THE PAPER SAGA

Claudia Koch

Years ago, while doing my degree in Publishing, I wrote a children's story about a hungry butterfly (the Monarch) and it raised some questions about the environment and the role that we, as humans, play in its preservation and/or destruction. The main objective of doing a Master's in Printmaking, was to find a way of getting the book printed, bound, and published by myself, using sustainable printing methods. As it happens, I never found a 100% environmentally safe printing method, especially because of the paper production, which seems to be a mystery in most countries, with no traceability on pulp sources. As I wanted the book to be sold across the globe, I came to a halt, and had a bit of an echo panic attack, with the brain freeze and all the rest of it. The thought of using paper that was made from trees that grow in tropical forests - especially in the Amazon - filled me with horror. At the time I only had suspicions that great part of the paper sold in Europe came from Brazil (or at least the cellulose to make the paper) or from other tropical forests - because in Europe the trees take forever to grow due to the cold weather - and any other materials would not give the paper the same strength and quality. According to the Estatisticas da Industria Brasileira de Arvores (Brazilian Statistics of Tree Production)[1], around 50% of the Brazilian pulp/cellulose production is exported to Europe - and that is a lot of material, if you consider the amount of Brazil's production and the size of Europe!

Exportações Brasileiras por Destino - US$ Milhões FOB

Brazilian Export by Destination - US$ Million FOB

Celulose / Pulp

Destino / Destination	Jan-Mar / Jan-Mar		
	2021	2022	Var. %
América Latina / Latin America	26,7	57,1	113,9
Europa / Europe	400,6	519,9	29,8
América do Norte / North America	215,2	225,7	4,9
África / Africa	7,7	30,5	296,1
Ásia/Oceania / Asia/Oceania	144,3	188,5	30,6
China / China	530,5	696,8	31,3
Total / Total	1.325,5	1.718,5	29,6

Fonte / Source: Comex Stat

Papel / Paper

Destino / Destination	Jan-Mar / Jan-Mar		
	2021	2022	Var. %
América Latina / Latin America	227,1	429,8	89,3
Europa / Europe	40,2	60,5	50,5
América do Norte / North America	34,5	46,2	33,9
África / Africa	30,8	39,1	26,9
Ásia/Oceania / Asia/Oceania	31,9	45,3	42,0
China / China	12,9	8,6	-33,3
Total / Total	377,4	629,5	66,8

Fonte / Source: Comex Stat

Figure 1

The paper/celullose production is a complex process, and Brazil seems to be taking the lead lately, with new powerful machinery imported from Switzerland, capable of producing thousands of tons a day, swallowing thousands of tons of trees. I've met an engineer who supervises these machines assembling and he showed me some processes while chatting during a flight to the South of Brazil. The machinery size is a few hundred yards long and works 24hs/day, 7 days a week. The amount of trees needed to feed those machines goes way beyond the amount produced by the sustainable forests around the globe. It's scary stuff.

Figure 2

I've checked the work that the Forestry Stewardship Council does in certifying papers from sustainable sources, but, as it happens, they only certify forests in the North hemisphere[2], and only in a few countries (Fig. 2), which doesn't really touch the amount of paper that is consumed around Europe or American continents (the main countries where my Butterfly Book would be distributed).

Figure 3

1 Correa, Cindy. (2022) Statistics of the Brazilian Tree Industry report, 1st Quarter. Brazil: Brazilian Tree Industry (Ibá), Figure 1. http://conteudo.sinpapel.com.br/Downloads2022/CenariosIba-Ed69.pdf

2 Forest Stewardship Council map (2023) Our forests [online]. Available from: https://search.fsc.org/en/ [Accessed 30 Nov 2023].

Figure titles and information

Figure 1: Brazilian pulp exports by destination.
Figure 2: A paper making machine being built in the South of Brazil.
Figure 3: The Forest Stewardship Council certified forests in the North hemisphere.

I then looked into recycled paper, but in an interview with a sales person from John Purcell, it was made clear that the benefits are questionable and the effects on the environment of all the chemicals used in the process, transport costs/issues, are not quite clear. Maybe in small quantities and local produce might not be as bad, but on a global scale would become a big problem.

So, I've signed up for a Japanese papermaking workshop and learnt how to make handmade paper from Kozo (Fig. 4) fibers (Fig. 5), and it was an eye opener for me. The whole process is laborious and takes time and resources, especially water, but it seems to be the ideal solution for a truly sustainable paper production.

Every plant cell is surrounded by a tough, fibrous material called cellulose. When chopped up and soaked, the tiny fibers connect with each other, bonded by an intermolecular pull called the van der Waals' forces.

There are quite a few plants that can be used to make paper, but the Kozo (*Broussonetia papyrifera*), gives the paper the strongest finish.

Figure 4

Figure 5

KOZO PAPER

Japanese paper making manufacture process (Handmade Kozo as an example):
Harvesting, Steaming, Stripping off the bark, Scraping outer bark off, Soaking, Cooking, Washing, Bleaching, Cleaning, Beating.
Paper making: Adjustment of the solution - mix the beaten fibers, water and tororo-aoi*, Sheet forming, Pressing, Drying, Finishing.

The paper sheets can be as thin as "Bible paper", or as thick as card; the Kozo fibers make the paper so strong that even if you wet the sheet of paper, squeeze and make a ball in your hand then stretch it open again, the paper will hold its shape and can be made smooth again (Fig. 6).

Figure 6

It can be used for print, sculpture, and when properly layered can even replace leather.

I've used a papaya leaf mold to create wings for the horse in my children's story. After the horse saved the butterflies, it went through some sort of metamorphosis and created a pair of wings. Through a process of layering, I managed to use the leaf mold to build wings strong enough to hold their shape,

Figure 7

Apart from the Kojnac used to push the paper sheet into the mold, some book binding glue can be used in between the layers, and it will help to harden the fibers of the paper (Fig. 8). More Kojnac is used to push the paper into the crevices of the mold, and when dry it will keep the shape of the mold. I've used only two sheets/layers of thin paper, and added colour with an airbrush. (Fig. 9 to 11).

Figure 8

Regarding the book binding, I find the old stories about the war very inspiring. Apparently, during the war paper was hard to find, and they

Figure 4: Kozo (*Broussonetia papyrifera*).
Figure 5: Kozo fibers.
Figure 6: Horse print.
Figure 7: Kozo paper being cast into a papaya leaf mold.
Figure 8: A Kojnac mix is used to harden the paper.

used to send letters written in tiny sheets of paper (A6 size roughly), in tiny writing. So, my idea for the Butterfly Book, as I call it, was to have it printed in a Mini Book format, probably on a concertina binding (Fig. 12).

My search for the right paper continues, though, and I managed to meet some Brazilian artisans, at the Universidade Federal de Minas Gerais, where they're developing handmade paper made from all sorts of fibers: banana peel, grass, sugar cane, etc. We are studying the possibility of working in partnership (Fig. 13).

But Japanese Kozo paper is still my passion, so in January 2024 I will be doing a week workshop with Kamori, a naturalised Japanese artist who plants the Kozo bushes, and produces Kozo paper in Sao Paulo, Brazil. Looking forward to it.

AUTHOR

Claudia Koch

Claudia has worked in advertising at the beginning of her career, and gradually moved into publishing, working with Health and Safety publications for many years. After moving to the UK, graduated in Arts with Creative Writing at Bath Spa University in 2011, and did a few freelance jobs for the former Industrial Museum, now the M-Shed, in Bristol, amongst other clients. Her Master's in Printmaking had the sole purpose of getting her Butterfly Book published and sold online. Claudia continues working on sustainable paper making and participating in workshops in her home land, Brazil.

Figure 9

Figure 10

Figure 11

Figure 12

Figure 13

Figure 9: When dried, the "leaf" is as hard as leather.
Figure 10: Air brush was applied to the wings to give them a leafy look.
Figure 11: The horse receives his butterfly/leafy wings, coming out of its clay cocoon.
Figure 12: Concertina bound book at the front, with other book binding options at the back, including Japanese binding.
Figure 13: Handmade paper workshop at the Minas Gerais Federal University, Brazil.

IMAGE GALLERY

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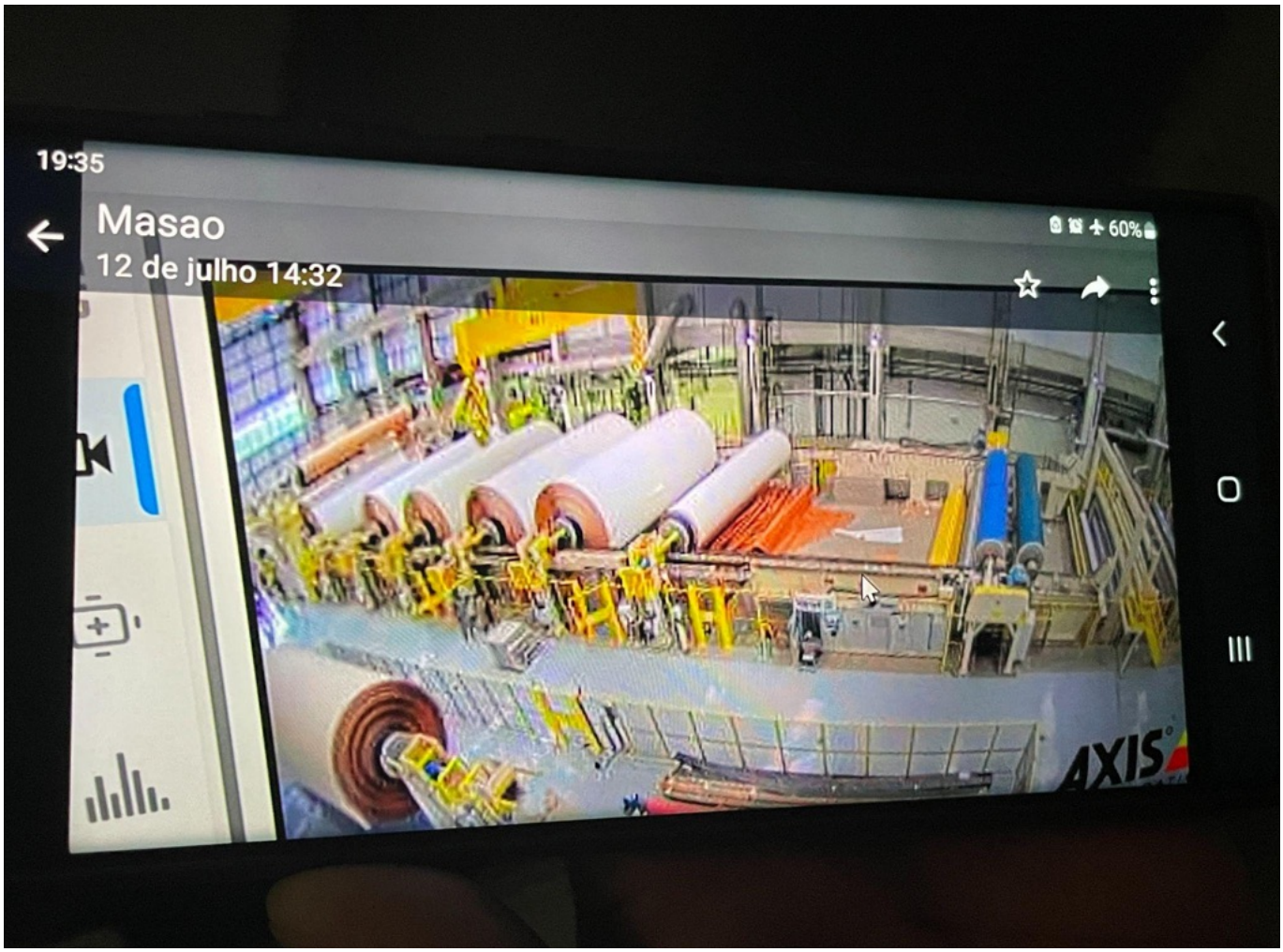

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