Kerala is the chief centre.

The huge leaves of coconut as such or most commonly woven together when young and then

dried, form the favourite material for thatchings, hut constructions and many temporary structures like partition walls, screens and so on. The tender leaves are interwoven into bewitchingly attractive decorative garlands or *toranas* or even *mantapams* or houses and platforms for the gods in Tamil Nadu and Kerala. The leaves are also used in making baskets, hats, mats, curtains and screens. The petiole or the stalks of the leaves and the central midribs are used for fence posts, canes, brooms, needles and pins.

The trunk constitutes a strong durable wood best suited for houses and bridge making. Some of the porcupine wood of commerce much used for cabinet work is obtained from the coconut.

The bud or the heart at the apex of the stem is eaten as a salad material and is also cooked like a vegetable much like cabbage.

The bark contains a useful resin while the root is a drug material.

B. SUPARI OR BETEL NUT

Coconut is essentially a food material but the betel nut is a masticatory viz. an article that is chewed as a mild stimulant. However the use of betel nut is probably much more than other masticatory such as tobacco, prevalent all the world over, or chewing gum - mainly an American habit and cola, the seeds of the cola tree—a native of many parts of tropical Africa, chiefly restricted to that region.

The desire for chewing betel is very great and happens to be a very ancient practice indulged in by all classes of people almost at all times. This habit is prevalent from Reunion islands and Zanzibar to India, Burma, Malaysia, Vietnam, Southeastern China, Indonesia, the Philippines and the far flung islands of the Pacific Ocean. Such a wide prevalence is an index of the great antiquity of this habit. The ancient Greek historian Herodotus described this habit as far back as in 340 B.C. itself. Betel chewing is so wide spread in India that it was estimated that over 100,000 tons of the nuts are used in India alone. It is chewed alone and usually after the meals or more commonly along with betel leaf or pan with or without tobacco and sometimes with a variety of many ingredients that are prepared in rather elaborate ways. Pan chewing often forms almost a ceremonial necessity.

Infact, both coconut and betel nut form auspicious materials or *mangala dravyas* for greeting the elders, the guests and the gods, the former as a *purna phala* - a perfect, all complete fruit and the latter, as a necessary adjunct material.

Betel nuts or areca nuts (named probably after its term in Kannada viz. *adake*, the tree itself being very intensively cultivated in coastal Karnataka) are the seeds of the betel nut palm *Areca catechu* belonging to the same family as that of coconut, namely Palmae. Chamber's English Dictionary

traces the root of the term *Areca* to the Portugese adaptation of the Malaysian term *adekka* for the plant. The term catechu refers to a dark extract of some Indian plants such as *acacia* (*kikkar* which we shall see latter), and betelnut. In Malay this is called *cachu* while in India, it is known more as *catha*, though the term *kachu* is also prevalent, say, in North Karnataka.

The plant is a native of Malaya specially Sunda Islands but it is extensively cultivated wherever the nuts are used, for instance, in India and the Eastern Archipelago. Betel chewing is often a complex art. The simplest and the more prevalent methods is to have a mixture of three ingredients, betel leaf, betel nut and lime. Slices of cured or semiripe or fully ripe nuts are first placed in the mouth and then fresh leaves of betel - *Piper betle*, smeared with lime are taken in and chewed together. The habit is essentially an after dinner practice as a sweetener of breath. This is not harmful and may aid in digestion. Quite often however, elaborate mixture of cloves, cinnamon, cardamom, nutmeg and other spices are added along with the pan and chewed. Another method is to use tobacco. The use of betel is mostly habit forming.

Names

Sanskrit offers a long list of names to this auspicious plant. They are: *akota*, *chhataphala*, *chikkana*, *dirgha padapa* (an elongated tree), *dridha valkala* (with a firm bark), *ghonta*, *gopadala*,

guvaka, kapitana, khapura, kramuka, puga, pugi; raja tala (the royal *tala*), *suranjana, tambula, tantu sara* (fibrous -fruit) and *valkataru.*

This is called *buah, puah* in Assamen; *qua, supari* in Bengali; *supari* in Hindi; *adake, puga, kaungu* in Kannada; *atekka, ghonta, kamuka* in Malyalam; *kamugu, pakku, pugam* in Tamil; *chikinamu, gautopoka, kolapoka, kramukamu* in Telugu and *supari* in Urdu.

Apart from Betel nut and Areca nut the two common names, English also calls it by many other interesting names. They are : Catechu palm, Catechu tree, Drunken, Date tree, Fasel nut, Medicinal Cabbage Tree, Pinang Palm and Supari palm.

Most European languages utilise areca as the base and call this plant accordingly. Thus, the tree in French is Arec, Arec del'indi; in German, Areca palme; Betel Palma in Russian and in Swedish, it is Areka.

Botanical Aspects

The genus Areca has two species in India, A.*catechu* Linn the areca nut which is well known and *A.nagensis* Griff. of the Naga Hills which is not well known at all being restricted to the Nagaland upto 800 feet in the Eastern Himalayas. The latter has a trunk rising straight as that of the areca nut but to a lesser height viz. 9-12 metres. The trunk is attached to the soil by innumerable black fibrous roots. The fruit is somewhat similar to the areca

nut or the betel nut; Nagas and Abors actually use this material as a substitute for betel nut. Nagas call it as *talpat*.

There are two more plants belonging to the family of the palms, where also the fruits are used as poorer substitute for the betel nut by the local population. They are: *Penanga dicksoni* Bl. found in the mountains of Travancore and Malabar in Kerala and Gerusoppa or the Jog falls and Nilkhand ghats of Western Karnataka. This is called as *kanakamukha* (the gold faced) in Malayalam, *konda* (the hill betel nut) in Telugu and *kadu adike* (the forest or the wild betel nut) or *jandarige* in Kannada. The other plant is *Loxodoccus rupicola* Windl; its seed is also used for mastication with betel leaf much like that of the areca nut. But this is almost endemically restricted to Sri Lanka, where it is called *dotaly*.

The plant of *Areca catechu* has a characteristic, tall, unbranched, rather slender and perfectly erect or straight stem, raising to a height of 12-30 metres and is usually about 50 centimetres in circumference and uniformly thick. A plantation of areca nut has a distinctive appearance of straight pillar like trees. The graceful pillars have a crown of elegant leaves. These are also large and much like those of the coconut palm, rather huge and pinnate, with the leaflets arranged on either side of a large central rachis as in the feathers of a bird. Leaflets are numerous, 30-60 centimetres in dimension, upper ones are united and all are

smooth, hairless and rather shiny and richly green. Spathe or the large bract at the region of the inflorescence is double in nature and is compressed, smooth and non hairy. Spadix or the fleshy inflorescence bears male and female flowers together, both being stalkless and it is much branched. Male flowers are very numerous while the female flowers are solitary and situated at or near the base of each branching of the spadix. Fruit is 3-8.5 centimetres long, smooth, green to start with but becomes orange or scarlet in colour at maturity. Fruit is a drupe with the fruit wall differentiated into three distinct regions much as in coconut but. all, of a very much smaller dimension. The regions are: the outer thin epicarp, the middle fibrous mesocarp and the innermost stony endocarp. Inside the fruit, there is a single seed which bears an endosperm or the stored food material for the developing embryo or the future plant. This endosperm is stone hard at maturity and is deeply ruminate in structure i.e. appears as if it is deeply but irregularly cut. It is this endosperm that is exposed, cured, dried in the sun and utilised as the *supari* or the betel nut. The seed is hard, heavy and bluntly conical. Areca nut plantation is an exacting agricultural exercise as it requires constant care but is highly remunerative as the nuts are always costly and are in great demand here as well as abroad. In fact areca nut has a good export market and forms an invaluable sea borne return to the national exchequer.

There are many cultivated varieties in areca nut such as *jahaju* (coming from the ships) somewhat elongated like the tail end of a cow), *manak chandi* (rather spehrical in shape), *shrivardhini* (a place near Ratnagiri in Maharashtra) and so on. The first two are most common.

The plant is cultivated in West Bengal, Assam, Sylhet and Western Ghats, very richly in Coastal Karnataka or the Districts of North and South Canara and Malabar as well as in the Eastern Archipelago.

Constituents

The part most used is the kernel or the endosperm of the seed or its extract. Root and tender leaves are also employed medicinally. A black coloured extract called catechu is also prepared from the seeds and utilised in various ways. In fact, it is the watery extract of the betel nut kernel that yields the commercial catechu.

The kernel or the endosperm contains catechu (for which purpose the nuts are chewed), tannin, gallic acid, oily matter (with a 14 per cent of fat), gum and the characteristic alkaloids (which act as the stimulant) such as arecaidine, guvacoline, guvacine and choline - the last two however, occur only in traces. All of these alkaloids are also related to one another chemically. Arcoline is a colourless volatile material much resembling nicotine, the unique alkaloid of the tobacco. Of all the alkaloids, it is the arecoline that is the most important. This

is also an anthelmintic i.e. worm killing principle which forms a white crystalline material in association with acids. This is a hydrobromide and constitutes a substance that by itself forms a recognised drug officially sanctioned in several pharmacopeas of Europe. It is soluble in water, alcohol and ether.

Pharmacology or the Drug Action

Fresh, uncured betel nuts are rather intoxicating and they produce outright giddiness in some persons. But the dried and the cured nut in which form it is mostly used is a stimulant; in addition, it is astringent in taste and action (therefore contractive to live tissues and healing) and also a febrifuge - i.e. a remover of fever and its heat. The nut chewing increases saliva formation and its flow. It also lessens perspiration, sweetens the breath, strengthens the gums and generates a mild exhilaration of spirits and a feeling of well disposedness. Areca nut has an aromatic, astringent and a rather acrid or biting taste. Since arecoline is very readily absorbed in the body it is not at all advisable to use it in a pure condition as a taenicide or a killer of the tape worms for which purpose it is often recommended. Instead, it is more preferable to use the powdered nut.

Pharmacologically the action of arcoline very much resembles that of the more common drug materials like muscarine, palleterine and pilo carpene all of which are violent stimulants of persistaltic action of the intestines and the bowels.

All of these also produce a marked constriction of the bronchi or the wind pipes. Another action is on the terminations of the vagi nerves resulting in a notable depression in the heart; the blood pressure also falls down consequently.

The areca nut alkaloid powerfully stimulates profuse salivation. It also stimulates sweating much as the pilocarpine drug brings about.

Arecanut is used medicinally in various forms. They are powders (in dosage of 10-30 grams), fluid extracts (dose is 10 to 30 minims), tinctures of alcoholic preparations (dosage is 1 to 2 drachms) and also as a reputed tooth powder which is actually a powder of arecanut and charcoal. As noted above, arecolin hydrobromide is a statutory drug in German pharmacopea and the French Codex. Taenine is a preparation containing arecanut extract and represents a liquid medicine used in veterinary practices against tape worms. The advised dosage of this medicine for dog is one minim for every pound of the body weight of the dog.

Medicinal Uses

Apart from its value as a masticatory, arecanut has considerable uses in medicine as well. Actually it enters as a pharmaceutical drug in Indian and British pharmacopeas. Pan chewing with betel nut is popularly believed to prevent tooth decay. But since this is regularly indulged in, a constant irritation of the mucous membrane of the mouth

and the gums come about resulting in an inflammation, a loosening and the loss of teeth and sometimes even in cancer.

Ayurveda regards *supari* as heavy for digestion, cooling, dry and astringent in taste. It destroys *pitta* and *kapha* and is intoxicating, stimulative and confers a taste to the mouth and also cleanses it; it is also laxative. The raw and the unripe nut is poisonous and harmful to the eyesight. What is cured and prepared by boiling has a central hard portion; this is excellent and destructive of all the three *doshas*. It can be said in general that the betel nut is harmful like a poison when young and unripe, rather purgative and digested with difficulty in the middle stage, and, almost an elixir like when fully ripe and dry. The nut should therefore be taken only in the third stage.

A gum like exudation occurs on the bark of the full grown trees. This gum is heavy, cooling, intoxicating, bitter and acrid. It causes *pitta* but destroys *vata dosha*.

Powdered nuts are given in dosage of 5 *rattis* to one *mashas* in cases of diarrhoea due to debility at an interval of 3 to 4 hours. Such a procedure proves beneficial even in disorders of urination. Sucking in the juice of a bit of dried *supari* gives an exhilarating and pleasant effect.

Areca nut affords a strengthening to tendons and also acts as a regulative to menstrual cycle. A lotion of it is used sometimes as a contractive to

the eyes much like the atropine. *Supari* is useful in cases of intestinal complaints and even lesions.

An extraction of the young tender leaves is made and utilised as a material for massaging in cases of complaints of the muscles and tendons of the waist.

Decoction of its roots is believed to be useful in the lesions of the lips.

An unripe nut is rubbed with milk and drunk to destroy tape worms.

A pinch of *supari* powder mixed with turmeric powder and sugar when taken in, will stop vomiting.

A decoction of the betel nut and *khair (khadira)* taken along with honey will cure minor urinary affections.

A sprinkling of the betel nut powder will cure syphilitic ulcers.

The tendency of skin to peel off at the mouth gets stopped by sprinkling of the ashes of betel nut and the bigger cardamom.

Consuming betel nut will cure many diseases of women connected with their uterus and menstruation.

Young betel nut is useful in bowel complaints of men and animals especially as an expeller of worms in the dogs.

An excellent worm expeller can be prepared by rubbing one fourth *tola* of the betel nut powder into a paste with two *tolas* of fresh lemon juice. It is often given more usefully in the form of gratings rather than the powder. This is administered in a dose of a teaspoonful after the patient has fasted for 12 to 14 hours, either made in the form of a bolus with ghee or more preferably as a floating on milk. The action is generally noticed within an hour of administration and the procedure is found to be effective in cases of both the round and the tape worms. It is believed that it is the arecoline hydrobromide that is responsible for the action. This has therefore been employed for colic or the twisting stomach pains of the horses as well as man. In man it is utilised as a taenicide (tape worm killer) as well as a myotic drug i.e. useful in muscular complaints.

Betel nut has astringent properties i.e. that of effecting contraction in the living tissues and bringing about an action of healing. This is utilised with satisfactory effects in the relaxed conditions of bowels, that sometimes occurs in tropical regions. If however large doses (say 6 drachms to one ounce) of the seed powder are given for this purpose, it will generate griping (painful contractions) and irritation and the loose motions may start as a result of such an irritation itself.

Another way in which this astringency is utilised is in preparing a tincture or an alcoholic extract of the powder and employ it but freely diluted with

water– 1 drachm of the tincture in 4 ounces of water. This is used as healing gargle for bleeding gums. This is also used locally or as an injection to stop water discharge from the vagina and also in checking the hydrosis or water rash of pregnancy. Here, a sudden flow of acid fluids from the stomach to mouth occurs and an outbreak of burning sensation (heart burn) in the gullet, as well.

Betel nut burnt into charcoal with an addition of an equal amount of catechu and quarter of cinnamon forms an excellent toothpowder.

Juice of the tender leaves is mixed with a bland oil and applied as an embrocation (to moisten and rub as with a lotion) in cases of lumbago which are rheumatic affections of the muscles of the lumbar region (i.e. about the loins).

The nut is regarded as a nervine tonic and an emmenagogue or that which brings about regulation in menstruation and its cycle.

In Sri Lanka, the nut is scraped and applied externally as a healer to ulcers. It is also employed to strengthen the gums and as a worm killer in animals. In Malaysia the green fruit in its unripe state is employed as a poison in combination with opium. The young green shoots are utilised to bring about abortion in early pregnancy.

In China, the nuts are used for their tonic, astringent and anthelmintic (worm killing) properties. In some parts of China, the nuts are

crushed and powdered and mixed with green fodder and given to the horses as a preventive against diarrhoea. In Northern China small pieces of the nut are boiled and the decoction is taken as a household remedy in many visceral complaints.

Cambodians use the leaves internally for bronchitis and externally for lumbago. They give the fruit in cases of diarrhoea in combination with opium and the root in cases of liver complaints.

In Kumaon areas the juice of the tender nuts is given in small doses as a laxative.

Yunani Opinion

Betel nut is considered digestive, contractive, duretic, a strengthener to the heart and a regulator of menstrual flow. It is used in overcoming swellings eyes, mental confusions, chronic urinary distress and pus formations.

It is also a nervine tonic and an aphrodisiac.

Taking *supari* with pan and lime will obviate the ill effects of lime.

Powdered *supari* is given to check loose motion.

Its use in tooth powder is advisable as it strengthens the gums and stops the bleeding.

It is an advisable embrocation for warm swellings.

Nuts are burnt and powdered fine and then used as a colyrium in preventing discharges and inflammations of the eyes.

The deleterious effects of *supari* are: it is likely to cause roughness of the chest and urinary stones. *Katira* (exudation from the tree of *Astragalus strobilifera*) and cardamom are the counteracting agents for these ill effects.

Modern Work

Both in India and China, betel nut has been used as a worm killer in man and animals since times immemorial. This was considered so highly efficacious against both the round worms and the tape worms and the popular esteem was also so high that it became automatically incorporated into the British Pharmacopeia quite early. Modern trials in this direction however, are not uniformly satisfactory.

Early studies carried out in Europe revealed five alkaloids viz. arecoline, arecaidine, guvacoline, gucacine and arecolidine. These were all isolated from the nut and were believed to be active principles especially for the anthelimintic effect observed. Recent studies have concentrated on polyphenol, an important constitute of the arecanut. The effect of this as isolated from fresh, and unripe nuts was studied on the uterus of rat under various hormonal influence and compared with the effects obtained with alkaloidal fractions. The ethyl acetate fraction of the aqueous extract was a stimulant of low degree on all uteri but its spasmogenic activity (i.e. to bring about spasmodic contractions) was comparatively more on uteri treated with progesterone, a stimulant.

The alcoholic extract of the nuts exerted distinct oxytocic (viz. like a hormone secreted by posterior pituitary and helpful in uterine contraction) activity on isolated rat uterus at a dose of 100mg. (microgram). The petroleum ether and aqueous extracts of the nuts were found to have encouraging antifertility activity in rats.

Extracts of areca nuts taken in water, alcohol, alkali and acid have been shown to have an effect of constriction of capillaries (or the minute blood vessels) to a varying degree when tested by a technique known as rat hind limb perfusion. Among these, the alkaline extract was found to be most potent in intensity as well as duration of vasoconstriction i.e. constriction of the vessels. This was followed by alcoholic extract. But the water and the acid extracts are seen to have only mild activity.

Arecoline, the characteristic alkaloid of the nuts was given in a dose of 1 milligram to one kilogram body weight of rat intrapertoneally. This induced slight sedation after five minutes in the maze learning abilities of the rats. After 30 minutes however, the rats regained their activity but took more time to reach their goal now. Moreover, the food given was not consumed by 50 per cent of these rats, indicating a loss of appetite. Both of these viz. loss of appetite and the increased time in reaching their goal are an indication that the alkaloid has a depressing action on the Central Nervous System.

Another important discovery is as follows:

Aqueous extracts of the betel nuts have been shown to have an inhibitory action on the growth of two important microorganisms, *Staphylococcus aureus* (causing boils) and *Trichophyton rubrum* (causing skin infections). The effect was seen *in vitro* i.e. when tested on artificial media and not inside the body of a living animal.

Alcoholic extracts of the betel nuts are shown to have similar inhibitory effect on the growth of some other microorganisms such as *Escherichia coli* (causing diarrhoea), *Candida albicans and C.tropicalis* (causing skin disease) and *Trichophyton interdigitale* (causing a skin affliction between the fingers).

The action of the extract of the areca nuts was also tested on the white blood corpuscles *in vitro*. It was seen that this had a depressant effect on the normal phagocytic (i.e. of eating up the harmful parasites) effect of the white blood corpuscles.

Chewing scented *supari* will destroy foul smell of the mouth. It will produce fragrant breath, increase the acuity of taste in the taste buds and render the gums hard and durable. Taking this daily is likely to ward off dysentery and diarrhoea.

Gargling with a decoction of *supari* will stop tooth ache. It also cures inflammations of the throat.

Excessive use of *supari* leads to anemia and the appearance of jaundice.

C. KIKAR OR GUM ARABIC, ACACIA ARABICA

Kikar is most famous as an yielder of a very valuable gum called Gum Arabic. Gums are degenerative products derived by breaking down of cellulose or other carbohydrate compounds and consist of an organic acid combined with inorganic salts. They occur in many trees, secreted naturally within the tissues internally or they get secreted outside as a result of wounding or through cracks on the surface. Gums help in retaining water since they are essentially mucilaginous and do not leave out water easily. They also serve as reserve food as various nutritive substances are stored in them. They are useful to man in his several industries and also as food and a medicine. Mucilaginous substances are closely related to gums; when moistened with water, they do not dissolve; instead, they form a slimy mass. Writing inks were once prepared as a combination of charcoal, gums and varnish. For instance, the most famous India ink, still in great demand and use, a virtually permanent and paint like carbon ink, is made from the carbon black or soot obtained by burning pipe wood or vegetable oil like sesame, mixed with glue gum Arabic or some other sizing material.

The process of disintegration of the internal tissues, specially cellulose that yields gum is referred to as gummosis. Gum contains large amounts of sugar and is closely allied to pectin, the typical cementing material between the cell walls of plants. It is a colloidal material and soluble

in water unlike mucilage which is not so soluble. In water it either dissolves completely or swells but it is insoluble in either alcohol or ether. The commercial gums reach the market in the form of dried exudations or "tears" as they are called. Gums are specially prevalent in plants of dry regions. They are mostly used as adhesives, and also in printing and finishing textiles, as sizing in paper manufacture, in making paints, in candy industries and also as drugs. The three most important commercial gums of the world are gum Arabic from *Acacia arabica;* gum tragacanth from *Astragalus gummifer* the thorny shrubs of the arid regions of Western Asia and South Eastern Europe; and, Karaya gum from *Sterculia urens*, a large tree of Central India, a gum imported from India in large quantities (several million pounds annually) and much praised for its use in textiles, cosmetics, cigar making, paste and ice cream industries. The last one is also called as India gum.

Gum Arabic is a dried gummy exudate obtained from many species of *Acacia* and other related species. These are small native trees of arid Northern Africa, extensively cultivated in Sudan but now quite common in India as well. The trees are tapped when the fruits are ripe. Cross incisions are made with a small axe and thin strips of the outer bark are torn off. The gum slowly exudes and collects as a hardened drop. After three to eight weeks many such "tears" are collected and are then bleached in the sun and the impurities are removed before shipping.

Gum Arabic has been used by the Egyptians as early as 2000 B.C. Sudan gum has been an article of commerce since AD 100.

Gum Arabic is slowly and completely dissolving in cold water and has a commendably high degree of adhesiveness and viscosity. Most of it is used in the industries of textile, mucilage, polish, and confectionary and as a glaze in painting. In medicine it is used as an emulsifying agent and as a demulcent - cooling and soothing.

Names

Sanskrit calls it by many names: *babul, vabbula barbara* (from Barbaric countries viz. African regions); *kingkirata; yugma kantaka* (bearing double thorns); *dridha ruha* (branches and the wood in general are very hard and durable); *mala phala* (fruits are stringed like garlands with many beads as it were); *pita pushpa* (bearing yellow flowers).

In English it is called Indian gum Arabic tree or Babul tree.

This is known as *kikar, kikkar, babul, jharkat* etc in Hindi; *babul, kala babul* in Marathi; *baval, kala baval* in Gujarati; *jali, karijali, bauni* in Kannada; *karu vael, karu velam,* in Tamil; *karuvelam, babola* in Malyalam; *sak* in Punjabi and Kashmiri; *akakia* (extract) in Persian and Arabic.

Botanical Aspects

Babul or *Acacia arabica* Willd. belongs to the common family of Mimosae to which many familiar

plants like Touch-me-not (*lajvanti*, *Mimosa pudica* a low lying shrubby herb) and *sirish* (*Albizzia lebbeck*, a huge tree) belong. The genus *Acacia* itself comprises of many closely similar or "varieties" of babul such as *A.fernesiana* (bearing musk like aromatic flowers), *A.leucoplea* (the white babul), *A.sundra* (the red babul) and also many other useful and familiar plants such as *A.catechu* (*katha* or *khadira* which we shall discuss later), *A.concinna* (the *ritha* or soapnut plant) and so on.

Babul is a very familiar shrubby, small sized thorny tree of the dry regions usually occurring in large groups or jungles. It grows to a height of 25 to 30 feet; the branches are thorny, very strong and rather drooping. The bark of the tree is grey, with radiating cracks and rough and broken. Leaves are compound, leaflets are very small, much like the tamarind leaves but smaller and occur in pairs of 10 to 20. The thorns are at the base of the leaves, very strong, white, straight, sharp and double and 1-3 inches long. Flowers are yellow, small and arranged in spherical heads; they are slightly scented. Fruits are 3-6 inches long, half an inch broad, flat, dry, curved, white in colour and constricted all along with reference to the seeds which are 8-12 in number. On maturity the fruit breaks into one seeded bits across these constrictions. The seeds are flat, round and grey coloured. The tree flowers in the months of Shravana-Bhadrapada (July-August), fruits in Chaitra (March-April) month and by Grishma (May-June) the fruits are well ripe.

On the surface of the bark, reddish white exudation or the gum is generated, by itself or on wounding. Gum collection is usually done during summer.

The tree occurs almost all over India specially in the arid jungle regions of the black soil. It does not probably cross the altitude of 2000 feet. It is plentiful in Western India, the Deccan region and Coromandal Coast.

There are two varieties of babul; the bigger and the smaller. The larger is called the *kikkar*; its stem ranges from 2 to 15 inches in diameter. The smaller is called *A.senegal*; even the fruits here are smaller and these are green when tender but become blackish on ripening. Flowers here are more abundant and more fragrant. This is called *khor kumata* in Hindi. In medicinal property this is equal to *kikar*.

There is a Bengal variety much prevalent in Bengal. Both the leaves and fruits here are dark coloured; the flowers are profuse but the smell is not good. This is regarded as useless medicinally. There also occurs a "foreign" *babul*; the tree is much small, shrubby, the branches are much spreading; the leaves are small and much like *babul* but borne on green flat petioles or phyllodes. The plant is grown mainly as an ornamental plant of the gardens. Though this is called "*vilayati babul*" or foreign babul in Hindi it is altogether a different plant botanically and called *Parkinsonia*

a. ıleata. In Gujarati this is known as *rambabul* or *Paradeshi babul* and in Marathi, *kesari babul.*

Of late, a new horticultural variant of babul called *subabul* in Hindi is becoming very popular mainly because it is a quick growing tree that can be grown almost everywhere with almost no care, except in the initial stages. It yields abundant fuel and rich fodder as it is thornless.

Botanically however the following different species of *Acacia* are known as some "varieties" of *babul* and are so named in our different regional languages: *Acacia farnesiana* (*vilayati kikar* or *gandha babul* in Hindi; *guya babula* in Bengali; *jab bavala, gu-baval* in Gujarati; *karijali* or the black babul in Kannada and Malayalam respectively; *gul babhul* in Marathi; *kuebaval* in Sindhi). Kannada calls a large number of Acacia species as but various types of *jali*, its name for *babul.* These include *A.eburnea* (*pik jali*). *A.farnesiana* (*kasturijali*, the fragrant), *A.latronum* (*dodda mullina* jali, the babul with large thorns), *A.leucophloea* (*bili jali*, the white babul), *A.planifrons* (*hode jali*, umbrella thorn) and *A.sundra* (*kempujali*, the red babul).

Many of these various species have some similarity or the other with *A.arabica* but it is only the latter that constitutes the famous gum arabic with which alone we shall concern ourselves henceforth.

The parts of the plant used in babul are: bark, fruits, leaves, gum and the thorns-individually or altogether when it is called the *panchanga* or the five organs forming a set.

Constituents

Gum contains an arabic acid combined with calcium, magnesium and potassium. There also occurs here small quantities of malic acid, sugar, moisture (14 per cent) and ash or alkaly (3-4 per cent). The bark contains a large quantity of tannin which makes it a very valuable material, for instance, for tanning the leather. Even the pods have considerable amount of tannin viz. 22-24 per cent.

Medicinal Importance

Ayurveda considers *babul* as heavy for digestion, dry in quality, astringent in taste and bitter on post assimilation effect. Pharmacologically, it is palliative of *pitta* and *kapha*, preventive of bleeding or clotting, healing to wounds and contractive. It mitigates burning sensation and is destructive of poisons. It is used beneficially in the following complaints: cough, liver complaints, dysentery due to indigestion as well as dysentery in which blood is accompanying, *vatic* troubles and *prameha*, the urinary disorder.

We shall now consider the medicinal utilisation of the different parts of the plant.

Bark of Babul

The bark is particularly contractive, heavy and astringent. It is palliative of both *kapha* and *pitta* aggravations and destructive of worms. It finds much acclaimed applications in the following disorders: bronchitis, dysentery, liver complaints, burning sensations, piles, leucorrhoea or the whites; ascitis or *jalodara* in which morbid water gets collected in the belly followed by its inflation; some stomach distresses and also the swellings and the skin afflictions of *kushta* or leprosy.

Aracia bark is a very astringent and a strengthening material. Oak bark is a famous drug material of this nature in Europe. Its place is almost taken over in India by the babul bark, even in the hospitals. It has been infact regarded that using babul bark for a lotion material is more preferable to the common alum lotion of the hospitals. One can secure more desirable contraction by babul lotion.

Giving a treatment of the anal region with babul bark in cases of rectal weakness during dysentery has been always found satisfactory. A cold infusion of the bark is cooling, viscous and nourishing. When the bark is digested in the stomach, it does not yield sugar; as such it is advisible to be used in diabetic persons. It forms an admirable drug in all cases where stimulation of the mucilaginous membrane is the pathological problem. These are: bronchitis, throat injuries, intestinal mucosal lining and its disorders, dysentery accompanied

with blood, leucorrhoea, obstructed urine and difficult urination. Its decoction proves beneficial in excessive vomiting due to poisoning and also in the debility due to excess purging.

Gargling with its decoction is salutary in cases of bleeding gums, affections of the throat and dental disorders.

In cases of *kushta* or leprosy, the ice like preparations (*hima*) of the bark are given as a drink twice a day in a dosage of three *tolas*.

In cases of prolapsed rectum, the area is washed with its decoction. For *prameha* and cases of poisoning, the decoction is given as a drink. For poisoning by mercury and the like, decoction of this bark is mixed with an equal quantity of the decoction of the mango bark and the two together are boiled for half an hour in 50 *tolas* of water and then used with great profit. In chronic dysentery and also in diabetes, its *fanta* (cold infusion) or decoction (prepared by using 4 *tolas* of bark in 50 *tolas* of water) is given in a dose of 5 *tolas* twice a day.

To stop vomiting or mitigate disorders due to poisoning, prepare a decoction of the bark (1/4th of the water used) and administer in a dosage of 2 *tola* each time at an interval of 3 hours. Even sprinkling of this decoction at the oral surface is attended with beneficial results.

For ascitis or *jalodara* (abdominal swelling due to morbid water collection), pound the bark and

cook in eight times the quantity of water on a low fire. When the water gets reduced to one fourth, remove from the fire, strain and again cook long enough to thicken it well. Administer 2-6 *mashas* of this, (made into pellets if needed) every day morning along with butter milk. If the patient can sustain himself on a fluid diet for a considerable period of time, when such a treatment is going on, all derangements of the belly including ascitis will definitely get rectified.

Take 5 *tolas* of the bark and 10 *tolas* of water. Pound them together well and long in an iron mortar. The juice you can secure thereby is to be given in a dosage of 2-1/2 *tolas*, twice a day. This will obviate all types of coughing. It can be given as an injection as well.

Or, prepare a *fanta* or one quarter decoction from 1 to 3 *tolas* of bark in 20 *tolas* of water, strain and administer as a comfortably hot drink twice a day. This will take care of all types of coughing and beneficial results are sure to follow. Adding 3 *mashas* of honey along with this decoction will render it useful in cases of breathing difficulties. Yet another recipe is as follows. Take 16 *mashas* of the bark, 16 *mashas* of water, 1 *masha* of black pepper, 2 *mashas* each of liquorice root and *babul* gum and 4 *mashas* of sugar candy. Prepare a confection or an *avaleha* with this combine and this will prove beneficial in cough as well as breathing difficulties.

For gynaecological disorders: In uterine pains, it is advisible to give a pinch of the powder of this bark in a dosage of 3 *mashas* and follow it by a drink of hot water of about 2 *tolas* morning and evening. In leucorrhoea, drinking of the decoction of this bark is advisable. Simultaneously an enema with this decoction mixed with an amount of alum will also prove useful. The decoction proves valuable in many uterine disorders such as uterine prolapse and the like. For parturition fever (*prasutijvara*) and disorder take 1 *tola* of the bark of *vilayati babul* and 2 or 3 grains of black pepper. Grind them together and administer in cow's milk. The diet should consist only of millet roti (*bajri roti*) and cow's milk. Such a measure continued for 15 to 20 days will destroy even terrible forms of parturition fever.

For oral diseases, gum afflictions and the diseases of the teeth, take the bark of *babul* and also the bark of tamarind tree, neem and *peepul*. Grind them together along with water and make an external application as required. The result is bound to be excellent. Or, add alum in a decoction of the *babul* bark and carry out a gargling with it. This measure also proves unfailingly beneficial.

For diseases of the throat and the eye disorders, gargling with a comfortably hot decoction of the bark many times a day and keeping the gargle for 5-10 minutes at times will prove curative in many grave diseases of the throat, even those that have been considered incurable. In cases of

conjunctivities of the eyes, applying the freshly extracted juice of the *babul* bark in a woman's milk will prove beneficial.

Leaf of Babul

Leaves are hot in quality, appetising, obstructive of stools and are found to be useful in cough, *vata* and *kapha* aggravations, piles, fractures of the bones and the like.

For bleeding, lesions due to burns and other injuries, sprinkling of the powdered leaves of *babul* proves beneficial. Cold extract of the leaves will stop bleeding due to *kapha*. In cases of nocturnal emission, chewing a few leaves of *babul* daily along with milk or water, after the morning walk proves beneficial.

In dog bite and its poison it is advisible to administer a drink of freshly extracted juice of *babul* along with cow's ghee or musk (*kasturi*). Or four *tolas* of the leaf juice alone for three days will do.

The tender leaves are useful in obstructed urine as well as gonorrhoea and syphilis. Take one *tola* each of these leaves and also of the leaves of *gokhru* (*Tribulus terrestris*) and 6 *mashas* of *kalami shora*. Grind them together to a fine degree. Drinking this will rectify obstructed urination.

Veneral diseases. For gonorrhoea, soak 2 *tolas* of these leaves in water overnight, grind next morning, strain and administer this water as a

drink, making it hot and mixing with ghee. This is to be carried out for three days. On the fourth day as well as the fifth day the juice is to be drunk cold and without the addition of any ghee. This procedure is reputed to be highly effective. Or, take one *tola* of the leaves, 1-1/2 *mashas* of red alum, grind well in 40 *tolas* of water, strain, mix country sugar with it and give an empty stomach in the morning. The beneficial effect is seen after a lapse of just a few days. Or, keep one *tola* of these leaves overnight soaked in water and kept exposed to the dew. Drinking the water in the morning after straining it will give great relief for the painful and burning lesions of the gonorrhoea patient. Or, take one *tola* each of these leaves and, of *gokhru*, crush them and soak overnight in water, strain next day morning and give this water as a drink. This will obviate the burning sensations of the body and if taken for a few day, skin afflictions will also disappear. Or, another measure for the same effect is to administer 6 *mashas* of the powdered leaves with an equal quantity of sugar candy.

For syphilitic wounds, sprinkling them with the powder of the *babul* leaves will prove beneficial.

For eye disorders such as inflammed eyes, discharges of the eye and the painful eyes, applying the juice of the young leaves and to do so for some time proves beneficial. This proves also useful in cases of injuries to the eyes and the attendant swelling. If the discharge alone is excessive, prepare a thick decoction of the leaves,

add honey and apply as colyrium or as a thin film. If the eyes are painful, prepare a ball of the paste of the ground leaves, warm it up in ghee and apply over the eyes. The pain will get mitigated. In cases of eye sores accompanied with much burning, grind the leaves and make a thick application over the eyes. In cases of styes in the eyes or frequent pustule formation in the eyelid, take 20 *tolas* of the leaves, cook them in 1-1/2 *ser* of water till the latter gets reduced to one fourth and strain and store. This is to be applied repeatedly, or, morning and evening. The disorder will not recur at all then. This will also prove beneficial in such cases of the eye affliction where the lashes fall down and the eyelids become red.

For all types of eye disorders, take a *ser* of the green leaves of *babul*, clean well and then take 10 *sers* of water and 10 *tolas* of *saindhav* salt. Cook them all together till the water quantity gets reduced to one fourth. Mix well and strain. Cook it again in a brass vessel which is well tinned. When more than half the water evaporates, add one *ser* of sugar and prepare a syrup, on low fire to the consistency of honey. It is important that the syrup should not be very thin, as it will then not stand as a colyrium nor should it be too thick as it cannot be used at all in that condition. When the syrup has reached a proper consistency, it can be stored and applied as a colyrium in many types of disorders of the eye - discharge, redness of the eye, conjunctivities, swellings and inflammations, stye

and so on. The medicine is useful for even small infants as well as the old people.

Or, crush the tender leaves, extract the fresh juice of the leaves and use this as an eye drop when mixed with a woman's milk.

Or, take 20 *tolas* of the tender leaves and cook in 40 *tolas* of water. When the latter gets reduced to half, mix well and strain. Thin this with four *rattis* of pure opium, place it on fire, keep stirring till it gets the consistency of honey. When ready, remove from the fire, add 2-1/2 *tolas* of honey, root of *punarnava* (preferably the white variety) powdered well and in a quantity of one *tola*. Store this in a bell metal vessel. Applying this as a colyrium morning and evening will prove beneficial in many disorders of the eye such as discharge, eye sore, swollen eye, as well as in feeble vision.

In disorders of the oral cavity, mix equal quantities of the leaves of *devdar* and *triphala* powder with the leaves of *babul*. Prepare one quarter decoction from this mix and use it as a gargling material to be utilised as frequently as desired. This will obviate inflammations at the mouth, looseness of the gum, swelling at the gums, dental caries and many other diseases of the mouth region. The same procedure proves useful in mercurial poisoning and the attendant incessant salivation and the severe inflammation.

For dysentery and *amlapitta*, a simple remedy is as follows. Grind the young, tender leaves of *babul*,

white cumin seeds and pomegranate buds, along with water. Extinguish in this water a piece of brick made red hot. Drinking this water will prove useful in these conditions. This is particularly beneficial in the dysenteries of the infants during their teething.

Adding a *ratti* of opium along with a *tola* of the leaves and giving this mix as a drink is specially beneficial for children as it will obviate their pain.

It is the bigger variety of *babul* whose leaves are particularly useful in cases of dysentery. Crush a *tola* of its leaves in water, stir well and administer as a drink. This proves beneficial in all cases of dysentery including that which is accompanied with blood. In dysentery due to *kapha* aggravation, mix with its leaves equal quantities of the black and the white cumin seeds (*jira*) - all powdered well and give it in a dosage of one and half a *tola* along with hot water.

For *amla pitta* take a *masha* of the gum from mango tree, keep this soaked overnight in 5 *tolas* of the decoction of the *babul* leaves. Give this as a drink after mixing it well and straining in the morning.

For any type of severe afflictions of breathing troubles, drinking freshly extracted juice of the leaves in a dosage of 2 *tolas* proves beneficial. By drinking thus repeatedly at an interval of two hours each time, complete relief can be secured. A patient of chronic breathing trouble is best advised

to keep using this; he is sure to secure full relief. In case the leaves are not available, keeping up a chewing of the bark even, will prove efficacious.

For stout and fatty persons who sweat too much, grind the *babul* leaves in water and keep applying over the body and rub. Similarly apply and rub *harad* ground in water and then let them take a bath. Their tendency for excessive sweating will stop.

To stop hiccup immediately, a simple procedure is to smoke like hooka a *tola* of fresh *babul* leaves and *supari* powder both kept in the *chilam.*

In case there is bleeding in the stomach, grind the leaves along with black pepper and give as a drink after mixing it with sugar and straining it.

In cases of injury, wounds, and swellings, take 20 *tolas* of the babul leaves, add five *tolas* of the turmeric and powder them fine. This is to be mixed with the oil of *karanja or Pongamia glabra* and applied. Even very vitiated wounds would respond well by this simple remedy. In cases of all injuries due to any reason whatsoever take shade dried leaves of *babul* (and tender fruits in case the leaves are not available), mix them with powdered cowrie shell (*cowdia shobhan*) and powder the two together to a very fine degree. Apply coconut or til oil over the area concerned and sprinkle this powder on it. Keep doing so for some time. The injury will heal up soon and there will not be any pus formation at all.

Grinding the fresh leaves and applying them over the region concerned will quickly heal all types of wounds. This will also obviate swellings due to *pitta* aggravation or heat.

It is quite usual to find that during the rainy seasons there will be bleeding sores between the toes particularly and also the fingers sometimes. Grind *babul* leaves along with *mehandi* leaves and apply the paste and keep doing so for some time. Relief is quick and certain.

Fruits of Babul

The pharmacological properties of the fruits are rather similar to those of the bark. As in connection with the other five organs of *babul*, fruits also find many medicinal applications.

Tender, unripe fruits are taken and dried and powdered. Double the quantity of sugar is added and given along with milk, in cases of nocturnal or quick emission.

In constipation, a quarter decoction of the fruits proves useful.

The fruits are very much useful in urinary disorders such as *prameha* as well as leucorrhoea (*shveta pradara*). For this, take young fruits, remove seeds and dry them in shade. Powder them fine, mix one eighth part of sugar candy, *babul* gum powder, equal amount of sugar and store. Six *mashas* of this powder is to be eaten daily in the morning followed by a drink of 20 *tolas* of hot cow's

milk. This will result in many benefits such as seminal thickening, obviation of *prameha* and benefit in leucorrhoea.

Or, take equal quantities of deseeded young tender fruits, tender shoots of *babul* and the *babul* gum. Dry and powder. Administer in a dosage of 4 to 6 *mashas* and follow this up with a drink of warm milk. This will remove nocturnal emission, seminal emission in urine and improves the seminal quality in general.

In anaemia as well as piles, mix one *tola* of the powder of the shade dried fruits along with *pravala bhasma* prepared with *babul* as an adjunct and in a dose of 1-3 *rattis*. This is to be taken along with sugar. Or, mix an equal quantity of sugar candy or sugar with the fruit powder and store. This is to be given in a dosage of 6 *mashas* to one *tola* in the early morning along with water.

For piles specially, both the bleeding and the dry type, if one keeps consuming only the fruit powder, in a dosage of 6 *mashas* in fresh water, one would find this procedure much beneficial.

For disorders of the eye, take about two *sers* of fresh tender fruits, pound and grind to extract the juice. Add with this 2 *mashas* of pure country camphor and an equal quantity of *pudina* distillation (*arka*). Keep this mixture in the sun for sometime, strain and store in a bottle, use two to four drops of this for the eye. This is beneficial in many disorders such as discharge, burning eyes and conjunctivities.

If the eye lashes are falling off, the freshly extracted juice of the fruits will give beneficial results soon, if it is continued to be applied for some time, fresh lashes will start appearing.

For dental pain, the fruit wall of *babul* and the hard wall of almond nut are mixed together and burnt. When the mixture becomes a black ash, add a little salt and use as a tooth powder. This measure will prove helpful.

Gum of Babul

This is viscous, sweet and astringent in taste, sweet in post-assimilation, cold in virility, palliative of *vata* and *pitta*, strengthening and useful as a remover of roughness in the viscera, a joiner of bones and a counterant to haemorrhage. It is applied in seminal debility, plethora, *prameha*, diabetes and so on.

In modern medicine, it is this gum alone that is most widely used by various names: gum arabic, gum acacia or gum senegal.

Gum from larger trees are of varied shapes of broken irregular tears with fine crevices on them, quite fragile when dry. The broken surface is shining and the different pieces tend to be coloured variously. The gum is odourless and slimy to taste. Gum from the smaller trees (senegal) is spherical or ovoid. The tears have pale yellow colour and are opaque. Gums are taken to strengthen the body and also as a virilifier. This is usually given to ladies after child birth. Its water removes the pains

at the stomach and the intestines. In excessive menstruation 4-1/2 *mashas* each of the gum and marking nut (*geru*) are given, grinding them and along with water. For fever accompanied with dysentery quinine is mixed with its powder and given. For headache due to "heat" this is mixed with water and applied.

An important quality of the *babul* gum and bark is that their use will see that there is no raise in the sugar level in a diabetic. Such a patient will find it beneficial if he takes the gum fried in ghee, 6 *mashas* morning and evening regularly and also avoid eating sweet. The gum fried in ghee is much useful in various types of dysentery as well. In sprue (i.e. intestinal mal-absorption) and specially when accompanied with stomach pains, powder the gum to a fine degree, take 6 *mashas*, mix this with 10 *tolas* of powder, prepare *rotis* and give them for eating. The repeated pain will go and there will also occur good motion. Or, take 6 *mashas* of the gum, prepare a tea like beverage in 10 to 20 *tolas* of water and offer it comfortably hot in a few teaspoonfuls, adding a little sugar for taste. Or, mix equal quantity of raw *bael* fruit in 2 *mashas* of the powdered gum and give this along with water four times a day.

In cases of dry cough, chest pain and burnings at the throat, keep the gum in the mouth and continue to suck in the juice. If there is simultaneously a breathing trouble, mix butter with 30 to 40 *rattis* of the gum and give. Another

recipe for the dry cough is as follows. Powder the gum and sugar in equal quantity and to a fine degree. Prepare small pellets with water and dry them in shade. Keep them in mouth like lozenges and go on sucking in the juice. Along with the gum, shade dried *peepul* leaves can also be ground and similarly made into lozenge like pellets and utilised. If blood is accompanying along with cough or as such during spitting, mix 4-1/2 *tolas* of the gum powder with 2-1/2 *tolas* of ghee and use this as an electuary 1 to 2 times a day and for a week. Cure is certain and the appearance of blood will stop.

For cough in children, prepare black gram like pellets from 3 *mashas* of the gum, 1 *masha* of opium, and 3 *mashas* of *maida* mixed with the required quantity of water and store in a bottle safely. For infants of 1-2 years, give 2 pellets and for children of 2-4 years, 4 pellets - in this way the dosage is to be increased based on the age of the child. For milk-feeding babies this may be proportionately mixed with the mother's milk and given. This procedure has been a well tried and definitive cure for not merely the ordinary cough but also very severe and terrible bouts of cough.

In cases of burnt wounds, mix the gum with water and apply. This will give immediate relief from burning and there will also occur a healing. In cases of sores at the feet during rainy seasons - chill blain or *bivayi*, fill the area with the gum, densely mixed with water and apply with a suitable bandage. A quick cure will result.

The principal use of the gum in allopathy is as a medium for emulsification in medicines that are given internally. Other uses are: to cause a suspension of those drugs that are non-soluble in water, and to prepare various types of pellets, tablets, troches, lozenges and so on. Another use is to inject the gum along with sodium chloride intravenously in cases of emergency due to excessive haemorrhage. The blood flow will stop and the possible shock is prevented. There are many other medicinal forms of gum such as mucilage acaciae, pulvis tragacanthae compositus, syrup acacae and so on.

Flowers of Babul

These are slightly hot, constipative and useful in destroying fever, *rakta pitta* or plethora, piles, *prameha* and the like. In plethora, (where a bleeding at the nose occurs), the flowers are offered to be smelt.

For discharging ears, and the peeling of skin at the mouth, mix the flowers in twice the quantity of *til* oil and cook on fire. When the flowers are burnt fully, remove and strain. Store the oil in a bottle. When the occasion arises, warm up the oil to a comfortable degree and use it as an ear drop. 3-4 drops will stop the discharge from the ears.

For skin peeling at the mouth, mix honey with the flower powder and apply on the regions concerned - for instance, below the tongue and the like. This is bound to be profitable.

Thorns and the Seeds of Babul

The thorns destroy *vata* aggravations and they are diuretic, removers of hiccup and curative of epilepsy.

For hiccup, take 2 *tolas* of the thorns, pound and cook in 40 *tolas* of water. When only 10 *tolas* of water remain remove from the fire, add honey and give it for drinking. This will remove even very severe forms of hiccup quickly. The same recipe is good for obstructed urine.

For epilepsy, select such thorns which occur together in a clump, presumably due to an insect attack. These are to be shade dried and powdered. Smoking such a powder by placing it in a *chilam* by a patient will prove beneficial to epilepsy.

The seeds help in seminal retention and also in joining bone fracture.

For cases of bone fracture, powdered seeds or powdered *panchanga* (the set of five organs of *babul*) are given as an electuary thrice a day and for three days.

The Fresh Twigs of Babul

These constitute the most prevalently used natural tooth brush, the *datun*, very common all over India and more so in the North. Its use is beneficial in many ways: strengthening the gums and the teeth as well as in preventing tooth decay.

Tooth powder of *babul*. Make a fine powder of the charcoaled sticks of babul, take 2-1/2 *tolas* of it, mix 1 *tola* of alum and half a *tola* of camphor both powdered up. Add a little bit of pepper mint to give a medicated and somewhat liquid consistency. Store in a bottle and use regularly. There will be no risk of pyorrhoea and the teeth will remain healthy and clean.

The five organs of *babul* (bark, leaf, fruit, flower and gum).

This is useful in *prameha*, diabetes, leucorrhoea and such other urinary disorders.

Take all the organs in an equal quantity. Dry them in shade and powder fine. Mix sugar equal in quantity to the net product and store. This is to be given for a few days in a dosage of 1/2 to 1 *tola* morning and evening along with 20 *tolas* of cow's milk. This is useful in *prameha* specially. It thickens the semen and also strengthens the body.

It is also healthy to keep taking this for 2 to 4 months early in the morning along with water. This will obviate quick emission, nocturnal emission, *prameha* and leucorrhoea.

For rectal prolapse, in children, take only the bark, the leaves and fruit, mix an equal quantity of the flowers of *ghay*, powder and cook in 3 *sers* of water. When half the water remains, remove and place in an open vessel. When the water is comfortably hot, the boy with such a complaint should be made to sit in this water bath and the

rectum should be continued to be washed. By doing so for a few days, the benefit conferred is definite.

Roots of Babul

These destroy disorders of stomach and uterus and also of the teeth; for the former two, a decoction of the roots proves beneficial. For the later, a tooth powder of the root is seen to be useful.

A Modern Assessment

Acacia arabica is an official drug in the pharmacopeia of many countries, for example Unites States, Britain and many European countries and the plant grows abundantly in India. Modern medicine also recognises its use in diarhhoea, dysentery and diabetes mellitus (gum); for its astringent and demulcent (cooling and soothing) value (bark); and for the rich presence of tannin in it (leaves and fruits 32 per cent; bark 41.7 per cent). It is also alleged to be an antiseptic and antidysenteric. The bark is an excellent astringent and is largely used in chronic diarrhoea in the form of a decoction. Its chief uses are as a local astringent douche in leucorrhoea, and vaginal discharge and as an enema in piles and prolapse of the anus and also as a gargle in foul smell and apthae or sores of the mouth. Its bark along with that of mango boiled together for half an hour in a pint of water forms a good mouth wash.

Alcoholic extracts of the bark has been found to have antiprotozoal activity against *Entameba hystolytica* that causes amoebic dysentery. It also has a depressant action on the Central Nervous System. Modern studies have revealed the presence of acetylcholine (a substance that is necessary for all neuromuscular functional activities and therefore useful in treating *myasthenia gravis*, or muscle weakness), histamine and 5 hydroxy tryptamine in the pollen grains of the *babul* flowers.

India is a country which is very rich in plant gums because of its varied types of plants growing in highly diversified climates. We thus have plants found in the cold climate of Europe and North America as well as the hot climates of Africa as well as those of South East Asia. Because of their many characteristic properties, plant gums are used as suspending or dispersing agents, as body builders and as adhesives for various applications. Many industries based on plant gums have been set up in India after the Second World War. Though this much, welcome development is not at all commensurate with the existing vast resources of our country, there has been a steady growth in this direction no doubt.

The major plants that give gum exudates are: *Sterculia urens* (gum karaya), *Acacia arabica* (gum arabic) and *Anogeissus latifolia* (gum ghatti or Indian gum). Many other Indian trees also produce gum for instance, neem, *bael*, *katha* and *jeol*. In

fact, most trees when wounded at the trunk will produce some quantity of gum, but since their amount is not considerable, it is of no commercial value.

In spite of the fact that gum arabic is of very great use and we have the *babul* trees in considerable amount, it is important to know that India's contribution to the world production of gum arabic is quite small. Most of the world supply still comes from Sudan though India can certainly increase its export quantity if sufficient care is taken for cultivation and commercial exploitation of the *babul* trees. Gum arabic is a very valuable gum used in confectionery, bakery products, pharmaceutical preparations, specially as a suspending and an emulsifying agent and as a demulcent. It is specially useful as an adhesive for envelopes, labels and stamps. Large quantities of this gum are actually imported by India; for instance, in the year 1976-77, the quantity imported was 1193 tons and its cost 50.4 lacs of rupees!

There are two ways of avoiding this unfortunate situation. One is to think of increased cultivation of *babul* which is a most well suited measure of afforestation or forest development in arid-regions and therefore a very valuable means of social forestry programmes. The other is to develop substitutes from indigenous gums by chemical and physical modifications. Gum ghatti, which is closely allied to gum arabic in chemical structure

may be the raw material of choice for such modifications. Researchers and industrialists should take note of this fact and intensively work in this direction. Gum ghatti is from *Anogeissus latifolia* a tree which grows well in India and to less extent in Sri Lanka. The gum is obtained as rounded tears which on fracture give a glass like surface. It is exported already to foreign countries including united States, where it is used for stable pharmaceutical preparation of oil soluble vitamins. It is also reported that by using gum ghatti the fluid loss in the oil-well drilling muds can be prevented. This has been seen to be true even when the drilling mud contains a high concentration of salts—a fact which may prove useful in coastal or even sea floor drilling for oil by Oil and Natural Gas Commission. Moreover, gum ghatti also has excellent adhesive properties.

D. CATHA, KATTHA, KHAIR OR ACACIA CATECHU

This is also called cutch or catechu, a term used for several kinds of raw materials used both as dyes and in tanning and also in medicine or as a masticatory like *supari*. Gambier is white cutch, a resinous substance from the leaves and young branches of *Uncaria gambir*, a climbing shrub of Malaya and Indonesia. Black cutch or catechu is the source of the most important brown dye and is obtained from the heart wood of *Acacia catechu*, a tree of India and Burma. Small pieces of this wood

is boiled in water and the extract is evaporated out to a purplish black, gummy, semisolid material which is molded into blocks for export. The dye here is strictly fast and employed to secure various shades such as brown, fawn, olive and drab colours and most importantly the all too familiar khaki shade. This is also medicinal and masticatory.

This plant is called *khadira* in Sanskrit, a famous astringent wood of the ancient authors, Charaka and Sushruta. *Katha* is at present its most important product. The art of making it is quite an ancient one, referred even by the earliest Indian writers. In recent years, Barbosa, a writer on East Indies in 1514, speaks of a drug cacho being exported then from Cambay to Moluccas. The Latin name catechu is from a term of South Indian languages from where its export took place for the first time. Cochin China has been another centre, the product being called Cayo there. Very likely, catechu has its earlier half from a Tamil name *kate, kuti or kati* while the latter half *chu* comes from Chuana. Another author Garcia da Orta gives in 1574 a full description of *khadira* tree under the Tamil term *Cate.* Till 17th century this substance did not catch the attraction of the West and when it did reach there, it went through Japan as a re-export; hence it was then known as Terra Japonica (as it was then considered a type of natural earth of Japan!). The source then was Surat, Malabar, Bengal and Ceylon. China has

been importing catha from its earlier times of sea trade, via Molacca. Garscia da Orta was a Portuguese physician of Goa who wrote that its demand then was mostly as a masticatory though he himself had used it as a medicine. In 1721 it entered as an official drug of British pharmacopea and since 1741 it has been an official drug in all European countries.

People of a tribe called *tang* near Himalayas were specially extracting catha; once they were infact called *khairi* after the plant's name *khair*. Those who prepare *kattha* in Haridwar and Nazibabad are even now known as *khairuva*. In Bombay they are called *kattha kari* and it is believed that they originally came from the Himalayas and first entered in Thane and then settled in Surat. They are regarded here as well as in Ratnagiri as Tribal Adivasis. In Orissa also, there is a separate caste meant similarly for this purpose of preparing catha from the *khair* trees.

Catha making is an extensive cottage industry in India, in ancient and modern times. It is presumed that 1500 tons of *katha* are prepared this way annually. The biggest modern industrial concern for this purpose is Izzatnagar, Bareilly; this produces 350 to 400 tons of *kattha* and 750-800 tons of cutch. Gwalior produces 400 tons, Orissa, Bihar and Gujarat are the other important centres. Annual income from catha is believed to be three crores of rupees.

Methods of Preparation

The traditional procedure takes place in the heart of the forests where the trees grow, during the winter. Mature trees are felled, sawn to suitable lengths and the bark as well as the sap wood peeled of leaving only the heart wood. This is reduced ingeniously to fairly uniform chips 2-4 cms by 0.5-1.5 cm. Egg shaped earthen pots are placed on funnel like hearths (*bhatti*), set fire by sapwood, bark and the extracted chips. These are covered with water and boiled repeatedly till they are exhausted of the solubles, often changing the water, the whole extraction taking 3-4 hours. This is first strained through muslin cloth, concentrated then to a particular consistency and set aside for natural cooling down for several days; the less soluble portion separates now. Both the consistency and the colour of the liquors change during this period and the whole stuff becomes a semisolid mass. This is then processed crudely to separate the less soluble fraction which is kattha. The fully soluble portion is cutch. The solid mass of kattha is made into blocks and then set aside for drying in the shade.

Technically however this traditional method is unsound as the total recovery is hardly 50 per cent compared to what could be achieved under controlled factory conditions. Actually it is a waste of valuable natural material specially since the wood sources are continuously dwindling. Besides, this kattha has many undesirable materials and

accidental impurities apart from intentional adulteration.

Indian wood products Ltd. Izzatnagar was the first factory that was started from 1920 for a judicious utilisation of *khair* trees. The processes here are all the same but each unit operation is mechanised and performed very scientifically which makes all the difference.

Kattha trade is however keenly competitive and also speculative. Its actual manufacture in the country is also divided between both the traditional as well as the factory methods. As such, firm data of production are hard to come by so as to plan for a healthy and good promotive programmes. Moreover, almost the entire kattha output of the country is consumed by Pan chewing in India itself, though there is a great demand for it from outside and it can easily be an earner of foreign exchange. Only a small fraction of it is utilised by Ayurvedic and Yunani medicine.

Occasionally when the logs are being prepared for further processing, some of them turn out to be hollow, there being a cavity inside within which the extract of catechu has become naturally collected as irregular lumps. These are called *nabhi* (navel) *kattha*. This is a very pure material and carefully taken out once it is seen. Since it is rare, it becomes costly, vaidyas and hakims prefering this very much. In English this is called caersal or khirsal; this is actually the catechuic acid. Vaidyas

refer to this as *khadir sar, khair sar,* the essence of *khair.* This is considered to be a wonder drug in the treatment of cough.

Pan chewing with kattha is very common in most Northern States including Maharashtra. Pan taking is quite prevalent in the South but taking kath along with it is almost not present. Uttar Pradesh is its chief centre of production as well as use.

Reference to *khadira* occurs even in the Vedas. There is a quaint story in Taittiriya samhita for the origin of Khadira. Vashatkara, a God cut down a head of the Goddess Gayatri and the blood fell down to the earth from where sprouted forth the *khadira* tree. The tree was much familiar in the Vedic times, there being many a mention of it. The tree is considered sacred to Kartikeya or the Lord Shammukha. The tree is also associated with many tribal functions for instance of the Adviasis of Navagaon.

It is quite probable that the use of Kattha in colouring the lips and the mouth has been in existence in India since those ancient times. Gangetic plateau—the area of Aryavarta, is still the area where pan chewing with kattha is most common. The old town of Pataliputra (Patna), Mirzapur, Champaran and the places in Eastern Uttar Pradesh are still the important places where kattha is much valued and people are almost addicted to its use.

Kattha is marketed in various forms and varying purity. Catechu extract actually consists of two substances, the highly soluble portion called cutch and the less soluble portion called kattha. The term kattha includes all varieties of solidified extract of khair wood, crude or refined. Market recognises two varieties the white kattha or catechu and the dark kattha or cutch. Kattha contains a large portion of catechu; white cutch consists of non-crystalline tannins. Kattha is commonly sold as small blocks or tablets of about 50 mm square and of a range of thickness from 5 mm to 20 mm. Its major use is as an adjunct of pan or betel leaf. It is generally painted to pan after making its paste in water. It is also an ingredient of *pan masala.* Cutch occurs in various forms based on tradition and the consumer's fancy. It is wrapped in the leaves of *tad (Borassur feabellifes)* or *sal (Shorea robushta)* but for industrial use it is packed in 40-50 kilo bags or blocks, solid or as powders.

Cutch is a cheap substitute for kattha; its chief consumption is in the villages and the tribes. Industrial use of cutch is extensive and varied. It is used for dyeing and colouring and produces brown and olive hues with different mordants and offers an excellent fastness of hue and a resistance to mildew attack. It is applied as a protective agent for fishing nets and sails that are constantly exposed to salt water. It is used to colour certain varieties of tobacco. Though it is rich in tannin (55

per cent) it is not a good tanning agent, as it produces harsh leather and also causes decolouration. Some work is done to modify it for tanning but its greatest 'industrial' use is to reduce the viscosity of drill mud. Other uses are for ore flotation removal of mercaptans from gasoline and manufacturing ion exchange resins.

Names

Sanskrit gives a number of names to this ancient plant. A few of these are : *khadira* (its principal name, a term which has yielded *khair* in Hindi), *balapatra, bala patraka* (with leaves very small), *sara druma* (a tree whose inner most wood or the essence is clearly demarcatable); *bahu sara, mahasara* (where the essence or the core portion is extensive), *raktasara* (essence or the core is red), *shyama saraka* (in some cases the core wood is so densely red that it looks darkish), *kala skandha* (the pillars made out of the core wood remaining stable and durable for times to come); *kanti, kantaki, shalyaka* (a thorny tree); *suhsalya, bahushalya, bahu shalyaka* (with many harsh thorns); *jihma shalya, vakra shalya* (with bent thorns); *kshata kshana* (thorns capable of causing injuries); *pathi druma* (an avenue tree); *khadira* (piercing the sky - a lofty tree that grows sky high), *kadara* (a corrupt from of *khadira*); *yagniya, yagnanga* (whose wood is useful in yagna as *samidh* or sacred fuel); *khadyo patri* (whose leaves form a fodder). All of these are descriptive terms. A

few are qualitative terms: *gayatri* (of excellent properties), *kushtakantaka, kushtaghna kushtari* (an enemy to leprosy), *danta dhavana* (a tooth brush tree) and *medhya* (auspicious, good for mental ability).

Botanical Description

This is a medium sized deciduous tree, shedding its leaves during a season. Branches are also small sized, thin, thorny, shining, deep brown or violet or *jamun* coloured on the surface. Thorns are small, slightly curved, rather compressed and double in nature and looking like *ankush* or elephant's goad. The bark is 1.25 centimetre thick, deep brown or brownish grey and striated. If removed, their inner surface is greyish red. Old trees will shed their barks in irregular pieces that keep hanging on. Leaves are pinnate compound and occur in groups. The small leaflets are in 30-50 pairs in a leaf; these are sleek, slippery and graceful. The axis of the leaves is glandular.

The whole tree becomes leafless for sometime during summer. New leaves start from April onwards and by June the whole forest appears beautiful with its profuse, green, leather like foliage on the tender branches all around. From the middle of the new branches and the midst of the leaves, whitist yellow fruits appear in stalked bunches. Both the calyx and the corolla are white in colour, corolla being thrice the length of the calyx. The tree continues to have flowers till July-

August or even longer. The inflorescence, bunches peeping out from amidst the dainty foliage augment the grand beauty of the trees. Valmiki offers a description of the gentle exhuberance of a *khadira* tree in bloom at the sacred *panchavati* of Sri Rama.

Fruits ripen quickly, by November they are fully ripe. To start with, they are green or reddish green; later they become mud coloured. The stalked, flattened fruits are 5-6 cms long, straight, straplike, deep brown, smooth, shiny and break open quickly on ripening. 3-6 seeds occur in a fruit; these are ovoid or circular, greenish grey, smooth, shiny and somewhat hard. Their hard cover becomes soft and slimy on getting moistened with water. The tree yields a profusion of seeds every year. The latter have a good sprouting ability and the young plants get firmly established soon and with not much care. The plant can therefore be grown well and is one of those trees that need to be best encouraged in the programmes of social forestry. They are valuable, graceful, quick growing though only initially and good avenue trees. But they need to be nurtured well in the younger stages. They need a lot of sunshine and can stand strong winds. If a good sized tree is cut a little about the ground level, profuse side branches spring forth and these can be made to take good shapes as one desires.

Khair consists of three principal varieties: (1) *Catechu proper.* Both the calyx and the corolla

on the main axis are clouded with extensive hairs here. This is found in Kashmir, Simla, Kangra valley, Garhwal, Kumaon, Mahdya Pradesh, Bihar and North Canara and Ganjam in the south and along the Iravati river in Burma. Yellow kattha is obtained from here in the North.

(2) Variety catechuoides. Here calyx and corolla are smooth and non-hairy but the axis has rough, shoddy hairs. This is mostly seen in Sikkim Terrain, Assam, upper Burma and old Mysore State.

(3) Variety sundra. Here calyx, corolla and axis are all smooth. This is seen in South and Western India, Coimbatore, South Canara and Konkan. Some consider it as a different species of Acacia and not merely a variety.

However, there is no difference in the properties among the three; they all yeild a gum, produce kattha and are useful fuel woods.

Medicinal Importance

Ayurveda considers *khadira* as cooling, pungent and astringent in taste and promotive of digestive juices. It removes tastelessness, takes away undigested residue (*av*), dries up phlegm and wards of cough and phlegmatic complaints. This is beneficially employed for plethora or *rakta pitta*, haemorrhage as well as bilious phlegm and other phlegmatic troubles. This removes fat from the body and is thus useful in slimming down. It is

good for teeth and is given in urinary and urino genital disorders, fever, scantiness of blood and anaemia. This is also antiseptic, wards of abscesses and swellings and is beneficially employed in itching, eczema, leprosy and leucoderma.

The gum of *khair* is sweet, strengthening and promotive of semen. The essence of *khadir* is clarifying, strengthening, good for patients of consumption, disease of mouth and blood flow.

Several parts of *khadira* have been in use in India from very ancient times for various afflictions. An idea of this is given below. The forms of use are gum catechu, powder, spirituous tincture and decoction. Catechu is the resinous extract produced by boiling the wood in water and then inspissating the decoction.

Diseases of the mouth: For an injured gum which has become spongelike, a cotton swab is dipped in tincture catechu and applied over the affected regions. A patient of pyorrhoea is advised to gargle with water in which a little kattha is dissolved. A drink of the decoction of the inner bark and a gargle with it would stop bleeding at the gums. Rustic people use very fine powder of kattha with roasted betel nut powder to fill the porous gums, but using it for a long time will render the teeth black. The hard coats of almond and walnut as well as myrrh and betel nut are burnt in a closed pot, charred, mixed with kattha

and powdered fine; this forms a household tooth powder. Another simple recipe for oral health is as follows: Boil kattha in water and prepare a thick fluid. Mix with it finely cut betel nut, nutmeg and camphor and mash; prepare gram like pills. These are kept in the mouth for the diseases of the gums, the palate and the tongue.

A small piece of catechu held in the mouth along with nutmeg and cinnamon bark is salutary in tooth ache, loss of voice, mircurial salivation and also in bleeding, ulceration and sponginess of the gums. This is used to stuff the hollow of the aching tooth.

Diseases of the alimentary canal: The amount of digestive juices secreted in the stomach is generally less in those who are habituated to *kattha* eating. Like other powerful astringent drugs, this is given to patients of dysentery due to the defective mucosal lining. This dries up the intestinal secretion and the stools get hardened so that loose motion gets stopped. Because of this reason it is given in sprue (*sangrahani* - an intestinal malabsorption) and dysentery. To stop loose motion in the young, this is given in powder form along with honey for licking. In stomach pains a large dose of it is advised.

For nausea and the like due to alimentary disturbances, villagers use kattha along with other aromatic substances. For acidic belching this is given with profit.

This is a much praised astringent given in a dosage of 5.15 grains alone or along with cinnamon or opium (the latter, if a sedative effect is also desired because of too much pain) in passive diarrhoea and haemorrhage. This is specially useful for children and given then either as powder or tincture along with other astringents. Prepare a mixture of powdered catechu and cinnamon bark. Prepare pills along with honey or syrup for this purpose. Or, take three drachms of catechu powder and one drachm of cinnamon powder, cook in half a pint of boiling water for two hours, filter and administer in a dose of 1-1/2 to 2 ounces three times a day. For adults only and not the young, add 5 drops of laudanum (or tincture of opium).

In coughing: The excellent astringent effect of kattha on the mucous membrane and the blood vessels will reduce phlegm and induce a contraction of the capillaries. For the young, when there is too much of phlegm or the latter is too thin, the body has become weak and there is also slow fever, pills made of kattha and myrrh (*bole* in Hindi or *Commiphora myrrh*) will prove beneficial. Dry cough reacts well to sucking the juice of kattha kept on the mouth. This is a good remedy for excessive foul salivation, tonsilitis, agitation of the vocal chords and the resultant highly distressing cough. In cases of difficult breathing due to tracheal obstruction this is a good help. It is regarded useful to give finely powdered kattha

along with a little liquor or curds water during cough. This will dispense phlegm as well.

To prevent blood flow: In Konkan areas if the phlegmatic patient is giving out blood along with phlegm, fresh juice of the bark of *khair* is given along with *hing*. Kattha is recommended in all cases of blood accompaniment of the respiratory system. Charaka advises the use of the powder of its flowers along with honey to check bleeding anywhere in the body. The essence of khair is a very good source of vitamin B. This is regarded useful in scurvy disease, wherein blue spots appear on the body, there will be much pain all over and there will also be a bleeding in all mucosal linings

For gynaecological disorders: Decoction of the heartwood of *khair* is excellent to prevent excessive haemorrhage at child birth. For leucorrhoea due to uterine debility, bleeding and uterine laxedness, pills of kattha and myrrh in equal proportion are useful. A mixture of these two drugs is given for strengthening after child birth and to increase milk secretion. An aqueous injection of kattha is given for leucorrhoea and the blood flow at the uterus and also in gonorrhoea.

A tincture of kattha is an excellent application for suspected bed sores and also cracked nipples.

Urinary and urinogenital disorders: Charaka includes *khadira* as one of the ten drugs that

reduce urination. Drinking a decoction of the essence of *khair* mixed with honey is advised for patients of diabetes. This is good for gonorrhoea patients also.

Kattha is considered to cause impotency in man. Drinking its powder along with water is regarded to reduce libido or the urge of sex.

Rectal affections: Out growths of piles are washed with kattha dissolved in water. In cases of rectal prolapse and protruding outgrowths of piles, applying an ointment made of finely ground kattha in lard is very beneficial. Washing with cold infusion or decoction of kattha or even fomentation with them is beneficial.

The use of kattha in anal fistula (*bhagandar*) is as follows. Prepare a decoction of cut pieces of kattha and *triphala*. Add a pinch of *vayavidanga (Embelia ribes)* powder and a bit of buffaloe's ghee. Administer this as a drink.

Ear Diseases: Kattha is dissolved in water which is then used to wash the ear with the help of a syringe. Fine kattha powder is also sprinkled.

Fever: *khair* is regarded to be preventive of malarial fever. It is also useful in constant fever. For chronic fever a decoction of the bark of khair and *chirayata* (*Swertia chirayata*) is advised. This also reduces splenic enlargement and confers a strengthening to the body.

Skin diseases and injuries: Ayurveda considers *khadira* as a very useful drug to skin diseases, for which purpose this is given internally or applied outside. Abscess and wounds are washed with its water. If this water is heated and used, it will reduce the swelling quickly. If there is injury in a patient of skin diseases, and there is perforation as well as bleeding, a decoction of the kattha bark is given. Powdered kattha is sprinkled over the injured regions and the lesions to stop breathing. Because of its astringency, kattha stops bleeding and also heals. For sores of the breasts, kattha is applied externally with benefit. Ointment of finely powdered kattha in lard or vaseline is excellent in foul smelling ulcers; the healing is quick. In obstinate cases add a little copper sulphate also (15 grains), specially if the ulcers are very chronic and hard.

A decoction is made of the following: *khair* wood, *triphala*, neem bark and the leaf of *patola*. This is good for leprosy, erysepelas (*visarpa*—a painful irregular reddening of the skin), boils, eruptions and itching.

Chakrapani datta - a commentator on Charaka advises the use of *khair* water extensively by patients of all types of skin diseases, to such an extent that all his articles of drinking and eating should also use this water. He should use this for washing as well as bathing.

Cancer and kattha: Yellow kattha is employed in cancer. This is first warmed in water, a paste is

made thereby and this is constantly applied to the affected part. Finely powdered kattha is mixed with ghee to form an ointment which is also used similarly. In Eastern Africa kattha and copper sulphate are mixed with egg yolk and applied.

Syphilitic ulcers: Kattha is employed in Punjab for eczema, syphilitic ulcers and burning sensations. Local application of kattha is considered very beneficial in initial syphilis.

Leprosy: Classical Ayurvedic authors recommend the use of *khadira* extensively in leprosy or *kushta*. Charaka includes this as one of the ten *antikushta* drugs; its name stands first in that list. He opines that the drinking of a decoction of the hard core of *khair* and taking bath in its water are both beneficial. Using *khair* to bathe, to drink or apply externally—all of these measures are salutary and believed to kill the microorganisms concerned. Decoction of the inner wood is given for a long time. Leprotic ulcers are washed and cleaned with *khair* water and its powder is sprinkled over them. In eating and drinking, fomentation and application, or, in bathing for the leprotic patients, *khair* is advised. The patients are also massaged with *khair* oil.

This is how the oil of *khair* is prepared: take 4 kilogram of the heart wood, cook it in 64 litres of water till 8 litres of water alone remain. Strain; take half a kilogram of *khair* wood, grind and prepare a chutney out of it with water. Add this

and two kilogram of sesame or til oil to the decoction and cook on low fire, till the water evaporates fully. Remove from the fire, cool and store in a bottle. This is an excellent oil for massaging. Ghees of kattha and mixed with *amalaka* will also act very well almost as an ellixir or *rasayana*, curing and strengthening the patient simultaneously.

Leucoderma: Charaka considers that the medication used for kushta is effective even in *shwitra* or leucoderma, the white spots. This patient is however given only *khair* water when he feels thirsty. This is how this water is prepared; soak small cut-up bits of the heart wood of *khair* in water overnight or even more, and use that water. Or prepare vessels from the red wood of *khair* and store water in it.

Chakrapanidatta recommends that by using a decoction of the heart wood of *khair* along with *amalaki* into which a powder of *bavachi* is mixed, leucoderma spots that shine even like conch shell or moon can be removed.

Some Properietory Preparations or Yogas

Three samples of rather elaborate yogas of kattha are as follows:

1. ***Maha khadira ghrita:*** Take 38 kilograms of the heart wood of *khair*, 9.500 kilograms of each of the central woods of *shisam* (*Dalbergia sissoo* and *asana* and 4.750 miligram of neem bark, mango

bark, *kutaja* bark and also *vayavidanga*, turmeric, *daru haldi (Berberis aristata)*, the pulp of *amalatas*, *guduchi*, *baheda*, *harda* and the bark of *saptaparni* (*Alstonia scholaris*). Pound them all into big bits and cook in 488 litres of water, remove from fire, after the latter is reduced to 62 litres. Strain and add the following: 12 *sers* and 64 *tola* each of cow's ghee and the juice of *amalaka* and 96 gram each of the pastes (*kalka*) of the bark of *sapta parna*, *ativisha*, *amaltas* pulp, *katuki patha*, *triphala*, leaf of *patola*, turmeric and the like.

This is given in a dosage of 6 grams to patients of leprosy and also applied to the affected parts.

2. ***Khadirarishta:*** Take 2.375 kilograms each of the inner wood of *khair* and *deodaru*, 560 grams of *bakuchi*, 933 gram of *daru haldi* and 284 gram each of *harad*, *baheda* and *amalak*. Pound them into large bits, cook in 43 litres of water. Remove from fire when only 25 litres of water remain. When cooled, add 9.500 kilograms of honey, 4.750 kilogram jaggery, 933 gram of the flower of *ghay* and 4.8 gram each of cold sugar, *nagakesar*, nutmeg, clove, cardamom, cinnamon bark and *tejpat*, plus 190 grams of *pippali* pounded coarsely. Place this in an earthen coare vessel lined with ghee. Keep for some time when it becomes ripe and then store.

This is given in a dosage of 15 to 30 millilitre for all kinds of skin diseases, leprosy even when organs have started falling (*galita kushta*),

glandular swellings, splenic enlargements, anaemia, cough and also breathing difficulties.

3. ***Madyasava:*** Take 748 kilogram each of the central wood of *khair* and *deodar*, pound coarsely, and cook in 6 litres of water. Remove from fire when the latter gets reduced to half, strain. When cool, add the following: 3 kilograms of honey, 748 grams of *loha bhasma;* the *triphala* fruits, the smaller cardamon, cinnamon bark, black pepper, *tejpat, naga kesar* - each 12 grams and 3 kilograms of country sugar. Place all of this in an iron vessel and keep. When fermentation is full and the *asava* is ready, strain and store in closed bottles in a cool place.

This is given in a dosage of 15 to 30 milliliters for patients of skin diseases and the *kilasa* type of leprosy. This gives a desirable relief.

Non-medical Uses of Khair

A few more uses of non-medical nature in addition to what have been mentioned earlier are as below:

Tanning: Kattha and many of the byproducts of its manufacture had found great use once in the tanning of leather. The great quantity of *khair* exported in Europe was mostly used for colouring the leather there because the resultant here was fast, standardised and settled. But for the actual tanning this way, *khair* is not now of great value as noted above as the leather tanned thereby becomes hard and the yellow spots continue to remain

there. Efforts are on however to rectify the situation.

Dyeing: A great use of *kattha* is made now in dyeing the clothes and to print the designs particularly of spots and creepers, over it. The shade obtained thereby is very fast. A speciality of its use is that the cloth as well as the threads over which it is applied acquire a desirable amount of durability. It affords a protection from the deleterious effects of climate. Because of this reason this is employed in maritime cordage and postal parcels. Jute fibres and products are best protected by an use of potassium dichromate and kattha.

There is a great demand for kattha for dyeing cotton as well as silken textiles.

Using the dissolved kattha with lime or alum will convert mud colour into an attractive red colour. This is a widely utilised procedure in India. For this purpose the inner wood of *khair* is cut into small pieces and boiled. Along with sal ammoniac, kattha is used very commonly to secure a stable bronze brown colour, suited best for fast printing on textile. Kattha is much used in Europe for textile colouring and printing.

Gum: Khair trees yield a pale yellow gum. This is sweet and dissolves fully in water. It is an excellent substitute of gum arabic. In fact it is often mixed with it and sold as such. Such a practice is very prevalent in Gujarat.

The Hard Wood: Khadira is one of the sacred woods in Indian forests much used in religious ceremonies. Shatapatha Brahmana declares that the tree sprang from the bones of Prajapati and therefore the wood is very hard. It is however true that khair wood is one of the hardest woods of the Indian forests. In Vedic times the wood was freely used for many domestic and other implements and chariot making and also in making vessels for drinking Soma juice as well as the laddle (*sruva*) for oblation. The wood is rather resistant to the termites. Its timber is good for building construction.

Its sap wood region is quite thick and yellowish white. This is actually seen to have been extensively utilised in very old buildings. It can be well used even now in the ports as it resists saline atmosphere. The wood is however too hard for being cut with saws; it needs heavy and durable machines. But it takes very good polish and also nice finish. Many implements are made with it such as sword handles, spears, bows, mortars, oil press, crushers, axils, sleepers of the rail track and so on.

In the regions where there is a jungle of these trees, the wood forms a common fuel. Its wood is considered to yield a very excellent charcoal.

Lac: Even in Vedic era, *khadira* was considered one of the best trees for lac production. This is

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- Gourds and Pumpkins
- Amalaka and Bhumi Amalaka
- Onion and Garlic
- Neem and its Relatives
- Banyan and Peepul
- Khas, Kesar, Nagakesar and Khaskhas
- Coconut, Supari, Kikar and Catha
- Bael, Wood Apple, Lemons and Castor
- Ginger and Turmeric
- Salts, Sugar, Jaggery and Honey
- Spices
- Isabgol, Gokhru and Brahmi
- Seasoning Herbs
- Fragrant Herbs
- Milk and Milk Products
- Leafy Vegetables
- [illegible]
- Karkat[illegible]

Nausa[illegible]

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