Guitars without trees: Blackbird, flax and Ekoa

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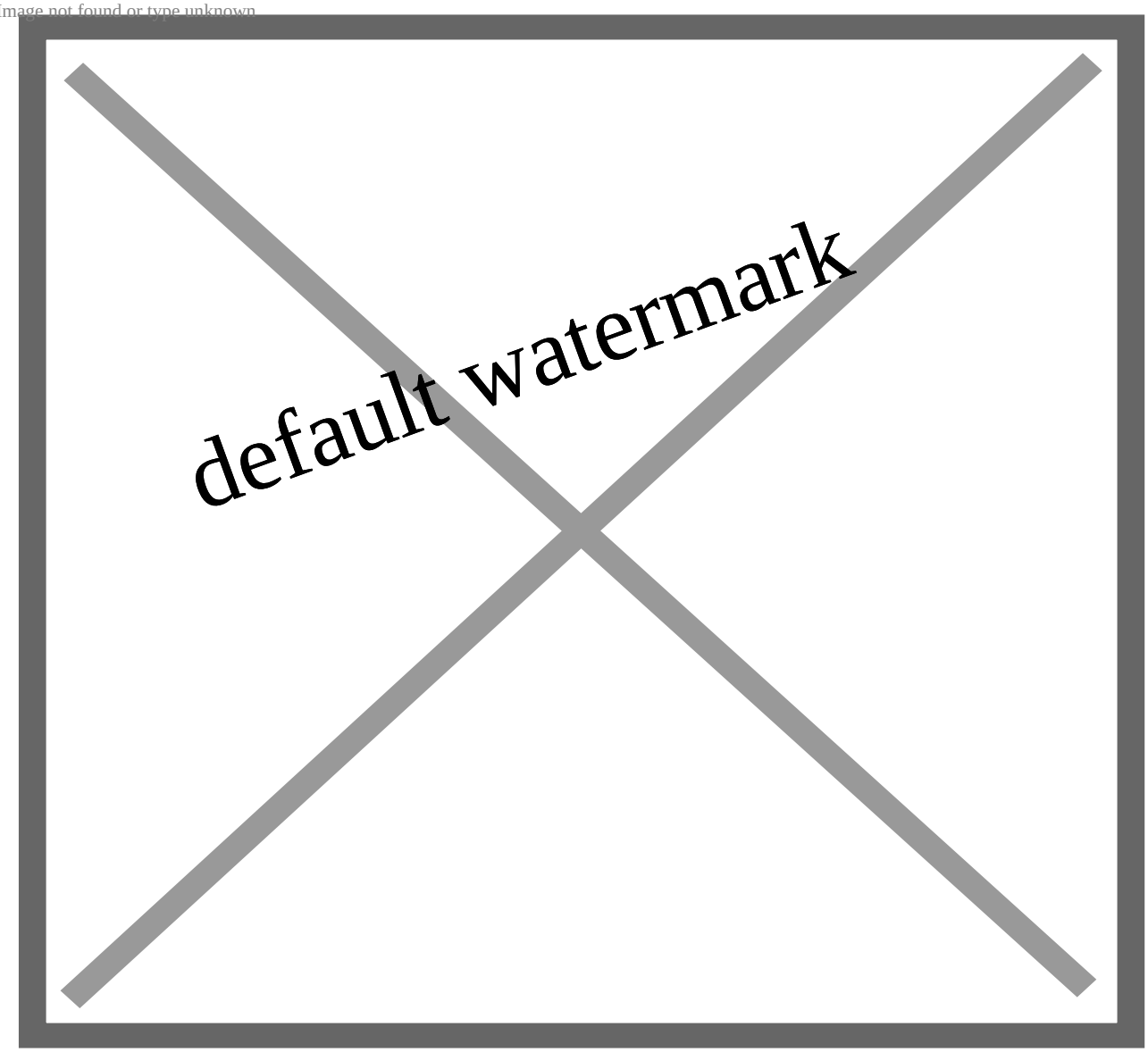

Flax: a great source of fiber and edible seeds. Turns out you can make guitars out of it too. Source: Brittanica © Mykola Ivashchenko/Shutterstock.com

Alternatives to wood for guitar making include various types of natural and synthetic fibers. Flax is a renewable material that makes great sounding guitars.

San Francisco encounters

In an early post on this site, I told the story of how idea for the Nature of Music project began – with the guitars of Wayne and Jayne Henderson.

That was back in 2016. By 2017 the project had taken shape – at that time, in the form of a book on the conservation and sustainability aspects of the materials used to build guitars. I envisaged an initial period of information gathering, including visiting and interviewing a selection of guitar makers. I even got the project approved through my university's Human Ethics Committee – necessary for any project that involves conducting surveys or interviews.

At the time, I was still traveling frequently in my role as an ecology professor, to attend conferences and work with overseas collaborators. So I was able to hitch this guitar project onto those activities. My first set of visits to guitar makers happened in April 2017, after a period of fieldwork at Jasper Ridge , near Stanford in California – where I had a research project for many years.

Jasper Ridge serpentine grassland: site of a long-term study on grassland dynamics. Photo: Lauren Hallett

After dropping my fieldwork buddy at San Francisco Airport, I set off on my itinerary which was to take in visits to several guitar makers in the San Francisco Bay area and in Santa Cruz. My first ports of call were Joe Luttwak at Blackbird Guitars in San Francisco, followed by Ervin Somogyi across the bay in Berkeley.

Looking back on it, I could not have chosen two more contrasting people to visit. Without planning it, I pretty much captured opposite ends of the spectrum of perspectives and approaches to the materials used for guitars. Ervin Somogyi has been called "the father of the modern guitar", and pretty much wrote the book about how to build excellent guitars. His guitars are hand-built with the finest traditional tonewoods and are considered to be some of the best in the world.

Joe Luttwak, on the other hand, appears to be trying to rewrite the book on how to make guitars. He's a great advocate for using alternative materials in guitars and makes some amazing instruments from unlikely materials. Fortunately, the world of guitar making has room for a wide array of approaches – and this makes it a lively and interesting place to be.

We'll meet Ervin Somogyi again in a future post, but here we'll look at the story of Blackbird Guitars and Ekoa. But first, let's talk a bit about fiber.

Fun with fiber

We've discussed often in previous posts the changes in availability of many of the traditional woods used in guitars. And we've explored a variety of responses to this from guitar makers – particularly the use of alternative woods, often from unexpected sources. But there is also another trend going on – namely considering completely different materials for building guitars.

Wood is described in Wikipedia as *"a porous and fibrous structural tissue found in the stems and roots of trees and other woody plants. It is an organic material – a natural composite of cellulose fibers that are strong in tension and embedded in a matrix of lignin that resists compression."*

Plant fibers. *Photo: By Jürgen Steger, Sachsenleinen GmbH – Work from Jürgen Steger, Sachsenleinen GmbH, CC BY-SA 3.0, Wikimedia*

The key word here is "fiber" (or "fibre" depending on where you're from) – a word which simply refers to some sort of substance (natural or man-made) that is much longer than it is wide. Fibers are extremely important components of many materials useful to humans – providing the building blocks for structural

materials, paper, cardboard, fabrics and so on. Most folks are also aware of the importance of dietary fiber for maintaining healthy digestive systems.

It's the fibers in wood and how they are arranged that give it its structural characteristics. And when the wood is processed, for instance to make pulp, the fibers disassociate and can be put back together again in multiple different ways – as paper, cardboard, and any number of composite wood derivatives such as particle board and Masonite.

Paper guitars

Wood provides the raw material for most guitars, but people have experimented with other materials for some time. Antonio de Torres, a Spanish guitar maker often identified as establishing the modern form of the guitar, famously made a guitar in 1862 with cardboard back and sides. There are numerous theories about why he did this, but no-one knows for sure.

Antonio de Torres' cardboard guitar. Source: cumpiano.com

Perhaps, like Bob Taylor, he wanted to show that making a good guitar depends as much or more on the skills of the guitar maker than the materials used. Or perhaps he'd just run out of wood. One comment in the thread above includes the observation: "*After all, what is paper? processed wood pulp dried and compressed*".

Torres' experiment was emulated more recently by the Leonardo Guitar Research Project – a non-profit organization whose purpose is "to study, demonstrate and communicate the possibilities of

building acoustic and classical guitars from non-tropical woods". They built guitars using different woods and did a lot of tests to examine how they sounded, with fascinating results that we will revisit in another post. As part of that process, a guitar was built using layers of newspaper for the back and sides.

Gaëlle Solal plays the 'Newspaper Guitar' / Choro N°1 – H. Villa Lobos (2017)

Wood derivatives such as Masonite have also been used as a guitar material – notably in Danelectro guitars – and the rise in the use of laminates and wood composites in guitars was discussed in an earlier post on koa.

Non-wood fibers

Fibers are produced by plants other than trees, as well as by animals. Non-woody plants have occasionally found their way into guitars – for instance, we'll talk about bamboo guitars in a future post.

Humans have created a wide range of synthetic fibers that are either derived from natural materials or synthesised from petrochemicals or other substances. Glass fiber has been used for over a century for a multitude of purposes – particularly in creating a reinforced plastic that ends up in boats, planes, swimming pools and many other structures. Similarly, carbon fiber has been developed as a very strong structural material since about the 1960s. Avid cyclists will know about the strength and weight advantages of carbon fiber. Similarly, sailing enthusiasts will know about the advantages of Kevlar as a material for making sails.

Carbon fiber is where we pick up the story about Blackbird Guitars.

Blackbird Guitars

As with many places where fine guitars are made, Blackbird Guitars inhabits an unassuming building – in this case, in the Mission District of San Francisco. I'd arranged a meeting with Blackbird's co-founder, Joe Luttwak, but arrived late because of the seemingly inevitable Bay Area traffic hold-ups that made my trip from the airport much longer than anticipated. Joe was nevertheless gracious and welcoming, and we spent a couple of hours looking over their factory and discussing the ideas behind what Blackbird are doing.

Blackbird Guitars in San Francisco

Blackbird was founded in 2005 with the express purpose of using composite materials to produce travel guitars that are more durable than wooden guitars.

Joe Luttwak had worked previously at Ferrari and wanted to transfer the insights gained there about materials to guitar making. The company started off by making carbon fiber guitars and ukuleles. The idea of a carbon fiber guitar may seem odd at first – but the key word again is “fiber”, and the synthetic material turns out to be pretty good for guitars. Well-crafted carbon fiber guitars can match the acoustics and playability of standard wood guitars. They have the added advantage that they are not as susceptible to damage from heat, cold, humidity changes, water and so on.

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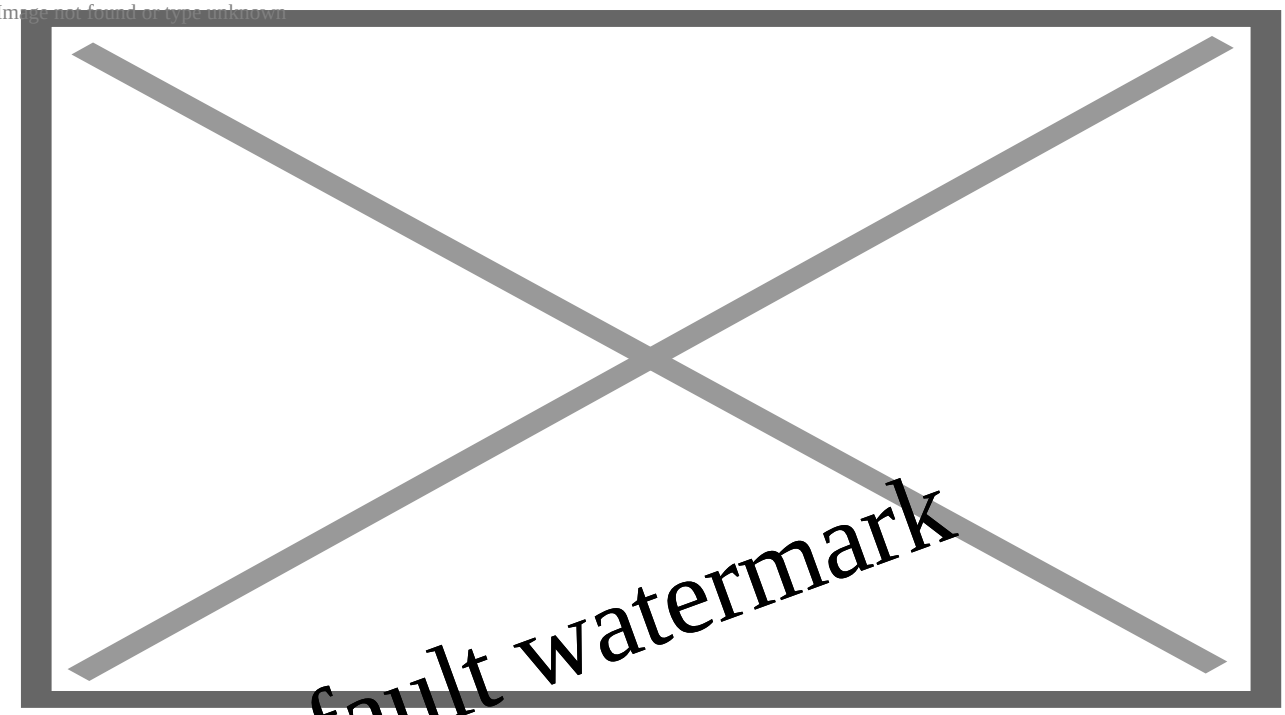

Carbon fiber guitars are pretty impervious to most environmental conditions. Photo: Klos Guitars

There's plenty more to be said about carbon fiber guitars, but that's for another time. Importantly, though, carbon fiber is expensive to produce and its durability means it also difficult to recycle. There is promising research on ways of recycling carbon fiber materials, and one would hope that not too many carbon fiber guitars would end up as landfill anyway.

Flax and Ekoa

Joe found himself seeking other alternatives to carbon fiber, and did a lot of research on different types of fiber. What if natural non-wood fibers could be used in similar ways to carbon fiber to make lightweight ,durable instruments? This question led him to create "the world's first plant fiber composite, Ekoa®, to create musical instruments which are lighter than carbon fiber, more resonant than old-growth spruce, and have a higher strength-to-weight ratio than steel".

The source of plant fiber was flax *Linum usitatissimum.* Flax is cultivated as a food and fiber crop in regions of the world with temperate climates. Textiles made from flax are known in Western countries as linen.

Flax is the oldest fiber known to have been used by humans. It's been used to make fabric for at least 10,000 years. A lot of flax for fiber is produced in Western Europe, particularly France, but it's also grown extensively elsewhere for both fiber and seed. Flax is considered a good option for fiber production in terms of sustainability. It is an eminently renewable resource that grows fast, captures a lot of carbon, and requires less water and fewer inputs of fertiliser, pesticide than most other alternatives, particularly cotton. Where a tree may take a hundred years to grow to a suitable size, flax reaches maturity in a hundred days. There's also the potential to use the stem material from flax grown for seed production as a source of raw fiber.

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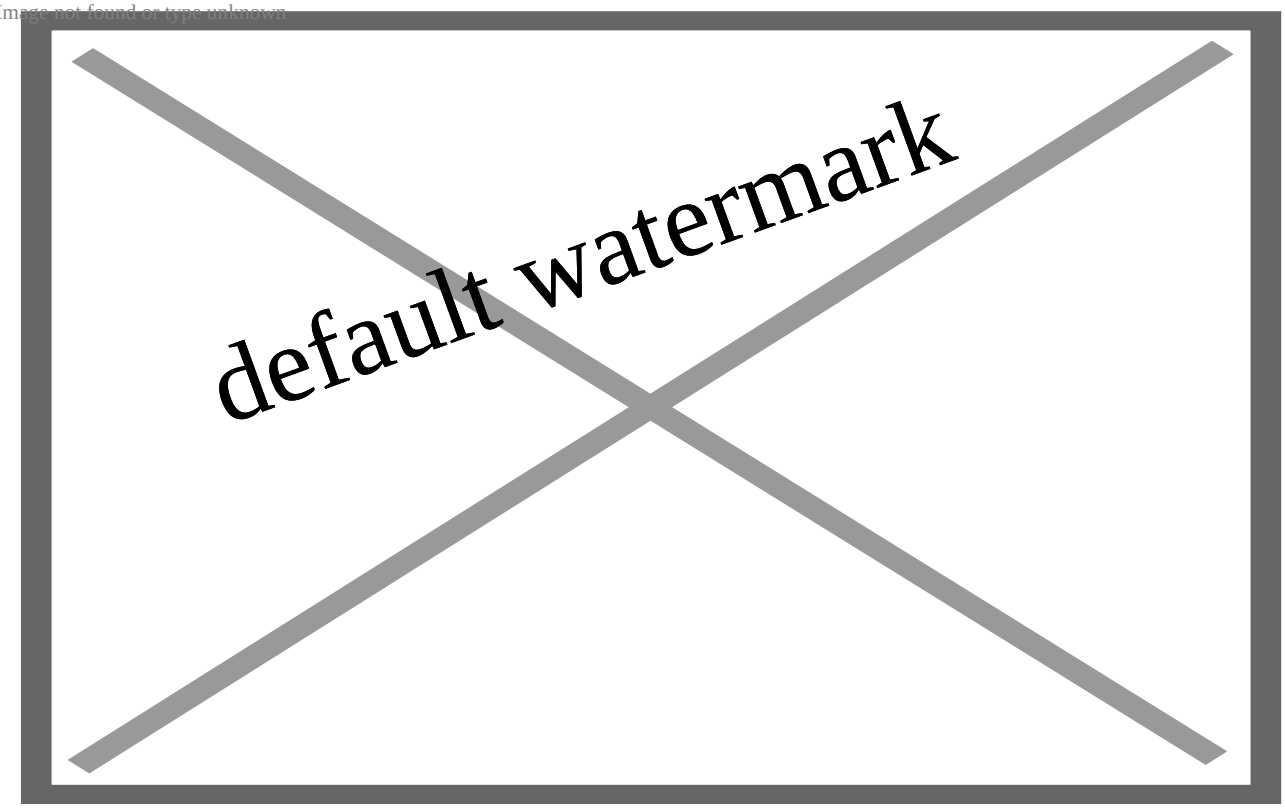

A field of flax. Source: moderndane.com

The flax fiber is combined with a bioresin – a biologically-based product derived from renewable and recycled materials.

Getting ready to mould the body of a Savoy guitar.

Being shown round the Blackbird factory was unlike any other guitar factory tour I have taken. The construction processes and technologies are totally different – and yet the result is a guitar that resembles a traditionally-built guitar in all aspects except for the materials used. Indeed, on all counts the Blackbird guitars – the El Capitan and Savoy – easily match the sound and feel of good quality wood guitars. According to Blackbird, they have "*all the stability of carbon fiber but the look, feel and sound of wood*".

With Joe Luttwak at the Blackbird premises. Joe has an El Capitan and I have a prototype Savoy.

After the tour of the manufacturing process, Joe let me have a play on an El Capitan and the prototype model of the new, smaller Savoy model. Man, they sounded good. So much so that I put my name down for a Savoy when they came into production. I have to say that I love playing that little guitar. It's lightweight, doesn't care about temperature and humidity changes, stays in tune regardless of what happens to it, and – most importantly – has an amazing tone. The fact that it's made from flax plants rather than trees adds a significant bonus.

The Ekoa guitar with the raw flax it started as.

The future

Will materials like Ekoa replace wood in guitars eventually? I doubt it. There are still plenty of people who are very sceptical about guitars made from anything other than wood – and particular types of wood at that. And as we have seen in other posts, there are many great initiatives underway to source guitar woods more sustainably and diversify the types of wood that are deemed acceptable for building good guitars.

But bringing alternative materials into the picture adds another set of alternatives and pushes the

envelope of guitar making further. Indeed, increasingly it's not an "either/or", with guitars being constructed with a mix of natural and artificial components. In the case of Ekoa, its success as a guitar material has now led to its development for many other uses as an alternative structural material. Joe started a spin-off company, Lingrove with co-founder Desi Banatao in 2014 which is producing Ekoa for other applications ranging from furniture to construction to car interiors.

Lingrove "*want to see our built world made of strong, high performance rapidly renewables where no compromises are made on your health or that of the planet*".

A very worthwhile goal – and one that started with the aim of building a better guitar.

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