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Tonkin's *giáy dó*¹ and its Chinese roots

Abstract: There are various sources concerning the manufacture of Indochinese paper at the beginning of the 20th century: articles published in colonial magazines by engineers or by industrial managers working in Indochina, photographs and postcards taken by the colonial services; the work of Henri Oger, administrator of the French civil services stationed in Hanoi between 1912 and 1919; and during a later period and Dard Hunter's book published in 1947, following a trip he made to Indochina. These sources provide a fairly precise idea of paper production and its social organisation in the region. This article presents the production of paper in the northern part of present-day Vietnam. It attempts to show the links between the Chinese and Tonkinese paper making.

Key words: Tonkinese papermaking, *giáy dó*, *cây gió*, *dó*, *duróng*, *tranh*, *cây mỗ*, *Daphne involucrata*, *Rhamnoneuron balansae*, *Broussonetia papyrifera*, *Aquilaria*, Paper mulberry, bamboo, straw, grass.

¹ *Giáy dó* means "handmade paper" as do the better known terms *washi* or *hanji* which designate handmade paper respectively in Japan and in Korea.

Introduction

For more than fifteen centuries Tonkin² in the north of present-day Vietnam was an important region for the quantity and quality of its paper production. Few Western sources exist before the end of the 19th century and limited research has been undertaken by Vietnamese academics. As a consequence, documents produced during the French colonial era provide invaluable insights into handmade papermaking in the northern region of Vietnam. This period extends from 1887 to 1954, from the creation of the Indochinese Union until the departure of the French.

These archives describe a formerly flourishing industry that enters a decline at the turn of the twentieth century as a result of the mechanisation of paper production and political upheavals triggered by colonisation, wars and revolutions.

The texts were predominantly written by engineers and botanists sent to the colony in search of raw materials, exploitable by the colony itself or for export to the Metropolis for profit. Articles were regularly published in scientific and economic journals throughout the colonial period³, some of which were illustrated. The authors, for the most part, were established scientists in their fields.

In addition to these publications, there are significant other sources of information from industrial archives and more particularly annual company reports⁴, which provide a good indication of the management of these colonial

² The term Tonkin, derived from the ancient name of Hanoi, Đông Kinh, was adopted by French settlers to designate this northern part of Vietnam. This unofficial term will be used here since all colonial sources used in this article for this period refer to this region under this term.

³ See in particular: R. Bouvier, *Le problème de la papeterie française et la solution coloniale*, “Revue de botanique appliquée et d’agriculture coloniale” 1940, no. 226, pp. 381-388; A. Camus, *Graminées d’Indochine pouvant donner de la pâte à papier*, “Revue de botanique appliquée et d’agriculture coloniale” 1925, no. 42, pp. 105-115; A. Chevalier, *Matières premières pour la production de la pâte à papier en Indochine*, “Revue de botanique appliquée” 1922, vol. 2, pp. 110-110; F. Claverie, *L’arbre à papier du Tonkin*, “Bulletin économique de l’Indochine” 1903, pp. 75-88; idem, *L’arbre à papier du Tonkin, suite*, “Bulletin économique de l’Indochine” 1904, pp. 75-88; C. Crevost, *La fabrication annamite du papier*, “Bulletin économique de l’Indochine” 1907, [https://gallica.bnf.fr/ark:/12148/bpt6k6562535m], pp. 789-797; J. Leandri, *Contribution à l’étude des Thyméléacées d’Indochine*, “Revue internationale de botanique appliquée et d’agriculture tropicale” 1949, no. 323-324, pp. 497-505; H. Lecomte, H. Humbert, F. Gagnepain, *Flore générale de l’Indochine*, vol. 5, Paris 1915; L. Chabert, L. Gallois, *Atlas général de l’Indochine française*, Hà-Nội, Hải Phòng 1909; *Women of Hanoi*, Pathé British 1930, [online] https://www.youtube.com/watch?v=R5_pP_A9xx4 [accessed 03.01.2020].

⁴ See in particular: “Annuaire Général de l’Indochine Française” 1901, II-858; “Le Moniteur de la papeterie française” 1st January 1907, July 1924, 1st January 1927, 1st February 1927; “Le Bulletin économique de l’Indochine Jan. 1914, July-Aug. 1920; “Les Annales coloniales” 18th May 1923, 31st May 1935; “L’Éveil économique de l’Indochine” 24th November 1918.

companies. Photographs taken by the colonial civil and military services, as well as the exotic images published in the form of postcards, give an added layer of rich information.

*Papermaking in Indochina*⁵ by Dard Hunter, a recognised reliable narrator who visited the area in 1935, is of particular value⁶. His travels afforded him an thorough view of the various Asian paper manufacturing processes⁷. His profession and his travels familiarised with papermaking and sensitised him to the technical details so he was able to interpret them. His book is also interesting as it is illustrated by photos.

Henri Oger's⁸ book *Introduction générale à l'étude de la technologie du peuple annamite*⁹, a long unrecognised work, describes papermaking in ancient Tonkin. The book brings together a total of 4,200 drawings on a wide variety of themes, from which valuable information on papermaking may be gleaned. It contains about 470 images related to paper, its manufacture, its use (such as printing, binding, painting, manufacturing of ritual and secular objects) and trade in it. This number alone suggests the importance of paper in the Tonkinese society.

Around sixty images show with precision the stages of paper production, the tools used, the transportation of materials and the finished paper itself. These are accompanied by captions which often seem unclear. Most of the images are informative, however, and illustrate useful details.

Although the textual and iconographic corpus is rich, not every phase of production is covered. This study therefore seeks to narrow this gap by comparing the methods of papermaking in Tonkin to the industry elsewhere in Asia. This will give us a better understanding of the manufacturing stages of ancient papermaking in Northern Vietnam.

The foundation of Tonkinese papermaking has its roots in China, from the time the Tonkin was a part of the Chinese empire. Similar to Far East Asian countries such as Japan and Korea, which also owe China a good deal with

⁵ D. Hunter, *Papermaking in Indochina*, Chillicothe, Ohio 1947.

⁶ D. Hunter (1883-1966) was a printer, publisher and hand-papermaker. See C.A. Baker, *By his own labour. The biography of Dard Hunter*, New Castle, Del. 2000.

⁷ D. Hunter, *Old papermaking in China and Japan*, Chillicothe, Ohio 1932; idem, *A papermaking pilgrimage to Japan, Korea and China*, New-York 1936; idem, *Papermaking in Siam*, Chillicothe, Ohio 1936; idem, *Papermaking by hand in India*, New-York 1939.

⁸ H. Oger (1885-1936?) was administrator of the Civil Services in French Indochina, stationed at Hà-Nội between 1908 and 1919.

⁹ First Edition: *Introduction générale à l'étude de la technologie du peuple annamite. Essai sur la vie matérielle, les arts et industries du peuple d'Annam*, Paris [s.d.]; *Technique du peuple annamite. Encyclopédie de la civilisation du pays d'Annam*, Hà-Nội 1909, 2 vol. Reissued in three languages, French, English and Vietnamese: *Technique du peuple annamite = Mechanics and crafts of the Annamites = Kỹ thuật của người An Nam*, eds. O. Tessier, Ph. Le Failler, Hà-Nội-Paris 2009, 3 vol.

respect to papermaking, Tonkin, while adopting Chinese technology, selected locally available plants and developed its own organisation and production methods. The huge cultural and technological influence of China and the geographical proximity of Tonkin's production areas to southern China, allowed the perpetuation of practices and tools inherited from its great neighbour until recent times.

The images and texts from the colonial period illustrate practices of paper manufacturing at the beginning of the 20th century in Tonkin. Like the anthropologist André Leroi-Gourhan, who thought that the technologies had endured for centuries, I also believe that there is an affiliation between the ancient and modern craft of papermaking. Modern records may thus be used as a reference models in order to identify ancient practices¹⁰. This comparison may be made by placing photographs from the beginning of the 21st century alongside images from the corpus of ancient sources¹¹.

It should also be noted that all the documents consulted are written in European languages. This paper lacks material from Vietnamese sources which might have helped to verify the information contained in the European sources and rectify any inaccuracies.

Historical overview

The Red River Delta region is considered the cradle of the Vietnamese nation. Possessing rich land suitable for the cultivation of rice, it has always been densely populated and coveted place to live. From very early on, a range of traditional crafts developed alongside agriculture in this area. Papermaking originally developed by providing work for villagers during periods of agricultural inactivity caused by river floods. It helped them to supplement their incomes.

The production of paper, a technology brought by the Chinese, who came to expand their influence in the region, existed as far back as the third century¹². This area, which at that time was part of China¹³, paid high taxes in kind, especially in paper. The influence of China is not unique to papermaking. Many other intricate, traditional industries were initiated, for example, by diplomatic

¹⁰ A. Leroi-Gourhan, *L'Homme et la matière. Evolution et techniques*, Paris 1943.

¹¹ Author's photos and photos from the websites cited in note 81.

¹² J.P. Drège, *First mentions of paper in Vietnam according to Chinese sources*, French translation of Những ghi chép đầu tiên về làm giấy ở nghề nam qua thu tịch trung hoa. Việt Nam Học, Ký yếu Hội thảo quốc lần thứ nhất, Hà-Nội 1998.

¹³ The Chinese province of Jiaozhi or Giao Chi in Vietnamese. See P.H. Langlet, *Histoire du peuplement*, [in:] *Population et développement au Viêt-Nam*, ed. by P. Gubry, Paris-Karthala 2000, pp. 29-52.

missions sent to China for long periods. They came back with new knowledge, which they went on to put into practice on their return¹⁴. This feudal relationship continued after the end of Chinese domination at the beginning of the 11th century¹⁵.

From that time on, with the establishment of the court on the current site of Thăng Long, the production of luxury crafts reserved for the well-to-do classes, increased. Paper was intended solely for royal edicts and religious ceremonies. It was also sold to the members of the wealthy and educated social classes. Luxury papers were also exported to China and Japan.

Industry in Tonkin was not the preserve of towns. In combination with rice growing, villages early on developed various types of manufacture (metallurgy, pottery, lacquerware, weaving, basketry) and were known as *craft villages*. Villages would specialise in a single activity and organise the production through family and economic networks. These strong commercial links were reinforced by the way in which the materials necessary for production were distributed. A village retained only what was essential to its activity and sold material it had no use for to other villages whose specialties were different¹⁶.

These clusters of villages undertaking a common activity were characteristic of village society. This type of community organisation applied not only to papermakers but to other craftsmen too.

Within the villages craftsmen were organised into guilds that allowed them to be exempt from compulsory work or military service. Taxes were paid in kind to the court. The tax in papers of various quality could amount to more than five thousand sheets per person per year¹⁷.

The villages were linked to Hà-Nội where the products were sold. From the 17th century the town had a *quartier des 36 rues et corporations* (district of 36 streets and corporations), each specialising in a craft. These streets bear the names of the crafts (such as for example *Hàng Giấy*, Paper Street; *Hàng Quạt*, Fan Street; *Hàng Bìa*, Map Street) and the merchants themselves were often also craftsmen.

The village of Yên-Thái, formerly Bưởi on the outskirts of Hà-Nội renowned since the 16th century for the high quality of its paper and its excellent calligraphy and printing is a good example. This village was the centre of an important paper market¹⁸.

¹⁴ P. Papin, *Histoire de Hà-Nội*, Paris 2001.

¹⁵ T.-H. Tsien, *Paper and printing*, Cambridge 1985, Sciences and Civilization in China, ed. J.S Needham, vol. 5, pp. 348-350.

¹⁶ S. Fanchette, *Papeterie et recyclage dans les villages de métier*, "Techniques & Culture" 2016, no. 65-66, [online] <http://journals.openedition.org/tc/7954> [accessed 13.01.2020].

¹⁷ Bùi Văn Vượng, *Du papier "Dó" aux estampes populaires*, Hà-Nội 1999.

¹⁸ Ph. Le Failler, *Quelques traits sur les villages papetiers du Nord-Vietnam*, [in:] S. Fanchette,

The first decline of the paper workshops began with the move of the court to Huế in 1806. During the 19th century the state-imposed standards in paper production and tax continued to be paid in kind¹⁹. At the same time, state control over the quality of papermaking diminished and private trade was encouraged. The craftsmen consequently experienced difficulties in selling their goods. Chinese merchants, however, invested in the traditional crafts and exported the goods in great quantities to China. They gave loans to the craftsmen and were paid back in finished products. This applied to papermakers to whom they sold the raw material on credit²⁰.

The second decline was caused by the arrival of the French. The colony needed paper in fairly large quantities for its administration, newspapers and schools, and could not import sufficient amounts from the Metropole. Manufacturers installed the first papermaking machine in 1892 at Hà-Nội on the banks of the Great Lake, in the *rue du village du papier*, which was located in the district of the traditional papermakers²¹. During the early years the two types of productions did not compete with each other, since their clients were different. The factories even supplied the raw material to the craftsmen²² and a significant amount of this craft paper was used to make firecrackers²³.

After the First World War, which brought a halt to paper production²⁴, two manufactures owned by the same proprietor, the SPI (*Société des Papeteries de l'Indochine*), operated in tandem. The factories of Việt-Trì and Đáp-Cầu were located not far from each other, a few dozen kilometres from Hà-Nội. SPI thus had the entire production chain at its disposal, with Việt-Trì producing the pulp and Đáp-Cầu making the paper²⁵.

The industrialisation process that began between the wars hastened the decline in traditional paper production. The War of Independence and the conflict with the United States disrupted all plans for the development of the paper industry.

From 1954 onwards individual production was banned and villagers were integrated into handcraft cooperatives. As had been the case in the past, they

N. Stedman, *A la découverte des villages de métier au Vietnam. Dix itinéraires autour de Hà-Nội, Hà-Nội-Paris* 2009, pp. 28.

¹⁹ T.H. Nguyễn, *Economic history of Hanoi in the 17th, 18th and 19th century*, Hà-Nội 2002.

²⁰ Ibidem.

²¹ C. Laroque, *La papeterie tonkinoise au début du XX^e siècle*. Proceeding of the International conference of the Institute of Paper Historians, Ghent 19th-23rd, 2018, forthcoming.

²² "Annuaire général de l'Indochine Française" 1901, II-858.

²³ "Bulletin économique de l'Indochine" January 1914.

²⁴ "L'Eveil économique de l'Indochine" 24th November 1918.

²⁵ "Les Annales coloniales" 18th May 1923; "Moniteur de la papeterie Française", 1st February 1927.

were forbidden to work in both agriculture and crafts. The clusters, which had been a component of the Vietnamese economy for many centuries, disappeared for a number of decades, but gradually reappeared in a similar form with the opening up of the country to the market economy²⁶. In the 1980s some villages thus obtained authorisation to restart individual paper production, but this was not commensurate with previous levels of production.

From the 1990s onwards traditional papermaking activities dwindled and craftsmen made papers of lower quality. The old village structure enabled them to overcome difficulties in finding raw materials. A new network was formed between the villages and the city of Hà-Nội. It is through this network that the recycling of paper, now the major activity in the paper industry in the region began. This largely comprised a mechanised small-scale production of toilet paper and packaging paper. This was accompanied by serious social and environmental impact²⁷.

Currently the production of handmade paper is limited to a few villages. All the production is carried out by women within the family compound, the men guaranteeing the main income by working outside the home.

What remains of the manufacture of traditional handmade paper is tiny compared to the production of paper little more than a century ago. This paper is now mainly sold to tourists and also used for artistic purposes²⁸.

Organisation of the paper-producing villages

These so-called *paper villages* would traditionally specialise in a single activity that would be closely related to, or interdependent with that of other villages. The first activity would involve the gathering of raw materials and their transportation to the villages where the paper was to be produced. These early villages would be located close to the locations where the raw materials grew, or were cultivated, or close to the rivers and roads by which they would be transported. Hunter informs us that the raw materials, the bark, came from the “Upper North Tonkin region” in the former province of Vĩnh Yên and from the plantations on the left bank of the Red River, in the region of Sơn Tây²⁹. More recent sources point to other centres in the provinces north of Hà-Nội, such as Thái Nguyên and Bắc Kạn; to the northwest of the city, such

²⁶ S. Fanchette, N. Stedman, op. cit.; S. Fanchette, *Papeterie et recyclage...*, op. cit.; T.H. Nguyễn, *Economic history...*, op. cit.

²⁷ S. Fanchette, N. Stedman, op. cit.

²⁸ J.S. Peachey, *Hand papermaking in Northern Vietnam*, “Hand Paper Making” 1995, no. 10/1, pp. 13-17.

²⁹ D. Hunter, *Papermaking in Indochina...*, 1947, op. cit.; F. Claverie, *L'arbre à papier...*, 1903, op. cit.; idem, *L'arbre à papier...*, 1904, op. cit.

as Phú Thọ, Lào Cai, Yên Bái and Lạng Sơn; and to the east Hòa Bình; and the southwest Quảng Ninh³⁰.

The second activity involved the production of the sheets of paper in different qualities and different formats for a variety of uses. The papermakers would be located between Hồ Tây, the *Lac de l'Ouest* and the Tô Lịch River that provided the necessary water for the production of paper. Many of the papermaking workshops were located on the south shore of the lake. Some of these villages, Yên-Thái, for example, or Hồ Khẩu, Đông Xã, Dịch Vọng and Cầu Giấy are now part of the city of Hà-Nội.

An important cluster remains, Dương Ô, in the of Bắc-Ninh province, with the villages of Đào Xá and Châm Khê, where a number of craftsmen continue to make bark paper in the many recycling paper workshops.

Within families the division of labour would have been gendered. The women would have been in charge of the production and drying of the sheets, while the men would have been in charge making pulp from the raw materials³¹. All ages would have been involved in a variety of operations, from children to the elderly.

A third category concerned the craftsmen who made religious or secular paper objects, such as fans, lanterns, parasols and umbrellas, kites, hats, masks, shoes, houses, palanquins and miniature boats, as well as statuettes of horses, elephants, birds, fishes, flowers and fruits³². Paper-made firecrackers and gold ingots for burning, had an important place, as well as the popular prints of the Tết festival³³.

These villages, like those where sheets of paper were manufactured, were located in the province of Bắc-Ninh, close to Hà-Nội, the main centre for the distribution of these goods.

Fibrous and mucilaginous plants³⁴

Fibrous plants

Botanical identification of the plants reported in the sources is complex, as most are reported under their vernacular names. The authors themselves sometimes seem unsure of their taxonomic attributions. For greater clarity,

³⁰ Ph. Le Failler, op. cit.

³¹ H. Oger, *Technique du peuple annamite = Mechanics...*, op. cit., pp. 45: The woman takes care of tasks requiring flexibility, patience and great skill of the hands while the man takes care of all the work that requires a great expenditure of strength.

³² C. Laroque, op. cit. Most of these objects were intended for ceremonial offerings.

³³ Village de Đông Hồ dans la province de Bắc Ninh.

³⁴ See Khartasia, [online] <http://khartasia-crcc.mnhn.fr/> [accessed 15.09.2020].

a table at the end of the article summarises the terms used in the sources consulted (see Table 1).

Local names may be preceded by the term *cây*, which means *tree*, but this term is also applied to certain grass plants. Depending on the period, certain terms are more popular with authors than others. Today, for example, the terms *dó* and *đường* are most frequent. These two terms designate respectively the *Rhamnoneuron balansae* (Drake) Gild and the *Broussonetia papyrifera* (L.) L'Hér. ex Vent.

The botanical identification of the plant would vary from one author to another, sometimes with considerable discrepancies in nomenclature. *Cây gió*, for example, was identified as a variety of Daphne, the *Daphne involucrata* Wall.,³⁵ by Henri Oger, F. Claverie, Dard Hunter and Charles Crevost, but Jacques Leandri identified it as both *Rhamnoneuron balansae* (Drake) Gilg. and *Aquilaria crassna* Pierre ex Lecomte. Although they belong to the same family, the two plants are used for different purposes³⁶. This has likely created some confusion in the identification of the taxon³⁷. René Bouvier, for example, identified *Cây gió* as a mulberry tree.

Daphne involucrata Wall., like the *Rhamnoneuron balansae* (Drake) Gild. belongs to the Thymelaeaceae family and it is described as a low shrub from the Himalayan regions. In Nepal, however, the root of *Stellera chamaejasme*, also from the Thymelaeaceae family, is used in papermaking³⁸. This, too, may have caused some confusion between the two plants. On the other hand, the *giuông*, sometimes preceded by *cây* is unanimously recognised as *Broussonetia papyrifera* (L.) l'Hér. ex Vent, along with its variant *Đường*.

Most of the sources refer to Tonkin, the northern part of Vietnam, but some references allude to plantations in Annam³⁹, the central part of Vietnam and Laos. The local names of the plants also vary depending on the regions and the local languages. *Broussonetia papyrifera*, for example, is called *May sa* or *May xa*, in Laos, the transcription of which into the Latin alphabet adds to the complexity.

³⁵ Alternative name for *Eriosolena composita* (L.f.) Thiegh.

³⁶ The wood of *Aquilaria crassna* Pierre ex Lecomte produces an odoriferous resin, calambac, which is used for its medicinal qualities. The bark of *Aquilaria sinensis* is used for the manufacture of paper, see [online] www.efloras.org [accessed 13.04.2020].

³⁷ C. Crevost, C. Lémarié, *Catalogue des produits de l'Indochine, plantes et produits filamenteux et textiles*, "Bulletin économique de l'Indochine" 1920, no. 140, p. 54.

³⁸ A. Helman-Ważny, *The archaeology of Tibetan books*, Leiden, Boston, Brill, 2014, p. 23.

³⁹ D. Hunter, *Papermaking in Indochina*, op. cit., pp. 44-46. Hunter says that at the beginning of the twentieth century Daphne was extensively cultivated in the province of Hung-Háo or Hung-Hoá (?) in Annam.

We may thus group the plants into three main families:

1. Thymelaeaceae: *Daphne involucrata* Wall., *Rhamnoneuron balansae* (Drake) Gild, *Wikstroemia indica* (L) C.A. Mey., *Aquilaria agallocha* Roxb. and *Aquilaria crassna* Pierre ex Lecomte.

The *Dó* is part of people's daily life. It produces fragrant flowers which are offered to ancestors during the *Tét* celebrations, the lunar New Year.

The use as fibrous material of the last two taxa requires confirmation because Agalloche wood is mainly used for its perfume (see note 36).

2. Moraceae: *Broussonetia papyrifera* (L.) l'Hér. ex Vent., *Streblus asper* (Lour.) and *Ficus religiosa* L.

The last of these, the *Pagoda fig tree* or *Bodhi tree*, also has an important place in society, particularly in the Buddhist religion.

3. Poaceae: *Imperata koëningii* (Retz.) P. Beauv., *Bambusa arundinacea* (Retz.), rice straws (probably *Oryza sativa* L.).

4. We also found mention of lianas, with no precise name indication; *Momordica luffa* from the Cucurbitaceae family, a vine which fruit, after drying, for example, provides a kind of vegetable sponge with stiff fibres.

There is a possible confusion between fibrous and mucilaginous plants⁴⁰. In the case of the first two families it is the bark of the branches of the shrubs that was used. In the case of the Poaceae family of plants used mainly in factories, the whole stem was used. In the written sources, however, it is difficult to distinguish between the traditional and industrial use of these plants (especially bamboo)⁴¹. Hunter tells us that rice straw and bamboo were used in the production of cheap paper⁴². Numerous references, however, mention the uses of the Poaceae family of plants in handmade papers, so should not to be ignored.

Some ethnic groups in northern Tonkin, Mông and Dao (the *Meo* in colonial terminology⁴³) make paper for family and ceremonial purposes with bark, but

⁴⁰ Kiwi (*Actinidia chinensis* Planch.), for example, which grows abundantly in southern China, is a dispersing agent commonly used in Chinese papermaking. Mucilage is extracted from the vine rather than the fruit.

⁴¹ C. Laroque, op. cit.

⁴² D. Hunter, *Papermaking in Indochina*, op. cit.

⁴³ J. Bonet, *Dictionnaire Annamite-Français. Langue officielle et langue vulgaire*, Paris 1899.

also with rice straw, straw grass or *tranh*⁴⁴ and bamboo (see last section for a description of this production).

Mucilaginous plants

The use of mucilage is one of the characteristics of Asian papermaking. Its rôle is to increase the viscosity of the pulp when the sheets are formed, so that the fibres spread slowly when poured onto the mould. This gives the papermaker more time to smooth the fibres over the mould.

Fewer mucilaginous plants are cited than fibrous, but the variety of vernacular names and their suitability for taxa are again problematic. I would refer the reader to the general table at the end of the text (See Table 2).

There are many variants of dialectical names for fibres. The genus, however, belongs to two families, Lamiaceae (*Clerodendrum* L.) and Lauraceae (variants of *Tetranthera laurifolia* and *Litsea* sp).

The mucilage of *mo* was obtained from *Clerodendrum* logs left to soak for several hours in water. The extracted gel would then be filtered before being added to the pulp when the sheets were formed.

No details are given for Lauraceae or the method of extraction of its mucilage. It would seem, however, that the wood of the branches was used⁴⁵.

Without specifying the nature of the plant, Tsuen-Hsuei Tsien writes that in Tonkin papermakers used a mucilaginous material that women used in their hair⁴⁶. Hunter seems to suggest that this might be *Machilus thunbergii* (Lamiaceae family)⁴⁷.

Production of bark paper

What follows is an examination of the steps involved in the manufacture of a sheet of paper from the extraction of the raw materials to packaging. Differences between the work carried out by one village and another are unspecified due to the insufficient precision of the sources to afford comparisons.

The cultivation and harvesting of raw materials, and the manufacture of paper would have been the responsibilities of two different communities: on the one hand farmers, harvesters, and on the other papermakers⁴⁸.

⁴⁴ Probably *Imperata cylindrica* (Linn.) Beauv.

⁴⁵ C. Crevost, op. cit.

⁴⁶ T.-H. Tsien, op. cit.

⁴⁷ D. Hunter, *Papermaking in Indochina*, op. cit.

⁴⁸ For the Vietnamese names of the phases of the operations see: *How to make dó paper*, [online] <http://zopaper.com/do-paper-making-process> [accessed 30.03.2020].

Several texts by Claverie and Crevost⁴⁹ outline fairly precise instructions in regard to the cultivation of the shrubs and especially concerning the way to maximise the yields. Information about harvesting and the transport is scarcer. Hunter and Claverie⁵⁰ specify that the cutting of branches would take place after the monsoon, i.e. between August and September inclusively. Trees would be harvested for the first time after three years and this would be repeated every three years until the trees reached nine years of age. This would maintain a high quality of bark.

Debarking was carried out either at the time of harvesting or after the branches had been immersed in water. The bark would be peeled from the wood and left to dry before being bundled together. It would then be transported from the growing areas by foot, by junks, by rafts or by train⁵¹. The bark would then be cut, into pieces since the quality of the wood varies along its length: thirty centimetres from the foot would give third grade paper, forty centimetres from the top would give second grade paper and the middle part would give first grade paper⁵².

The first phase would consist of transforming the bark, a stiff raw material, into a pulp by dint of chemical or biological methods. Following this, the raw pulp would be made into a paper pulp by mechanical action and finally the pulp would be formed into sheets of paper and dried.

Bark retting was the first phase. Claverie outlines that different methods were employed in two different villages⁵³. The bark would be immersed for two days in water before it would be cooked in an alkaline liquid. A different method would consist of a real retting process, provoking a fermentation of the bark in a pond or a pit (Fig. 1). This is followed by an elimination of impurities, mainly wood nodules. The bark would then be immersed for two days in either a lightly alkaline bath, a potassium ash lye or lime milk. This treatment would facilitate the penetration of the alkaline agent during the cooking, the intention of which was to dissolve the pectins in order to release the fibres.

Claverie and Crevost describe this operation somewhat differently, but the process appears to be rather obscure. According to Claverie, the bark would be transferred to a “regular kiln or a kiln similar to a regular lime kiln” (Fig. 2). These earth furnaces were built at different heights near the maceration pools. These structures have completely disappeared and the archive images lack sufficient clarity, so they provide no additional information. Claverie provides unclear explanations regarding the operation of the furnace. Two methods do, however,

⁴⁹ F. Claverie, *L'arbre à papier...*, 1903, op. cit.; C. Crevost, op. cit.

⁵⁰ D. Hunter, *Papermaking in Indochina*, op. cit. ; F. Claverie, *L'arbre à papier...*, 1903, op. cit.

⁵¹ C. Crevost, op. cit.

⁵² Bùi Văn Vượng, op. cit.

⁵³ F. Claverie, *L'arbre à papier...*, 1904, op. cit.

appear to have been used: one consisting of steaming the lime-impregnated bark and the other of cooking the bark in an alkaline bath. Claverie explains that the lime-impregnated bark would be placed on wooden crossbeams above a copper cauldron, which was placed on the top of the kiln. The upper part of the kiln would be covered with clay to prevent the escape of water vapour from the oven. Water would constantly have been supplied by a pipe throughout the cooking process, which would last between three and four days.

Fig. 1. 363. *Tonkin. Paper making. Pounding to macerate the pulp* © Dieulefils ed., Hanoi (active between 1885 and 1925)

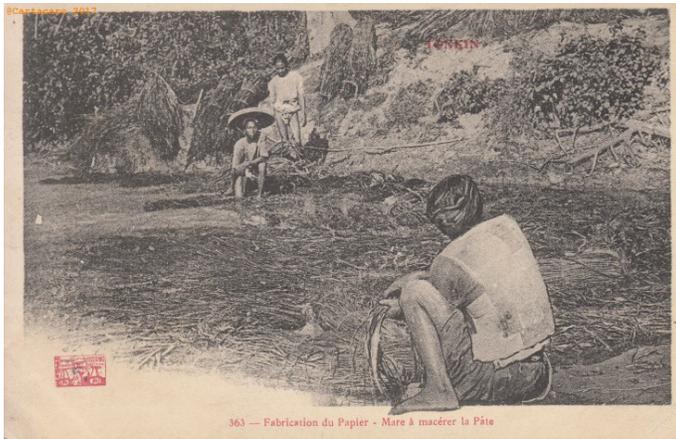
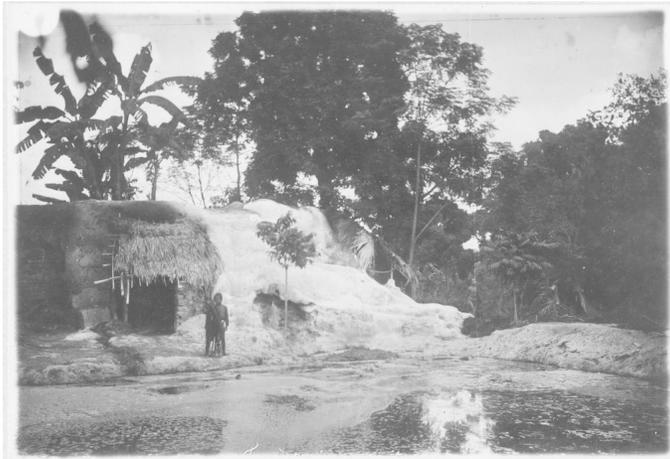


Fig. 2. *Paper making. The ovens.* VIEO 3041 © EFEO⁵⁴ (1906-08)



⁵⁴ EFEO – Ecole Française d’Extrême-Orient.

Hunter describes a practice close to modern practices in China, Japan and Korea. The bark would be placed in a bath containing alkali (in this case a lye of potash) and then boiled. The bark would be stirred constantly throughout the cooking process with a wooden stick. Though he does not specify the duration, he does mention that it is determined by the papermaker on assessment of the consistency of the bark. Other sources have mentioned a cooking time of between eight and ten hours.

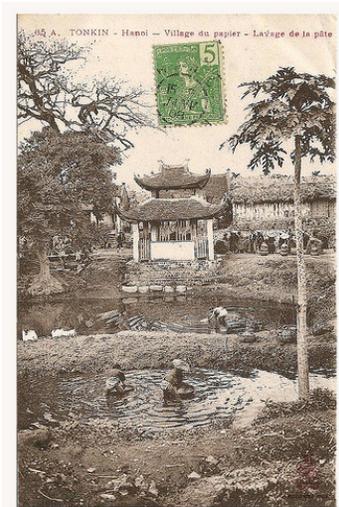
Crevost does not refer to cooking or steaming. Instead he states:

[...] The bark is loosened on the side of a stream or a pond and thrown into the water where they usually stay for one day and then spend two days in a pool whose water contains a certain quantity of lime [...]. The bark is then carried and set in stacks in circular cavities made above the kilns [...].

The bark thus remains drying for four days and it is during this procedure that the effect of the lime on materials other than the cellulose fibres probably comes to an end⁵⁵.

Following this, he mentions that the bark should be cleaned of the lime. Here again Crevost and Claverie differ. Crevost describes an immersion process in which the bark would be left in a tank filled with water for four days, after which it would be placed in baskets to be washed under running water “on the outskirts of the village”⁵⁶. The bark would then finally be washed following the completion of the pounding process.

Fig. 3. 65A. *Tonkin-Hanoi. Papermaking village. Washing the pulp* © Dieulefils ed., Hanoi (active between 1885 and 1925)



⁵⁵ C. Crevost, op. cit.

⁵⁶ Ibidem.

Claverie only refers to washing with cold water before pounding followed by a final rinse. Oger's drawings and photos illustrate a practice in which the bark was washed in a basket in running water (Fig. 3). This process would be followed by the purification of the fibres, which would give the paper its final quality. The outer bark, brown and hard, would be scraped off with a knife before pounding⁵⁷. This would often be a family affair, with men, women and children taking part in the work (Fig. 4): The white part of the bark would produce a higher quality paper and the removed parts, brown and green bark, would be kept for lower quality paper.

Fig. 4. Bark cleaning. Bắc Ninh village, Vietnam 2012 © C. Laroque 2012



The last step consists of the separation of the fibre. Fermentation and alkaline cooking treatments would have allowed the dissolution of the materials agglutinating the fibres, but their release would have to have been completed by a mechanical process. This operation would yield a pulp composed of fibres free to circulate and entwine onto the paper mould to form a sheet. The crushing could have been carried out in several ways: with a hand pestle, a foot hammer or by foot treading. Hunter writes that beating might have taken up to two hours, but neglects to specify by which method⁵⁸.

⁵⁷ Hunter has this operation after soaking in water rather than after the alkaline treatment. According to him, the bark suppliers would have been responsible for this operation. These variants are doubtless linked to the price the bark might fetch.

⁵⁸ The poet Nguyễn Huy Lượng (1750-1808) wrote in his verses about the Western Lake: “The pestle of Yên Thái strikes, a little drunk in the mist”. It is easy to imagine the sound of these hammers punctuating the life of the villages.

The hand method would require the worker to pound the fibres in a stone mortar using a wooden pestle driven by a bamboo lifting device (Fig. 5). This device would facilitate the beating process, as the elasticity of the bamboo would cause the pestle to rise automatically. The pounder would be assisted by a child who would constantly push the fibre under the pestle. The pestles were also used to crush other materials, as Oger tells us, in an image of the “Pounding of the Minium for the making of red ink”⁵⁹.

Fig. 5. 69. *Hanoi. Worker making paper* © Dieulefils ed., Hanoi (active between 1885 and 1925)



Mortars with a more rudimentary pestle and no lifting device are used by ethnic communities in northern Vietnam. The quantity of material processed is more limited and it is a labour-intensive process. These mortars are also found in homes and are used to grind food. They are common tools not only in Asia but all over the world.

The foot hammer is both a domestic and agricultural tool. It is driven by foot power and is used to crush or compress a variety of materials. This tool, like other types of mortars, is a good example of the influence of industry and the appropriation of tools for use in spheres very different from their original intended purpose. The tool has found new uses apart from domestic and agricultural applications in industry.

Though Hunter mentions that the design of the foot hammer dates to a later period than the suspension pestle, it is found in a number of works, such as

⁵⁹ H. Oger, *Technique du peuple annamite = Mechanics...*, op.cit., Plate 56.

Tiangong Kaiwu⁶⁰ or the Genzhitu⁶¹ dating from the 17th century (Fig. 6). Today this impressive wooden hammer is still often found in the countryside throughout East Asia. Hunter describes its use in China but also in India⁶² (Fig. 7).

Fig. 6. Two beating tools in Kangxi [Qing Shengzu], *Le gengzhitu, le livre du riz et de la soie. Poèmes de l'empereur Kangxi [or The book of rice and silk]*, ed. by J. Bingzhen, Paris 1696

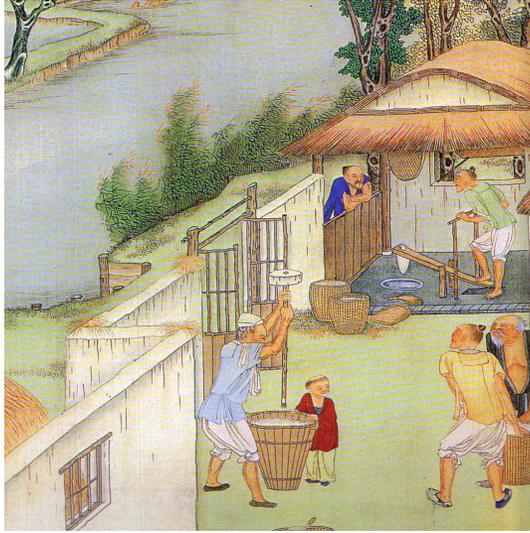


Fig. 7. Fibre beating. Shiqiao village, Guizhou, China © ChinaTourGuide



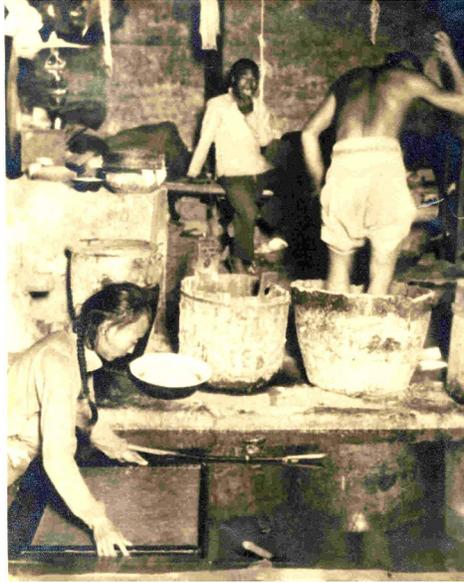
⁶⁰ Song Ying-xing *Tiangong Kaiwu* (天工開物) or *The Exploitation of the Works of Nature*, first edition 1637. Translation into English by E-tu Zen Sun and Shiou-chuan Sun, *T'ien-kung k'ai-wu; Chinese technology in the seventeenth century*, University Park 1966, pp. 91, 92, 220.

⁶¹ Kangxi [Qing Shengzu], *Le gengzhitu, le livre du riz et de la soie. Poèmes de l'empereur Kangxi*, ed. by J. Bingzhen, Paris 1696, Plate 18.

⁶² D. Hunter, *Papermaking by hand in India*, op. cit.

Foot treading would be carried out in a mortar. Hunter alone describes this technique as the oldest of the practices. In China it is known as the classical method, but in recent times it has been rarely used (Fig. 8).

Fig. 8. *Beating the pulp* in D. Hunter, *A papermaking pilgrimage to Japan, Korea and China*, New-York 1936, Chinese collection © Robert C. Williams paper Museum



According to Hunter, after vigorous crushing the pulp would have been rinsed again, inside jute sacks or wicker baskets tightly woven to retain the fibres, which would by now have become extremely weak. These bags or baskets would be placed in running water. Again, this would have been a method common in China and Japan but one no longer widely used (Fig. 9).

The fibre pulp would then be ready and the production of the sheets could begin. This would have been the responsibility of the women who would have performed both the plunging of the mould and the couching of the sheet⁶³. The pulp would have been poured and diluted in a large rectangular wooden vat, large enough for several women to work side by side, Hunter tells us⁶⁴. This would have been a special feature of Tonkin (Fig. 10). The dilution would have been adapted according to the desired final weight of the sheet. At this

⁶³ This method is most widespread in Asia. European practice involves two people work together.

⁶⁴ Hunter is talking about 1.4/L.12/P.2.5 feet or 1.1.20/L.3.60/P.0.75m. Crevost speaks of a 1.30m/3m tank with a concave bottom and specifies that four women would work together.

stage the mucilage⁶⁵ would have been added and the pulp would have been stirred vigorously with a wooden bar fitted with a fin. Claverie mentions that, as the pulp would be taken, the papermaker would have added mucilage but in the form of *mô* wood shavings from a basket⁶⁶. The mucilage would lose its power to thicken the pulp rather quickly, the viscosity of the pulp would have to be readjusted regularly.

Fig. 9. Washing pulp after beating in D. Hunter, *A paper making pilgrimage to Japan, Korea and China*, New-York 1936, Fig. 64



Fig. 10. 64A. Tonkin-Hanoi. Paper village. Lady making paper from the tank
© Dieulefils ed., Hanoi (active between 1885 and 1925)



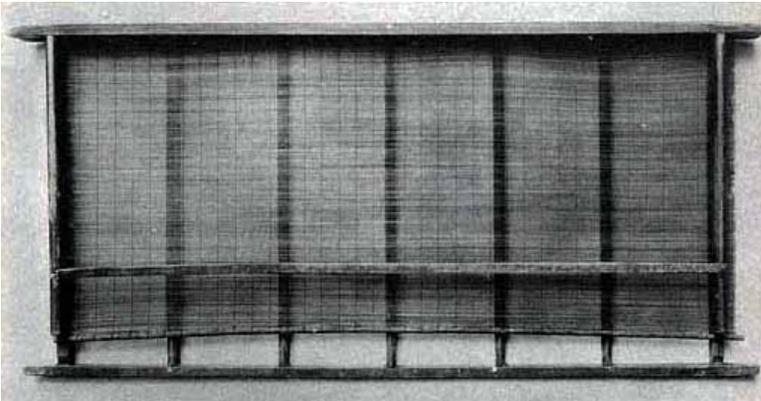
⁶⁵ Hunter speaks about 450 g of *mô* logs for 16 Kg of dry bark and Claverie 2 Kg of *mô* for 60 Kg of bark.

⁶⁶ F. Claverie, *L'arbre à papier...*, 1904, op. cit.

The sheet is formed by successive shifting of the pulp in the paper mould allowing the stacking of fibre layers. This method is widely used throughout East Asia⁶⁷. The stacking of fibre layers makes it possible for the papermaker to modify the thickness of sheets. Hunter mentions that light-weight papers, for example, are obtained by three successive layers. The weight is regulated by the dilution of the pulp, the number of layers and the papermaker's position at the time of the immersion. Claverie and Crevost only refer to one immersion, as do Philippe Le Failler and Olivier Tessier⁶⁸, who described the papermaking process that they observed in 2009.

The mould is described by Oger, Hunter, Claverie and Crevost and was photographed by Hunter. It consisted of three independent parts: a frame, a wooden cover enclosing a sieve made of fine bamboo stems sewn in the manner of blinds. The frame was reinforced by ribs⁶⁹ (Fig. 11). Once the pulp had been poured onto the sieve, the papermaker would shake the mould to distribute the fibres more evenly. After rapid draining, the cover would be removed, the sieve lifted from the frame and the sheet laid onto a wooden table and the sieve would be rolled to detach it from the sheet. The sheets would be stacked without spacers in piles of 100 or 1000 units depending on the workshop. This variation would probably be the result of a lack of clear documentary evidence regarding the daily output of a typical worker (Fig. 12).

Fig. 11. *Papermaking mould* in D. Hunter, *Papermaking in Indochina*, Chillicothe, Ohio 1947

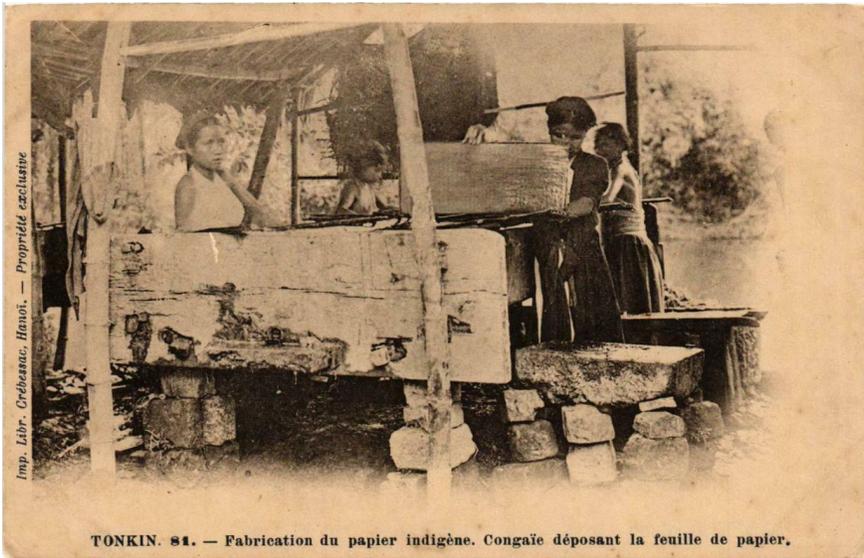


⁶⁷ This method of superimposing fibre layers is widely used in Japan and Korea.

⁶⁸ H. Oger, *Technique du peuple annamite = Mechanics...*, op. cit.

⁶⁹ Hunter says the most common sizes of the moulds are 10×24 inches (25.4×61 cm) and 12×26 inches (30.5×66 cm).

Fig. 12. *Tonkin 81. Indigenous paper making. Congaïe laying down a sheet of paper*
© Printing-Bookstore Crébessac – Hanoi



Hunter reports that the pile of sheets would then have to be pressed for six hours to remove the excess water. The pile would be placed between two boards and inserted into a lever press. Pressure was achieved by blocking the pile of sheets with a wooden beam which would be lowered under the weight of heavy stones attached to one end (Fig. 13). This was another device which would have been common in Asia and would be used for various tasks, as shown in Oger's picture: "Press for the manufacture of soya cheese" (Figs 14 and 15). This press was also found in Japan⁷⁰. It is still found in China although its use has now become rare (Fig. 16).

At the end of this operation the sheets would be separated and dried. Two methods appeared to have been used: air drying (though the moisture-saturated air in the environment would not have been suitable for rapid drying), and forced drying on a heated wall.

Claverie, Crevost and Hunter have described a drying device which is still used throughout China in cold weather: a hollow brick structure, in which the walls would be covered with cement⁷¹ to achieve a suitably smooth surface, which would be heated by a central fire (Fig. 17). The construction would be cone shaped to

⁷⁰ D. Hunter, *A papermaking pilgrimage to Japan...*, op. cit, Image no. 40. See: Robert C. Williams paper Museum, Atlanta, Georgia. Dard Hunter's Japanese collection: Pressing no. 3 and 5.

⁷¹ C. Crevost, op. cit. He explains that the coating consists of lime, fine sand, salt and *gô mo* extract, a coating similar to that used to waterproof the walls of water pools.

facilitate the brushing of sheets on the walls. The sheets would be brushed while still wet, with a pine needle brush⁷². Hunter and Crevost tells us that this brush would be soaked beforehand in *cây mo* water. This would not be a sizing process but probably rather a way to soften the brush with a viscous substance

Fig. 13. 683. *Tonkin-Hanoi. Paper making. The pressing* © Dieulefils ed., Hanoi (active between 1885 and 1925)

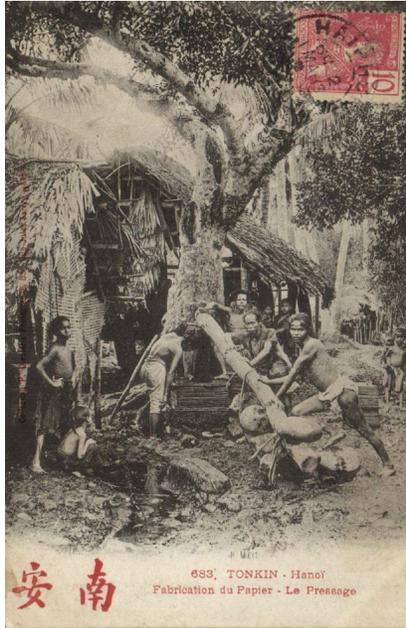
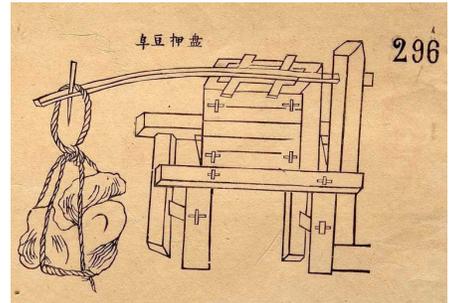


Fig. 14. H. Oger, *The paper press*, 1909, Fig. Nr 90



Fig. 15. H. Oger, *A press to make soja cheese*, 1909, Fig. Nr 296



⁷² H. Oger, *Technique du peuple annamite = Mechanics...*, op. cit. Plates 27-1, 169, 327, 389.

Fig. 16. Pressing sheets of paper. Gong Chuan village, Guangxi, China © gxm.org (https://www.youtube.com/watch?v=_XQgTi9lURk)



Fig. 17. Paper drying in D. Hunter, *Papermaking in Indochina*, Chillicothe, Ohio 1947, Fig. Nr 14



The sheets would be applied to the entire oven wall. As they dried rapidly, they could be detached after a short time and the space left available for the next sheets. Sheets would also be dried on unheated walls. This would

be a more economical technique, similar to air drying but less than ideal in humid climates, where the sheets might moulder. The sheets would be placed in bundles of about ten, and stuck to the wall by means of an expandible leaf that would be glued around the circumference (Fig. 18). This method was and is still used to make the most of limited space on the wall. A similar common technique in southern China consists of staggering the sheets of paper on the drying wall (Fig. 19).

Fig. 18. Paper drying by packs. Bắc Ninh province, Vietnam 2012 © C. Laroque



A more economical method of open-air drying would see the sheets being detached after pressing one by one and hanging them on thin rods. These rods would then be attached to a frame and hung parallel to each other outside (Fig. 20). After drying the sheets would be placed in piles under a weighted board in order to flatten them. They would be examined and sorted according to their quality before being packaged and transported to the points of sale.

Claverie, Crevost and Hunter neglect to discuss trimming the sheets before they are packed as the frayed edges represent, as for European handmade papers, a mark of beauty of the paper. Neither are the questions of finishing, gluing and sizing addressed in the sources consulted because, contrary to Western practices, these choices would be left to the craftsman or artist who would use the paper rather than to the papermaker. The sheet was usually prepared for a specific use after being sold. This question will therefore not be addressed here, but could be the subject of another study.

Fig. 19. Stepped paper drying. Longzhu village, Yunnan, China 2010 © C. Laroque



Fig. 20. Air drying of paper sheets. IM-IT62-893 © ECPAD-Paris⁷³



⁷³ ECPAD: Etablissement de communication et de production audiovisuelle de la défense.

Paper denominations

The issue of paper denomination is much-debated in paper mills around the world because different names may be used for the same paper denomination in different places and at different times. The names used in Tonkin, as in much of Asia, refer to a variety of concepts: the material used, the place of production⁷⁴, the method of production⁷⁵, the appearance, the size, the use, the name of artist or studio, among others. Given this complexity, I shall limit myself to the most frequently used terms.

The terms *giấy Ta* (local paper) and *giấy tây* (modern western paper), for example, are used to differentiate between craft and industrial papers⁷⁶. Sylvie Fanchette⁷⁷ reports that until 1980 there were eight different types of paper, such as two papers of average quality, made from bark mixed with paper residues⁷⁸, *giấy phượng* and *giấy trúc*, used for the manufacture of votive objects, fans and firecrackers, or from bamboo pulp. Two low quality papers, *giấy bán*⁷⁹ and *giấy khan* or *giấy khay*, would be used for packaging. Luxury papers, first *giấy in tranh*⁸⁰, a pearly paper covered with shell powder, used for *Đông Hồ*, the popular prints; *giấy hành ri*, which was decorated with traditional patterns and used for calligraphy; and finally *giấy sắc* and *giấy dó lụa*, made with *dó* bark, were intended for royal treatises and paintings.

Crevost distinguishes between three paper qualities and provides costs for what he refers to as a “usual size” sheet, 0.30×0.65 m: *giấy bánh giấy* (superior quality), *giấy me* (medium quality), *giấy xe* (low quality)⁸¹. Huard and Durand⁸² cite two other types of paper: a medium quality white paper, what Crevost referred to as *giấy moi*, and wrapping paper, *giấy phèn*. Bửu Văn Vương mentions *giấy phê*, which would be used for official certificates, *giấy bì*, stiff, thick paper used for covers, *giấy phượng* for ex-voto⁸³, *giấy lệnh* for royal edicts.

⁷⁴ For example, *Nghĩa dó* from the name of the village.

⁷⁵ P. Huard, M. Durand, *Connaissance du Việt-Nam*, Paris-Hanoi 1954: e.g. *giấy sắc*. This paper was made from *dó*, in the village of *Nghĩa*. It may also be referred to as *Nghĩa dô* or *Giấy Nghè* (i.e. beaten) because it is a hammered paper that was used for centuries to make imperial patents. It is dyed yellow with *Sophora japonica* L. and bears motifs of clouds and dragons drawn in gold or silver ink. It would be made in Yên Thái, which was given the name *Nghè*.

⁷⁶ Bui Van Vuong, op. cit.

⁷⁷ S. Fanchette, op. cit.

⁷⁸ C. Crevost, op. cit.

⁷⁹ Also cited by P. Huard, M. Durand, op. cit.; Hữu Ngọc, *Dictionnaire de la culture traditionnelle du Vietnam*, Hanoi 1997; Bửu Văn Vương, op. cit.

⁸⁰ Also known as paper *Giấy điệp* because of the white powder coating obtained from the shells of molluscs.

⁸¹ C. Crevost, op. cit.

⁸² P. Huard, M. Durand, op. cit.

⁸³ These are paper objects of various kinds, especially models of animals, which are burned as

Conclusion: potential avenues for future research

There are potential avenues for further research in regard to the papermaking industry in Vietnam, where it was once fundamental to the economic and cultural history. Ancient sources, the colonial texts on which this article is based in particular, describe the paper production in northern Vietnam almost exclusively. Reports on manufacturing in central and southern Vietnam are rare. This raises questions about the existence of traditional papermaking in other regions of Vietnam. Crevost⁸⁴ makes one of the few references to this. He writes that paper is sold in “all the markets in Annam, which produce only vulgar and very coarse forms of paper”. Hunter⁸⁵ talks about the cultivation of *dó*, in quite large quantities in the same region. It is thus possible to imagine that there was once a local paper industry in central Vietnam.

For southern Vietnam no references have been found in the sources examined. It seems unlikely, however, that paper manufactured in the north could only meet the needs of the northern Vietnam. Transporting paper to the south, over a distance of almost two thousand kilometres, seems both difficult and expensive. There is also a lack of research on the paper trade between the neighbouring countries, Laos in the centre, Cambodia, to the south and Thailand, which have important papermaking traditions. If carried out, such research on trade in this area corresponding to the former protectorates of Annam and Cochinchina, could inform studies into the importation of paper, its places of original production, the routes it took and the volumes imported.

A few accessible sources refer to the existence of production parallel to that in the Hà-Nội region, in the small northern village communities of Mông and Dao.⁸⁶ Papermaking in these villages is similar to that in the Dai villages of Yunnan. Originally paper produced in these communities was not initially intended for commercial purposes, but was rather an occasional production on a family or village scale. Production was seasonal, carried out in October and November.

Paper, then and now, is mainly used for ritual purposes. It is used to decorate the altars of ancestors or burned during prayers. It holds an elevated position in the celebrations of the Tết festivals. Paper is also used for writing important texts for families, both sacred and secular, such as for example tales, poems, and genealogy.

offerings to the deities. Oger's book contains many drawings of these votive objects.

⁸⁴ C. Crevost, *op. cit.*, p. 797.

⁸⁵ D. Hunter, *Papermaking in Indochina*, *op. cit.*

⁸⁶ The municipalities of Hàng Kia and Pa Cô in the Mai Châu district in the province of Hòa Bình and the village of De On in the municipality of Quốc Dân in the district of Quảng Uyên, province of Cao Bằng.

Paper surplus to domestic requirements is sold in markets. Village women have for some years been encouraged to revive traditional activities and today are taking up paper production, thus bringing additional income to their households. The development of tourism means that these traditional village practices are benefiting from a revival of interest in their craft. According to cultural tradition, papermaking, like weaving, is a practice that was always associated with women.

In addition to the bark of the plants referred to above, rice straw, bamboo and *tranh* were also used as raw materials. These plants have been reported in colonial sources, but the papermaking methods involved have been overlooked. Crevost and Lémarié⁸⁷, however, mention some “indigenous rice straw factories” in the Bắc Kạn province. Hunter also indicates their use, albeit without specifying the places bamboo and rice straw would be utilised to make ceremonial papers and firecrackers⁸⁸. Claverie⁸⁹ briefly mentions that in Cochinchina, *Momordica luffa* (*Muróp trâu* or *Muróp kiến*) had been used for many years for the manufacture of paper.

Though plants of the family Poaceae, particularly bamboo, have been reported in colonial sources for their potential in industrial paper production. It has been difficult to assess whether these meant traditional fibres used for traditional papermaking and also suitable for modern industry or new raw materials which have not yet been used in colonial era. It is therefore more appropriate to look at modern sources that potentially reflects old practices⁹⁰.

In modern practice the steps in the preparation of the bark are reminiscent of the traditional methods presented above: maceration in water and then immersion in an alkaline bath followed by pounding or hammering. The tools utilised may vary depending on the quantities required. The pounding is carried out inside a stone mortar without a lifting device or alternatively may be carried out with a mallet on a hard surface, either stone or wood (Fig. 21).

The preparation of bamboo pulp involves two methods which are similar to the methods used in China. In both cases young bamboo shoots are chosen, about two or three months old and three meters high. The leaves are stripped from the stems, the green bark is removed and then the bamboo is cut into

⁸⁷ C. Crevost, C. Lémarié, op. cit.

⁸⁸ D. Hunter, *Papermaking in Indochina*, op. cit.

⁸⁹ F. Claverie, *L'arbre à papier...*, 1904, op. cit.

⁹⁰ *The paper-making craft of the Mong ethnic group*, [online] <http://english.vietnamnet.vn/fms/vietnam-in-photos/93434/the-paper-making-craft-of-mong-ethnic-group.html> [accessed 15.04.2020]; *Làm giấy - Nghề truyền thống của một số Dân tộc thiểu số* [Paper making: traditional jobs of some ethnic minorities], [online] <http://thegioidisan.vn/vi/lam-giay-nghe-truyen-thong-cua-mot-so-dan-toc-thieu-so.html> [accessed 15.04.2020]; *Giấy bản, thương hiệu của người Nùng ở Cao Bằng* [Paper at Cau Bang's], [online] <http://langvietonline.vn/Lang-Pho/148711/Giay-ban-thuong-hieu-cua-nguoi-Nung-o-Cao-Bang.html> [accessed 15.04.2020].

pieces. The fibre release step is carried out by two means, rotting and alkaline cooking. The precise order of these steps may vary, but the overall purpose is the same. In one method the bamboos are placed in pits full of water and left to rot before being cooked for several hours in an alkaline solution. In the other fermentation takes place after cooking and a long immersion in alkaline lime or ash water. The bamboo canes are then wrapped and kept out of the light and air to allow fermentation to take place. Once the fibres have been softened, they are rinsed and crushed to be made into pulp. The pulp is cleansed of impurities, large pieces being removed. Once the pulp is homogeneous, it is ready for making into sheets. Straw and *tranh* are treated in the same way.

Fig. 21. Fibre beating © VNP.vn



The characteristic peculiarities of papermaking of these few villages are illustrated by the method of sheet formation. Two types of paper mould are used: the mobile screen mould and the fixed mould. The latter seems similar to the traditional mould that has been replaced in some of the paper mills by a mobile screen mould, as it provides a better yield.

The fixed mould is indeed an older device still used in the Himalayas (Tibet, Nepal, Bhutan) and in some regions of Laos, Cambodia, Thailand and in Yunnan, China. This type of mould is not equipped with a mobile sieve that allows the sheet to be removed immediately from the mould. The mould is

composed of a wooden or bamboo frame and stretched with a canvas on which the pulp is spread to form the sheet. The sheet is dried on the mould before being peeled off.

In most of the areas mentioned above, this mould is floated, meaning that it is placed on the surface of the water in a vat, to float. The pulp is then poured and evenly distributed before the mould is lifted out of the tank. By delaying draining flotation allows for an even dispersion of the pulp over the entire surface. Nevertheless, here the mould is placed horizontally, slightly raised from the ground and the pulp is poured onto the surface of the canvas using a utensil similar to a large ladle or alternatively a bowl (Fig. 22). The pulp is poured in a line in a regular back and forth motion. Water, which tends to drain to the ground, is therefore lost. Great dexterity is required in order to distribute the pulp evenly and to achieve an equal thickness over the entire surface of the sheet. At the end of the process the mould is exposed to the sun to dry. The drying time varies depending on the weather. Once dried, the sheet is detached from the canvas. The papermaker must therefore have several moulds for continuous production (Fig. 23).

Fig. 22. Sheet forming © Baosonla.vn



The method of papermaking and the tools utilised in the Mong and Dao villages suggest a connection with the practices still used in a number of

Himalayan villages and neighbouring countries⁹¹. There is scope for further research into possible links between the technologies still used today by these populations.

Fig. 23. Drying sheets of paper on the mould © Nghệ An.vn



Bibliography

“Annuaire général de l’Indochine Française” 1901.

“L’Éveil économique de l’Indochine” 1918.

“Le Bulletin économique de l’Indochine” 1914, 1920.

“Le Moniteur de la papeterie Française” 1907, 1924, 1927.

“Les Annales coloniales” 1923, 1935.

Baker C.A., *By his own labour. The biography of Dard Hunter*, New Castle, Del. 2000.

Bonet J., *Dictionnaire Annamite-Français. Langue officielle et langue vulgaire*, Paris 1899.

⁹¹ See S. Watkins, *Hand papermaking in Central Burma and Northern Thailand*, “The Book and Paper Group Annual” 1992, pp. 197-203, [online] <https://cool.culturalheritage.org/coolaic/sg/bpg/annual/v11/bp11-41.html> [accessed 10.08.2020]; C. Delang, *Bamboo paper production and religious use by the Lanten Yao in Northern Lao PDR*, “Ethnobotany Journal” 2006, vol. 14, [online] <http://www.ethnobotanyjournal.org/era/index.php/era/article/view/104/90> [accessed 10.08.2020]; M. Malakou, V. Marinos, *Living paper production among the Lanten of Northern Laos*, “Paper History” 2012, vol. 16, issue 2, pp. 13-18; J. Lemoine, *Ethnicity, culture and development among some minorities of the People’s Republic of China*, “New Asian Academic Bulletin, Special Issue on Ethnicity and Ethnic Groups in China” 1989, no. 8, pp. 1-10.

- Bouvier R., *Le problème de la papeterie française et la solution coloniale*, “Revue de botanique appliquée et d’agriculture coloniale” 1940, no. 226, pp. 381-388.
- Bùi Văn Vượng, *Du papier “Dó” aux estampes populaires*, Hà-Nội 1999.
- Camus A., *Graminées d’Indochine pouvant donner de la pâte à papier*, “Revue de botanique appliquée et d’agriculture coloniale” 1925, no. 42, pp. 105-115.
- Chabert L., Gallois L., *Atlas général de l’Indochine française*, Hà-Nội, Hải Phòng 1909.
- Chevalier A., *Matières premières pour la production de la pâte à papier en Indochine*, “Revue de botanique appliquée” 1922, T. 2, pp. 110-110.
- Clavier F., *L’arbre à papier du Tonkin*, “Bulletin économique de l’Indochine” 1903, Nr 24, pp. 75-88.
- Clavier F., *L’arbre à papier du Tonkin, suite*, “Bulletin économique de l’Indochine” 1904, no. 25, pp. 75-88.
- Crevost C., *La fabrication annamite du papier*, “Bulletin économique de l’Indochine” 1907, pp. 789-797.
- Crevost C., Lémarié C., *Catalogue des produits de l’Indochine, plantes et produits filamenteux et textiles*, “Bulletin économique de l’Indochine” 1920, no. 140, pp. 53-71.
- Delang C., *Bamboo paper production and religious use by the Lanten Yao in Northern Lao PDR*, “Ethnobotany Journal” 2006, vol. 14, [online] <http://www.ethnobotanyjournal.org/era/index.php/era/article/view/104/90> [accessed 10.08.2020].
- Drège J.P., *First mentions of paper in Vietnam according to Chinese sources*, French translation of Những ghi chép đầu yien về làm giấy ở nghề nam qua thu tịch trung hoa. Việt Nam Học, Ký yếu Hội thảo quốc lần thứ nhất, Hà-Nội 1998.
- Le Failler Ph., *Quelques traits sur les villages papetiers du Nord-Vietnam*, [in:] S. Fanchette, N. Stedman, *A la découverte des villages de métier au Vietnam. Dix itinéraires autour de Hà-Nội*, Hà-Nội-Paris 2009, pp. 28-45.
- Fanchette S., *Papeterie et recyclage dans les villages de métier*, “Techniques & Culture” 2016, no. 65-66, [online] <http://journals.openedition.org/tc/7954> [accessed 13.01.2020].
- Giấy bản, thương hiệu của người Nùng ở Cao Bằng* [Paper at Cau Bang’s], [online] <http://langvietonline.vn/Lang-Pho/148711/Giay-ban-thuong-hieu-cua-nguoi-Nung-o-Cao-Bang.html> [accessed 15.04.2020].
- Helman-Ważny A., *The archaeology of Tibetan books*, Leiden, Boston, Brill, 2014.
- How to make dó paper*, [online] <http://zopaper.com/do-paper-making-process> [accessed 30.03.2020].
- Huard P., Durand M., *Connaissance du Viêt-Nam*, Paris-Hanoi 1954.
- Hunter D., *Old papermaking in China and Japan*, Chillicothe, Ohio 1932.
- Hunter D., *A papermaking pilgrimage to Japan, Korea and China*, New-York 1936.
- Hunter D., *Papermaking in Siam*, Chillicothe, Ohio 1936.
- Hunter D., *Papermaking by hand in India*, New-York 1939.
- Hunter D., *Papermaking in Indochina*, Chillicothe, Ohio 1947.

- Hữu Ngọc, *Dictionnaire de la culture traditionnelle du Vietnam*, Hanoi 1997.
- Làm giấy – Nghề truyền thống của một số Dân tộc thiểu số [Paper making – Traditional jobs of some ethnic minorities], [online] <http://thegioidisan.vn/vi/lam-giay-nghe-truyen-thong-cua-mot-so-dan-toc-thieu-so.html> [accessed 15.04.2020].
- Langlet P.H., *Histoire du peuplement* [in:] *Population et développement au Viêt-Nam*, ed. by P. Gubry, Paris-Karthala 2000, pp. 29-52.
- Leandri J., *Contribution à l'étude des Thyméléacées d'Indochine*, "Revue internationale de botanique appliquée et d'agriculture tropicale" 1949, no. 323-324, pp. 497-505.
- Lecomte H., Humbert H., Gagnepain F., *Flore générale de l'Indochine*. T. 5, Paris 1915.
- Lemoine J., *Ethnicity, culture and development among some minorities of the People's Republic of China*, "New Asian Academic Bulletin, Special Issue on Ethnicity and Ethnic Groups in China" 1989, no. 8, pp. 1-10.
- Leroi-Gourhan A., *L'Homme et la matière. Evolution et techniques*, Paris 1943.
- Malakou M., Marinos V., *Living paper production among the Lanten of Northern Laos*, "Paper History" 2012, vol. 16, issue 2, pp. 13-18.
- Nguyễn T.H., *Economic history of Hanoi in the 17th, 18th and 19th century*, Hà-Nội 2002.
- Oger H. First Edition: *Introduction générale à l'étude de la technologie du peuple annamite. Essai sur la vie matérielle, les arts et industries du peuple d'Annam*, Paris [s.d.]; *Technique du peuple annamite. Encyclopédie de la civilisation du pays d'Annam*, Hà-Nội 1909, 2 vol. Reissued in three languages, French, English and Vietnamese: *Technique du peuple annamite = Mechanics and crafts of the Annamites = Kỹ thuật của người An Nam*, eds. O. Tessier, Ph. Le Failler, Hà-Nội-Paris 2009, 3 vol.
- The paper-making craft of Mong ethnic group*, [online] <http://english.vietnamnet.vn/fms/vietnam-in-photos/93434/the-paper-making-craft-of-mong-ethnic-group.html> [accessed 15.04.2020].
- Peachey J.S., *Hand papermaking in Northern Vietnam*, "Hand Paper Making" 1995, Nr 10/1, pp. 13-17.
- Kangxi [Qing Shengzu], *Le gengzhitu, le livre du riz et de la soie. Poèmes de l'empereur Kangxi*, ed. by J. Bingzhen, Paris 1696.
- Tsien, T.-H., *Paper and printing*, Cambridge 1985, *Sciences and Civilization in China*, ed. J.S Needham, vol. 5, , pp. 348-350.
- Watkins S., *Hand papermaking in Central Burma and Northern Thailand*, "The Book and Paper Group Annual" 1992, pp. 197-203, [online] <https://cool.culturalheritage.org/coolaic/sg/bpg/annual/v11/bp11-41.html> [accessed 10.08.2020].
- Women of Hanoi*, Pathé British 1930, [online] https://www.youtube.com/watch?v=R5_pP_A9xx4 [accessed 03.01.2020].
- Ying-xing S., *T'ien-kung k'ai-wu; Chinese technology in the seventeenth century*, translated by E-tu Zen Sun and Shiou-chuan Sun, University Park 1966.

Table 1: Fibrous plants used for paper production in Vietnam

	FIBROUS MATERIALS		
Vernacular name	Genus⁹²	Family	Authors⁹³
Cây gió	<i>Daphne involucrata</i> Wall. ⁹⁴ <i>Daphne</i> variety <i>Rhamnoneuron balansae</i> (Drake) Gilg. ⁹⁵ <i>Aquilaria crassna</i> ⁹⁶ (fragrant wood) Mulberry	Thymeleaceae Thymeleaceae Thymeleaceae Thymeleaceae Moraceae	D, E, K, F P L, H L A
Dó	<i>Rhamnoneuron balansae</i> Unspecified genus <i>Rhamnoneuron balansae</i> ⁹⁷	Thymeleaceae Thymeleaceae Thymeleaceae	N R I, B, O
Dó giấy	<i>Rhamnoneuron balansae</i> Gilg	Thymeleaceae	O
Cây ró	<i>Rhamnoneuron balansae</i>	Thymeleaceae	J
Vô dó	<i>Rhamnoneuron balansae</i> Gilg	Thymeleaceae	O
Dó niệt	<i>Wikstroemia indica</i>	Thymeleaceae	R
Dó hoa	<i>Wikstroemia indica</i>	Thymeleaceae	R
Cây cảnh	Unspecified Thymelaceae, wild	Thymeleaceae	D, E, K
Cây gió cảnh	<i>Daphne cannabina</i> (Lour.) ⁹⁸ Small Thymelaceae	Thymeleaceae Thymeleaceae	F G
Gió niệt	<i>Wikstroemia Indica</i> (L) C.A. Mey. Var. viridiflora Hook ⁹⁹	Thymeleaceae	H
Gió cảnh	<i>Wikstroemia Indica</i> (L) C.A. Mey. Var. viridiflora Hook	Thymeleaceae	H
Cây gió niệt ou niệt ?	<i>Daphne cannabina</i> (Lour.) Small Thymelaceae	Thymeleaceae	F G
Cây gió truôi	<i>Daphne cannabina</i> (Lour.)	Thymeleaceae	F
Cây gió chuol ou chuột ?	Unspecified genus and family	?	G
Cây niệt già ou gió ?	<i>Wikstroemia indica</i> (L) C. A. Mey. <i>Rhamnoneuron balansae</i> (Drake) Gilg.	Thymeleaceae	M
Gió	<i>Rhamnoneuron balansae</i> (Drake) Gilg.	Thymeleaceae	H

⁹² The names of the plants are cited as they appear in the reference.

⁹³ The letters in the right-hand column refer to the bibliographical references below the table.

⁹⁴ Synonymous with *Eriosolena composita* (L.f) Thiegh.

⁹⁵ Synonymous with *Wikstroemia balansae* (Drake) Gilg.

⁹⁶ The current nomenclature is *Aquilaria crassna* Pierre ex Lecomte.

⁹⁷ The current nomenclature is *Rhamnoneuron balansae* (Drake) Gild.

⁹⁸ Synonymous of *Wikstroemia indica* (L) C. A. Mey.

⁹⁹ The current nomenclature is *Wikstroemia indica* var. viridiflora (Wall. ex Meisn.) Hook. f.

Gió núi	<i>Aquilaria agallocha</i> Roxb.	Thymeleaceae	H
Gió chuột	<i>Wikstroemia</i>	Thymeleaceae	H
Gió bầu	<i>Aquilaria agallocha</i> Roxb.	Thymeleaceae	H
Cây trầm gió	<i>Wikstroemia viridiflora</i> Meisn ¹⁰⁰	Thymeleaceae	L
Cây gió bầu	<i>Aloexyllum agallochum</i> (Lour.) ¹⁰¹	Thymeleaceae	F
Cây gió núi	<i>Aloexyllum agallochum</i> (Lour.)	Thymeleaceae	F
Dướng	<i>Broussonetia papyrifera</i> ¹⁰² Paper mulberry	Moraceae	N, I, B
Giao	Paper mulberry	Moraceae	Q
Cây giương	<i>Broussonetia papyrifera</i> Vent.	Moraceae	D, E, F, J
Giấy	<i>Aquilaria crassna</i> <i>Broussonetia papyrifera</i> Vent.	Thymeleaceae Moraceae	H H
Cây ruồi	<i>Streblus asper</i> (Lour.)	Moraceae	F, H
Bồ đề	<i>Ficus religiosa</i> L.	Moraceae	J, I
Tranh	<i>Imperata Koenigii</i> ¹⁰³	Poaceae	F, C, H
Cây tranh	<i>Imperata Koenigii</i>	Poaceae	F
Tre nica	Bamboo	Poaceae	F
	Bamboo <i>Bambusa arundinacea</i> ¹⁰⁴	Poaceae Poaceae	F, K, C, H D
	Straw (rice ?)	Poaceae	K, H
Dây bò bò	Unspecified liana	?	F
Cây bò bò	Grass family, <i>Coix</i> genus	Poaceae	E
Mướp trâu	<i>Momordica luffa</i> ¹⁰⁵ (liana ?)	Cucurbitaceae	D
Mướp kiến	<i>Momordica luffa</i> (liana ?)	Cucurbitaceae	D, E
Cây nac	Not identified	?	H
Cây ha	Not identified	?	H
Cây man	Not identified	?	H
Thương lạc	Not identified	?	B
Thương nhật	Not identified	?	B

¹⁰⁰ The current nomenclature is *Wikstroemia viridiflora* Wall. ex Meisn. Synonymous with *Wikstroemia indica* C.A. Mey.

¹⁰¹ According to Crevost in "La Parfumerie moderne. Revue scientifique et de défense professionnelle" 1919, vol. 11, pp. 194-195. This would be a questionable name used by Loureiro for *Aquilaria agallocha* Roxb.

¹⁰² The current nomenclature is *Broussonetia papyrifera* (L.) L'Hér. ex Vent.

¹⁰³ The current nomenclature is *Imperata koenigii* (Retz.) P. Beauv.

¹⁰⁴ The current nomenclature is *Bambusa arundinacea* (Retz.).

¹⁰⁵ The current nomenclature is *Momordica luffa* L.

Table 2: Mucilaginous plants used for paper production in Vietnam

	MUCILAGINOUS MATERIALS		
Vernacular name	Genus	Family	Authors¹⁰⁶
Cây mỡ	<i>Clerodendrum</i> L.	Lamiaceae	N, D, E, K, B
	<i>Machilus Thunbergii</i>	Lamiaceae	K
Cây gỗ mỡ	Laurinée (<i>Laurus culibaban</i> ?)	Lauraceae	F
Cây bời lồi	<i>Tetranthera laurifolia</i> Jacq. ¹⁰⁷	Lauraceae	F
Mỡ gỗ	<i>Litsea polyantha</i> Juss.	Lauraceae	J
Mỡ nhót	<i>Litsea sebifera</i> Pers. ¹⁰⁸	Lauraceae	H
	<i>Litsea glutinosa</i> (Lour.) C.B. Roxb. ¹⁰⁹	Lauraceae	
	<i>Tetranthera laurifolia</i> Blume ¹¹⁰	Lauraceae	
	<i>Sebifera glutinosa</i> Lour.	Lauraceae	
Bời lồi nhót	<i>Litsea sebifera</i> Pers.	Lauraceae	H
	<i>Litsea glutinosa</i> (Lour.) C.B. Roxb.	Lauraceae	
	<i>Tetranthera laurifolia</i> Blume	Lauraceae	
	<i>Sebifera glutinosa</i> Lour.	Lauraceae	
	Rice starch		Q
	Mucilaginous material used by women for their hair		S

Bibliographical references

- A** Bouvier R., *Le problème de la papeterie française et la solution coloniale*, “Revue de botanique appliquée et d’agriculture coloniale” 1940, no. 226, pp. 381-388.
- B** Bùi Văn, *Du papier “Dó” aux estampes populaires*, Hà-Nội 1999.
- C** Chevalier A., *Matières premières pour la production de la pâte à papier en Indochine*, “Revue de botanique appliquée” 1922, T. 2, pp. 110-110.
- D** Claverie F., *L’arbre à papier du Tonkin*, “Bulletin économique de l’Indochine” 1903, no. 24, pp. 75-88.
- E** Claverie F., *L’arbre à papier du Tonkin, suite*, “Bulletin économique de l’Indochine” 1904, no.25, pp. 75-88.

¹⁰⁶ The letters in the right-hand column refer to the bibliographical references below the table.

¹⁰⁷ Synonymous with *Litsea chinensis* Lam.

¹⁰⁸ Synonymous with *Litsea glutinosa* (Lour.) C.B. Roxb. var. *glutinosa*.

¹⁰⁹ The current nomenclature is *Litsea glutinosa* (Lour.) C.B. Roxb. var. *glutinosa*.

¹¹⁰ Synonymous with *Litsea sebifera* Pers.

- F** Crevost C., *La fabrication annamite du papier*, “Bulletin Economique de l’Indochine” 1907, no. 60, pp. 789-797.
- G** Crevost C., *Considérations sommaires sur les industries indigènes au Tonkin*, “Bulletin Economique de l’Indochine” 1909, pp. 298-327.
- H** Crevost C., Lémarié C., *Catalogue des produits de l’Indochine, plantes et produits filamenteux et textiles*, “Bulletin Economique de l’Indochine” 1920, no. 140, pp. 149-169.
- I** Hữu Ngọc, *Dictionnaire de la culture traditionnelle du Vietnam*, Hanoi 1997.
- J** Huard P. Durand M., *Connaissance du Viêt-Nam*, Paris-Hanoi 1954.
- K** Hunter D., *Papermaking in Indochina*, Chillicothe, Ohio 1947.
- L** Leandri J., *Contribution à l’étude des Thyméléacées d’Indochine*, “Revue Internationale de Botanique Appliquée et d’Agriculture Tropicale” 1949, no. 323-324, pp. 497-505.
- M** Lecomte H., Humbert H., Gagnepain F., *Flore générale de l’Indochine*. vol. 5, Paris 1915.
- N** Oger H., *Technique du peuple annamite = Mechanics and crafts of the Annamites = Kỹ thuật của người An Nam*, eds. O. Tessier, Ph. Le Failler, Hà-Nội-Paris 2009, 3 vol.
- O** Mekong River Commission, [online] [http://www.mekonginfo.org/mrc_en/doclib.nsf/0/DA12400B261CE9F047256D4B002C6C70/\\$FILE/06-Used-IT.htm](http://www.mekonginfo.org/mrc_en/doclib.nsf/0/DA12400B261CE9F047256D4B002C6C70/$FILE/06-Used-IT.htm) [accessed 10.09.2018].
- P** Oger H., *Technique du peuple annamite. Encyclopédie de la civilisation du pays d’Annam*, Hà-Nội 1909, 2 vol.
- Q** Thomasset R., *Le papier fabriqué à la main. Efforts d’hier et d’aujourd’hui*, “La Feuille Blanche” 1942, no. 2, pp. 1-8.
- R** Vũ Hồng Thuật, *From Do paper to dong ho folk prints*, Hanoi 1974.
- S** Tsien, Tsuen-Hsuein, *Paper and printing*, [in:] J. Needham, *Sciences and civilization in China*. Vol. 5, p. 1, Cambridge 1985, pp. 348-350.

