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Socially constructing the Richlite fretboard: Actors and artifacts in the acoustic guitar ecosystem

Master's thesis in Music, Communication and Technology

Supervisor: Dr. Heather Frasch

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ABSTRACT

Shrinking global supplies of over-harvested and increasingly protected hardwoods used for acoustic guitar fretboards have led to some manufacturers exploring the use of alternative fretboard materials. In particular, Richlite—a paper composite manufactured using a thermosetting resin—has seen increased use in recent decades and has its enthusiastic adopters and vehement detractors among the guitar-playing community. In this thesis, internet forum postings concerning Richlite and made on the *Acoustic Guitar Forum* in the period 2011-2021 are cataloged and sorted via poster outlook and reasoning. This analysis is then interpreted using a selection of established frameworks informed by social construction of technology (SCOT) perspectives and the larger Science and Technology Studies (STS) field. Examination of the forum data via these frameworks indicates that adoption of the Richlite fretboard among users is best understood as ongoing, with closure and stabilization—as defined in SCOT methodologies—still potentially forthcoming. Conflicting pragmatic and traditionalist perspectives are driven by a host of factors that continue to support the plasticity of the artifact. Use and non-use perspectives vary, with use perspectives arising from primarily qualitative aspects of the artifact and non-use perspectives deriving from context and a narrower social and historical construction of acceptable guitar manufacturing norms.

ACKNOWLEDGEMENTS

I would like to acknowledge the assistance of my advisor, Dr. Heather Frasch, and the efforts of the Music, Communication and Technology faculties at both NTNU and UiO during the tricky COVID era. Likewise, I'm grateful to my fellow students for sharing their own fascinating research.

Perhaps most importantly, this thesis would not have been possible without the support of my wife, Caitlin, who was there to patiently listen as I went deeper and deeper down the STS rabbit hole.

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INTRODUCTION

When choosing an instrument and its constituent parts, the modern acoustic guitarist has likely more choices than at any other time in history. Between the well-known larger manufacturers—some of whose instruments defined the sounds of 20th-century popular music—and the many less iconic guitar builders who exist on the spectrum between budget and boutique, options abound. However, as is not unusual with technologies whose profiles have hardened, certain materials and traits *have* become more or less standardized. In the coming pages I will examine these norms more closely, but in its relatively hardened modern form the acoustic guitar has historically consisted of a mixture of softwoods and hardwoods colloquially known among musicians and luthiers as *tonewoods*. Unfortunately, many of these woods are sourced from increasingly at-risk tree species and harvested via dubious means. These woods continue to be used due to their desirable tonal, aesthetic, and elastic traits, as well as what might be described as a substantial traditionalist bias among producers and consumers of instruments. Although traditional woods remain, by far, the most used materials in acoustic guitar construction, new materials have in recent decades been introduced. Composite and synthetic materials, non-traditional woods, and even metals today appear in the place of traditional hardwoods and softwood on a number of guitars produced by major and minor manufacturers. Reactions to—and modes of adoption of—these materials are topics that currently offer an enlightening window into the producer-consumer feedback loop of influence, and, as it is likely that continued depletion of traditional woods will lead to more widespread transitions in acoustic guitar manufacturing norms, are well worth examination.

Just as today's guitar enthusiasts have near-endless options for instruments, so too do they have near-endless opportunities for discussion of said instruments. Like many passionate user groups who have taken to the internet en masse, the guitar-playing community has, over the last several decades, adopted the use of specialized internet forums to share information, opinions, and whatever might be on their minds concerning their shared passion. Many guitar-focused internet forums have current membership numbers in the hundreds of thousands with thousands of individual posts being published each day and archival posts numbering in the millions. Whereas in previous eras guitarists might be primarily limited to local contacts, guitar-focused events, and print periodicals, forums currently allow for instantaneous dialogues between guitarists on different sides of the world. This has resulted in an enormous amount of specific, time-stamped, and relatively anonymized—forum user names are typically pseudonymous, but posts are ascribed to specific users—data concerning user perspectives that is readily available on dozens of high-traffic internet forums.

Considering these conditions, there are many social elements of the modern guitar universe that are well-suited to study, however this thesis deals specifically with the use of Richlite, a paper material composite, as a replacement for the traditional hardwoods used in acoustic guitar fretboards (Richlite, n.d.). While certainly not the only wood-replacement fretboard

material used in recent decades, Richlite is distinct in its increased inclusion in higher cost guitars by larger manufacturers. Likewise, having been consistently used in various models by *C.F. Martin & Company*, one of the largest American producers of acoustic guitars, since 2009, information regarding its reception and usage over a full decade is available. This differs from other, similar materials such as Rocklite and Blackwood Tek that have only recently seen increased use in fretboards. Also, this combination of longevity and inclusion on instruments constructed by one of the most iconic acoustic guitar builders elevates Richlite and the accompanying conversation from niche to fairly central in the ongoing evolution of acoustic guitar construction practices. As will be seen and discussed in the coming sections of this work, the Richlite fretboard, like any technological artifact introduced into a previously balanced producer-consumer ecosystem, has its enthusiastic cheerleaders and vocal detractors.

This variety of consumer outlooks is not, in and of itself, novel, however the particularly global range of influences and details involved in even lay conversations of this transition makes it ripe for examination via social constructivist methods. As I will further elaborate upon in the Literature Review portion of this thesis, the social construction of technology and the accompanying SCOT acronym are today simultaneously indicative of both a narrow program of research and a greatly expanded perspective on technologies and their roles in societies and groups that informs much contemporary activity in diverse fields of study. Indicating essentially a constructivist perspective in which the development, placement, role, and ongoing redefinitions of any and all of these stages for a technology are constructed by details and impetuses from the surrounding society, the SCOT school of research stems from (and is arguably among the best defined evolutions of) the Science and Technology Studies (STS) field that became increasingly active in the latter half of the 20th century and continues to evolve today (Bijker, 2001).

To properly understand and diagram the motivations of key groups of actors in the orbit of the Richlite fretboard, within this thesis I categorize a large collection of internet forum posts from the *Acoustic Guitar Forum (AGF)* discussing the topic in the years 2011-2021 (The Acoustic Guitar Forum, n.d.). These posts are sorted according to user perspectives and primary reasons informing these perspectives. This data is then used to inform an analysis—in the SCOT style—of the social construction of the Richlite fretboard. As this thesis will show, when properly contextualized and examined via SCOT methodologies and accompanying STS heuristics, this actor data reveals the Richlite fretboard to be an artifact whose social construction remains plastic. While actors, intentions, and diverse outcomes desired by actors can be identified, the social construction of the artifact remains perhaps more ongoing than would be expected of an artifact that has existed in mass-produced form for well over a decade, indicating an unexpected complexity of actor motivations in the development of what is—for the great majority of its users—an essentially luxury item.

Source-consumer spectrum

Although in earlier paragraphs the *producer-consumer* spectrum was mentioned in regard to the basic social placement and history of the actors and artifacts involved in this thesis, for the more involved analysis to follow it is necessary to establish the concept of a larger *source-consumer* spectrum. The consumer pole of this spectrum is, of course, fairly easy to identify. The consumer is in this case the final purchaser and subsequent user of the Richlite fretboard. Much of the analysis in this thesis involves actors who are best identified as consumers. However, the *source* end of the spectrum is complex, and attempts to fully incorporate it into an actor-data driven examination of the Richlite fretboard's social construction would require a greatly expanded research scope.

For the purposes of this thesis, the *source* pole of the spectrum of artifact use really begins with those actors supplying the raw materials for the production of Richlite. The many stages of manufacturing and subsequent wholesaling and retailing of the Richlite both in pre-fretboard and finished form make up much of the middle of the *source-consumer* spectrum, while the advertisers, sellers, and shippers of complete instruments featuring the Richlite fretboards constitute the remainder of the spectrum as it approaches the final consumer. Despite the heavy weighting of this research toward the *consumer* end of the spectrum, attention in research and analysis must be paid to all spectral areas due to the potential for wide-ranging forum content. As previously stated, the enhanced connectivity of the contemporary guitar ecosystem has produced a knowledgeable user base for whom conversations aren't merely limited to individual interactions with instruments but might include larger conceptual elements. Although the *AGF* has strict rules regulating participation by manufacturers or those with commercial intentions, many guitar enthusiasts come from backgrounds within the guitar industry that might lead to greater or more specific knowledge from outlying parts of the *source-consumer* spectrum.

The acoustic guitar: Past and present

Both historically and currently the guitar has had many forms, however this thesis deals primarily with what might be considered the modern acoustic guitar. Characterized by steel strings and a higher string tension than the gut-strung instruments that remained prominent until the early 1900s, the modern acoustic guitar possesses traits that assured a strong popular foothold almost immediately upon its introduction (French, 2012). The conditions leading to shifts in guitar design were complex and primarily driven by social and technological changes that simultaneously changed what potential users desired and what was possible for guitar makers to produce. While guitar luthiery had been an almost entirely European endeavor during the instrument's heyday as an ensemble and parlor instrument in the 18th and early 19th centuries, immigration and the potential for new markets led to an increased number of American luthiers in the mid-19 century (Johnston & Washburn, 2003). Their design experimentations and an American guitar-buying public desirous of louder instruments spurred a transition when steel strings became more readily available at the turn of the 20th century. As steel strings were both cheaper and more durable than the gut that

they replaced, owning a guitar became less costly for the growing American population (Somogyi, 2011). The newfound demand for guitars led to industrialized instrument manufacturing on a scale that hadn't previously occurred within the more strict European luthiery traditions. The traditional guild system that dictated rules and regulations for many types of artisans and craftsmen in Europe didn't exist in the United States, allowing for rapid expansion. Unsurprisingly, many of the guitar makers in the United States who most drove these advancements were craftsmen who had formerly plied their trade in Europe before electing to immigrate in pursuit of greater opportunities and professional flexibility (French, 2012).

With changes in musical tastes and the increased affordability of the guitar in the early 20th century came modifications to the instrument's social construction. The popular American musics of the time tended toward homophonic textures in which sung or played melodies were well supported by plucked or strummed chordophones operating as primarily harmonic instruments. And although the fortunes of the guitar ebbed and flowed in relation to those of the sometimes more popular banjo and mandolin, the instrument persevered alongside these louder cousins (Johnston & Washburn, 2003). The relevant chordal style of guitar playing, less complex than the salon music of the 19th century, didn't typically require its players to possess the ability to read sheet music and was of a nature well suited to vernacular dissemination. Of course the guitar in its varying historical forms has also been associated with popular and vernacular musics for centuries, however it was with the 20th-century burst of affordable manufacturing and the coalescing of diverse international musics into the American popular music idiom that a relatively unified vogue for the instrument that stretched across American social strata and ethnic groups emerged. Note that this is and will continue to be a necessarily reductive representation of both the musical styles and manufacturing trends that drove the evolution of the guitar as "America's instrument." Ascribing a loose linearity to these processes is a necessary evil in a work of such unavoidably narrow scope. That being said, the broad strokes narrative presented here is an attempt to sum up the social and physical development of the modern acoustic guitar without allowing extreme gaps in perspective or omitting crucial contexts.

Affordability and increased industrialization in instrument manufacturing were key elements in the growth of the guitar at this time, but of similar importance were the emergences of both radio and film as mediums that average Americans could afford to experience (Malone, 1993). These avenues for dissemination of American depictions of what it was to be 'American' were ripe for adoption by a collective American public that was quick to self-mythologize. The guitar, and specifically the singing cowboy, became intimately linked with depictions of American expansion and the toughness and vastness of their country that Americans wished both to feel as a key component of their national identity and to transmit internationally as an emblem of the uniqueness and hardiness of the American way of life. In *Singing Cowboys and Musical Mountaineers: Southern Culture and the Roots of Country Music*, Bill C. Malone writes on the subject.

Furthermore, mountaineers and cowboys valued, and presumably embodied, freedom and independence; both were heroic and fearless; both preserved those manly traits that had ensured survival on the frontier and that were distinctive and defining ingredients of American life. Cowboys and mountaineers, in short, were profoundly American. (Malone, 1994, pp. 73-74)

Subsequent periods in the 20th-century United States similarly continued to feature guitars and guitar music as focal elements of the American cultural identity. In the prosperous post-war period, the growth of the American middle class with newfound disposable incomes and the rise of the *teenager* as a newly recognized, socially distinct subset of society drove an additional wave of guitar mania (Johnston & Washburn, 2003). As social contexts shifted and varying mixtures of folk, blues, rock and roll, and other musicians took the musical place of the cowboy in the American conception of the acoustic guitar, one thing that remained consistent was an ongoing national devotion to the instrument. But, obviously, as the guitar communities examined over the course of this thesis exist entirely within the context of an internet forum, background information pertaining only to the United States does not tell the whole story. Forum conversations on the *Acoustic Guitar Forum* are almost entirely in English, however it is utterly unlikely that forum membership consists only of American users or users for whom English is a primary language. For this reason it is important to avoid US-centrism in analysis. Although certain key elements of the 20th-century adoption of the acoustic guitar in popular culture occurred in American and western contexts, co-occurring adoptions and trends throughout the globe similarly contributed to the contemporary guitar landscape that informs this thesis and related topics. In interpretation of the forum data that drives analysis in the later stages of this thesis, a concerted effort is made to maintain a global perspective concerning the social construction of the Richlite fretboard. This combination of ongoing international framing with relatively Americentric background and scene-setting likely best approximates the expansion of the specifically modern acoustic guitar in its steel-strung, high tension iteration.

Fretboards

Divorced from the instrument to which it is affixed, a fretboard appears simple but is actually deceptively complicated. Superficially appearing to be only a flat strip of wood attached to the neck of an instrument and divided at intervals by inset fretwire, in many cases a fretboard is carefully radiused at an either constant or compounding radial scale and shaped to allow for ease of guitar playing (French, 2012). Historical instruments of the 19th century and earlier often had fretboards that lay flush to the instrument body's top, however such a design is rare in modern acoustic guitars. In the majority of modern acoustic guitars, the fretboard is raised slightly above the instrument's top and overlaps the instrument body to shortly before the soundhole (Tyler, 1980). Although there are of course exceptions, in most cases the geometry of modern acoustic guitars has the fretboard meeting the body at either the 12th or 14th fret, with an overall string length—measured from the saddle (affixed to the soundboard) to the nut (located where the neck meets the headstock)—of somewhere in the range of 24 to 26 inches (French, 2012).

Figure 1*Relevant elements of the modern acoustic guitar**1) headstock; 2) nut; 3) fretboard; 4) neck; 5) soundboard; 6) side(s)*

While contact is frequently made between a guitarist's "fretting" left hand and the fretboard wood, it is in fact only necessary for the guitar string to be pressed into the fret wire to divide the string length and produce an intended note. Because of this—and the fact that acoustic guitar sound production occurs almost entirely within the hollow, resonating body of the instrument—there are strongly conflicting views among guitarists regarding the degree to which fretboard material influences tone. It is generally accepted, however, that choice of fretboard material has somewhat less tonal impact than the choice of woods used for the instrument's top, back, and sides (French, 2012). Desirable traits for fretboard woods include hardness and workability for the instrument manufacturer. The wood must be of a type that can be worked and slotted for installation of fret wires (typically affixed to a fretboard on a modern instrument by a narrow tang that is hammered into the slot beneath a fret). As mentioned, the guitarist does sometimes contact the fretboard with her or his left hand, so it is also necessary that the chosen wood is tactilely pleasing and capable of withstanding pressure by guitarists in cases where they might press strings more firmly into the fretboard than necessary. It is not uncommon on old instruments to see indentations worn into the finish or even the wood of a fretboard itself in locations on the neck where a guitarist most commonly plays (Johnston & Washburn, 2003). This is particularly true of the steel-string instruments with which this thesis is concerned. The lighter gut strings that preceded steel-string construction were far less capable of impacting the hardwood of a fretboard in a manner leading to lasting indentations or scoring. Because only a fairly thin strip of it is used to create the fretboard, a far heavier wood variety can be used for the fretboard than one would expect in other elements of instrument construction (The Wood Database, n.d.).

The woods primarily used in fretboard construction are profoundly influenced by historical trends beyond just the development of the guitar. Bowed string instruments such as those of the violin and viol families have been built for centuries by European luthiers, and elements

of modern acoustic guitar design—specifically approaches to wood selection and bracing—owe much to this tradition (Tyler, 1980). In large part due to this ancestry, modern acoustic guitar fretboards of the traditional school continue to be made primarily of hardwoods such as various species of Ebony and Rosewood. Both historically and today, these hardwoods are sourced almost entirely from countries in the Global South. Centuries of overcutting and poor treatment of the areas from where these hardwoods are harvested have led to extreme depletion of global stocks of the most desired trees (Boltz et al., 2003). As the same dark hardwoods that are desirable for instrument building are equally desired in the much larger furniture and furnishings industries, guitar manufacturing accounts for only a small portion of the larger issue, however—given the strong opinions of the guitar-buying public—is potentially among the industries most resistant to wholesale change. Notably, in 2011 the Gibson Guitar Corporation—among the largest and most iconic guitar manufacturers in the United States—had its Tennessee facilities raided by federal marshals operating under suspicion that the manufacturer was knowingly sourcing illegal woods from Madagascar and potential other locations (Havighurst, 2011). This followed a previous 2009 raid in which ebony from Madagascar was confiscated from the manufacturer’s Nashville facility. While the complexities of this specific example of potential wood-related malfeasance are grossly complicated and beyond the scope of this thesis, it serves as an example of two important facts. Firstly, prime hardwoods were and are growing increasingly difficult and costly to source in responsible ways for even the largest of users in the guitar industry. As the makers of iconic guitars used by such musicians as the Beatles, Aerosmith, and Guns N’ Roses and sellers of instruments with prices ranging from \$1,5000 to well over \$10,000 (USD), the Gibson Guitar Corporation is likely among the companies best positioned fiscally to legally and properly source their woods (Gibson, n.d.). That they would potentially be unable to do so and knowingly or unknowingly engage in questionable practices while aware of how closely the wood trade is monitored is indicative of just how scarce resources are getting. Secondly, the lack of real public outcry or impact on Gibson’s financial bottom line following these raids is indicative of a guitar-buying public that is, at best, largely apathetic concerning the sourcing of materials and, at worst, complicit in the potential abuse of resources and workers provided that goods continue to be produced in the manner that has come to be expected.

Harvesting fretboard woods

It should come as no surprise that the sourcing, harvesting, and working of the hardwoods that become fretboards are rife with potential for abuse of both human and natural resources. The export of exotic woods from the Global South to the Global North has been a large industry for centuries, and only in recent decades have meaningful steps been taken to improve or limit the conditions in which woods are acquired. The CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) agreement was agreed to by representatives of 80 countries in 1973, with the express intention of ensuring “that international trade in specimens of wild animals and plants does not threaten the survival of the species” (CITES, n.d.). In the decades since, many hardwood species specifically involved in guitar manufacturing have received elevated protections under CITES, sometimes

creating confusion for both manufacturers and owners who might own vintage instruments constructed from highly regulated woods. Species protected under CITES are divided into Appendices I, II, and III, with each appendix corresponding to a different level of protection and regulation (CITES, n.d.). For example, Brazilian rosewood (*Dalbergia nigra*)—among the most historically desirable fretboard materials—is included in Appendix I and is currently heavily regulated in both ongoing use and already completed instruments. To cross international borders with an instrument featuring the wood, a guitar owner must have CITES paperwork proving that the wood used in their instrument conforms to regulations or risk confiscation (The Wood Database, n.d.). As a result, while builders continue to work through supplies of Brazilian rosewood that they might have already warehoused, the species has been largely replaced in large-scale new construction by East Indian and Honduran rosewoods, at best a stop-gap measure since all rosewood (*Dalbergia*) species are currently included in CITES appendix II and are increasingly vulnerable to overuse and subsequent elevation to CITES appendix I (The Wood Database, n.d.). Most species of ebony used in acoustic guitar fretboards are similarly included in appendix II, meaning that there is a very real possible future in which few of the historical fretboard materials remain available to builders.

Human concerns

Regardless of the legality or environmental soundness of logging methods, in all cases there is the additional component of potential abuse of human capital to be considered. Forest workers in the countries from which rosewoods, ebonies, and other tonewoods are sourced are typically underpaid and not protected by the types of worker protections that are the norm in more regulated businesses and geographic locales (The World Bank, 2016). Because of this, forest work can be low-paying and dangerous. Certifications and industry policies to promote sustainable and safe harvesting of forest resources are, of course, necessary given the extreme pressures that centuries of over-logging have produced, but uneven enforcement of such policies can actually serve to exacerbate problems within at-risk worker populations. As an indicator of inherent challenges in enforcing policies relating to the wellbeing of workers, while an estimated 54.2 million workers were involved in the timber industry in 2016, 41 million of these workers were informally employed (The World Bank, 2016). Such conditions are less than ideal for ensuring that workers are treated fairly. While conditions for workers working in ‘above board’ situations are likely to improve with mandatory pay and working standards, workers employed in the continuing large-scale ‘shadow industry’ that acquires and supplies woods via more dubious means may very well see working conditions decline. Obviously through enhanced enforcement of already-existing policies concerning forest labor would come more evenly dispersed improvements in worker conditions, but without substantial moral buy-in from those buying forest products there is little incentive for reform within the field (Deblauwe, 2021). An interesting example of one of the few industry-led attempts to address ongoing and future hardwood shortages in guitar manufacturing is the Ebony Project, started by Taylor Guitars and Madinter—a supplier of woods for luthiery—in 2011. Through co-ownership of a Cameroonian ebony mill in the city of Yaoundé and development of a re-planting program to ensure future ebony supplies, the companies are

attempting to work with local professionals to create improved working conditions (The Ebony Project, Taylor Guitars, n.d.). The Ebony Project website illustrates a scenario in which initial poor conditions negatively impacted both workers and outcome.

Between faulty electricity, a lack of training, and poor sanitary conditions, it was nearly impossible for employees to properly process wood. As a result, there was considerable waste and compromised safety. Employees were not paid well. Most didn't have lunch to eat, and there was no access to clean water. (The Ebony Project, n.d., Transforming a Sawmill section)

Subsequent improvements to pay, buildings and physical resources, worker conditions, and Ebony use patterns have led to Taylor Guitars now sourcing all the ebony used on their instruments from this Cameroonian project, and in 2014 Bob Taylor was presented with the Secretary of State's 2013 Award for Corporate Excellence (ACE) in the United States (The Ebony Project, Taylor Guitars, n.d.).

This approach to finding solutions for past abuse of wood resources and those workers who supply them is an interesting example of one potential path for ensuring that future instruments can continue to be produced using traditional materials, however the specifics of conditions facing depleted or shrinking forest populations vary from species to species. The relative success in ongoing management of the West African ebony (*Diospyros crassiflora* Hiern) milled at the Yaoundé sawmill is in no way indicative of a blanket approach that would allow for other traditional woods to continue to be used at current levels in guitar manufacturing with implementation (The Wood Database, n.d.). Also, while the commitment by Taylor Guitars and Madinter to improving worker conditions and potential future outcomes for both individuals and the Yaoundé community at large appears genuine—and is commendable—there is an obvious public relations component to such a project. Until all materials used in Taylor Guitars are demonstrably sourced in similarly forward-thinking manners, one could argue that there is potentially more work to be done (Taylor Guitars, n.d.). Serving as an example of one of perhaps the most environmentally aware and open guitar manufacturers regarding manufacturing practices, the case of Taylor Guitars does illustrate the complexities of corporate responsibility and large and small scale community involvements necessary for modern, relatively sustainable production.

Richlite

As previously mentioned, Richlite was initially developed in the 1940s for use in the aerospace industry. Durability and other positive traits subsequently led to its adoption in other industries in the following decades and today the Richlite Company website (<https://www.richlite.com/>) features Richlite products cosmetically modeled for many different uses. Although extremely similar in appearance to hardwood, Richlite is produced with resin-saturated sheets of paper bonded via heat and pressure. Because of this production process, sizing is quite flexible and Richlite wood replacements can be easily produced in convenient sizes. According to materials on the Richlite Company website, Richlite is

“[c]omposed of approximately 65% FSC®-certified or recycled paper content and 35% phenolic resin” and is currently used in the production of “interior and exterior applications including furniture, cabinetry, cladding, skateparks, consumer products, signage, retail displays, restaurant tables, bar tops, and worktops, and for industrial use in die stock, silent gears, and foundry patterns” (Richlite, n.d.). In later text, also listed are “guitar fret boards [sic], culinary cutting surfaces, skateparks, mobile phone cases, industrial tooling molds, and router blocks” as products in which a consumer might find Richlite (Richlite, n.d.). I have quoted these extensive lists of applications from the manufacturer specifically to highlight the degree to which Richlite has become a viable wood replacement across multiple distinct industries.

To the degree that one might expect, the traits that make a hardwood desirable in one industry often translate logically to another. The traits that make Richlite a successful material for cutting boards and other artifacts that are both visually and functionally involved in the day-to-day life of a household likewise make it an unsurprising choice for guitar manufacturers looking to replace certain hardwoods in guitar fretboard production (French, 2012). Add too that Richlite is easily dyed or cosmetically altered beyond its resin-derived original color, and it seems a strong candidate not just for the replacement of a certain variety of fretboard wood, but potentially for a range of aesthetically different woods. Pre-cut fretboard “blanks” are available from the Richlite Company website and other retailers of instrument manufacturing supplies that cosmetically emulate woods including varying shades of maple, ebony, rosewood, and other non-wood materials (Richlite, n.d.).

Contrasting with the previous example of Taylor Guitars and their ongoing use of more sustainably sourced West African ebony, C.F. Martin & Company has elected to mix the usage of Richlite fretboards on certain models into product lines in which they also continue to use externally sourced, FSC-certified hardwoods (C.F. Martin & Company, n.d.). This hedging approach acknowledges the likelihood that future manufacturing will need to increasingly rely on alternative materials, yet still provides options featuring traditional woods to those consumers who are as yet unwilling to accept changes to what they have come to expect in a Martin guitar. As one of the largest guitar manufacturers to embrace Richlite in fretboard manufacturing—and almost certainly the largest acoustic guitar manufacturer to do so—Martin’s adoption of the material and its future ramifications for wider-spread use of it by other manufacturers will feature prominently in this thesis in later analysis of consumer perspectives.

Richlite as artifact, fretboard as artifact, richlite fretboard as artifact

Having outlined these actors and conditions within the guitar ecosystem relevant to the topic of the Richlite fretboard, let us briefly reiterate what is being examined within this thesis and—just as importantly—what falls outside of the relevant scope. In socially constructing an artifact it is crucial that involved actors are recognized and considered, however excess

expansiveness creates a real danger of muddled findings or an overly wide or vague program of study. This thesis is concerned with the social construction of the Richlite fretboard as what we might call the artifact of record. The nature of its role within a guitar of course requires consideration of the larger system of artifacts that combine to form the instrument, but a specific research focus on only this artifact means that this thesis refers only in passing to hardwoods, softwoods, and composites used in the other parts of the acoustic guitar even if the relevant social constructions are likely similar. Future related research questions regarding these social constructions would certainly prove relevant to the larger discussion of the social construction of the acoustic guitar in a changing source-consumer landscape, but are not answered within this thesis. Likewise, as a manufacturing alternative to hardwoods beyond just the guitar industry, Richlite is involved in an increasing number of applications (Richlite, n.d.) that have real past, present, and future ramifications for the social construction of many everyday consumer items. These issues too fall outside the scope of this research. Qualitative and aesthetic questions concerning Richlite either non-contextually or in contexts beyond those of the fretboard aren't predicated on the same desired traits as those same questions in the context of the acoustic guitar fretboard. To attempt to frame the social construction of my chosen artifact through the inclusion of these considerations would certainly cloud the interpretation of the user perspectives in my chosen context. In short, the Richlite fretboard as a single defined artifact is complex enough in its social construction already that the scope of this thesis is—and will remain, despite the complexity of user communities and relationships to the artifact and each other—prescriptively and intentionally narrow.

LITERATURE REVIEW

To contextualize this thesis in the interdisciplinary milieu constituting STS, it is necessary to outline the literature and field-specific preconceptions inherent in the chosen approach to understanding technologies and their social significances. The following literature review traces a path through both formative and more recent researches in the intersections between the social, the technological, the culturally mediated, and the economically driven components that contribute to the social construction of an object. For simplicity's sake I have divided this literature review into sections exploring the social, SCOT as method and mindset, technological determinism and constructivism, expertise, and concepts of use and non-use in consumer-producer contexts.

Social and its meanings

Throughout this thesis frequent allusions are made to a number of specific interpretations of the “social.” As so many related—but distinctly separate—fields deal specifically with social standards, contexts, and adaptations, it should be expected that numerous accepted definitions of the term exist. To ensure a consistent framework herein, I've elected to hew fairly closely to a definition provided in the introduction to Latour's *Reassembling the Social*. Latour (2007) defines social “not as a special domain, a specific realm, or a particular sort of thing,

but only as a very peculiar movement of re-association and reassembling” (p. 7). This definition is distinct in both its specificity and seemingly opposing inclusivity. Removal of considerations of “realm” or “domain” frees the social from discipline-specific notions of ownership of the term. Also, of particular note—and of value in this thesis specifically—is the significance of the inclusion of the prefix “re” in the context of Latour’s “association” and “assembling.” It indicates a conception of the social that emphasizes plasticity and something resembling constant flux within relationships. This is not to say that the relationships pertaining to an artifact are incapable of stabilizing, rather that artifacts and relationships once stabilized offer no guarantee of permanent stabilization. The closure and stabilization one would find in the Empirical Programme of Relativism, and subsequent SCOT interpretations is typically achieved via either rhetorical means or the redefinition of the circumstances surrounding an artifact’s social construction (Pinch & Bijker, 2012). This too isn’t indicating a specific permanence within an all-defining closure, only a closure of specific contexts or even instances.

SCOT as mindset and method

Within the greater ecosystem of SCOT research, the prototypical “Social Construction of _____” variety of paper has been a primary tool in nailing down the proper function of discipline-specific approaches. Both Bijker and Pinch, whether together, alone, or with other collaborators, have returned repeatedly to the form and used it to sharpen the specifics of their working language. It is a testament to the solidity of the SCOT scaffolding that placing different artifacts under the hypothetical microscope emphasizes varying aspects of their social constructions while still allowing effective analysis. The formative bicycle and Bakelite chosen respectively by Pinch and Bijker (2012) and Bijker alone (2012), could not appear more different in implications and applied realities, yet both submit functionally—and maybe even more importantly—compellingly to examination via SCOT techniques. So what then is SCOT? Having assumed a place in the literature as catchall term for both field and method, the acronym needs to be understood in terms of both forms it might be representing.

The mindset

As first presented by Pinch and Bijker in 1984, the social construction of technology could be best understood as simply a perspective on technological development that preferences social influences. Rather than allowing for bits of determinist logic, the SCOT mindset seeks explanations for development in the complicated webs of actors surrounding an artifact (Pinch and Bijker, 2012). These webs and their non-linear shapes put paid to notions of any artifact truly possessing a single straight line of development. Instead, relationships and actor details both internal and external to what might initially be considered the social ecosystem of an artifact combine in leading to conditions in which said artifact moves toward closure and potential social recontextualization. As a response to other developments in related fields and a clear indicator of the academic interdisciplinarity that would develop in the decades to follow, SCOT essentially brought technology studies alongside studies of science and studies of culture in their expanded briefs.

The relatively ready acceptance of the SCOT mindset in the mid-1980s and its continued influence on a field that has grown considerably in the decades since have substantially colored modern science and technology studies. Interdisciplinarity has grown measurably, but simultaneously, reactions to SCOT precepts are at the heart of much modern scholarship. In the preface to the 2012 edition of *The Social Construction of Technological Systems*, Bijker and Pinch acknowledge and outline briefly the widening that SCOT approaches have undergone since their original 1984 article on the subject and the first 1987 edition of the subsequent edited collection. This expansion includes increased attention to cases in which SCOT has successfully seen a “broadening of the unit of analysis from artifact to sociotechnical ensemble” and answers criticisms of the degree to which SCOT in its earliest forms undervalued the potential dynamism and cultural fluidity of real-world users (Bijker & Pinch, 2012, p. xxii). Likewise, cross-pollination between fields has seen an increased SCOT interest in the political drivers and subsequent ramifications behind the construction of artifacts. Placement of an artifact in a social milieu when considered with increased attention to these aspects of its development is potentially far more politically scripted than previous scholarship would have revealed. These traits, in addition to the obvious mandatory globalization of modern perspectives and ongoing sociotechnical interactions guaranteed to bring “new domains” ripe for study, all contribute to an academic approach that continues to be at the core of the STS field. The intended role of the SCOT approach as something that might be “targeted at the empirical studies of the inside of the black box of technology and on theoretical explorations of that technology’s relations to society” remains as relevant today as it did when first proposed (Bijker & Pinch, 2012, xxvii).

The method

At the heart of the SCOT mindset is a reproducible method of considering an artifact’s social construction. This framework, modeled in large part on Harry Collins’ prior *Empirical Programme of Relativism* (1981), joins “a social constructivist approach to the study of technology” (Pinch & Bijker, 2012, p. 11) and maps alternate significances onto the EPOR stages of (1) the display of “interpretive flexibility,” (2) identifying social aspects impacting transitions toward closure, and (3) the broad contextualization of closure.

For better adaptation to the nature of artifacts rather than debates or scientific findings, the EPOR stages required some alteration in the development of the SCOT framework. For the initial stage in which interpretive flexibility must be proven, SCOT requires proof of the cultural construction and interpretation of an artifact (Pinch & Bijker, 2012). Pinch and Bijker state the following.

. . . the interpretive flexibility of a technological artifact must be shown. By this we mean not only that there is flexibility in how people think of or interpret artifacts but also that there is flexibility in how artifacts are *designed*. There is not just one possible way or one best way of designing an artifact. (2012, p. 34)

This flexibility opens the narrative and social texturing of an artifact's development to include a large degree of what could be best labeled situational chaos. Developmental logic—likely overvalued in technologically deterministic or more linear approaches—is still of course involved in the design and interpretation of an artifact, but in no way is it a singular, linear logic. Instead there exists a plurality of potentially interdependent logics, and only through the interactions of these does the social construction of an artifact begin.

The closure found in the second stage of the EPOR is in SCOT accompanied by a stabilization of the artifact that must to some degree occur. For this to be achieved, there are two types of closure that support stabilization: rhetorical closure and closure by redefinition of the problem (Pinch & Bijker, 2012). Rhetorical closure, consisting of claimed solutions to problems or aspects of an artifact, is achieved through rhetoric. If a narrative surrounding an artifact comes to include, via advertising or other means, content directly contradicting past themes in such a way as to offer an assumed solution, rhetorical closure has occurred. In the second variety of closure, the redefinition of the problem, the repositioning of the narrative in such a way as to alter actor perceptions. By altering the narrative in such a manner as to solve a different problem concerning an artifact, actors might essentially redefine a “problem” out of existence.

The final SCOT stage once again shares a general program with the EPOR stage by which it was inspired. As described again by Pinch and Bijker (2012):

The task here in the area of technology would seem to be the same as for science—to relate the content of a technological artifact to the wider sociopolitical milieu. This aspect has not yet been demonstrated for the science case, at least not in contemporaneous sociological studies. However, the SCOT method of describing technological artifacts by focusing on the meanings given to them by relevant social groups seems to suggest a way forward. Obviously, the sociocultural and political situation of a social group shapes its norms and values, which in turn influence the meaning given to an artifact. (pp. 39-40)

Placing an artifact in the “wider sociopolitical milieu” of course requires a relatively complete interpretation of said milieu, and for this reason this ultimate stage continues to be perhaps the hardest to bring to anything resembling completion. At best a researcher might achieve this final contextualization within a corner of an artifact's total actor milieu, however the inexorable widening of contemporary social groups makes anything beyond partial success unlikely. Arguably, it is this aspect of the SCOT method that has driven the continued expansion of the field mentioned previously. SCOT might be seen as a methodological example of the old adage—asccribed to various historical thinkers—that “the more you know, the less you know.”

Writing about the framework in 1987, Pinch and Bijker were quick to position it in what was still a fledgling field, but also to advocate its use as an applicable approach to the social construction of artifacts of any type. The bicycle—which became emblematic of the SCOT

field due to its use as example artifact in Pinch and Bijker's formative chapter—proved the potential for use of the SCOR framework. In both their original 1980s works and subsequent revisions and comments, Pinch and Bijker recognize the essential incompleteness with which one can socially construct an object in contemporary society, while still positioning SCOT methods as a viable approach to establishing the most complete social construction possible.

Bijker's technological frame

Understood in conjunction with the wider SCOT program, Bijker's concept of a technological frame helps us to better identify and interpret our actors and the environment that may define them (Bijker, 2010). As Bijker explains it, “[a] technological frame structures the interactions among the members of a relevant social group, and shapes their thinking and acting” (p. 69). This is particularly important in the case of this thesis as successful analysis is dependent on the existence of such interactions within the *AGF* internet community.

In this way, existing practice does guide future practice though without logical determination. The cyclical movement thus becomes: artefact–technological frame–relevant social group–new artefact–new technological frame–new relevant social group, etc. Typically, a person will be included in more than one social group and thus also in more than one technological frame. (Bijker, 2010, p. 69)

Seen in light of this explanation, it is feasible that the evolution of an artifact that features room for evolution or alteration as elements of the technology or the role it might fill change could be conversely considered either a single distinct artifact drawn repeatedly into a series of changing technological frames or a series of different artifacts surrounding by distinctly similar technological frames.

Technological determinism

Constructivist and determinist approaches to technology studies are at the core of much of the ‘push and pull’ that still exists within the different schools of thought in relevant disciplines. However, gone are the days (if ever they existed) when these concepts remained polar rather than spectral. Modern concepts of technological determinism exist on a spectrum ranging from the monochromatic insistence on specific technologies driving society in specific directions to prismatic interpretations allowing for variation that begins to approach an almost constructivist outlook (Smith & Marx, 1994). Referring critically to Smith and Marx's 1994 description of a technological determinism possessing more rounded edges, Sally Wyatt suggests that “soft determinism is vague and is not really determinism at all, as it returns us to the stuff of history, albeit a history in which technology is taken seriously” (Wyatt, 2008, p. 173). Ironically, Wyatt's quotation comes from midway through a chapter in which she herself is suggesting increased acceptance and segmentation of interpretations of technological determinism among a research public that she finds quick to discard it. Her proposed four varieties of technological determinism, “justificatory,” with its emphasis on

actor susceptibility to technological impacts both good and ill, “descriptive,” concerning situation determinism that receives criticism but is in some cases capable of explaining historical outcomes in what might be considered a form of academic hindsight, “methodological,” which functions from a research basis that includes a society’s technologies in analysis, and the full-stop “normative” technological determinism with its single-outcome momentum and potential for autonomy, seem inclusive enough that surely there is a home for most perspectives within them.

Wyatt’s set of four varieties of technological determinism superficially varies only slightly from Bruce Bimber’s similar set of three interpretations: normative, nomological, and unintended consequences (Bimber, 1990). However, while Bimber’s framework places Karl Marx in a category distinct from true technological determinism, Wyatt is instead advocating for the tentative acceptance of technological determinist narratives in STS and related fields (Wyatt, 2008). What appears to be a disagreement of nomenclature and best practices for the interpretation of research and researchers working along the edges of the technological determinism spectrum may however actually be a more substantial example of one layer of ongoing friction that still seems to color technology studies. Of course, in the development of an academic field or school of thought there is often the narrative—be it express or unsaid—that past approaches are incomplete or contrary in some way to the realities of the field. However, with the fracture of larger academic fields into increasingly small disciplines and the speed with which technology studies have evolved in recent decades, there appears to be an occasional tendency to “throw the baby out with the bathwater.” Although approaching the topic from different directions, I interpret Bimber and Wyatt as actually advocating very similar positions. In both cases the ultimate goal seems to be the evaluation of a complete picture. Should this picture be best evaluated from perspectives that might smell slightly of technological determinism, the perspectives should not be ignored, rather understood and contextualized within a more nuanced framework than that of the dreaded technological determinism. Notably, Bimber’s very desire to place Marx safely away from the *technological determinist* label—even if only by dint of an altered nomenclature—shows the degree to which researchers across multiple fields had discarded perspectives tainted by determinist elements.

Technological constructivism

As I have just illustrated, it is inaccurate to place determinism and constructivism at two diametrically opposing poles with no drift between the two. The constructivist school of thought, in which an artifact’s profile is constructed by the actors in the surrounding network, ascribes far more immediacy of social structuring to these surroundings, however should not be seen as *carte blanche* for infinite extrapolation of social constructions. To use an absurdist example, in Pinch and Bijker’s classic bicycle example, we can and should recognize an outer edge to the immediacy with which actors might be drawn into an artifact’s orbit (Pinch & Bijker, 2012). It doesn’t matter that an octopus is incapable of riding a bicycle or that a bicycle’s wheel (regardless of what variety of bicycle) wouldn’t fit into a baby’s mouth. The

social construction of an artifact cannot be truly boundless, no matter how expansive the collection of relevant actors might seem.

I bring up this seemingly unimportant element of the social constructivist approach here not merely because it is entertaining to picture an octopus riding a bicycle, but because it will prove important in future pages as I structure and interrogate the nature of the Richlite fretboard's many relevant actors.

Expertise

Perhaps one of the most important—yet difficult to contextualize within this specific thesis— aspects of technology and its users is the nexus of expertise surrounding an artifact. On the *source-consumer* spectrum that I have previously outlined, expertise as an aspect of interaction with an artifact or artifacts varies greatly depending on the placement within the spectrum. The expertise of a millworker who can identify a piece of ebony as flawed and set it aside is obviously far different from that of the guitar designer who decides whether a 12” or 16” radius is preferable for a specific model’s fretboard or the financial worker who determines that an instrument featuring a specific fretboard must be sold at greater than \$2,000 USD to make an acceptable profit, however all are equally involved in the success of the artifact within its greater context. Parsing the significances and roles of these diverse expertises and the related but alternatively constructed lay expertise of guitar consumers is challenging. Evans and Collins (2008) argue that narrow interpretations of expertise within some areas of the STS sphere lead to missing or incomplete perspectives on technologies and relevant interactions. In “Expertise: From Attribute to Attribution and Back Again?” they pose questions concerning potential for “‘upstream’ analyses of expertise as well as downstream” (Evans & Collins, 2008, p. 610). This refers to methods of thinking about expertise that highlight the elements of *expert* and *lay* knowledge that should be more successfully combined when decisions must be made concerning technologies and their impacts on users and surrounding non-users. In short, they argue that experts who possess specific knowledge may not know how best to deploy said knowledge, while laymen and laywomen may best know how the knowledge could be best used despite not possessing it (Evans & Collins, 2008).

What is missing and arguably most important in the framework of this thesis is consideration of a group-derived lay expertise. As something greatly facilitated by internet forums and the age of widespread digital connectivity, this lay expertise in the context of a community of over 126,000 acoustic guitar enthusiasts rivals historically feasible lay expertises in its geographic expansiveness and the speed with which new elements of collective knowledge can be disseminated. I will return to this concept of group-derived lay expertise in later discussions of the collected forum data.

Use and non-use

The historic tendency to unbalance considerations of use and non-use in scholarship has created an academic environment in which it is only fairly recently that the importance of non-use as an element of an artifact's social construction is being rightly considered. In their edited collection, *How Users Matter* (2003), Oudshoorn and Pinch emphasize a potential equal footing by opening the book with an introduction titled "How Users and Non-Users Matter." Why the exclusion of the non-user in the title of the complete collection only to include it in the introduction? I interpret this as primarily an acknowledgement of the as-yet unbalanced nature of scholarship on user and non-user impacts. Although non-users are certainly included in analysis at places throughout the collection—particularly in Wyatt's "Non-Users Also Matter: The Construction of Users and Non-Users of the Internet"—discipline-specific approaches seem not yet fully capable of weighting non-users equally with the more easily interpreted users (Wyatt, 2003). Later in this thesis, I deal specifically with what I consider an under-valued group, those actors who fall cleanly into neither the user nor non-user category in relation to an artifact. The profiles of these actors—be they users who chose to become non-users, unknowing users, or users against their will—possess key traits that prevent them from being neatly sorted into one of the two artifact relationships, yet their stories are equally important to the ultimate social construction of an object. This category of actor is admittedly more relevant in some cases than others. The nature of certain artifacts makes them distinctly more binary than artifacts interacted with in different ways. Although specific usage may vary, an individual can confidently tell you whether she or he has been a user of a spaceship. However, it is much less likely that a potential user of butyl or nitrile could confidently state the specifics of whether she or he had used either artifact. In defining four categories of non-use, Wyatt et al. (2002) begin the large task of properly shading the spectrum inherent in use and non-use, but their non-use categories of *resisters*, *rejecters*, *excluded*, and *expelled* may not in all cases be sufficient in defining more complex use and non-use relationships.

Recent scholarship

As is likely obvious, the majority of the literature outlined thus far is drawn from past, formative stages in the development of the SCOT and greater STS fields. This is an intentional weighting of scholarship due to the primary goal of this thesis: to test and interact with core STS and SCOT frameworks as a means of better understanding a specific, physical artifact. It is, of course, necessary to outline in detail the origins of the frameworks used in this analysis.

However, this overview of the literature influencing this thesis would be incomplete without a brief examination of contemporary works from within the SCOT sphere. While the majority of recently published works incorporating SCOT methods deal with the social construction of non-physical things—be they digital networks, healthcare apparatuses, or social transitions toward technologies—it is these works that are responsible for the ongoing vitalization and expansion of the field. A recent 2021 paper, "From Musical.ly to TikTok: Social

Construction of 2020's Most Downloaded Short-Video App" is representative of the nature of at least a portion of modern scholarship and its use of SCOT frameworks (Savic, 2021). In this work, the ongoing social construction of a popular mobile application is examined and found to be ongoing. The artifact has proven intense interpretive flexibility, but without the stabilization yet achieved to properly declare that something resembling closure has occurred. Savic in this way is using the SCOT framework in much the way that Pinch and Bijker likely hoped would occur as they refined their perspectives, as an essential stage of heuristic organization for the process of fully—or as fully as possible in cases of ongoing social construction—understanding the web of relevant actors responsible for an artifact's social construction (Pinch & Bijker, 2012).

Likewise, other recent research engages with SCOT perspectives, in some cases utilizing relevant frameworks alongside tools from parallel disciplines, as in the case of recent research into the transition toward automated vehicles and logical directions for research agendas (Milakis & Müller, 2021). As technologies grow increasingly complicated and interconnected by networkable components, SCOT outlooks in many ways grow only more viable and well structured for making sense of the role of actors in technological developments. The profiles of the automated vehicle and its related social construction actually mirror in meaningful ways those of the Richlite fretboard, in that both examples posit a possible replacement of—or coexistence with—an already existing and stabilized artifact. In the case of the automated vehicle that is, of course, the driver-directed automobile, while in the case of the Richlite fretboard it is the traditional hardwood fretboard. Crucially, the paper by Milakis and Müller also serves to remind us that fields of study concerning the development of technology remain more fragmented and uneven than might be expected after the rise of STS as an interdisciplinary space. In the closing paragraphs of the paper Milakis and Müller (2021) state that:

The societal dimension of the AVs transition has attracted relatively limited research attention, despite the fact that AVs represent a socio-technical transition. This paper suggests a research agenda addressing the societal dimension of AVs transition. We identify key research shifts from the mainstream transport literature to more interdisciplinary approaches that would contribute to a more comprehensive and holistic exploration of the societal dimension of the AVs transition. (p. 8)

The fact that such a proposed research program would be in any way novel within studies concerning the autonomous vehicle—a technology with potentially enormous and epoch-shifting implications for a global web of actors—shows that there are still cracks between academic disciplines in which valuable methodologies and frameworks are becoming stuck.

Having engaged in a fairly exhaustive literature review, what does seem clear regarding trends in the most modern SCOT approaches is that current researchers interested in the potential of SCOT frameworks are more concerned with their use than with proposed updates to the research program. Those criticisms and comments that appeared regarding SCOT's perceived narrowness in the mid-1990s, including even in works that Pinch himself

contributed to, seem to have been largely answered by the previously discussed broadening of the field (Clayton, 2002).

METHODOLOGY

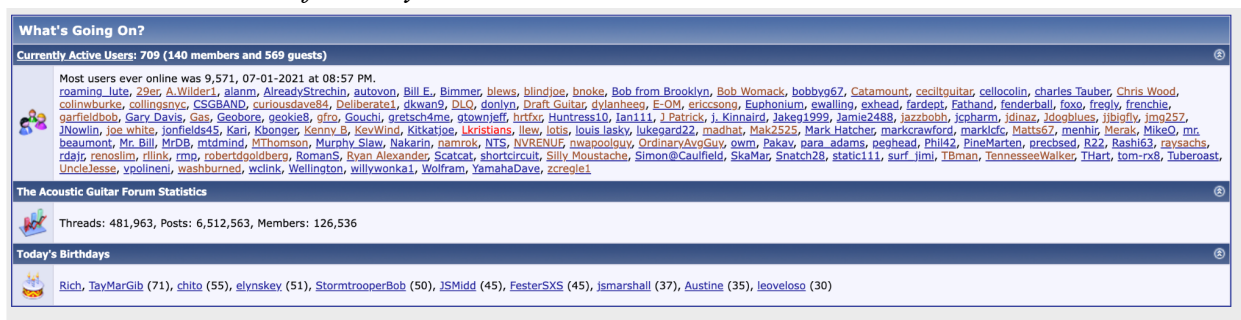
As research for this thesis is made up of two differing phases of analysis, two distinct, sequential methodologies are outlined below. Methodology A, consisting of the acquisition and coding of forum contents directly informs the steps taken in Methodology B, which consists of inserting those contents into well known SCOT frameworks.

Methodology A: Forum content coding

The *Acoustic Guitar Forum (AGF)*, a popular internet forum whose topical focus should be obvious to the reader, was selected for analysis in this thesis due to a number of factors. First, its longevity and consistently high member involvement allowed for the analysis of a full decade of active user postings.

Figure 2

Forum involvement as of 12 May 2022



<https://www.acousticguitarforum.com/forums/index.php>

Both metrics—user totals and consistency of forum content creation—are important, as a large member population is meaningless if said members aren't consistently posting, and consistent posting doesn't present even the possibility of a viable actor cross-section if all the content is coming from only a handful of users. Second, the *Acoustic Guitar Forum* is devoted to the generalized topic of the acoustic guitar, while the other popular forum considered for inclusion, the *Unofficial Martin Guitar Forum*, is (at least in title) devoted primarily to guitarists interested in guitars produced by C.F. Martin & Company. Such specificity of title, even if content might not reflect quite so narrow a focus, quite likely impacts search patterns and the individual profiles of guitarists electing to be active members within the forum community. In any case, with over 125,000 members and almost 6.5 million posts, the *Acoustic Guitar Forum* offers ample content for analysis.

During the collection of relevant forum postings, individual postings within the 'General Acoustic Guitar and Amplification' section of *AGF* were searched for the term 'richlite.' The 'General Acoustic Guitar and Amplification' section includes the subforums *General*

Acoustic Guitar Discussion, Custom Shop, Show and Tell, Classical, Harp Guitar, Archtops, Carbon Fiber, Other Musical Instruments, Acoustic Amplification, Electric Guitars, PLAY and Write, RECORD, LISTEN, and Build and Repair. The ‘For Sale’ and ‘Other Discussions’ sections of *AGF* were excluded from the search to limit the number of incidental mentions without interpretable content that would have arisen from instrument specification listings in threads dedicated to the sale of specific instruments. Search results were limited to the years 2011-2021 and yielded 3,130 posts. These relevant 3,130 posts were then individually sorted by the following criteria.

User perspectives

Positive, Negative, or Neutral

Categorizing posts in regard to poster perspective was fairly straightforward. Classifications were based on specific, outright statements or implied value judgements drawn from posting text. As all forum analysis was performed by the same individual, interpretation remained consistent throughout the process.

Primary justifications for user perspectives

The following ten categories were identified as the conversation topics most likely to inform the user perspectives being expressed in forum posts. Although in some forum posts multiple topics were mentioned, only the most heavily emphasized topic was selected for coding. In cases where multiple qualitative traits appeared equally weighted, the *Overall Perceived Quality* category that is expanded upon below was selected.

Aesthetics: Post content in which the visual nature of the Richlite fretboard is the primary concern. This might include comparative discussion of the aesthetics of Richlite in relation to more traditional materials or perspectives on imitative and non-imitative uses of the material.

Cost: Relating specifically to the expense or monetary value of the material. This includes discussion of the raw material pricing, instrument expenses, and any concerns relating to wholesale or retail costs.

Durability/Maintenance/Workability: The functionality—both initial and ongoing—of the Richlite fretboard. This includes discussions of luthiery and repair-related subjects, as well as user perspectives on how the material is aging in comparison to the hardwood fretboards with which they are more familiar. The inclusion of durability, maintenance, and workability all within a single category is due to the challenge of drawing analytically viable lines between these topics based on unknown actor profiles. This relatively wide category serves at the very least to isolate views pertaining to this specific aspect of the Richlite fretboard’s physical status within an interpretable subset.

Incidental Mention: Postings that mention Richlite indirectly without commentary or value-laden content. An example of a post categorized as “incidental mention” might contain only a list of components used in the production of an instrument as is common in a ‘spec sheet.’ For analysis these postings will be removed from the pool of user data to focus interpretation primarily on those posts that reveal actor perspectives and artifactual interactions.

Overall Perceived Quality: This category is for posts that express a value perspective based equally on—or without clear distinction between—multiple aspects of the Richlite fretboard.

Sound: For posts that primarily ascribe tonal characteristics to the Richlite fretboard or the interaction between the Richlite fretboard and other materials of an instrument. An important distinction must be made between user outlooks that contain positive perspectives on those instruments that sound good or bad and happen to have Richlite fretboards and those instruments that sound good or bad in a way that the user attributes to some degree to the inclusion of the Richlite.

Sustainability: Concerning the environmental impacts of Richlite itself, the hardwood or other material it might be replacing, or other sustainability-related impacts of a transition toward Richlite in fretboard construction.

Tactile Experience: Relating to the physical experience of touching or playing upon a Richlite fretboard. Posts in this category refer to contact with the fretboard during the act of playing the guitar and may refer comparatively to traditional fretboard materials or refer to the tactile nature of the Richlite fretboard without comparative context.

Traditionalism: Postings that prioritize traditional perspectives on fretboard construction. In these cases, users are expressing value-laden perspectives based on historical or personal norms. This category is of particular interest for analysis via SCOT methods due to the differing layers of non-use and resistance likely personified by actors expressing traditionalist perspectives.

Unclear: For posts in which users indicate a clear perspective on the Richlite fretboard but offer no contextualization.

Methodology B: SCOT frameworks and heuristics

Less easily defined or bookended than Methodology A, this analysis stage involves the interpretation of the forum postings in conjunction with tools and perspectives from the greater SCOT and STS fields. This analysis and subsequent expansion of related topics constitutes much of the remainder of this thesis. Specifically, the forum data is first interpreted with particular attention paid to questions of the artifact *working* versus *succeeding* and *use* and *non-use* perspectives and trends. Using perspectives from the forum data, I determine whether the ongoing narrative surrounding the Richlite fretboard can be interpreted within any of Wyatt’s four approaches to technological determinism.

Subsequently the Richlite fretboard is considered in detail within the “moral economy of the household” using the framework proposed by Silverstone et al. (1992). Although neither Wyatt’s terms nor the phases defined by Silverstone et al. are specifically SCOT-derived heuristics, these frameworks well-position our artifact for a final test within the EPOR-derived SCOT program upon which Pinch and Bijker built the larger SCOT field (Pinch & Bijker, 2012).

While the methods outlined above are hardly the only heuristic frameworks that could be used in the exploration of the Richlite fretboard and its ongoing social construction, these were chosen primarily due to their early and ongoing significance within the SCOT field. Placing a specific artifact—accompanied by ample anonymous user data—under the microscope in this way reveals not only aspects of the artifact’s social journey, but the open-ended viability of outlooks that form the cornerstone of an academic manner of interpreting the socio-technical world.

Also, although I occasionally use the term *heuristic* to refer to the STS or SCOT frameworks used in this analysis, the degree to which these frameworks are used and interrogated as they relate to the Richlite fretboard may elevate them methodologically to what would be better termed “templates” in the case of this specific research program.

DISCUSSION

Forum data

As revealed by analysis of the content from the *Acoustic Guitar Forum*, the Richlite fretboard is by no means currently a stable artifact. The distribution of post perspectives, although showing that more users perceived Richlite positively than negatively or neutrally, is quite largely divided. It would certainly be inaccurate to ascribe a specific overriding perspective to the community active on the *Acoustic Guitar Forum*.

Table 1

Forum posts by perspective

Perspective	Total Posts
Positive	945
Negative	591
Neutral	628

Note. These totals do not include those posts that were categorized in topic *Incidental Mention*.

Table 2
Forum posts by topic

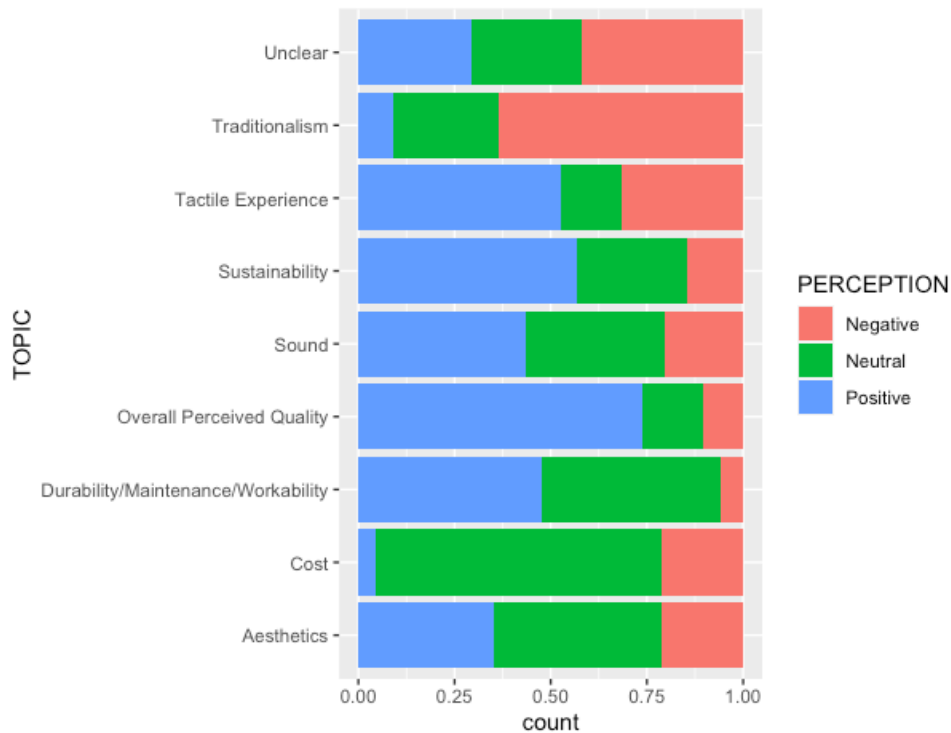
Topic	Total Posts
Aesthetics	71
Cost	109
Durability/Maintenance/Workability	301
Overall Perceived Quality	642
Sound	69
Sustainability	111
Tactile Experience	165
Traditionalism	435
Unclear	261

Note. These totals do not include those posts that were categorized in topic *Incidental Mention*.

While certain topics leading to user perspectives are substantially better represented in forum conversation than others, there is a meaningful variability in the topics driving conversation.

Figure 3

Distribution of perceptions within each post topic



Note. As in Tables 1 and 2, this doesn't include those posts that were categorized in topic *Incidental Mention*.

It is, in fact, somewhat remarkable that the adaptation of a material that has existed since the 1940s for use in an essentially luxury industry can continue to drive such levels of conversation and vehemence of opinions over a decade after its use became fairly widespread. Throughout this discussion of the forum content and relevant outlooks, a key conceptual realm will be the space distinctions between “success” and “working” that are crucial to the works of Pinch, Bijker, and Wyatt among others (Wyatt, 2008).

Does it “work?” Is it “successful?”

Over the 2011-2021 period, lay conversation by forum participants skewed heavily toward questions of success. This should not come as a surprise considering the social implications of posting in a relatively open forum. Beyond an enthusiasm for the acoustic guitar, there is no specific, identifiable profile that can be assumed of a forum user. Likewise, there is zero mandatory entry ‘buy-in’ for users to express opinions or share experiences. A solitary posting by a forum user who has interacted with a Richlite fretboard only once or even by a user simply relaying ‘word-of-mouth’ content might be superficially valued to the same degree as one by a user who has amassed hundreds of hours of experience with the material. In fact, it is this leveling of user context that likely drives the surprisingly ongoing nature of forum discussions in general. Without a finite end, forum threads can be resurrected repeatedly each time an actor appears with new interest in either learning more about or

sharing information relating to our artifact. However, by relying on the forum data it is possible to examine the context and flavor of “Does it work?” and “Is it successful?” conversations with regards to the Richlite fretboard.

Does it work?

Defined by Pinch and Bijker as a primarily technological question, the matter of functionality is maybe foremost in the minds of those creating and introducing an artifact, but as the *AGF* ecosystem consists almost entirely of potential users rather than producers of Richlite fretboards this topic is certainly approached differently in these contexts than it might in a laboratory or assembly plant. It is important to return to those concerns raised by Evans and Collins (2008) regarding the interaction of lay and expert perspectives in the context of the Richlite fretboard. Looking at lay perceptions of the *Overall Perceived Quality* and the majority of positive outlooks in this category, an expert drawn from the financial department of a company using the material would likely feel that it is proven to be working. At the same time, an expert whose professional expertise is situated within the marketing fields might be more unsure given the majority negative views seen in the *Traditionalism* topic. Does the enthusiasm of users who appear to not be primarily concerned by traditional and historical norms in instrument making sufficiently outweigh the purchase power of traditionalists who are potentially more invested in acoustic guitars in the long-term? There is no right answer here, but the conflicting perspectives and conclusions that different experts might come to based on forum analysis are supportive of academic viewpoints that suggest a better understanding of interactions between lay and expert knowledge is needed to best understand the social positioning of changing technologies.

Is it successful?

... I'd still have my D-16GT if it had a rosewood fretboard.

Loved everything about that guitar except the Richlite fretboard. And it was only the idea of a plastic fretboard that made me sell it. I never really noticed a negative impact on playability or tone.

I'm an idiot. (Slim, 2012)

Questions of success—defined again by Pinch and Bijker as the social foil to the more technological “working”—appear more complicated. It isn’t possible to look at forum perceptions of the Richlite fretboard and immediately proclaim the artifact to be either successful or unsuccessful based on forum contexts alone. Between the large positive and negative poles of use and non-use can be found many degrees of acceptance of the artifact.

Considering Silverstone et al. (1992) and the “moral economy of the household”

As a heuristic for better understanding our forum data, the “four non-discrete elements or phases in the dynamics of the household’s moral economy” nicely describe aspects of the

ongoing construction of our artifact in the physical space of the actor with whom it interacts (Silverstone et al., 1992, p. 20). Particularly given the performative elements of internet forum usage that will be unpacked shortly, these phases are readily on display in forum postings regarding the Richlite fretboard, and posting habits of some forum users allow for almost complete analysis. However, based on the collected forum data and large changes in how and to what scale the moral economy of a household might be presented in the 21st century, expansions of the concepts of “household” and “moral economy” are necessary. Here I will first construct the scaffolding of the established four phases, before then adapting the framework for better analysis of the 21st-century household.

Note that, in explanation of their four phases, Silverstone et al. are primarily concerned with information technologies such as the television, audio equipment, and the computer. However, their overall heuristic appears equally suitable to the construction of unrelated consumer items. Particularly given the previously discussed social weight ascribed to the guitar as both traditional and aspirational cultural artifact, the Richlite fretboard and its implications within the context of a “moral economy” are well suited to interpretation via this framework.

Appropriation:

As outlined in more detail during previous portions of this thesis, the “appropriation” of an artifact takes place when that artifact ceases to be unhomed. The point at which an individual iteration of an artifact becomes *owned* reestablishes that specific object and its greater ecosystem. Here in our specific case, I am choosing to situate that transition at the point in which an acoustic guitar featuring a Richlite fretboard is purchased by a guitarist. However, the forum environment adds a distinct layer that could either be framed as an immediate predecessor to this appropriation or as actual cause leading to the appropriation. This layer consists of the internalization of an anticipatory feeling by the purchasing actor. It isn’t enough to merely frame the purchase as appropriation in this case, because the purchase may be informed by value-laden perspectives on Richlite fretboards both as replacement for more traditional fretboard materials and as part of the larger system combining to form the complete instrument. The mass of forum posts created by *AGF* users seeking and sharing qualitative information about Richlite fretboards is indicative of a pre-appropriative phase. In this way it could be argued that before—as Silverstone et al. (1992) put it—“artefacts become authentic (commodities become objects)” for a would-be user, in our forum context there is typically at least a degree of reliance on interactions with other actors who have either passed through an appropriative stage or somehow become informed regarding the nature of the artifact by other means (p. 21).

Objectification:

Regarding the objectification of the Richlite fretboard, it is necessary to again return to the lengthier explanation provided by Silverstone et al. (1992).

Objectification is expressed in usage . . . but also in the physical dispositions of objects in the spatial environment of the home (or in extensions of the home). It is also expressed in the construction of that environment as such. (p. 22)

In this case, there are certainly multiple layers of usage, display, and physical disposition that bear consideration. Aesthetic explanations for user perspectives on Richlite fretboards are numerous in the forum data, and should be seen as perhaps more multifaceted than they might prove to be for a stationary artifact introduced to an actor's environment. In my interpretation, users discussing the aesthetic of our artifact are actually discussing it in three distinct ways. First and most simply, there is the matter of aesthetic within its primary new "spatial environment." In appropriation and acquisition of the artifact, the actor has moved beyond the hypothetical to the concrete. More complexly, there is the related but separate issue of comparative aesthetic. How does the Richlite fretboard look in the "spatial environment" *in comparison* to how a fretboard made of traditional hardwoods might look? Thirdly, even at this stage I believe we can ascribe an additional layer of construction to the relationship between actor and artifact. To what degree is the objectification of the Richlite fretboard—keeping in mind its status as an artifact that replaces and, in most cases, imitates a previously accepted artifact—governed by the nexus of tradition and aesthetic? Here forum posts in which users admit to enjoying the Richlite fretboard only until learning that it is made of Richlite reveal the dissonance which I feel must be accepted as a very real part of the social construction of an artifact. Within the current four-phase framework, of particular relevance are users who state an only conditional acceptance of our artifact even in cases in which they have unknowingly purchased a guitar with a Richlite fretboard (appropriation phase). The objectification of the artifact becomes particularly messy in those cases in which an accepted and environmentally positioned instrument is no longer appreciated or aesthetically desirable to the actor.

Incorporation:

In this case incorporation—achieved in conjunction with previous objectification—is substantially different than what might occur with artifacts of a different nature. The televisions and stereos presented in examples of this process remain stationary with usage varying based on user profiles within a household. A Richlite fretboard is, of course, as mobile as the guitar to which it is attached, however its "display and use" are, if forum data is any indication, heavily coded to a single element of household or individual identity (Silverstone et al., 1992, p. 25). Incorporation of the Richlite fretboard, particular specific or vocal incorporation involving a comparative element, might be in response—whether harmonious or combative—to aspects of a household's moral economy. Most analogous in examples from the text is perhaps the case of a teenager controlling the volume of a stereo within a bedroom, however this too is missing the element of mobility and the detail of placement within an otherwise socially constructed artifact that the Richlite fretboard possesses. In this case, if the intent is to smoothen the concept then the acoustic guitar itself could in many cases be considered a *complete* actor in the household, being easily explained in terms of appropriation, objectification, incorporation, and conversion. The Richlite fretboard then casts its own shadow in regard to moral economy and the "spatial and

temporal boundaries” that “are created and defended within and around the household” (Silverstone et al., 1992, p. 25).

Conversion:

With conversion, the placement of the artifact returns to a context including not just that which occurs within a household, but also the relationship between that positioning and that which occurs in extra-household environs. This is not merely referring to how the moral economies of individual households might interact with one another but to a larger perspective in which social placement of the artifact, household, and system of households all combine to create a larger social construction (Silverstone et al., 1992). I will momentarily return to this topic in the contexts of the larger framework facilitated by the *AGF* and the internet culture of connectivity at large.

Remaining within the confines of the 1992 explanation of incorporation, the forum data is supportive of an interpretation that positions actors with positive perspectives regarding Richlite fretboards as distinctly willing to discuss the artifact in terms of overall quality. Whether this is symptomatic of a perspective in which conversion has facilitated “inter-household” expectations for acceptance cannot be concretely stated, however it does seem clear that something of the sort is occurring in cases where an ‘echo chamber’ of identical perspectives on the Richlite fretboard populate a forum thread. Could this be a contemporary example of a trend identified by Silverstone et al. (1992) primarily among teenagers but here extrapolated outside a single known age group? “This aspect of the expression of the moral economy of the household is particularly significant for teenagers, who will use their consumption of recorded music, or their collection of computer games, literally as a ticket into peer-group culture” (p. 26).

The “household” in the 21st century

Where this four-phase framework proves insufficient in the explication of modern artifacts and their roles in the moral economy of a household is with regards to the bounds of the modern household. It is understandable that in 1992 it was impossible to predict the extreme to which the boundaries of concepts of the household might change in the 21st century. The framework expects and supports a geographic and physical interpretation of the household and potential for inter-household relationships that excludes the rapid developments in internet and social media that have transformed the personal networks and relationships of much of the world.

However, it appears that the four phases proposed by Silverstone et al. are likely malleable enough to support at least tentative expansion into a shape capable of reflecting changing social conditions. Key elements of this expansion relate to concepts of *physical space* and *display*. In 2022, objectification and incorporation of an artifact into the moral economy of a household can be reflected just as completely by its appearance (be it via imagery, description, or other means) within the digital space that an actor or actor’s family might interpret as an extension of the household. Arguably, given the tremendous growth of the

percentage of the average person's personal network that is primarily or solely interacted with via social media, objectification and incorporation represented via digital means might today be more reflective of a chosen moral economy.

Pairing appropriation and conversion, the two phases that were previously most related to relations with the larger world and to the extension beyond the immediate household, positing a specific 21st-century correlative is less simple. If the forum data is considered, one could make the case that these bookending stages are reflected in the announced, anticipatory enthusiasm of actors either in the period immediately surrounding the use or acquisition of a Richlite fretboard and the relative finality of those actors who own and repeatedly advertise enthusiasm for Richlite fretboards each time a new forum thread regarding the topic appears.

Use and non-use: Allowing for nuance and scale

Questions of use and non-use, complicated in the best of times, grow particularly complicated when related to artifacts which form only a part of a combined system that serves as a larger artifact. Likewise in the specific case of the Richlite fretboard, concepts of replacement and degrees of acceptance leading to degrees of use or non-use further muddy the water. Among the many forum posts from users either owning and singing the praises of an instrument featuring a Richlite fretboard or stating an outright refusal to even consider the use of such an artifact could be found a large number of less polarized posts. As an example, in some cases users stated conceptual support for the development of the Richlite fretboard due to sustainability or other factors however had no actual, experienced interaction with the artifact. Where does the potential user sit in the spectrum between use and non-use? While Wyatt (2003) outlined a number of means by which degrees of non-use and resistance might be understood and interpreted, interpretive attention to further nuances would be valuable. Drawing on evaluation of the *AGF* forum postings, I've selected a few specific perspectives from the use/non-use spectrum for closer examination and have here tried to properly situate them within the conversation concerning the place of users and non-users in the social construction of the Richlite fretboard. The shaping of these user groups is equally drawn from the actual distribution of perspectives and topics and the narratives and contextual shading within posts that is less easily quantitatively expressed.

The supportive non-user:

As previously mentioned, in some cases support for the use of Richlite fretboards was expressed by forum posters who, in physical act, would be classified as non-users. These posters in some cases possessed instruments with fretboards made of traditional materials and felt no need to replace said instruments and in other cases expressed a desire to acquire a Richlite fretboard but the existence of some kind of obstruction—monetary or otherwise—to the procurement of one. Supportive non-users are relatively heavily represented in the group of forum users who expressed positive perspectives on the artifact that were driven by sustainability-related themes.

The pragmatic adopter:

Grouping of forum posts revealed a category of *pragmatic adopter* whose ongoing adoption of the Richlite fretboard is primarily driven by expectations of future necessity. Posts by such users are characterized by viewpoints acknowledging the increased cost and environmental footprint that is increasingly more easily linked to traditional hardwood sourcing. Neither wildly enthusiastic regarding Richlite fretboards nor fully willing to be complicit in what they perceive as questionable practices, these users focus on the functionality of the fretboard while acknowledging but downplaying those elements they find less desirable.

To be perfectly candid, I went in today ready to hate Richlite. Six Martins later, my thoughts are quite different. Richlite is just fine....see, you can teach an M's dog some new tricks! (ukejon, 2015)

Unlikely enthusiastic adopters who might actively push the Richlite fretboard as a preferred choice regardless of external conditions, pragmatic adopters find it to be the preferred option *due to* these external conditions.

The ideological non-user:

Represented heavily in the group of forum users whose negative perspectives were based on *Traditionalism*, these are the acoustic guitar enthusiasts whose aversion to the Richlite fretboard has more to do with contextual circumstances surrounding the fretboard and acoustic guitar at large than specific traits of the artifact itself.

... when I found out my D16 had it I couldn't believe [sic] it. I thought it was ebony at first but upon closer inspection I couldn't see any ebony wood lines . So onto the internet to research what it was, richlite what the heck is richlite. Imagine my surprise to find it's a paper by product substance used for many things including countertops. Not for nothing but I feel if you pay over a thousand dollars for a guitar a real wood fretboard should be included... Now comes the kicker, if I was blindfolded and given this or one of my ebony fretboard [sic] a play I couldn't feel the difference. (talister106, 2012)

Counterintuitively, this group of non-users may prove to be one of the most important in understanding the ongoing social construction of the Richlite fretboard. While other groups are focused on tangible aspects of the artifact and the related interpretive flexibility, ideological non-users are opposed based on representative, implied, and socially derived aspects. These non-users are in some ways similar to the *resisters* introduced by Wyatt et al. (2002) with the key distinction that the *resister* category does not appear to carry a required ideological component. *Traditionalism*—as the second-most discussed topic informing perspective after *Overall Perceived Quality*—has clear and important significance in whatever social construction of the Richlite fretboard has, is currently, and will in future take place.

I just prefer wood.

Perhaps someday that won't be an option anymore. I'll be gone by then. (Dotneck, 2015)

What would be of related interest but is unfortunately not supported by the method of data collection in this thesis is the demographic breakdown of the ideological users. Are these non-users of a specific age or demographic less willing to entertain changes to hardened technologies with which they consistently interact? Or is the ideological basis for their non-use constructed via forum pressures and tropes that might operate independent of initial external demographics?

In fact, the very question of demographic within a forum community necessitates potential multiple modes of analysis. There is the external demographic of a user outside of forum contexts, in which a user exists in the physical world at a specific age, level of income, and position within some form of social hierarchy. But, concurrently, forum users construct forum or community-specific personal demographics based on a different set of attributes that might position them—within forum contexts—in a very different position in their social interactions with others. The ultimate question here is whether analysis of forum users—or really any contemporary individuals whose lives are partially constructed via non-physical communities—best interprets actors and their motivations when combining the physical and digital personas or when attempting to construct distinct, different personas within the two realms.

The ideological user:

Although a fairly small group, those actors who could be labeled *ideological users* are essential for building an understanding of our chosen *AGF* forum ecosystem. These users are best represented by the posts that perceive Richlite fretboards positively based on matters of *Sustainability* and *Traditionalism*. As a basic foil to *ideological non-users*, these are individuals whose positive perspectives are primarily expressed reactively. They are often well aware of the environmental and human impacts of the acquisition of traditional fretboard materials and their positive feelings regarding Richlite as an alternative are driven by these factors. Although they may also find Richlite to be work or succeed—depending specifically on user backgrounds—this is not the primary motivation expressed in their posts. Likewise, those *ideological users* whose positive views are explicitly expressed as a reaction to opposing traditionalist perspectives might, in some vocabularies, be referred to as *early adopters*. This is an intentional, specific reaction to that which has come before and in favor of that which is yet to come, or at least yet to gain total acceptance.

Guitar players are traditionalists and purists, and electric players are almost more so than acoustic players. Electric guitars are a modern invention, but what do people want? ...electric guitars that look, function, and sound like 50 and 60 year old ones.

When Taylors came out people criticized them for having a bolt-on neck. I'm sure when steel strings first came out there were purists who clung to their cat-gut strings.

I have a OMCPA4, and I like the way richlite feels and sounds. And just think of the possibilities with synthetic materials... with a 3-D printer, it is now possible to "print" a guitar. (stormin1155, 2013)

Forum data and the *source-consumer* spectrum

Returning to considerations of the *source-consumer* spectrum in relation to the forum data, forum users seem far less cognizant of the outlying *source* pole than one would expect of passionate users of a technology. The relatively small degree of interest in topics relating to sustainability or material sourcing among posters indicates that actor perspectives—at least among the pool of actors represented by forum users—are driven primarily by factors located further toward the *consumer* pole of the *source-consumer* spectrum.

Richlite is an engineered resin infused with wood-paper-pulp. I personally didn't care for feel but many people really love their Richlite fingerboards and Martin is pretty smart about how to make good parts.

Its environmentally responsible, very hard and smooth and cost effective.

Fans of this seem to love these and are very happy with them. (fazool, 2014)

SCOT and the Richlite fretboard

I have saved examination of the original SCOT framework for this final stage of discussion. This placement was chosen for two reasons. Given the scale and influence of the SCOT framework in the STS field as a whole, it is natural that its usage would receive primacy of placement in a research work examining a collection of STS methodologies and mindsets. Also, as the exploration of the forum data reveals, the social construction of the Richlite fretboard remains far from “complete” and will not necessarily yield a clear narrative informing closure at either the forum or global level. The details gleaned from previous topics within this discussion are likely essential to forming as complete as possible a picture of the current placement of the Richlite fretboard within its ongoing social construction.

Stage 1) Interpretive flexibility

Much of the introduction of this thesis dealt specifically with the conditions and details surrounding the introduction of the Richlite fretboard. And while these elements hinted toward interpretive flexibility, with the forum data in hand it is now possible to more concretely examine specific traits and situational aspects of actor perspectives. The sheer quantity and topical depth of forum conversations concerning the artifact speak to a situation in which these actor perspectives remain clearly diverse. It is necessary to note here that the chosen means of data collection for this thesis impose some specific limitations on actor variation, however it could be argued that nearly all forms of data collection involving human beings unavoidably privilege specific actor pools at the expense of unrepresented actor profiles. For the purposes of this study, the variability allowed by an internationally-populated guitar enthusiast community will have to suffice in providing varied outlooks.

The why

In examining forum user perspectives, representations of interpretive flexibility can be broken down into larger basic categories. The “why” represents an element of forum

conversation that is particularly illuminating in this specific case of what might be termed *artifact replacement*. Here an accepted iteration—or iterations, should each different fretboard material be considered a distinct artifact—of the artifact is, depending on user perspective, either being augmented or replaced by an iteration of very different origins. Interpretatively speaking, users must subconsciously determine the placement of the Richlite fretboard in the larger fretboard ecosystem. As forum data shows that aesthetics were not of primary concern for users expressing either positive or negative perspectives regarding the Richlite fretboard, this situation differs from examples provided by Pinch, Bijker, and others in which introduced artifacts differed visually to a degree that aesthetic considerations had potential for overriding other factors (Pinch & Bijker, 2012).

You could have knocked me over with a feather. Later I looked up the specs and saw the richlite (I assumed the board was ebony). I researched it, and said to myself, - "never would have known it wasn't ebony by playing it." It's a good sounding guitar. Even though its a 16 series, you know its a Martin. (TBMan, 2015)

We can therefore incorporate aesthetic concerns as a small and not all-encompassing aspect of the interpretative construction of our artifact in this early stage of analysis.

Continuing to examine the “why” of things, forum perspectives appear to revolve primarily around basic questions, many of which are inexplicably linked to the potential for future stabilization of the Richlite fretboard. I have highlighted two here that appear to be particularly indicative of the forum narrative and that shine a light on important aspects of the ongoing social construction that is occurring.

Is this change due to shortages of traditional hardwoods?

Accounting primarily for users whose post topics were cataloged in either the *Sustainability* and *Traditionalism* post categories, this question emphasizes the interpretive flexibility of the Richlite fretboard specifically in relation to the artifact that it is potentially replacing. This is an excellent example of the expansive nature of actors and modes of artifact development and interaction that must be considered in this first SCOT phase. While whether or not the Richlite fretboard *works*—as I have previously defined the term—is in no way dependent on questions of this nature, however, whether the artifact is *successful* can entirely hinge on such subjects. The definition of success is obviously as variable as the profile of the actor whose opinion is being considered, however, in the larger picture, the pool of actor data with which this study is involved considers primarily actors at the consumer pole of the source-consumer spectrum. Actor acceptance of the artifact due to necessity—rather than possible initial enthusiasm—still leads in the long term to conditions more supportive of stabilization.

Richlite isn't cheap. Then advantage for martin is availability, workability, consistency, stability, durability. It's a huge improvement on all those factors.

What did you want from an ebony fingerboard? Dark, consistent color; very fine grain with no pores and practically no grain lines; hardness. Hello, Richlite!

Ebony is scarce. It's not going to get any less scarce in the near future. Demand for ebony is only going to go up in the Far East. Martin is smart and IMHO responsible. (pb+j, 2014)

The history of historically handmade or artisanal products is littered with the gradual yet largely complete acceptance of modern manufacturing methods utilizing modern materials and methods.

While—in the previous paragraph—interactions and interpretative movements by users concerned with traditionalism were largely considered, interpretive flexibility of the Richlite fretboard in the context of this question is also seen in discussions of the sustainability of the artifact and environmental concerns. It is momentarily necessary to consider the acoustic guitar as a larger artifact to properly contextualize user perspectives on this aspect. As a singular artifact, the acoustic guitar consists of a number of succeeding artifacts whose social constructions are more or less stabilized. The destabilization of the fretboard due to reasons of resource depletion almost certainly bears the potential for future destabilization of similarly sourced artifacts. It is understandable that a shift in manufacturing norms for the fretboard potentially heralds future shifts in manufacturing norms for other components. To the change-averse user or potential non-user such possibilities thoroughly complicate an artifact with which they have only interacted in its stabilized form.

Is Richlite cheaper than traditional hardwoods?

Embedded in this topic is a hidden double-edged sword. In the context of the acoustic guitar community—and likely any community primarily connected by interests in an expensive or luxury item—*cheaper* might mean one of several things. It is certainly no accident that *Cost* was discussed in perspectives on the Richlite fretboard more than either *Sound* or *Aesthetics*, subjects that one would expect to be paramount for users of a musical instrument. Therefore, in attempting to understand the ongoing social construction of the Richlite fretboard it is important to understand the different dimensions of this topic. *Cost* seems to not only mean different things to different individuals, but also different things to the same individual dependent on with whom he or she is conversing and about what aspect of the acoustic guitar and its components are being discussed.

Looks just like a cheap home depot counter top and feels the same under my fingers. I would rather have a wood fingerboard than a richlite fingerboard anyday, be it ebony, rosewood or something else. Just my opinion. Most people could probably overlook the richlite material if they liked everything else about the guitar.. me.. I don't know, it would have to be a real nice sounding/playing guitar to overlook. (Wasper, 2014)

In conversations reflecting negative perspectives on the Richlite fretboard, perceptions of *cost* were typically tied either to material quality or the material's future potential impact on the monetary value of an instrument for which it was used. This seems perhaps to veer toward a traditionalist perspective on how instruments will be monetarily valued in future and whether the concept of *vintage* will be dependent on the exclusive use of traditional wood components. Such an outlook seems shortsighted in its lack of acknowledgement of the historical changes that the instrument underwent throughout the latter half of the 19th century and the first half of the 20th century without substantial impact on contemporary markets for said instruments, but then concepts of *collectability* and the communal labeling of specific items as "vintage" while other items are labeled merely "old" are not necessarily tied to logic. As an aside, this longer-term aspect of the social construction of certain items seems under-represented in general STS research and likely has potential for future development. In "From the Shadows: Users as Designers, Producers, Marketers, Distributors, and Technical Support" (2003) Christina Lindsay engages with the TRS-80, an early personal computer that continues to have its great enthusiasts and might be considered *vintage*, but her research is primarily concerned with representation within user groups and changing roles users might play in the ongoing construction of an artifact.

Remaining within the spectrum of negative perspectives, forum posts concerning *Cost* and its relationship to physical material quality reflect an interesting aspect of the material's interpretive flexibility with regard to group narrative and its effect on perception. Note that these cost-concerned commentaries on material quality don't refer concretely enough to definable physical or aural qualities to lead to the categorization of a post within *Tactile*, *Sound*, or a different topic grouping. In these cases, messaging often revolves around an expressed opinion that guitars with Richlite fretboards should be cheaper than guitars with traditional hardwood materials, specifically because of the presence of the Richlite.

Stage 2) Closure and stabilization

Despite recognizing that the social construction of the Richlite fretboard remains distinctly ongoing, it is still possible to use the forum data to make some distinct statements about what has happened thus far in this process and what we might expect in the future development of the artifact. By identifying those steps toward closure that have taken place and those questions that remain unanswered, we can at the very least also determine whether the SCOT program seems to properly fit the real-world social construction of this artifact. Also, armed with Bijker's explanation of the technological frame that one can expect to encounter as an element of the closure of an artifact, the dimensions of forum discussions regarding the Richlite fretboard make distinct sense. The collections of actors involved in the *AGF* are all involved in the ongoing construction of some form of rhetorical closure through which they might collectively understand the Richlite fretboard. The large emphases on either the total quality of the material or its profile within traditional interpretations of what a fretboard should be are indicative of early movement toward some form of stabilization that is hinted at through relative ongoing homogenization of conversation. Tactility, aesthetics, and fretboard impacts on instrument tone production are considered primarily within these wider topics.

In light of the nature of the forum data, it isn't entirely clear to what degree it is possible to ascribe the development of a single overarching technological frame to the *AGF* community. While the previously discussed crystallizations of specific group perceptions would indicate that a primary technological frame is forming, there is also an undercurrent of incompleteness that—just as it obscures motion toward closure—clouds the dimensions of actor intentions. Unfortunately, the spontaneous and uncontrolled nature of forum data that makes it so useful for the purposes of this study also produces metaphorical rounded edges around known user traits. Defining edges of user groups is difficult in this context. If we are to consider the users of *AGF* as a single large group, the technological frame expands to such a degree that seemingly all the layers of user perspective discussed in this thesis are relevant to movement toward closure. However, more realistically these actors hold perspectives best divided into several different technological frames. For this reason, further research using forum data to explore the social construction of the Richlite fretboard would be well-served by closer examination of the specifics of user background beyond just online persona and the opinions expressed in forum contexts.

Given the complications surrounding this user rhetoric and the related rhetorical closure, stabilization via the redefinition of the problem seems in some ways more likely in the case of the Richlite fretboard. However, identification and interpretation of movement toward redefinition would require a research method in which manufacturer perspectives and motives were considered. The current messaging from the producers of Richlite doesn't appear to be a substantial element or motivator of user perspectives as represented on *AGF*. If anything, forum users are drawing conclusions regarding commercial elements of Richlite's attributes and use based on information from the guitar manufacturers that incorporate the material into acoustic guitars. This gives primary agency to guitar manufacturers in the definition of the problem surrounding the social construction of the Richlite fretboard. Were the *problem* to be redefined at the marketing level as one of advancement of production techniques or of improvement of guitar durability, the terms of closure and stabilization would likely change. Whether this change would be of a manner to alter actor behaviors and spur different outcomes is obviously outside of the scope of this thesis, but within SCOT scaffolding would certainly be notable for its potential impacts.

Stage 3) The "Wider Context"

Ironically, while it is hard to fully predict and interpret aspects of the unfinished closure and stabilization of the Richlite fretboard, it feels in some ways easier to discuss the wider context surrounding said processes. In fact, the nature of this wider context may be in a certain sense responsible for the inherent difficulties in finding closure for the Richlite fretboard. The collision of social, societal, economic, and environmental influences in this specific case is arguably broader than it would be for many less complex artifacts. Although little-mentioned thus far, there is an important component of user comprehension inherent in the social construction of this specific artifact. It should not be particularly surprising that the impacts or resource requirements of a composite manufactured with paper and phenolic resin are not as readily obvious to lay users as would be those of a straightforward hardwood.

I have deep respect for engineered materials in terms of stability and performance. But between the trees harvested and the admixtures used, I cannot think that Richlite is all that environmentally-friendly. There are plenty [sic] of certification bodies that will put the stamp of approval on various things, but they have to make a living somehow. Can't think they would throw a monkey wrench in things by making an issue of the formaldehyde.

In the meantime, you can harvest wood in an environmentally sustainable way and just not add any weird chemicals to them. THAT is more environmentally sustainable than Richlite, IMHO. Ebony and rosewood may come at a premium financially, and you may make a case they are not horribly sustainable. But you can make fretboards out of a lot of other woods, too. Just not as cheaply as Richlite. (HAMFIST, 2013)

Similarly central to contextualization of the Richlite fretboard within the larger acoustic guitar ecosystem is a degree of mandatory or forced change. Already materials that guitarists grew to expect are no longer being used in historically typical ways. It isn't a stable system into which the Richlite fretboard is being inserted, but one where change is already occurring and will continue to occur regardless of whether the new artifact stabilizes successfully.

The paper used by Richlite is certified by the Forest Stewardship Council (FSC), a global non-profit organization devoted to encouraging and monitoring responsible management of the world's forests. This adds to the sustainability of Richlite, as it comes from readily renewable wood resources, managed in a way that allows for growth to exceed harvest by 47% in North America.

Whether or not you believe that, my case doesn't smell of formaldehyde, and the formaldehyde is a lot safer on my guitar than in a land fill. I plan on playing this guitar for the rest of my life and handing it down to my grandchildren.

And considering that it takes up to 200 years for an ebony tree to grow big enough to be harvested you really can't consider it a renewable resource. (stormin1155, 2013)

Posts such as the above—referring to matters of sustainability and functional durability—are indicative of those guitarists whose interests in the guitar appear to be mediated by an awareness of the impacts that their decisions regarding instruments might produce. Weighing environmental impacts of Richlite manufacturing and how they might compare to the problems of the hardwood lumbering industry is far outside the purview of this thesis, but the two 2013 posts from *HAMFIST* and *stormin1155* respectively are indicative of an *AGF* user base that is specifically conscious of larger aspects of their chosen hobby's impact, while simultaneously interpreting their experiences and available information in substantially different ways. The manner in which forum data was gathered in this case limits deep understanding of user motivations beyond immediate perceptions of Richlite, but user interpretations of larger trends of industry evolution or stasis might better illustrate how this group of actors perceives the responsibilities of the acoustic guitar community.

Relevant successes and failings of SCOT

As the preceding discussion of the data—and the varieties of analysis it supports—shows, the application of SCOT principles to this specific process of social construction is neither

uniformly successful nor unsuccessful. The specificities of the Richlite fretboard and the role it is intended to fill in an already successful larger system of artifacts contain more complications than the classic bicycle and Bakelite examples. The assembly of actors included in forum interactions and the degree to which the *source-consumer* spectrum can and should be untangled in a 21st-century analysis combine to ensure myriad layers of complexity. It would be far easier to interpret the social construction of either Richlite itself or the modern fretboard. In either of these cases, the approaches advocated by Pinch and Bijker (2012) would be more suitable for producing a complete interpretation of the artifact's social construction. This is not in any way a criticism of the SCOT approach that Pinch and Bijker developed, rather an acknowledgement that specificity in artifact selection for examination via SCOT frameworks can lead to overly complex ecosystems of actors and relevant additional artifacts that must be considered. Extreme interpretive flexibility and diversity of actor groups in the first stage of the SCOT process—as in the case of the Richlite fretboard—ensures extreme complexity in each subsequent stage of the process.

CONCLUSION

The path to artifact stabilization is rarely, if ever, straightforward according to SCOT precepts, and the ongoing social construction of the Richlite fretboard proves to be no exception. As the analysis of forum user perspectives from the *Acoustic Guitar Forum* has shown, guitar players and enthusiasts have not just widely varying opinions on the place of the artifact within the system of the acoustic guitar but are also developing said opinions due to highly different criteria. What at first glance appears to be a fairly homogenized user group—acoustic guitarists interested enough in discussing their instrument to seek social outlets for doing so—is actually quite fragmented in its motivations and intended outcomes. Through the STS and SCOT approaches tested throughout this thesis, it becomes clear that use and non-use decisions are not necessarily dictated by performance qualities of the Richlite fretboard, but by external constructions. Traditionalist perspectives among those users expressing negative views of the Richlite fretboard, despite being in some cases openly derived from intangible roots, are as involved in the process of social construction as perspectives formed from concrete interaction with the artifact.

In this attempt to produce a “The Social Construction of _____”-style thesis depicting the development of the Richlite fretboard, it is possible to see the interpretive limitations of such works in fully constructing certain varieties of artifact. Here the Richlite fretboard creates problems due to its simultaneous replacement, accompaniment, and imitation of a previously accepted and successfully socially constructed artifact. The traditional fretboard, relatively unchanged for multiple centuries, until recently required little interpretive validation. Only recently did producers and consumers become unavoidably aware of resource limitations and negative impacts, and—even armed with that awareness—clearly the importance of these problems is perceived unevenly by various involved parties. In any case, it is unlikely that traditional hardwood fretboards will instantly disappear from either new production instruments or the used and vintage acoustic guitars still owned by millions of guitarists, so

the Richlite fretboard must achieve a variety of closure allowing for its success both alone and in relation to the ongoing success of a parallel hardwood artifact. Add to this too that usage thus far of Richlite in fretboard construction hasn't extended to non-imitative aesthetic approaches and the complications around its stabilization continue to grow. It may well be that future closure will be aided by an approach in which new aesthetic norms are achieved through the use of Richlite as an enhancement of past acoustic guitar orthodoxies, but the complexities of such a situation—particularly in a field proven by the forum data to be intensely traditionalism-driven—are hard to predict. Let it instead be said that given the extreme interpretive flexibility of the Richlite fretboard it is more than likely that both usage norms and actor response to evolving usage will continue to vary.

In closing, a number of relatively firm conclusions can be reached despite the ongoing instability of the social construction of the artifact chosen for examination in this thesis. Procedurally, STS and SCOT frameworks do provide interpretive scaffolding that explains how the Richlite fretboard has been perceived thus far and how we can expect it to be perceived in the future. This is not to say that we can predict the specific details of its social construction that will allow closure and stabilization, rather that the current interpretive environment surrounding the artifact is developing in a way that is recognizable in relation to past scholarship concerning the social construction of earlier artifacts. Whether social conditions and stimuli will prove such that the Richlite fretboard hardens into the primary alternative to current traditional hardwoods, merely one in a collection of accepted fretboard options, or a failed approach that is discarded in favor of other options remains to be seen. However, when interpreted via a range of STS and SCOT perspectives the *AGF* data makes it clear that the process will be dependent not on purely tangible properties of the Richlite fretboard but on a kaleidoscopic array of factors inherent in its larger social construction.

References

- Bijker, W. E. (2001). Technology, Social Construction of. In N. J. Smelser & P. B. Baltes (Eds.), *International Encyclopedia of the Social & Behavioral Sciences* (pp. 15522–15527). Pergamon. <https://doi.org/10.1016/B0-08-043076-7/03169-7>
- Bijker, W. E. (2010). How is technology made?—That is the question! *Cambridge Journal of Economics*, 34(1), 63–76.
- Bijker, W. E. (2012). The Social Construction of Bakelite: Toward a Theory of Invention. In W. E. Bijker, T. P. Hughes, & T. Pinch (Eds.), *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology* (Anniversary ed. edition, pp. 155–182). The MIT Press.
- Bimber, B. (1990). Karl Marx and the three faces of technological determinism. *Social Studies of Science*, 20(2), 333–351.
- Boltz, F., Holmes, T. P., & Carter, D. R. (2003). Economic and environmental impacts of conventional and reduced-impact logging in Tropical South America: A comparative review. *Forest Policy and Economics*, 5(1), 69–81. [https://doi.org/10.1016/S1389-9341\(01\)00075-2](https://doi.org/10.1016/S1389-9341(01)00075-2)
- CITES. (n.d.). *What is CITES?*. <https://cites.org/eng/disc/what.php>.
- Clayton, N. (2002). SCOT: Does It Answer? *Technology and Culture*, 43(2), 351–360.
- Collins, H. M. (1981). Stages in the Empirical Programme of Relativism. *Social Studies of Science*, 11(1), 3–10. <https://doi.org/10.1177/030631278101100101>
- Deblauwe, V. (2021). Life history, uses, trade and management of *Diospyros crassiflora* Hiern, the ebony tree of the Central African forests: A state of knowledge. *Forest Ecology and Management*, 481, 118655. <https://doi.org/10.1016/j.foreco.2020.118655>
- Dotneck. (2015, December 20). *I just prefer wood*. Acoustic Guitar Forum. <https://www.acousticguitarforum.com/forums/showthread.php?t=411689&page=12>

- Evans, R., & Collins, H. (2008). Expertise: From Attribute to Attribution and Back Again? *The Handbook of Science and Technology Studies*, 609.
- fazool. (2014, July 24). *Richlite is an engineered resin infused with wood-paper-pulp*. Acoustic Guitar Forum. <https://www.acousticguitarforum.com/forums/showthread.php?t=350405>
- Forests Generate Jobs and Incomes*. (n.d.). World Bank. <https://www.worldbank.org/en/topic/forests/brief/forests-generate-jobs-and-incomes>
- French, R. M. (2012). *Technology of the Guitar* (1st ed. 2012.). Springer US : Imprint: Springer.
- HAMFIST. (2013, November 24). *Plus one. I have deep respect for engineered materials in terms of stability and performance. But between the trees harvested and the admixtures used, I cannot think that Richlite is all that environmentally-friendly*. Acoustic Guitar Forum. <https://www.acousticguitarforum.com/forums/showthread.php?p=3706256>
- Havighurst, C. (2011, August 31). Why Gibson Guitar Was Raided By The Justice Department. *NPR*. <https://www.npr.org/sections/therecord/2011/08/31/140090116/why-gibson-guitar-was-raided-by-the-justice-department>
- Latour, B. (2007). *Reassembling the Social: An Introduction to Actor-Network-Theory*. OUP Oxford.
- Lindsay, C. (2003). From the shadows: Users as designers, producers, marketers, distributors, and technical support. *How Users Matter: The Co-Construction of Users and Technology*, 29–50.
- Malone, B. C. (1994). *Singing Cowboys and Musical Mountaineers: Southern Culture and the Roots of Country Music*. University of Georgia Press.
- Milakis, D., & Müller, S. (2021). The societal dimension of the automated vehicles transition: Towards a research agenda. *Cities*, 113, 103144.

- Oudshoorn, N., & Pinch, T. (2003). *How users matter: The co-construction of users and technology*. the MIT Press.
- pb+j. (2014, July 24). *Richlite isn't cheap. Then advantage for martin is availability, workability, consistency, stability, durability*. Acoustic Guitar Forum.
<https://www.acousticguitarforum.com/forums/showthread.php?t=350405>
- Pinch, T. J., & Bijker, W. E. (2012). The Social Construction of Facts and Artifacts. In W. E. Bijker, T. P. Hughes, & T. Pinch (Eds.), *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology* (Anniversary ed. edition, pp. 11–44). The MIT Press.
- Richlite*. (n.d.). Richlite. <https://www.richlite.com/>
- Savic, M. (2021). Research Perspectives on TikTok & Its Legacy Apps| From Musical.ly to TikTok: Social Construction of 2020's Most Downloaded Short-Video App. *International Journal of Communication*, 15, 22.
- Silverstone, R., Hirsch, E., & Morley, D. (1992). Information and communication technologies and the moral economy of the household. *Consuming Technologies: Media and Information in Domestic Spaces*, 15.
- Slim. (2011, March 31). *You're not crazy. I'd still have my D-16GT if it had a rosewood fretboard*. Acoustic Guitar Forum.
<https://www.acousticguitarforum.com/forums/showthread.php?t=274724>
- Smith, M. R., & Marx, L. (1994). *Does technology drive history?: The dilemma of technological determinism*. Mit Press.
- Somogyi, Ervin. (2011, January 17). *Tracking The Steel-String Guitar's Evolution, Pt. 1*. Premier Guitar. <https://www.premierguitar.com/tracking-the-steel-string-guitars-evolution-pt-1>
- stormin1155. (2013a, November 24). *According to Wikipedia: Richlite is a dense material*

made from partially recycled paper and phenolic resin. Acoustic Guitar Forum.

<https://www.acousticguitarforum.com/forums/showthread.php?p=3706271>

stormin1155. (2013b, December 31). *Guitar players are traditionalists and purists, and electric players are almost more so than acoustic players.* Acoustic Guitar Forum.

<https://www.acousticguitarforum.com/forums/showthread.php?p=3755071>

talister106. (2012, February 24). *This is a sore subject for me because when I found out my D16 had it I couldn't believe it.* Acoustic Guitar Forum.

<https://www.acousticguitarforum.com/forums/showthread.php?p=2946858>

Taylor Guitars: The Ebony Project in Cameroon. (n.d.). Ebony Project.

<http://www.taylorguitars.com/ebonyproject>

TBMan. (2015, December 17). *That's what happens.* Acoustic Guitar Forum.

<https://www.acousticguitarforum.com/forums/showthread.php?t=411689&highlight=richlite&page=6>

Meier, Eric. (n.d.). *The Wood Database.* Website. <https://www.wood-database.com/>

Tyler, J. (1980). *The Early Guitar: A History and Handbook.* Oxford Univ Press.

ukejon. (2015, December 20). *To be perfectly candid, I went in today ready to hate Richlite.* Acoustic Guitar Forum.

<https://www.acousticguitarforum.com/forums/showthread.php?p=4756413>

Wasper. (2014, July 24). *Looks just like a cheap home depot counter top and feels the same under my fingers.* Acoustic Guitar Forum.

<https://www.acousticguitarforum.com/forums/showthread.php?t=350405>

Wyatt, S. (2008). Technological determinism is dead; long live technological determinism. *The Handbook of Science and Technology Studies*, 3, 165–180.

Wyatt, S. M. (2003). Non-users also matter: The construction of users and non-users of the Internet. *Now Users Matter: The Co-Construction of Users and Technology*, 67–79.

Wyatt, S., Thomas, G., & Terranova, T. (2002). They came, they surfed, they went back to the beach: Conceptualizing use and non-use of the internet. *Virtual Society*, 23–40.

