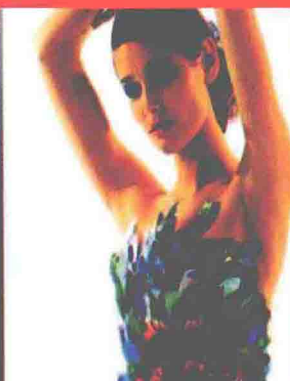




NON CONVENTIONAL TEXTILES

G K GHOSH



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Innovation, like water to the ancient Romans, is
the central sustaining nourishment for growth.

Tap idea streams and flourish.

— *Robert Beachy*

Introduction

Eye-brow may be raised about the term non-conventional textile itself. To understand this term it is necessary to understand its opposite term, "conventional textile". But even before that it is necessary to understand what we usually mean about textile itself.

In order to understand textile, it is not necessary to go for much technicalities. Let us begin with simple explanation of textile what we normally presume. If asked, a person having neither technical background, nor even education shall only react saying textile is a term meaning dress. When further asked he may only add few more items like towel, bed sheets, bed spreads, curtain cloths and so on, woven from yarn of various materials like cotton, silk, wool or synthetics and so on. If we go still deeper even non-wovens may be included in the textile family. Perhaps this may be simplest explanation of the term textile. Even most complicated definitions of textile may also ultimately lead to same or similar meaning.

When basic term is explained now it is time to understand the terms conventional and non-conventional textiles. Before non-conventional textiles are to be understood, it is better to probe into the term "conventional textile". Infact the term itself explains its meaning. The textile items, which are commonly being used by convention, are obviously conventional textile. But it should also to be noted

that they are area specific and time specific. For example gowns used by women in Europe are conventional dress or textile in Europe, which in India it is not. On the other hand it is saree in India. On the other hand shirt and pant for men was non-conventional about a century back in India, but now may be considered as conventional dress. This relates to mode or style of use, which changes during passage of time.

But the terms may also be applicable based on basic material. If we talk about conventional textile based on basic material one may easily pronounce cotton, silk, wool or synthetic in India, the last being one of the latest addition. But they may also be region specific and time specific. Even a few centuries back Linen was conventional textile in Europe and Egypt while cotton in India and silk in China. The scenario has changed often gradually later drastically. With scientific development rayons (both acetate and viscose) as well as synthetics has been added in the list of conventional textile, many natural fibres used in yesteryears were forgotten, many area specific items were universalised and finally blending of more than one items brought in certain new conventional products. In the process however we ignored many wonderful natural products that were conventional during some point of time became non-conventional later. These are also products which has potentiality to become useful textile were never tried seriously.

The modern trend in textile sector has extremely damaging effect during years to come. As days proceed, due to pressure from Western lobby and MNCs textile made from synthetics are becoming most common textile items. Apart from being unfriendly to skins, bulk use of these items shall also deplete our petroleum reserve faster thus cause crisis of fuel. This reserve need to be preserved for our fuel need rather than converting to textile which we can get from other renewable sources. Though it is realised, it is not happening since MNCs are out for amassing wealth at the cost of dark future of the planet. Even the textile policy supports this

trend. Use of synthetics blended with cotton even upto 16% is permitted to the extent that such blended cotton textile can be legally accepted as pure cotton. Thus policy itself is against the cause of healthy environment.

Considering textile from natural resources the consumption is increasing in such a galloping rate that even renewable sources becoming non-renewable. The method of manufacture of textile in modern era also causes pollution. Manufacture of synthetics right from beginning causes pollution. Even textile from natural resources in some stage or other causes pollution to considerable extent. That is how textile cities like Ahmedabad or Coimbatore have become most unhealthy cities only because of textile. With growth of population at galloping rate, the demand for textile shall increase at equal or faster proportion, more so because consumption for fashion is an added dimension. Unless we search for alternate renewable resources for textile it will lead to a sad story of textile history. That is the reason there is a need to search non-conventional renewable source for textile to give us an effective solution. It is also necessary that method of manufacture should also be as ecofriendly as possible.

According to modern trend the production method adopted in mass production. The process of mass production not only deprives human hand thus causing mass unemployment but the process itself causes pollution. Thus entire process not only is being against human well being but also far from ecofriendly. This trend is certainly against the people and biosphere. On the other hand Mahatma Gandhi pleaded production by masses. Those who won elections swearing the name of this great soul also opted mass production instead of production by masses though during their election speeches or otherwise expressed their solidarity with Gandhian principles. It is felt that if non-conventional textiles be encouraged following Gandhian principle of production by masses we can ensure happy citizens with clean environment.

With all the above in view, this book may come handy to all right from planners, researchers, fashion designers, textile operators and so on, and if they think for better shall ensure a better tomorrow for this land.

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CHAPTER 1

Ramie

Ramie fibre often referred to as prince of fibres for its lustre and quality. The plant is basically grass and may be considered best among the non-conventional textiles. The plant is botanically known as *Bochemeria ramie*, Ramie and china grass in English, Rhea in Assamese and Kawkura in Bengali.

A perennial shrub a metre or two high which spends up large members of straight slender stalks of one to two centimeter in diameter. It is indigenous of Japan, China and Far Eastern countries. But it has been in use in India from pre historic times. In early Sanskrit literature it is often mentioned as grass linen. Valmiki, Vyas and Kalidasa have made frequent references to fabric made out of this fibre. The Indian plants growing cultivated as a garden crop under the name of *Kankura* and growing uncultivated under the names Pooah in the sub-Himalayan regions and Rhea in Assam were identified as Ramie as a result of studies undertaken in 1836 AD by the botanists of the East India company. Apart from common species B. Ramie there are also a couple of more species grow in India all belonging to *Bochmeria* genus which can be used for same purpose as discussed here.

In Assam even during recent past the fibre has been used as textile woven with endi or mulberry silk but recent trend shows it has been discontinued due to two basic

reasons (i) difficulty in extraction of fibre, (ii) as Ramie growing areas has been unsurped by tea gardens, availability thus popularity has been reduced.

Ramie plants grow best in a warm moist climate, tropical, sub-tropical or temperate as far north and south as 40 latitude. In sub-tropical and temperate regions it grows best on an elevation of 300 to 400 metres. In the tropical areas, an elevation of 1000 to 2000 meters gives the best crop. Rainfall should average not less than 8 cms per month regularly distributed throughout the year.

Periods of heavy drought or excess of rain and water logging conditions are detrimental to the crop. The areas should be free of strong winds. The preferred soil is a moderately rich loam, loose and friable and well drained. The crop exhausts soil readily, hence heavy manuring at frequent interval becomes necessary.

The propagation is usually by means of stem cuttings. The plants can also be raised either from seeds or from roots. If properly cultivated no replanting becomes necessary for 6 to 15 years, depending on the soil and the climate. The root system gives rise to abundant fresh shoots after each cutting of stems. It takes about 10 months for the stems to mature after the first planting. But in climates and areas unsuited, the time taken may be as long as two years. For obtaining fine soft fibre, shoots must be cut before the mature and begin to flower. The quality of the fibre depends on the age and the length of the shoots. Shoots not more than 60 cms in height give the best fibre, but the quantity is small. In long stems the fibre is coarse. Hence shoots one or a little more in height are usually preferred.

When the root system is well established, a crop may be harvested during the warm growing season on the average of once in 60 days and the plants will continue to produce stalks of good quality fibre for 5 to 15 years. Thereafter roots become matted; the fibre produced by the plant becomes coarse. In areas where one crop in a year can be taken the

plants are known to live and give good fibres for 20 to 30 years.

Harvesting is done by hand in nearly all the countries excepting U.S.A., where machines are employed. In India where it grows wild it has to be by hand.

Ramie fibres occur in the form of bast bundles with the ends overlapping so as to produce continuous filaments throughout the length of the stalk. Gums, waxes and pectins, hold them in place and to each other rather firmly.

It will be seen from the foregoing description of the plant and the manner in which the fibre lie quartered within it, that the conditions obtaining in ramie differ a good deal from jute, hemp and other bast fibres which shall be discussed in respective chapters. It is not then surprising that the method of retting described in the respective chapters do not deliver the fibres. An entirely different treatment, a more complicated and expensive one is called for; it makes the fibre a costlier one. The reason for all this is that the bark i.e. the wood of the bark grips the fibres very tightly.

The method of decortication, which combines in it the retting principle only in a limited degree is employed to separate the fibres from the bark on one hand and stalk on the other, and for getting rid of the gums, waxes and pectins. Even when that is done only the crude fibres results, which should be further processed.

Decortication is done in two ways :

- (i) by hand
- (ii) with the help of machines

The areas where hand decortication is practiced have each their own special process. The only point where all are agreed upon is the removal of the leaves from the stalks. In some areas, the bark together with the fibres adhering to it

is peeled away from the stalks. The fibres are later on freed from the woody portion i.e. the bark, by alternate soaking in water and scraping; this process goes on till the fibres come out clean and white. The separation of the stalks from the bark with the fibres is done in some areas by peeling and in some by beating the canes till the latter come out. In some areas freshly cut stalks are treated for this operation. In some areas the freshly cut or dried stalks (with the bark and fibre on) are soaked in water for a few days to facilitate the peeling. The beating is done by pounding in some places. In others the stalks are dashed against stones or wood.

The soaking of the separated bark with fibre adhering is done in some places in still water, in some places in running water. In some areas fresh water is used while in some saline water is used for the soaking. In some areas cold water is used, in some warm water while in some hot water.

The tools used for scraping also vary from area to area. In some shells are used; in some bamboo strips; in some knives with blunt blades of bronze and of iron on others. The operation is done by holding the scraper in one hand with the edge against a guard, drawing the bark towards the operator; in some cases the knife is drawn away.

The fibres thus produced are in the form of strands with gums, waxes and pectins adhering to them. Hence they are degummed. This is done by repeatedly soaking, scraping, washing and sun drying the fibres. In some areas lye, made from ashes, or lime is used in the soaking water.

Machine decortication has developed in various countries since 1800 AD. In USA alone more than 2000 patents are said to have been issued for the machines. Most of them are working on the raspador system employed for recovery of pineapple or sisal fibres; the scrapes away the bark leaving the fibres free. But the fibres even under these conditions contain woody particles which should be brushed away by a brushing machine, and gums and pectins which should be removed by chemical treatment.

A large stationary machine combining the scraping and brushing operations was patented in Germany in 1933 AD.

A small portable machine, also working on the raspador system was patented in Japan in 1947 AD, in which country the ramie fibre industry has made considerable headway. A special type of decorticator and a brushing machine work together. The former frees the full length of the fibre in one operation when the canes together with the leaves are fed at one end by hand. The fibres, thus, decorticated and dried are brushed by the other machine.

Literally thousands of machines are in use though nearly all work according to the raspador system. Brushing too becomes necessary in all cases.

In both hand as well as machine decortication, the degumming operation is essential. Degumming means the removal of the gums, waxes and pectins remaining on the brushed fibre after decortication. If they are not removed the fibres become brittle and weak. Proper degumming separates the individual fibres and leaves in soft clean state with their strength and the other characteristics intact. This is a skilled job, on the successful performance of which alone, fibres of the required quality results.

There are two basic methods for degumming one on commercial scale—bacteriological and chemical. Since the first method never succeeded in case of ramie only chemical methods has to be applied.

The chemical process of degumming consists of boiling the fibre in a chemical solution usually made with caustic soda. The amount of chemical to be used depends largely on the quality and the quantity of the fibres, i.e., on the amount of the gums, etc., in them. The length of the cooking time varies depending on various circumstances, from one to four hours. After the cooking the fibres are rinsed, neutralised, washed, centrifuged several times oiled and then dried. In some cases the fibres are bleached before oiling.

The production of the fibres from the weight of the canes varies from 2.5 to 3.5 percent. The average annual yield from an acre is estimated to be half a ton of clean white fibre. In Japan where this industry has progressed well gives almost 2 tons an acre.

Ramie fibre is naturally very white. It resists the effects of bacteria and fungi including mildew remarkably well. It is very strong and durable. Of all the vegetable fibres it is the least affected by moisture. It is said to possess three times the strength of hemp. The fibre can be separated to the fineness of silk. It takes dyes easily. Particularly after bleaching it takes snow-white appearance. It does not become dirty easily. It possesses a beautiful lustre equal to that of silk and superior to that of linen. It has high absorption capacity.

Ramie is used in Europe for sacks, sail cloths, belting, tablecloth, sheeting, nets, threads, cordage, paper etc. Gas mantles of good quality are also made from it. But it is rarely used itself as textiles: it is mixed with wool, silk and cotton. Its special use in the manufacture of lustres non-creasable fabrics.

Traditionally this fibre was extracted in Assam where it is used for manufacture of textiles blending with endi silk. But this practice gradually being discontinued. Some attempt is being made for revival but not with much success. There are Ramie research stations in Guwahati and in Goalpada district and it is reported a good amount of work has been done. But as usual there is lack of lab to land transportation thus these research findings remained useless. No one bothered to identify problems, even if done no attempt has been done to solve them for obvious reasons. Ramie in Assam is a wild crop and rarely cultivated. The Ramie growing areas were usurped by tea gardens thus no one dare to touch the tea lobby backed by powerful MNCs. While Ramie would have benefited a larger number of people, tea benefits a few rich. But who will belt the cat? The second

problem being the technology of extracting fibre. If drudgery be removed by partly mechanising following Japanese model this problem would have been solved. Ramie would have given us beautiful lustorous textile if woven by handloom and can enhance beauty of silk and wool if blended. Theoretically many scholars speak in this language but rarely implemented. One of the major constraint however is lack of implementing agencies in Assam. There is hardly any NGO or even any government sponsored agencies who think about Ramie. They go for easy method of adopting endi, muga or mulberry silk. Insurgency is another big problem for this type of development. NGO's or voluntary organisations dare not go to these areas for new work plan or new type of developmental activities. Many Govt. of India officials who thought to do some good work are usually threatened by underground outfits.

Problems are there to stay. But there is need to solve them. If such a wonderful material available on plenty goes waste, it is unfortunate. People of Assam are deprived of their income and Assam State loses valuable revenue even foreign exchange. Value addition may even ensure greater income. There is need to draw a definite action plan to utilise this valuable wealth. There is also need of policy support and initiative from Central and State Governments. Till now however there no step forward worth mentioning.