

The Music Producer's Survival Guide

Chaos, Creativity, and Career in Independent and Electronic Music

Brian M. Jackson

Cengage Learning PTR



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The Music Producer's Survival Guide: Chaos, Creativity, and Career in Independent and Electronic Music

Brian M. Jackson

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Preface

The most damaging phrase in the language is: We've always done it this way.

–Grace Hopper

Reality is not composed of things or processes; it is not composed of atoms or quarks; it is not composed of wholes nor does it have any parts. Rather, it is composed of whole/parts, or holons.

–Ken Wilber

Chaos is what we've lost touch with. This is why it is given a bad name. It is feared by the dominant archetype of our world, which is ego, which clenches because its existence is defined in terms of control.

–Terence McKenna

Welcome. I truly hope you enjoy this book, on multiple levels. *The Music Producer's Survival Guide* is as much a creative project for me as any track or record I've produced. Obviously, I think I have something significant to share with the world, or I wouldn't be writing a book such as this. At the same time, this book ultimately is not about me. It is not an autobiography of a music producer. That said, on multiple occasions I do share biographical stories and anecdotes when it serves a purpose—giving background on my thinking, using my personal history to contextualize the present, to illustrate a point, and especially when I think you can learn something from my successes and mistakes.

I love what I do for a living. My professional passions are the intersections of music, audio, technology, education, culture, and consciousness. Between my students, collaborators, and clients, I have literally worked with people at all levels of the industry—total beginners, legendary DJs, multiplatinum heavy-metal legends, movie stars, multiple Grammy nominees and winners, brilliant software developers, and countless otherwise-accomplished musicians, artists, and thinkers. This variety of experiences with such a diverse amalgam of people sparked the inspiration for this book.

After consistently being asked the same sorts of questions from a nice sample of the aforementioned people, I realized I needed to write a music-production book. After answering their questions, there was no one website, no one book, no one written source to which to refer them for follow-up. Many of these questions were contextual or relational in their nature, meaning that it was my synthesis of information that clarified the issues. So, in addition to my technical, creative, and cultural knowledge, I knew that my philosophical and intellectual perspective would have to be a significant aspect of the project.

A Philosophical Survival Guide

Survival guides are practical by definition because they help ensure you are prepared via pragmatic expert advice and a slew of utilitarian lists. Some intend to prepare you for unexpected, dangerous situations, be they hurricanes, getting lost in the wilderness, the zombie apocalypse, while others emphasize navigating common difficult non-emergency scenarios, such as help with popular technologies or personal finances. If not a survival guide for reading philosophy, “philosophical survival guide” may seem like an oxymoron or the premise for a lost scene from Monty Python's *The Meaning of Life*.

Unlike the typical survival guide that underscores immediate concerns, life as a technical-creative professional is an odyssey. Accordingly, this book is equal parts practical and philosophical. In many ways, what really sets this book apart from all the many other books on music-production topics is the perspective of your author. I do not claim to be the smartest, best-educated, most-talented, most-successful, most-experienced, or most-knowledgeable person to write a music-production book. I am certainly nowhere in the vicinity of the most famous or richest. However, it is my sincere belief that you have a unique book in your hands (and/or on your screen)—one that I hope you find equally useful and inspiring.

I don't blame you if you are already thinking something along these lines:

Oh, great. Another Gen X electronic musician who thinks he's some sort of thinker or philosopher. So he's read some Kurzweil, Bey, Stephenson, Baudrillard, Pinchbeck, and his fill of books by Disinformation and RE/Search. He's had his share of 5 a.m. discussions with other psychonauts about holographic cyberspace chakras and the sound of one hand clapping as it relates to a post-apocalyptic, hyperdimensional, culture-jamming, open-source, raw vegan-induced singularity while listening to the CD release of Alien Dreamtime: Space Time Continuum with Terence McKenna.

Okay, sure. Maybe I've had a few such discussions. Who hasn't? But in all seriousness, to put your mind at ease, I *do* have a few actual degrees from respectable, accredited American institutions of higher learning. Although I've been active in music and music culture nearly my whole life, I have a BS in sociology and philosophy (1994) and an MA (nearly ABD) in East-West psychology (1999). In fact, the focus of my master's thesis largely provides the philosophical and intellectual framework for the practical aspects of this book. It was the late 1990s, and I was in my late 20s, so with a complete, self-aware, ironic academic pretentiousness, I wanted to have the longest title in the printed program at the graduation ceremony: "Complex thinking, perceiving, and meaning-making: The evolution of integral consciousness and the paradigm of complexity." (Actually, it turned out to be the second longest title.)

Enough on my *bona fides*.

This is a big-picture book that includes a ton of specific, practical, detailed discussion. I intend to clear up common confusions, bring clarity to frequently murky topics, and provide context for many aspects of modern independent and electronic music production. As you will see, there are many aptitudes and skill sets involved, and understanding how they overlap and relate to each other requires a solid intellectual framework. There are many books on software, audio engineering, music composition, music business, music production, record producers, and promoting your band, for starters. Many of them are quite good. Yet they primarily address only pieces of the puzzle—a necessity for any in-depth discussion. So, to talk about how all the puzzle pieces fit together, we must need a "holistic" approach, right?

According to Ken Wilber, if part-ism is "gross reductionism," then holism is "subtle reductionism." French thinker Edgar Morin breaks it down for us: "Holism is a partial, one-dimensional, and simplifying vision of the whole. It reduces all other system-related ideas to the idea of totality, whereas it should be a question of confluence. Holism thus arises from the paradigm of simplification..." (*Journal of Social and Evolutionary Systems*, 1992). Required is a discussion not only of the parts and the whole, but also the relationship of the parts to each other and to the whole, to other wholes and their parts, and so on and so forth. Fortunately for us, Integral philosophy is perfectly suited to such an ambitious goal, and therefore I am taking an *integral* approach to this book.

Integral Philosophy and This Book

In December of 1994, after one semester of grad school at Western Michigan University, I walked away from a full ride (with stipend) and moved to San Francisco to pursue music. Thanks to my friend Naomi, another recent transplant from the Kalamazoo DIY music scene, I quickly landed a job at Royal Ground Coffee on Polk St. A few blocks down I found Fields Book Store, an amazing shop that was in the same location from 1932 until February of 2013, when the new digital landscape forced it to go online only (fieldsbooks.com). There, I discovered countless mind-opening books, including a few by psychiatrist Stanislav Grof, MD. Grof pioneered LSD psychotherapy starting in 1955 (when it was still legal), which directly led to his co-founding of the field of transpersonal psychology in 1969 with psychology pioneer Abraham Maslow.

After a few years as a barista in the wonderful freak show that is Polk St., in 1996 I started looking into grad schools to continue my formal education. While looking through a Learning Annex pamphlet, I saw that Grof was lecturing at a school just a few blocks away, the California Institute of Integral Studies (CIIS), and he also taught there! That fall, I became an East-West psychology PhD student at CIIS, where I remained until the summer of 1999. While at CIIS, I had amazing professors for a wide variety of courses. Excluding the most traditional and alternative, they ranged from Mahayana Buddhism and Vedanta, to transpersonal psychology and consciousness studies, to chaos theory and linguistics. There, I was exposed to the works of many great thinkers and researchers, but only four of them became the focus of my thesis: Robert Kegan, Jean Gebser, Edgar Morin, and Ken Wilber. Again, I left grad school for music, which is why I do not have a PhD, just a master's. From 1996 to 2000, I was also in I Am Spoonbender (GSL, MINT), a band I co-founded with a friend from Michigan—but that is part of another story.

CIIS: The American Academy of Asian Studies was founded in San Francisco in 1950 by Stanford professor of religion Frederick Spiegelberg (a friend of Carl Jung) and Alan Watts, an influential British East-West philosopher, speaker, writer, and self-described "spiritual entertainer." They wanted an Indian scholar on faculty at this newly founded East-West graduate school, and wrote a letter to the highly regarded Indian sage Sri Aurobindo for a recommendation. One of Aurobindo's students, Haridas Chaudhuri, chair of a philosophy department in Bengal, soon joined them in California. In 1974 they changed the name to the California Institute of Asian Studies, and then in 1980 to the California Institute of Integral Studies. In 1981, CIIS was accredited by the Western Association of Schools and Colleges. It continues to draw more and more students from around the globe.

What Is Integral Theory?

We live in a complex world that places an unprecedented combination of demands on us. In his 1994 book *In Over Our Heads: The Mental Demands of Modern Life*, Harvard psychologist Robert Kegan summed up his research on this point. Kegan tells us that these demands may “require a qualitative transformation in the complexity of mind every bit as fundamental as the transformation from magical thinking to concrete thinking...or the transformation from concrete thinking to abstract thinking.” Just a few years after making this statement, Kegan would become a major player in the emerging field of Integral psychology.

What are some of these demands on professional independent and electronic music producers in the 21st century? You need musical and technical skills, of course, which means you need to know how to learn. People must know who you are and want to work with you, which means you are part of social scenes and require professional social skills. How do you know that the styles you want to produce are relevant? To answer that question, you need to be immersed in culture. You need to stay motivated and inspired, which means knowing yourself and evolving as a person. To take care of your mind, you need to take care of your body. Add all of those together, seeing them as simply different dimensions of the same thing, and you can start to get an idea of what integral means.

The word integral has two basic definitions:

- ▷ Necessary for wholeness or completeness
- ▷ That which integrates

The first notable appearances of the word “integral” in 20th century philosophy are found in the works of two intellectual giants: Sri Aurobindo (India, 1872–1950) and Jean Gebser (Poland/Switzerland, 1905–1973). Building on the works of these two geniuses, Ken Wilber (USA, 1949–) burst on the scene with the 1977 publication of his book *The Spectrum of Consciousness*, establishing himself as the premier theorist in the field of transpersonal psychology. By the 1990s, he’d evolved beyond one field and into the most prolific thinker, teacher, pandit, and writer on Integral theory. An expert meditator, needing just a few hours of sleep a night, and a true polymath, able to effectively speed-read a few books a day, his knowledge is accurately described as encyclopedic.

Currently, Integral theory is primarily associated with Wilber. Although he was not the first Integral philosopher, he was the first to develop a comprehensive theory that synthesized knowledge from almost every major field. Certainly, he has his detractors and critics, but fans of his writing include massage therapists, psychoanalysts, rock stars like Billy Corgan and Serj Tankian, Hollywood notables like Sharon Stone and the Wachowskis, and even Bill Clinton and Al Gore. In 1998, he founded Integral Institute with dozens of respected experts and professionals from numerous fields: psychology (including Robert Kegan), business, politics, medicine, education, law and criminal justice, art and music, ecology, and spirituality. On the front page of Integral Institute’s website (integralinstitute.org), they offer the following definition.

Integral theory is an all-inclusive framework that draws on the key insights of the world’s greatest knowledge traditions. The awareness gained from drawing on all truths and perspectives allows the Integral thinker to bring new depth, clarity and compassion to every level of human endeavor—from unlocking individual potential to finding new approaches to global-scale problems.

Lofty goals, for sure. I don’t pretend for a second that this book is going to solve global problems in any direct way. But I am working with the same intellectual framework, and I want you to know why. A serious study of Integral theory has numerous positive, practical side-effects, such as sharpened critical-thinking skills, tools for addressing common logical fallacies, and enhanced clarity when wading through ostensibly nebulous issues. I am not attempting to formally apply Integral theory as the central focus of this book. I only emphasize a few aspects and some not at all. In fact, other than a few mentions here and there, unless you know what to look for you will barely even notice Integral theory’s influence on this book. You do not need to focus your energy on learning it. If you are interested in knowing more about Integral theory make sure to check out Appendix B, “Integral Theory Primer.”

While Integral theory is mostly supporting architecture, topics of chaos and complexity are plainly visible elements. We will soon talk about tipping points, fractals, the butterfly effect, and other aspects of chaos and complexity. Integral theory is more expansive and inclusive of perspectives and ways of knowing than chaos theory and complexity studies. As such, a serious study of Integral philosophy ensures that a passion for science does not cause a devaluation of domains it does not adequately address, namely the world of subjective and inter-subjective experience. So, now that we have a basic idea of what is meant by “integral,” let me tell you a story about a dragon and a dragon slayer. And no, heavy-metal lyrics are not the inspiration here.

Chaos, Dragons, and Fractals?

I love chaos. It is beautiful, especially if you learn to perceive its ubiquitous patterns and rich nuances. Chaos is often conflated with confusion or complication, or often solely to its pejorative connotation of destruction. Historically, you can trace our civilization’s problematic relationship with chaos back to an ancient Babylonian myth (c. 1900 BCE). In this myth, the “hero” Marduk slays a dragon,

the ocean goddess Tiamat, and order rules over chaos—the second version of the myth, by the way. In the earlier version of the myth, Tiamat was the peaceful creator of the cosmos, which is more in line with our current understanding of chaos as equally a creative process. The post WWII computer revolution isn't just responsible for the tech we use to produce music; the raw number-crunching power of computers made it possible to discover the fundamental role that chaos has in shaping the physical universe. Chaos theory, fractal geometry, cybernetics, systems theory, 3D computer-generated imagery, astronomy, and various schools of psychology and medicine are just a few examples of fields rife with research and results saturated with chaos.

Deborah Tussey is a law professor at Oklahoma City University who specializes in intellectual property and copyright law. Her 2012 book *Complex Copyright* applies complexity concepts to a future vision of a more flexible and adaptive copyright law. A few years earlier, in 2005, she published a paper on chaos and file sharing, called “Music at the Edge of Chaos: A Complex Systems Perspective on File Sharing” and published in *Loyola University Chicago Law Journal*, which included as succinct a summary of all key elements of complexity theory as I could find. What follows is an academic quote that I think will help you understand precisely where I am coming from:

A brief foray into the basic concepts of complexity theory is an obvious prerequisite to application of those concepts to the music system. Complexity theory posits that complex adaptive systems universally possess certain characteristics: they are composed of multiple, interconnected components; change cascades through them in a nonlinear manner; they evolve and coevolve over time in a pattern of punctuated equilibrium; and they produce emergent behaviors. These qualities make system behavior unpredictable over the long term and, where humans intervene in such systems, their actions are likely to produce unintended consequences. The most robust systems exhibit a property sometimes referred to as self-organizing criticality or positioning at the ‘edge of chaos’—the ability to maintain a productive internal tension between order and chaos.

So what does music production or being a music producer have to do with chaos and complexity? Chaos and complexity are fundamental characteristics of the natural world, and we are part of that world, so they not only influence music, art, culture, technology, psychology, and careers, but life in general. The more fluid and dynamic a given system, the higher the tendency toward turbulence, and the more likely we will notice chaotic behavior. Artistic and entertainment industry careers are much more fluid than most fields, with various flavors of instability being a common state of affairs. Why do some people's careers take off, and other's not? Why do new genres blow up, when they blow up? Chaos and complexity also shed light on everything from the creative process to social scenes, the evolution of music styles and genres, and dynamics in pop culture.

NOTE: Complexity studies is the broadest intellectual umbrella for the fields interested in the ideas mentioned in the preceding quote. In popular language, chaos theory is synonymous with complexity studies, though it is just one of many approaches to complexity. Technically speaking, chaos theory is a subset of dynamical systems theory, and is the mathematical study of non-linear, unpredictable behavior of complex deterministic systems.

Moreover, the concept of complexification helps to explain many of the massive changes in our industry that make this book possible in the first place. From a complex systems theory perspective, we are reaping benefits of the complexification process, which is illustrated via numerous relevant examples throughout this book. For right now, let's just work with Ervin Laszlo's succinct explanation from his 1991 book, *The Age of Bifurcation: Understanding the Changing World*:

In sum, the processes of evolution create initially comparatively simple dynamical systems on particular levels of organization. The processes then lead to the progressive complexification of the existing systems and, ultimately, to the creation of simpler systems on the next higher organizational level, where complexification begins anew. Thus evolution moves from the simpler to the more complex, and from the lower to the higher level of organization.

Throughout this book, to help explain certain concepts and relationships, I rely on various aspects of complexity studies, especially key concepts from chaos theory such as unpredictable outcomes and fractal geometry. Regarding the latter, we are going to talk quite a bit about branching structures and self-similarity in a number of the chapters. Sometimes I apply ideas and concepts in line with the science as it is currently understood. At other times I take poetic license, using them as metaphor, analogy, muse, and/or inspiration. In either case, I do not get into the mathematics underlying the science. In addition to sidebars mixed in with the chapters, the aptly named Appendix A, “Chaos Theory and Complexity Studies Primer,” serves as a primer on chaos theory and complexity studies.

One of this book's meta-goals is to formally introduce these ideas into our field. They are already utilized in psychology, sociology, biology, education, and numerous other academic fields, but also video game development, digital visual arts, and other fine arts. Many of today's scientific givens, which are regularly discussed in audio engineering and the more technical aspects of music production, were once deemed too “off topic” in the context of music (for example, the Nyquist-Shannon sampling theorem). Some of you may find it odd that I am

putting so much time and energy into integrating chaos and complexity ideas into the world of independent and electronic music production. Just as talking about computer networks and IP addresses would have been fringe topics in music production curricula back in the 1980s, talking about music production, chaos, and complexity one day will seem like a no brainer.

Down the Rabbit Hole

I know for a fact that some of you will really appreciate and enjoy the science and philosophy contextualizations in this book. But, if you are concerned that this book might be too intellectual or academic for your taste, don't fret. Although I do not hold back when I think there is something worthy of deeper consideration, I guarantee that you will also find a lot of perfectly straightforward, practical, immediately useful information. It took years to digest the fundamentals of chaos theory, complexity studies, and Integral theory, and new layers of understanding continually dawn on me. You do not need to know all of this stuff for *The Music Producer's Survival Guide* to be useful. If you do decide to take a deeper look into the ideas presented here, you may just find an endless source of inspiration and intellectual stimulation, as I have. If not, no worries. This book is designed in such a way that there are levels of understanding to take away from it, so there is something in here for everyone.

To sum up the intuitive foundations of my thinking better than any words can convey, this preface concludes with pretty photos of self-similar, fractal shapes found at all levels of the physical world. (See Figures P.1–P.6.)

NOTE: For full-color versions of the images in this book, be sure to visit this book's companion website, www.iempsg.com.

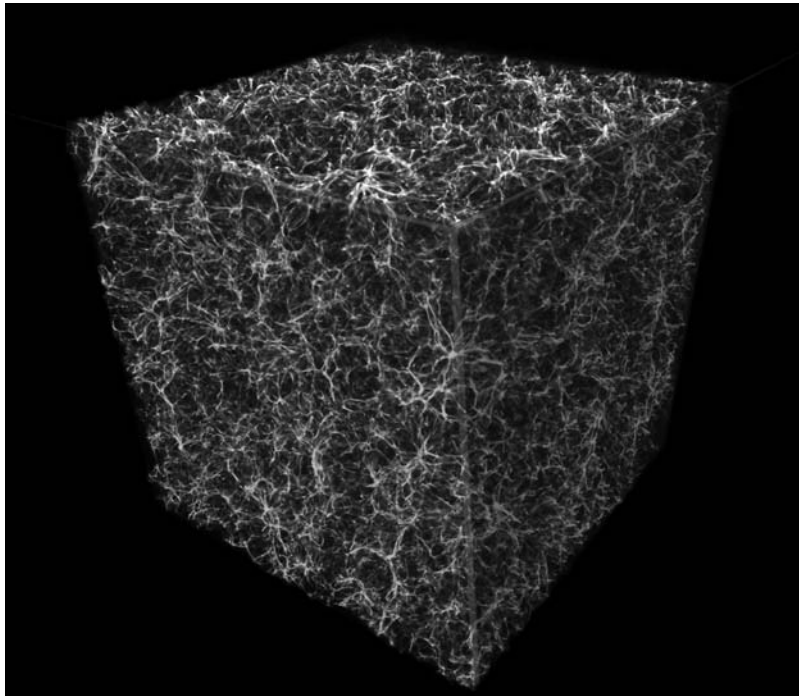


Figure P.1 NASA-generated simulation of 13 million³ light-year sliver of our universe. The texture is created by the “filaments,” which represent dark matter in the space between galaxies.

Source: Public domain via NASA.gov.

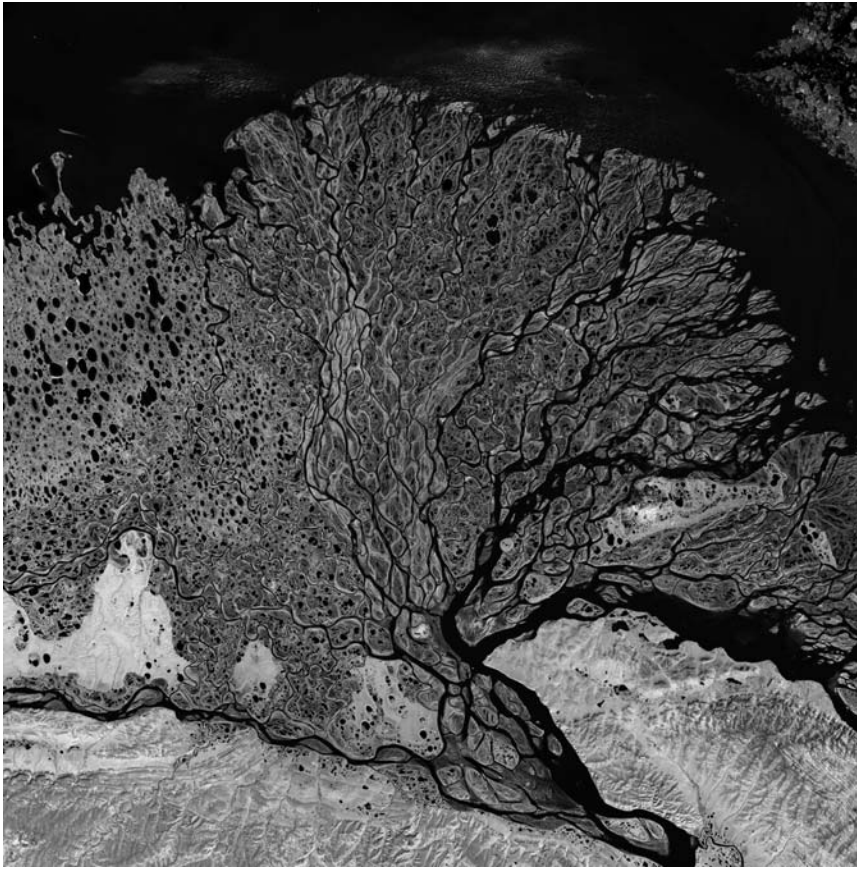


Figure P.2 A satellite photo of the Lena river delta in Siberia, with fractal structures similar to a sponge, cardiovascular system, or “filaments” as seen in Figure P.1.

Source: Public domain via NASA.gov.

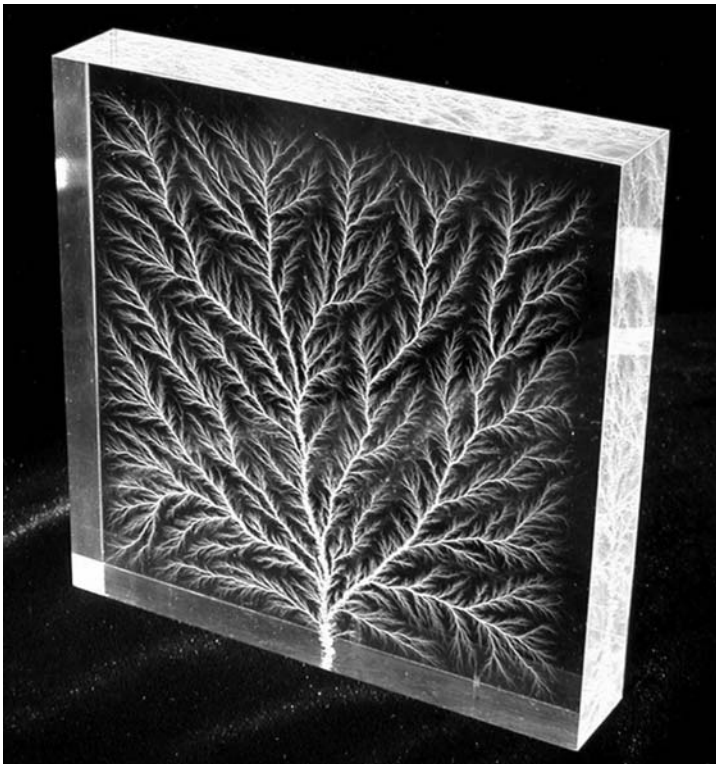


Figure P.3 Lichtenberg figure in plexiglass caused by high-voltage current. Created and photographed by Bert Hickman of Stoneridge Engineering (capturedlightning.com).

Source: Public domain via Bert Hickman.

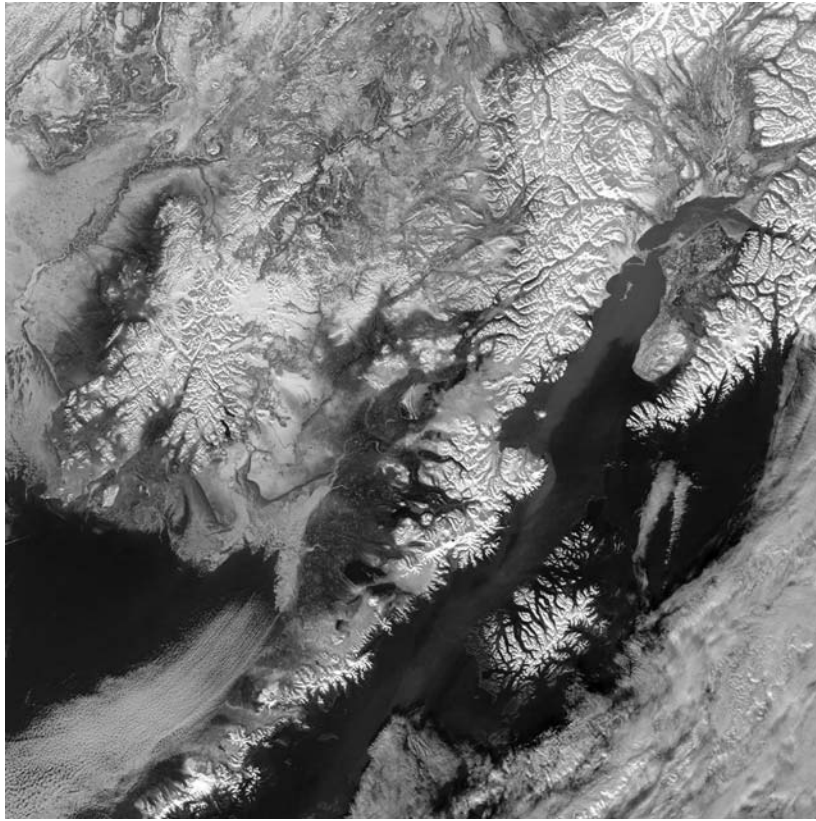


Figure P.4 A satellite photo of the Yukon river delta in Alaska. Notice the coastline's and mountain ranges' fractal branching structures.

Source: Public domain via NASA.gov.

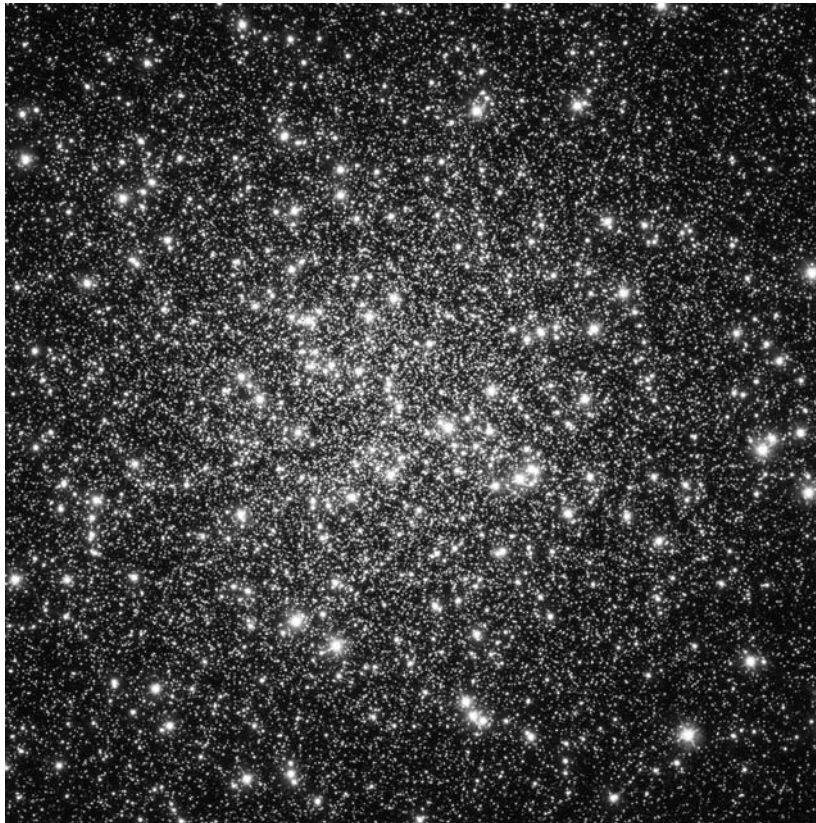


Figure P.5 A Hubble satellite photo of the M13 Galaxy nucleus. (Photo by NASA/STScI.)

Source: Public domain via NASA.gov.

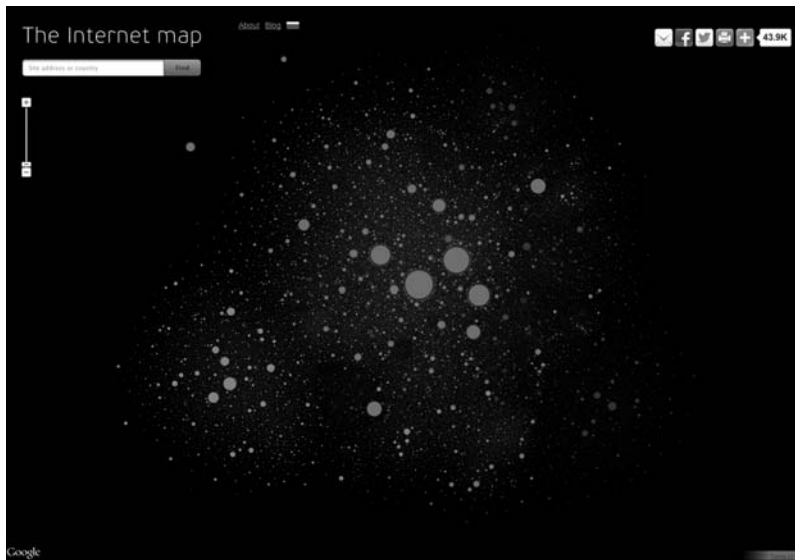


Figure P.6 Screenshot of internet-map.net depicting a map of the Internet in 2011. Each dot represents a website, and the overall image displays self-similarity.
Source: internet-map.net.

Acknowledgments

The Music Producer's Survival Guide: Chaos, Creativity, and Career in Independent and Electronic Music represents a culmination of experiences and knowledge from the past 25 years or so. This brain dump was a group effort, so there are a lot of people that I need to thank for making it possible. There is one group that must be thanked above all others: my students. They say that the best way to learn is to teach, and I couldn't agree more. If not for students asking me questions, this book would not exist.

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Any factual, intellectual, or philosophical mistakes in this book are mine, and not the fault of anyone else.

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About the Author

Brian Jackson is a musician, audio engineer, music producer, teacher, and philosopher. He is co-owner and director of education at Devotion, an art gallery and community space in Brooklyn that also serves as his Ableton Certified Training Center. Brian's involvement in DIY, independent, and underground music culture started in Detroit more than two decades ago. He has produced various styles of electronic music, played bass in bands, promoted club events, attempted a record label, and DJed after-hours parties. From award-winning experimental video to TV shows such as *24*, his sounds have been heard worldwide. He uses the pseudonyms Infinite Volume and Cyphony for solo works and remixes, was half of the conceptual retro-future electro synth A/V duo Memory Systems, and co-founded the genre-bending band I Am Spoonbender (1996–2000). He is the author of multiple tutorial DVDs on Ableton Live and technical editor of books on Live and Pro Tools, among others. Brian is also a creative-technical consultant with clients including Ableton, Access, and multiple Grammy nominees/winners. With a B.S. in Sociology and Philosophy already under his belt (WMU, 1994), Brian went on to earn an M.A. in East-West Psychology (1999) from the California Institute of Integral Studies in San Francisco. He lives in Brooklyn, NY, and is reachable through his website, www.formlabsnyc.com.

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Introduction

As technology advances, it reverses the characteristics of every situation again and again. The age of automation is going to be the age of “do it yourself.”

–Marshall McLuhan, 1957

The technology at the leading edge changes so rapidly that you have to keep current after you get out of school. I think probably the most important thing is having good fundamentals.

–Gordon Moore (co-founder of Intel)

None of us ever got into it to strike it rich, let’s put it that way. I think anybody who wants to start a band...specifically to make money...it’s kind of a fool’s dream in a way.

–Thurston Moore, Sonic Youth (*Innovators in Music*, 2010)

I could use the industry to try and further my own career or get records signed to major record labels but that’s not what I’m about....I’m just so happy to be traveling around with my friends and to play records for people in clubs....It’s not about success or money for me, it’s about shared experiences.

–Ellen Allien (owner, BPitch Control)

DIY.Independent.Electronic.Music.Producer.

Like most of you reading this book I started out as a music fan and musician. Production and audio engineering came later, initially as a way to help better express musical ideas without having to depend on costly recording studios and later as a way to help pay the bills. I love computers, production, and audio engineering, but first and foremost I am a music fan. Although we all have our favorite styles and genres, I can appreciate something about most any one of them. If an artist truly has something to express, it doesn’t matter if the music is released on a major label, an imprint, a boutique indie, self released, or simply just performed live. The music can be techno, electro, house, rock, metal, punk, jazz, hip hop, pop, bluegrass, Afrobeat, funk, gospel, classical, experimental, or unclassifiable. It can be from Detroit, Berlin, London, Morocco, Ghana, Iran, Israel, Tibet, China, India, Brazil, Mexico, or parts unknown. Having said all that, this is not a music-appreciation book, *per se*. Rather, it is about music production—*independent and electronic music production*. Moreover, it is as much about *being* an independent/electronic music producer in the 21st century, and being able to do it yourself, being DIY, as it is about music production.

If I had started writing this book in 1992 and not 2012, the main title would simply be the *Electronic Music Producer’s Survival Guide*. Back then, electronic musicians were the only ones you would find toiling away for hours by themselves making music with computers, synths, samplers, and sequencers. The Internet’s role in the spread of information and connecting the like-minded from anywhere, at any time, cannot be understated. So this book talks about the computer revolution and the resulting home-studio boom. How they have inexorably changed the game for everyone, given that making high-quality music at home using computers is no longer just the domain of arty rock stars and electronic music producers. We’ll deal with the implications of powerful, sophisticated, affordable (and even free) software putting once-expensive, state-of-the-art capabilities from just a few decades past in the hands of anyone looking for it.

What Is the Goal of This Book?

The Music Producer’s Survival Guide is no slacker. It is ambitious and has a lot of goals. It wants to help you become smarter and wiser. It wants to help those who are committed to their craft rise above the distracting, incessant, low-level noise generated by marketers, shills, haters, posers, followers, clowns, oafs, trolls, and parasites. It aims to give you tools that you will need to survive, and better yet, to have a fulfilling career as an independent and/or electronic music producer in the 21st century.

We live in the Information Age. There is a vast amount of information readily available to you about most all aspects of music and production. Largely absent is readily available knowledge about how all this information fits together. Even more rare is readily available knowledge about how all these aspects connect to other areas of life and career that are equally important for survival and success. As a teacher, I am motivated to share information and knowledge. So in many ways, this book aims to fill in many of the gaps that an aspiring producer would learn only from many years of experience or a few less years of mentoring from established professionals. I do not claim expertise in every area discussed in this book, and I regularly seek out knowledge from others, but I have more than enough expertise and competence across the board to help you perform a metaphorical decryption of cipher text into plain text.

Rapid advancements in technology are changing most every aspect of our lives, not just audio and music. For music producers, the narrow context is music technology's piggyback ride on the exponential ascent of the communication, computing, and information revolutions instigated by Alexander Graham Bell, Nikola Tesla, Thomas Edison, Claude Shannon, and Alan Turing. Given the complexity of the modern world, and our field in particular, there is a need for clarity. Not only is our industry evolving and changing at a very rapid pace, but it is also exposing us to knowledge once privy only to specializations and crafts unto themselves. How do various aspects of music production relate to each other and what does it mean for somebody trying to do it all himself or herself? For example, there are few aspiring young producers who understand the differences and relationships between composing, sound design, mixing, mastering, audio technology, creative process, and technical skill.

I want to get you thinking—about the big picture and about very specific topics. At the same time, there are a lot of questions that everyone needs to ask themselves—in other words, contemplations. I am not so deluded as to think that I have all the answers, or that I even know all the questions, but I know a lot of the questions that every aspiring technical creative professional should ask himself or herself. As a *philosophical survival guide*, this book puts the onus on you to pave your own road.

As a philosophical *survival guide*, this book is also very practical. I want you to have immediate takeaways, and each chapter provides these in its own way. Here are a few examples of topics that feature tips and pointers:

- ▷ Planning your career
- ▷ Learning your craft
- ▷ Networking and navigating social scenes
- ▷ Organizing your sessions for maximum productivity and creativity
- ▷ Dealing with creative blocks
- ▷ Making decisions about equipment
- ▷ Avoiding common lifestyle pitfalls
- ▷ Protecting your hearing
- ▷ Staying healthy

How Is This Book Structured?

If this book were an analog synthesizer, you could say it is semi-modular. Each chapter provides different functionality to the system and its user. Each chapter also offers guidance regarding key components of a music producer's survival. Various themes are woven throughout, and I do refer to other chapters' topics here and there, but each one can stand on its own. I certainly didn't write this book in order, so a non-linear read seems as logical as not. Read it straight through, or jump around to make it suit your needs.

Each chapter includes a combination of loosely definable section types: quotes, context, theory, contemplations, definitions, practical topics, and anecdotal items. There is no set order for these sections, but I always start out with a few quotes. Usually what follows is prose about the big picture to provide context before moving on to theory or topics designed to provoke contemplation about your specific needs and situation. When I say big picture, I mean it, and I know a lot of you are going to appreciate these sections. But, I realize a broad context may not be useful for some beginners or those who are already feeling a bit lost or overwhelmed by the sheer amount of options and information. (If you suddenly wake up on the corner of Broadway and Astor Place on a rainy day, having never been to NYC, and you ask someone where you are, being told that you are toward the outskirts of the Milky Way galaxy is not very helpful.) Every chapter also includes useful definitions and/or highly practical sections to make sure there is something to immediately apply. To illustrate key points or to ground seemingly abstract ideas, I often use personal anecdotes, so you can learn from my experience and mistakes or simply avoid reinventing the wheel.

Depending on your personal entry point to the subject matter or your mood that day, you may be more or less interested in different sections or chapters. While moving through different chapters out of order will work for some of you, I do recommend approaching most of the chapters in a more linear fashion—at least on the first read. Whether you go from start to finish or take a more circuitous route, as you circle back through material, previously read sections will take on new meaning and eventually you will put it all together in a way that makes sense to you.

The Music Producer's Survival Guide

Toward the back of the book you will find three appendixes. Appendix A, “Chaos Theory and Complexity Studies Primer,” is additional background on complexity studies and chaos theory. Appendix B, “Integral Theory Primer,” offers additional background on Integral theory. Appendix C is an interview with legendary music producer Hank Shocklee.

NOTE: Look for the companion book to *The Music Producer's Survival Guide*, which features interviews with a variety of music professionals.

What This Book Is Not

The Music Producer's Survival Guide is not trying to be trendy. It is not overly concerned with what is currently hot. It is not going to show you a bunch of screenshots of this year's latest software. Therefore, it is not going to slowly leak relevance with each new update and GUI overhaul or with the rise and fall of genres, styles, or artists. A survival guide must have a decent shelf life.

This book is not an in-depth technical manual. It does not shy away from technical discussion when it is relevant, but it does not attempt to give you technical training. You will find out about what you should learn, tips on how to learn it, and suggested directions on where to learn it.

This is not another “how to make it in the music industry” book. What you may learn here can help you to meet your goals, whatever they may be. I do want you to make a living doing what you love, but the goal of this book is not to help you get rich and famous (although it is a guide that may help you reach those goals should a fulfilling career require them). That said, I hope you find fame and fortune so you can drop my name in interviews and hire me to hang out in your entourage. (You never know. You may just need someone who can explain the differences between dither and aliasing and between minimal techno from Detroit or San Francisco at your next private after-hours party.)

Whom Is This Book For?

This book is custom-tailored for people interested in the intersection of music, sound, audio, technology, creativity, culture, science, philosophy, and consciousness. You may even notice that many of the concepts are also relevant to other creative-technical trades and professions. There is something in here for almost anyone interested in the topics named on the cover, but I expect it will be most appreciated by five loosely defined groups:

- ▷ If you are an aspiring young producer or musician and just getting started in music production or have yet to pursue a career path, this book is for you.
- ▷ If you are an experienced DJ or serious hobbyist with some production experience and want to make a go at it, this book is for you.
- ▷ If you are a student or teacher at a college or school with a music-production or audio-technology curriculum, then this book is perfect for you.
- ▷ If you are a professional and/or are established in one of the four major aspects of music production (music, sound design, audio engineering, or tools; see Figure 4.1 in Chapter 4, “Master Your Craft”) and are looking to expand your creative and career options, there is a lot in this book for you. (Although, it is equally likely I have a lot to learn from you in your area of specialization.)
- ▷ If you have a home studio, are a hobbyist, are a serious music fan with interest in technology, or are someone who is simply trying to make sense of all of the options available for working on music in the computer-centric world, there is something in this book for you.

Can I Get a Venn Diagram?

The terms DIY, independent, indie, and electronic music are defined and briefly discussed right after Figure I.1. First, this diagram is not to scale in any way, and only attempts to clarify the focus of the book in your hands, not all possible relationships. We are concerned with the circles labeled “indie music” and “electronic music,” primarily where they overlap. In total, there are seven circles: one huge, one large, three medium, and two small. The huge one that encircles the other six represents music in general, which has been around for a very long time—at least 42,000 years (but possibly millions). The large circle on the right represents music business, which includes all the aspects of

music related to commerce. There is commercial music, traditionally dominated by major labels, and artists concerned with getting on a major label. This industry is really young—only about 125 years old. There is/are indie music, indie artists, and independent labels, which may or may not consciously appreciate the DIY ethic. In this diagram I am using “indie” in its broadest sense and not showing any delineation from DIY. Electronic music can be indie or commercial.

NOTE: The terms *producer* and *professional* are defined and discussed in Chapter 2, “Plot Point on the Space-Time Continuum.” A sidebar later in this introduction ruminates on the word *produce*.

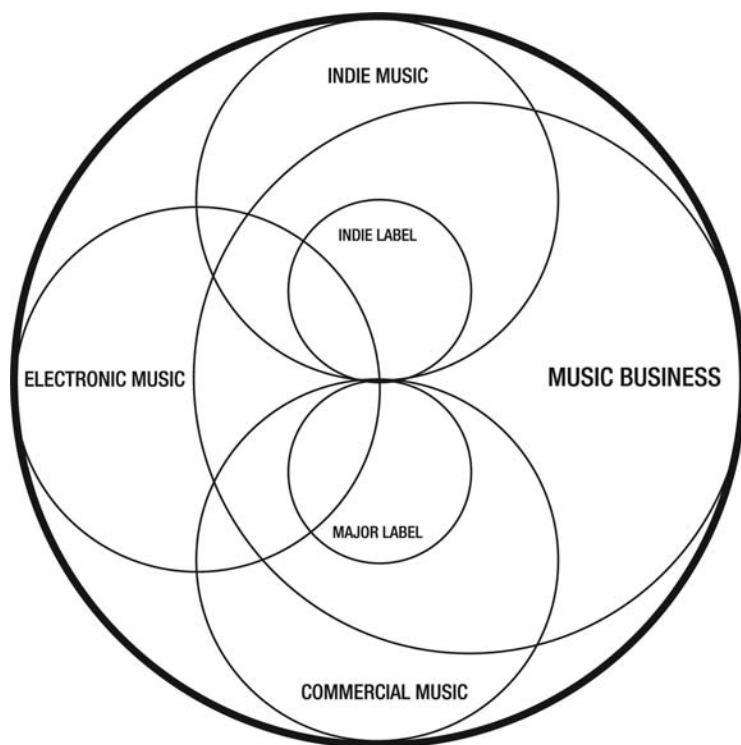


Figure I.1 In this diagram, the largest circle is music, with the circles representing electronic music and indie music as this book’s focus.

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DIY

Don’t hate the media; be the media.

–Jello Biafra, founder of Dead Kennedys and Alternative Tentacles Records

Do-it-yourself is a philosophy. “Yourself” is not limited to one person; it can be groups or even collectives of people who share the same sensibility. It implies consciously chosen freedom from dependence on institutional structures for your creations and productions. This choice usually involves a tradeoff of less financial or material resources for absolute creative control. There was a time when this tradeoff resulted in poor production quality and lack of sonic fidelity, leading to a common and fair criticism of DIY/indie productions. Nowadays, due to more readily available information, overall production quality is improved, and fidelity is no longer a serious concern because of lower technology costs, increased computing power, and the maturation of digital audio. Note that DIY implies being independent, but not necessarily vice versa.

Independent (Indie)

Independent labels take nothing and make something out of it. Major labels buy that something, and try to make more out of it.

–Tom Silverman, CEO Tommy Boy Records

By independent, I mean music that is not part of the major label, multi-national corporation music business (as briefly discussed in the next section). I am not referring to a specific style or aesthetic of music. Although indie music can be very popular and commercially

successful, commercial viability is not normally the primary motivation. The modern indie label mold is most associated with the DIY punk counter culture movements of the late 1970s/early 1980s, the electronic music and adventurous/experimental labels of that same period and into the early 1990s, and later labels following in the footsteps of the aforementioned. (More discussion on this topic is in Chapter 1, “Musica Universalis.”)

How is indie different from DIY? If you are DIY you are in all probability indie, but not necessarily the other way around. For example, there are artists on indie labels who play on the smaller-venue music circuits, but essentially use smaller, cheaper, less-commercial versions of the traditional project workflows, production processes, and commerce infrastructures. They are indie, but not very DIY. Also, indie labels are often stepping stones for artists hoping to sign with a major label, so they are indie only by definition and DIY only by necessity, not philosophy, until they get signed (if they get signed, and it works out). There is nothing necessarily wrong with this fact; it is what it is.

Electronic Music (EM)

Electronic music is not easy to precisely define, but it is safe to say that it is music primarily created with electronic instruments such as synths, samplers, drum machines, and sequencers. Electronic music production (EMP) is easiest to DIY from a logistical point of view because it can literally just be you and your computer. Yes, there is mainstream, major-label, electronic pop and dance music, but the vast majority of electronic music is aptly part of the DIY and independent music world.

Chapter 1, “Musica Universalis,” and Chapter 7, “Creative Process,” discuss historical relationships and evolutions of various genres. Here I offer a super short history of EM for context, but know that most of the following is further covered throughout the book. Although electronic instruments first appeared in the 1870s, electronic music didn’t really get going until the 1950s with pioneering academics such as Karlheinz Stockhausen and Max Matthews. Then, in the 1960s, with the synthesizers of Don Buchla and Robert Moog in particular, various composers and experimental musicians fertilized the ground for the major-label, progressive rock artists of the early 70s along with the German Krautrock movement that birthed Kraftwerk. By the late 1970s, the U.K./U.S. led new wave and proto-industrial music’s paralleling of synth pop, Zapp and Roger’s electro funk, and Giorgio Moroder’s chart-topping Italo-disco productions solidified electronic music in the pop and club worlds. Jamaican Dub and Roland’s legendary x0x series of drum machines and synths were the final ingredients needed for the largely African-American innovations of house, techno, electro, and hip hop that spawned most of the countless genres thought of as EM today.

NOTE: From a production point of view, hip hop is for all intents and purposes electronic music (as it is a close relative of electro, or “break-dance music”). The exact same technology is used to make beats or produce tracks. If this doesn’t make sense to you, just listen to “Planet Rock” (1982) by Afrika Bambaataa or “Jam On It” (1983) by Newcleus. The record industry separates hip hop and other “urban” styles from the rest of electronic music for marketing and distribution purposes. Mainstream hip hop and other styles of electronic music do inhabit different cultural niches, so this separation is understandable.

A Few Words on Major Labels and the Corporate Media Business

NOTE: While reading this section, keep in mind that “independent” is in this book’s title for a reason. Accordingly, it is written from the perspective that, not only can you have a fulfilling and successful career without the major labels and/or corporate media companies, but that moreover, such a career is a commendable goal unto itself.

There are numerous obvious cases of creative and artistic successes by popular major-label artists, yet it is important we never forget that the commercial music business is first and foremost profit driven. In most industries, competition between companies is good for consumers, while monopolies are not good for the public because they can fix prices, offer limited products, and control access to opportunities. In 1998, there were six major label groups—“The Big 6”—which included Dutch, German, British, American, Canadian, and Japanese financial interests. As of 2012, there was only “The Big 3”: Universal Music Group (35+ labels), Sony Music Entertainment (10+ labels), and Warner Music Group (20+ labels). All of these are subsidiaries of larger corporations. Combined with the predatory domination of various media by Clear Channel (discussed next), these four entities basically control the large-scale, commercial music industry (and much more).

Clear Channel in particular is quite problematic. For starters, its Live Nation Entertainment subsidiary includes a 2010 merger with Ticketmaster, who already had a famously troubled relationship with musicians and fans alike due to its fees and control over access to

venues. Clear Channel also has major interests in TV (including news), talk radio, outdoor advertising (billboards), and performance venues. In fact, Clear Channel owns more than 99 percent of the top 250 broadcast radio markets. In 2008, its primary shareholder, Bain Capital, took it from a publicly traded company to a privately owned subsidiary of CC Media Holdings, Inc. In addition to other industries, Bain also has significant financial holdings in Guitar Center, AMC Cinemas, Warner Music Group, and D&M Holdings, a merger of Japanese companies Denon and Marantz, which also now owns U.K.-based Allen & Heath. (Yes, Bain is the same private-equity company founded by the losing 2012 Republican presidential nominee Mitt Romney.)

Clear Channel will do anything they can, threaten me, go to my clients directly, anything to get control of the markets. And once they've got that control they can do whatever they want, including raise the rates. They're a clear example of what can happen with deregulation. They've ruined radio, as far as I'm concerned. And now they're licking their chops to be able to control more of what the public sees and hears."

—Anonymous owner of a southeastern advertising agency (in Eric Boehlert's 2003 article "Clear Channel's Big, Stinking Deregulation Mess" on Salon.com)

Universal Music Group, until recently part of France's Vivendi Universal Entertainment, was sold to GE (80 percent in 2004 and the other 20 percent in 2011), owner of NBC, to form NBC Universal with Comcast in 2011. As of February 2013, Comcast bought GE's remaining shares to become full owner of NBC Universal. Comcast is a huge company and, as the largest cable operator in the U.S., also has significant control over Internet access.

So, when we talk about the *commercial music business*, we are referring to an industry controlled mainly by just four entities in only two countries (as of February 2013): Comcast (U.S.), Time Warner Inc. (U.S.), Bain Capital (U.S.), and Sony Corporation of America (U.S./Japan). Media corporations have a lot of vested interests, including those of their parent companies. To support their financial, political, and/or ideological goals, they make decisions on what to say, print, and release, and what to omit. (To be fair, most corporations do not have political and ideological goals, and therefore primarily make decisions based on revenue and their mission statement.) As a generalization, we can say that misinformation and censorship are the most pressing concerns about mainstream, corporate-owned media's control of information flow.

A famous middle-aged rock-and-roller called me last week to thank me for speaking out against the war, only to go on to tell me that he could not speak himself because he fears repercussions from Clear Channel. "They promote our concert appearances," he said. "They own most of the stations that play our music. I can't come out against this war."

—Tim Robbins, actor (in Eric Boehlert's 2003 article "Habla usted Clear Channel?" on Salon.com)

Everyone has a point of view, so all media has a bias of some sort, but I think the most problematic forms manifest in specific ways: with mainstream right-leaning media, it is what they do say (profit interest misinformation) and don't allow (ideology and morality censorship), while with mainstream left-leaning media it is what they don't say (corporate interest censorship). There are significant implications for bands, artists, and music producers. Who controls what you can sell, where you can sell it, what you can say, how you can say it, where you can play, and how you are heard? In other words, who controls your freedom of expression and ability to make a living doing it? These are not new issues or questions. In fact, these issues are precisely why DIY and independent exist in the first place. Moreover, there are more opportunities than ever for self motivated DIY and independent artists and producers.

NOTE: Chapter 2 discusses the evolution of the record industry and the huge changes that have transpired in the last decade due to the digital revolution.

Let me be very clear. For a few people, major labels are a good choice. When you have a substantial following and have outgrown the capacities of smaller labels, then considering working with a major label can make sense—should it be an option and the deal is right. Just remember that although the A&R person who signs you may be your friend, to their boss, you are just numbers on a spreadsheet, profit or loss, nothing more, nothing less. If your buddy in A&R is let go, you likely depart with him or her. It happens all of the time. If "getting signed" is your goal, just make sure to do your research and get a really good music-business lawyer. (Check with your local musician's union for a referral.) That said, you should have a good lawyer for any deals, and don't assume that independent labels won't screw you over just because they are "indie."

Music business is not covered in this book because there is a lot of material out there already and it is not my area of expertise. But I have four pieces of hard-learned advice that are important when dealing with strangers, acquaintances, and even friends:

- ▷ Get financial agreements sorted out before any money is involved.
- ▷ Put agreements in writing.
- ▷ Do your research. Don't make decisions based on assumptions.
- ▷ If it sounds too good to be true, it probably is.

Magic Might Make Machine Mechanism, *Moegen Macht*

"Any sufficiently advanced technology is indistinguishable from magic."

—Arthur C. Clarke

Whether before or after one chooses and commits oneself to a life of intellectual, technical, and/or artistic pursuit, there comes a time to recognize a lineage. Who and what carved the pathways that created this option for you and your peers? Although the most immediate and obvious forerunners are important to recognize, beyond that, the breadth and scope of this lineage can vary greatly from person to person and career to career. A musician may simply see himself or herself as following in the footsteps of the modern greats in his or her genre, while another might understand that he or she is also part of a broader artistic movement that also includes the writers, filmmakers, dancers, and painters of his or her day. Other musicians will further see themselves as participants in long arcs of intellectual traditions that include not only the arts, but also whole cultural movements including technology, science, politics, religion, and social change. It is not unreasonable to even include streams of thought or traditions dating back hundreds or thousands of years, such as shamanism, the philosophers of ancient Greece, or the artists of the Italian Renaissance.

We are committed to producing music using modern electronic and computer technology, so what is our lineage? There is no right answer, and I am not going to offer one. I'm sure you can figure out the music part for yourself, but for the big context, I offer the following paragraphs for your consideration.

A brief scan of various dictionaries tells us that the verb *produce* means to make, to create, to bring forth, to bring into being, to give form or shape to, to oversee the making of. The word *technology* stems from the Indo-European root, *tek*, which means to shape or to make, and the later Greek *tekhne*, which refers to arts, skill, craft, methods, or techniques, combined with *-logy*, meaning the study of or language of. Jean Gebser (1949) pointed out that all the terms in this section's heading stem from the same Indo-European root, *magh*. In German, *moegen* means *to want*. *Macht* means *power*, as in might or willpower (though not unrelated to energy, as in a power station or *ein kraftwerk*).

The tree-like branchings that stem from the primal root words *magh* and *tek* point to an archetypal constellation that permeates our craft. Christopher Nolan's film *The Prestige* (2006) brilliantly re-imagines the late 19th century's crossfade from mechanical trickery to electrified technological wizardry via the bitter adversarial competition between two popular magicians: one driven by want, the other by will. David Bowie makes an appearance as Nikola Tesla, who is regularly referenced as a wizard or magician. Thomas Edison, inventor of the phonograph (1877), was known as the "wizard of Menlo Park," and released a silent film called *The Magician* in 1900. Magicians present a variety of illusions, with the most common known as a *production*—wherein they produce something from nothing, such as a rabbit from a hat.

Welcome to the Future

We truly are living in amazing times. I'm not exaggerating when I say that you have more freedoms and opportunities than any creative person living at any time in human history. It is unquestionable that technology is largely responsible for this state of affairs. But as with all technological progress, there are also new challenges. Just because you have more opportunities does not mean they are easy to grasp because anybody can readily choose to compete for those same opportunities. The Internet and the democratization of computing technology enables everyone to have their own media outlet. Even if you've never explicitly thought about the DIY ethos, these challenges include implicit responsibilities and demands on each of us to do more for ourselves. Whether you produce house, techno, hip hop, dubstep, indietronica, or even independent movie soundtracks, we are all in the same boat. Those who refuse to accept the new technologies are being left behind. Those who are too dazzled by all of their possibilities and wonder are ultimately distracted.

Frank Sinatra sang on over 1,000 recorded songs, but is credited as a composer on fewer than 10 of them. Have you heard of Motown? What about the Funk Brothers? The Funk Brothers were the in-house session musicians who played on all the classic Motown recordings from 1959–1972. Even if you are not a fan of that era's music, every producer should see the 2002 documentary *Standing in the Shadows of Motown*. It was not that long ago that recorded music was a process accomplished only by a whole team of specialists. First, there was

the producer who put the whole team together, including the composers, lyricists, and arrangers—the songwriters. Commonly, studio musicians played the accompaniment. Finally, you had the performers and singers—the ones whose name was on the cover of the album. Additionally, there was the A&R person, a recording engineer, mixing engineer, pre-mastering engineer, mastering engineer, manager, and publicist, to name just the most obvious.

The Accidental Producer

Now it is expected, often unrealistically, for the independent musician/artist to accomplish or plan, and pay, for the whole production—in other words, to play every role and be the whole team. For the moment, let's just consider the writing, recording, and mixing. Most electronic music producers are comfortable wearing all these hats, although they often get assistance in the mixing area. For other independent music producers, whether hip hop or indie rock, writing and recording is often the main goal. Regardless, each of these areas takes years to master, and musicians who want to produce their own music are often thrown right into the deep end of the audio-technology pool. So here you find yourself interested in pursuing a creative-technical profession that demands a high level of DIY—buying all your own tools of the trade, learning how to use them, and learning the industry, all by yourself. It may sound crazy, but it is a common expectation, whether fairly placed or not. There are many reasons for this situation, but the advancement of technology and equally drastic decreases in its cost are at the center of it.

Faster, Smaller, Cheaper...Easier?

In 1979, Tascam released a groundbreaking affordable tape recorder: the Teac Model 144 Portastudio, for about \$1,200. Mix Online's TECnology Hall of Fame describes it as "an integrated 4-track cassette recorder with Dolby B noise reduction, 3.75 ips operation and a 4 × 2 mixer with pan, treble and bass on each input." Just 25 years later, in 2004, Apple's top-of-the-line Power Mac G5 2.5 GHz DP retail price was \$2,999. That same year, Apple released the iLife '04 software suite, which included GarageBand, iTunes, iMovie, iPhoto, and iDVD. In 2002, Apple had acquired Emagic, makers of Logic Audio. Dr. Gerhard Lengeling, Emagic's founder, directed the development of GarageBand. Upon its release, iLife '04 was included *free* on all new Macs, and for another \$49, anyone could purchase it. Counting for inflation, \$1,200 in 1979 is equivalent to \$3,100 in 2004.

Yes, there have been huge advances in interface design and functional simplification, but it is a mistake to assume that technology is easier to understand or use simply because it is more affordable and accessible than before. As somebody who is a musician, electronic or otherwise, why would you expect to quickly understand how you're supposed to use all the tools you have at your disposal? Nearly every major piece of audio software is standing on the shoulders of a century's worth of history and technology. Just because current smartphones have more computing power than a desktop computer with an Intel Pentium 4 or PowerPC G4 processor, that certainly does not make you think you understand what is inside it any more than the more expensive, larger, older computer.

It is fair to say that somebody just getting into music production might be a little confused and overwhelmed with all the options and information presented by numerous sources of varying reliability. One reason for all this confusion is the separation of the technology from their various trade crafts. Just a few decades ago, if you wanted to learn how to use a recording console, you would have gotten a job or internship in a major recording studio because those audio desks often cost many hundreds of thousands of dollars. A piece of equipment that expensive is not trusted to just anyone, so engineers were brought up in a pseudo-apprenticeship situation. Subjective sonic characteristics aside, you basically have most of the same functionality of the \$500,000 consoles in your personal computer. Why should you be expected to know how to use it professionally without significant training just because technology's advance has made it smaller and cheaper?

From Musician to Producer: An Author's Version

The following personal anecdote illustrates dynamics of decisions and outcomes related to career evolution and should be especially eye-opening for those who are just starting down the path. Although a lot has changed since the 1990s, the underlying structural elements are largely the same. Most of the themes are topics worthy of in-depth discussions, which are found spread throughout chapters in this book. For your convenience, they are noted when relevant.

In late 1995, I decided I didn't want to be dependent on other musicians for my creative expression. I was going to create a bedroom studio using some "extra" student loan money. I went to Guitar Center on Mission St. and bought a Tascam Porta07 four-track cassette tape recorder for about \$300 (see Figure I.2) and a used Alesis SR-16 drum machine. (I didn't keep either of them for long). I had my Music Man bass, drum machine, tons of Boss and DOD FX pedals, and my all-in-one home stereo as a mixdown deck. This setup was a lot of fun, but I very quickly outgrew its capabilities. I started looking at eight-track recorders but realized that without spending way more money than I had, I would not overcome the limitations causing the creative frustrations.

In 1995, the World Wide Web was only a few years old, and there were not yet many audio forums. Using my state-of-the-art 28.8 Kbps dial-up modem and taking advantage of new free AOL trial offers every 30–60 days (they sent CDs to everyone like junk mail back then), I found a few useful forums. I noticed a lot of discussion (flame wars) about all the advances in digital audio on the Mac. By the summer

Record,
Thinking about getting a 4-track? Then check out the TASCAM Porta07. It's everything you demand in a multitrack cassette — for less cash. Whether you want

bounce,
to record high-quality demos, or need your own music sketchpad for the road, the Porta07 is your personal recording studio. No other 4-track offers so many

overdub,
features for so little money. First off, you get Hi and Low EQ and Effects Sends on all four input channels. Second, it runs at double the tape speed, and includes

punch in/out,
dbx noise reduction. This means low noise recordings, outstanding dynamic range and clean sound — even for bounced tracks. But wait. There's more. The

EQ,
Porta07 even comes with a master mixer section. Complete with a Stereo Effects Return for adding reverb or other effects. Plus, you get four Tape Cue Levels

mixdown,
so you can set a monitor mix just for overdubbing. A dedicated monitor section with level control means you're free to monitor anything going through the deck —

and more

for

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*Suggested retail price. dbx is a registered trademark of AKG Acoustics, Inc.

Figure 1.2 An ad for the Tascam Porta07 in *Guitar World* magazine, 1993.

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of 1996, I sold my Performa 6116 (60 MHz) and 14-inch CRT monitor, upgraded to a used Power Mac 7600 (120 MHz) with a used 17-inch CRT monitor, and decided to get into this fairly new thing called Pro Tools.

Most of my friends either didn't know what I was talking about or thought I was crazy for embracing computer-based audio. One of them had spent a lot of time in recording studios (his previous band was signed to Metal Blade Records), so I asked him to meet me at Guitar Center for the purchase. Skeptical of making a computer the center of my studio, he tried to convince me that I would be better off with the new Roland VS-880 digital multitrack recorder (\$2,900). My gut told me that Pro Tools was the future, and that it might even lead to paying work at some point down the road. Fifteen minutes—and \$1,500—later, I was the proud owner of Pro Tools v3.4 w/DAE PowerMix and an Audiomedia III PCI card. (For more information on related topics, see Chapter 3, “What Is Your Plan?” and Chapter 8, “Selecting Your Tools.”) Looking back, I can say without hesitation that it was the single best career decision I ever made.

NOTE: FYI: Accounting for inflation, \$2,900 in 1996 is more than \$4,200 in 2012, and \$1,500 in 1996 is more than \$2,100 in 2012.

Ancient Pro Tools: Pro Tools w/DAE PowerMix was the short-lived native, non-TDM precursor to Pro Tools LE (which appeared with version 5 in 2000). Depending on your CPU speed, you could play back eight tracks of audio using the Audio Media III card in a PCI slot, and had access to a few, very basic, real-time EQs. Or, you could use your built-in sound card and play back 16 tracks with no EQ. AudioSuite plug-ins didn't show up until version 4 in 1997, and RTAS not until version 5. Needless to say, it was extremely limited compared to any DAW of this century. The AM III card had two RCA jacks for analog in, two RCA jacks for analog out, and another RCA pair for S/PDIF digital I/O, and there were no preamps. Also, there were no virtual instruments. Pro Tools could only play back MIDI files at that time, and was not even able to record or edit them until version 5.0. So, I had to sync Cubase to PT via OMS and an IAC bus (more on OMS and IAC in Chapter 6, “Producer Tips”). Even with all those limitations, it was still very good at multi-track audio editing. And honestly, it was a lot of fun. I had plenty of hardware synths, drum machines, and effects boxes to play with, in addition to file-based sound-processing software such as SoundHack and dearly missed pre-MacOS X only apps such as Thonk and SoundMaker (of course with Michael Norris' SoundMagic FX plug-ins). By the way, to play back 16 full tracks of audio, I needed two hard drives. Each external 9 GB SCSI drive (Digidesign qualified) cost more than \$1,300 in 1997. Up hill, both ways, in the snow.

One Thing Leads to Another: Positive Chaos

We are all agreed that your theory is crazy. The question which divides us is whether it is crazy enough to have a chance of being correct.

—Niels Bohr

Getting into Pro Tools ahead of the curve was my most important career decision from a trade-craft point of view. Inspired by a tip from a friend, the most consequential decision was the selection of my part-time job during freshmen year at college in 1990. At that job, I established important relationships, which are key to any fulfilling career (and of course life in general). The second-best career decision was adding Ableton Live to my repertoire shortly after moving to Brooklyn in 2002. (The previous paragraph includes key topics from Chapters 3, 4, and 5.)

These three decisions and their combined outcomes beautifully illustrate sensitive dependence on initial conditions, what is commonly known as the *butterfly effect*. Seemingly small changes in the system amplified each other to produce unpredictable results, a system with radically different characteristics. In this case, the different characteristics are appreciated opportunities and positive outcomes, not a tornado in Texas set off by Lorenz's hypothetical butterfly flapping its wings in Brazil. Each opportunity opened the way for subsequent ones, but this deterministic process did not resemble a cascade of falling dominoes or even a Rube Goldberg machine. In hindsight, a visualization of the process more resembles the fractal, branching patterns emphasized in the preface's images. (More on the butterfly effect in Chapter 3 and Appendix A.)

The Music Producer's Survival Guide

For now, I am omitting stumbles, dead ends, sacrifices, and questionable decisions with variable outcomes, so what follows is a simplified, sanitized, bare-bones yet accurate description of one thing leading to another. Learning Pro Tools helped lead to a job at Harmony Central, which directly led to a job at Rocket Network, which certainly led to a teaching job immediately upon landing in NYC in 2002, which directly led to a better one in 2003 (working for Richard Termini). Also, knowing Live directly led to writing an online article about using ReWire with Live and Pro Tools for the now-defunct *DigiZine* in 2005. This in turn led to authoring Ableton Live tutorial CDs for Thomson Learning's CSi CD-ROM series, and then starting in early 2008 to work as a technical editor for their Course Technology division (mostly Pro Tools- and Ableton Live-related books).

In tandem with developed professional relationships, the previous gigs led to an invitation to the very first Ableton Certification testing event in the summer of 2008, hosted at SAE NYC. I was the only one not sent there on behalf of an existing school, and therefore the only one paying out of their own pocket to get certified—a no-brainer DIY decision. After two days of presentations and tests, I became the first person on the planet to be handed an Ableton Certified Trainer certificate—an honor for which I will be eternally grateful. (The four other attendees were also certified at that inaugural event, as was Laura Escudé shortly thereafter in L.A., who helped design the program for Ableton.)

After the Thomson Corporation and Reuters Group merged in 2008, they spun off Thomson Learning to a new company, Cengage Learning, the publisher of this book. Orren Merton, the acquisition editor who made it possible for this book to happen, was the technical editor on the very first Ableton project I did for Thomson Learning in 2005.

Conclusion: If you like this book, make sure to thank my long-time friend Dave. I am a fan of *non sequiturs*, but the previous statement is not one of them. Although he was living in Bloomington, IN, while attending Indiana University at the time, Dave mentioned that when I moved to Kalamazoo, MI, I should check out this music club that his band had played at while on tour. It was well respected nationally by booking agents for its “new music” Monday nights and all-ages weekend matinees. A few days after moving into the dorms, I went into the club to see if they were hiring. One position had just unexpectedly opened up. I worked there part time as a doorman (ID checker) and occasional bouncer during my freshmen year at Western Michigan University. With such a high-visibility job, I was able to meet and socialize with everyone of significance in the regional music scene and beyond....

Translation: If not for being told about that club before moving there, I likely would not have applied in time to get the job, since there was just one opening at the time and it was a highly desirable job. I would not have come to know many of the people who led to all the things that made it possible for me to write this book, and therefore for you to be reading it wherever and whenever you may be. So be sure to thank Dave if you like *The Music Producer's Survival Guide*.

Companion Website

One more thing: If, after reading this book, you're interested in learning more about the topics presented or accessing a list of the resources cited herein, please visit this book's companion website, located at www.iempsg.com.

Musica Universalis

Let us begin with music itself. Its history could be written from the viewpoint that music consists of a continuous discovery of new harmonies, of novel consonances and harmonic possibilities.

–Joachim-Ernst Berendt

To unify recent insights in physics and in the life sciences into a coherent description of reality, a conceptual shift from structure to rhythm seems to be extremely useful. Rhythmic patterns appear throughout the universe from the very small to the very large.

–Fritjof Capra

In the final analysis, it is a matter of interpretation whether we experience the numerical proportions that are found in so many phenomena of the organic and inorganic world as harmony or as rhythm. Harmony is rhythm is harmony is rhythm.

–Joachim-Ernst Berendt

I AM MAKING ONLY ONE ASSUMPTION ABOUT EVERYONE INTERESTED IN THIS BOOK: You love music. There are many reasons for choosing music and music production as a career, but one of those reasons is that your passion for music is strong enough that it is what you want to do with your life. Even if we do not share taste in any artists, styles, or genres, all of us at least have that one thing in common. This book is about being an independent and/or electronic music producer, but this chapter is largely about music. It is about the significance of music in our lives and culture. It is about the cultural cross-fertilization in the evolution of music and its proliferation of genres and styles as seen through the lens of chaos theory. It is about the rise of indie labels and a brief history of electronic music.

NOTE: The terms DIY, independent, and electronic music are defined in the book's introduction, which also includes a brief summary of the extraordinary consolidation of major labels in recent years. The next chapter defines "producer" and briefly discusses the record industry from its inception to present and the impact of the digital revolution and the Internet on the music industry as a whole.

Music Is Universal

All human cultures and civilizations develop their own particular customs, artifacts, and social systems. When we compare them to each other, the differences add up to a mind-boggling variety and diversity of human creativity and problem solving. Even given the astounding differences between them over long historical arcs, vast geographical separations, and layered socio-economic strata, these differences appear as unique manifestations of universally shared human enterprises. In many ways, what defines each culture is its characteristic manifestation of these domains, including but not limited to language, cuisine, art, social structure and norms, religion and creation myths, spiritual and/or mystical practices, ritualistic/ceremonial mind-altering substances, distilled and/or fermented libations, martial arts, and music. To say that music is the universal language is of course a cliché, but all clichés are true, which is why they are clichés. And although it could be argued that food is also a universal language, music nonetheless has a unique and uncanny ability to successfully communicate across all known cultural barriers like no other cultural creation.

Identifying a significant culture or civilization without its own music and musical instruments, from at least the last 6,000 years, is not an easy task. Some expression, manifestation, or integration of music, song, and/or chant is found in most significant human endeavors. Music is everywhere, from songs of celebration, to the chants in a rain dance or meditative mantra, to pub songs, party anthems, and a romantic candle-lit-dinner-for-two piano music. It is present at weddings, bar mitzvahs, funerals, and protest marches. It is heard as the beat of war drums and in the traditional music performed during the Wai Khru Ram Muay ceremony as Muay Thai fighters enter the ring. Music is central to collective experiences at concerts, modern music festivals, and "raves." Music is ubiquitous.

Music Is Diverse

Music can express any emotion. It can capture any mood or state of mind. Music can be affectionate, aggressive, angry, annoying, banal, bombastic, calming, depressing, devotional, disgusting, eccentric, egotistical, elevating, energetic, entertaining, ethereal, evocative, fantastical, flippant, fun, grounding, hateful, humorous, incomprehensible, inspiring, institutional, insulting, ironic, irreverent, jittery, kinky, lethargic, malicious, manipulative, motivating, mysterious, nihilistic, painful, ominous, outlandish, profane, provocative, psychedelic, quirky, rebellious, revolutionary, sacred, sensual, serious, somber, soothing, strange, surprising, transcendent, transformational, uplifting, vibrant, whimsical, weird, xenophobic, zany...the list goes on. Artists create music that reflects their experiences and those of the surrounding culture. People gravitate toward music they relate to or that connects to them in some way.

Given that music is so diverse and pervasive, it is not surprising that whole cultures and communities develop around specific styles of music. This is particularly obvious when we look at the subcultures that developed in the latter half of the 20th century, such as punk and hard core, B-boy, industrial, goth, indie rock, metal, rave, and various other electronic music scenes. Although it is hard to imagine now, there was a time not that long ago when every one of these scenes was almost totally isolated from the others. Rockers didn't go to techno parties or vice versa. Punks and metal heads acted like the Hatfields and McCoys. Goth and industrial made a perfect pair, and although they occasionally hung around some of the more arty punks and metal heads, they literally occupied different cultural universes from B-boy scenes. House and garage were primarily urban, black, and gay, while indie rock was primarily suburban, white, and straight. Although most of the scenes that birthed these styles still occupy recognizably similar cultural niches, the social boundaries between them are significantly more porous, and any boundaries pertaining to the cross-fertilization of musical influences, ideas, and aesthetics are non-existent.

Music Is Technological

Music's fundamental status in culture is illustrated by how quickly new technologies are applied to it. Many musicologists argue that musical instruments became commonplace for the first time right after we learned how to make hunting tools, and therefore not only had new craft knowledge but also regular exposure to naturally resonant animal parts such as ram's horns. Yet, we have evidence of rudimentary tools from millions of years ago and our oldest physical evidence of a musical instrument is from about 42,000 years ago. Fast forward to 1874, when, while working on inventing the telephone, Elisha Gray demonstrated the Musical Telegraph, the very first synthesizer. While working at Bell Labs, Max Matthews applied computers to music recording and synthesis in 1957, 20 years before the Apple II.

Apple and other significant entrepreneurs and hackers emerged out of the Homebrew Computer Club in Silicon Valley. The release of the MITS Altair 8800 spurred the creation of this club, and although it was almost useless and had no operating system, the fact that an individual could have a computer at home in 1975 was the stuff of nerd legend. About a month after the founding of the club, no one had yet figured out what to do with the Altair. Then, Steve Dompier demonstrated a lengthy switching program that modulated AM radio interference, which produced a cover version of the Beatles' *Fool On The Hill*. Shortly thereafter, inspired by this musical hack, other members got the idea to create add-on boards for the Altair, and the personal computer industry was born. Shortly after microprocessors became commercially available in the early 1970s, it only took a few years before they found themselves in digital music systems and synthesizers. The MIDI spec was published in 1983, and by 1984–1985 Steinberg, MOTU, and Opcode had released commercially available music software for home computers. Within months of the iPad's April 2010 release, developers offered audio and music production software. That same month, Propellerhead re-released ReBirth-338—its flagship title circa 1997 and discontinued since 2005—for iPhone and then quickly updated for the hottest gadget around.

Music Is Personal

The combination of artists and styles one most enjoys says a lot about a person. Our individualized palate of musical tastes can influence what people think about us, and what we think about who we are. Many cultural signifiers are attached to music, which are interpreted to imply everything from social scenes, to political views, to attitudes toward authority, and even intelligence or education. Moreover, the music in someone's personal collection often represents memories, feelings, and experiences from specific times and places in one's life. Although these collections are often organized with playlists on an iPod or the like, in the past personal attachments extended to the actual "record," with its full-color cover art and pages of liner notes, whether vinyl album, cassette tape, or CD.

A million people listening the same song are part of a shared experience, but there can be millions of interpretations. Some songs carry an extra special personal meaning to many because of life experiences associated with that song. Like sports, politics, or religion, people get

emotionally involved with their music. It is no coincidence that The Beatles' emphasis on personalized lyrics, not yet common to upbeat music, helped them set the standard for huge frenzied international followings—what was known as “Beatlemania.” With titles like “Love Me Do,” “Please Please Me,” “From Me to You,” and “I Want To Hold Your Hand,” it is no wonder that fans felt like John and Paul were singing right to them. They had a personal connection, even while surrounded by other crazed, crying, screaming, and even fainting fans in the crowd. These crowds were unprecedentedly loud—to such an extreme that The Beatles could not hear themselves on stage. This famously caused them to mistakenly play two different songs at the same time, a gaffe that went unnoticed until the band figured it out backstage after the show. Those were simpler times, but even today, commercial pop songs still load up on personal pronouns in the hope of selling more records. How many songs combine “you,” “me,” “us,” “I,” “we,” and “baby,” with some mix of “all night,” “tonight,” and/or “love”? Such examples from the dawn of the modern pop era to today clearly show that music is very personal.

Why is it that consumer music products are commonly marketed with slogans containing the words “your music”? Generally speaking, the music in question was made by someone else, and many millions of others might have the same song. So why “your music”? Why did “I Want To Hold Your Hand” set off the British Invasion of the 1960s? As painfully contrived as this common approach to consumer marketing may be, the fact remains that music is very personal, and marketers understand the deep and powerful emotional relationship we have with the music we enjoy. We don't like it when others mess with our music. If it is dissed, exploited, or commoditized in a way that cheapens or lessens our experience, we feel personally insulted or disrespected to an extent that does not occur in relation to other products, such as cars, home appliances, or clothing. When profit motives influence those products, how they are designed, marketed, and sold will bother some people, but not in the same way as when it influences their music. Certain artists who give into such commercialization (or are perceived to have done so) are referred to with some version of the pejorative phrase “sell out”—as in, “They sold out,” “What a sell out,” “They were great before they sold out,” or “Why did they have to go and sell out?” This gets at why numerous communities have issues with big labels—or more precisely, with what often happens to certain types of artists after they mistakenly sign with one of them. (Chapter 2, “Plot Point on the Space-Time Continuum,” talks more about the pros and cons of the major label sector of the music industry.)

Music Is Vital

Without music, life would be a mistake.

–Friedrich Nietzsche

Without music to decorate it, time is just a bunch of boring production deadlines or dates by which bills must be paid.

–Frank Zappa

Music is a moral law. It gives soul to the universe, wings to the mind, flight to the imagination, and charm and gaiety to life and to everything.

–Plato

I do not think that is an overstatement to say that music literally saves lives. Many individuals over the years have credited music with giving them a sense of hope and direction when life seemed pointless or meaningless. Music was their antidote to the variety of negative experiences, feelings, and thoughts so fully described and elucidated by the existentialists and absurdist.

The serious issues in existential philosophy regularly found themselves repurposed in the brilliant comedy of Monty Python. There is no better example of existentialist humor than their 1983 sketch comedy musical movie *The Meaning of Life*. The movie's theme song is heard during the closing credits, but is first performed about halfway through the film by troupe member Eric Idle. To console Mrs. Brown after witnessing her husband's gory death by premature organ donation due to a bureaucratic mix up, he leaps out of a closet and leads into the very whimsical, vaudeville-esque song. A brief prelude is directed at Mrs. Brown, as he lets her know that when life is hard or people are bothersome, and she's had enough of it all, to remember that she is on an evolving planet.

The first verse of this song, called “The Galaxy Song,” is a lengthy astronomical description of the Earth's location in our enormous galaxy and universe, with the second verse of the song telling us how the universe is continually expanding at the speed of light in all directions, the fastest speed possible, before reminding Mrs. Brown that her unlikely birth is no less amazing regardless of how insecure or small she feels. The song then concludes with a punch line about intelligent life in space but not on Earth. Though intended to cheer up the newly widowed character by pointing out to her that it is amazing she is here in the first place, to make that point he first must explain how tiny we are in a vast expanding universe. Monty Python's comedic genius is on display here as they make existential despair funny. It is almost impossible to appreciate how they do this if you've never seen the movie, so do yourself a favor and watch it sometime, or at least find “The Galaxy Song” scene on the MontyPython YouTube channel.

The Music Producer's Survival Guide

Feeling small and feeling insignificant are classic existential maladies, ones that can be cured by comedy and music. Countless alienated, angst-ridden teens and young adults have stated that music was a positive influence that helped through rough patches by giving them hope and allowing them to feel like they were part of something bigger than themselves. Beyond the powerful emotional impact of the music itself, there is also a connection to the artists and music scenes full of others with similar dispositions and experiences, which creates a shared sense of cultural identity. This dynamic is especially noticeable when considering the various subcultures that once defined the “underground,” such as goth, punk, industrial, metal, techno, house, rave, and B-boy, which are now the foundations of many current-era styles.

Personally speaking, deep involvement in underground music culture starting in my late teens was incredibly formative and for the most part full of positive experiences. An intense passion for music that was commonly frowned upon definitely helped me to get through very rough, rebellious, angry high-school years. In the mid to late 1980s, punk, metal, industrial, and what was then called “hard core” rap offered powerful distractions from the homogenous, conformist, superficial, and otherwise dull high-school years common to American suburbs like those north of Detroit. Additionally, a lot of this music was the target of national-level censorship campaigns by various religious fundamentalists or secular “concerned parent” groups like the PMRC—the latter of which instigated the now-legendary Congressional hearings that, in 1985, resulted in the RIAA giving in to pressure to place “Parental Advisory” stickers on all records with “offensive” content. Because music is so personal, especially to those who already feel like they must operate outside of the mainstream, these perceived attacks galvanized music communities and made involvement in such scenes that much more meaningful and motivating.

Music has this powerful positive effect on all kinds of people, not just angst-ridden teens and other fans of intense, aggressive, angry music. In 1982, Indeeep released the post-disco-funk-pop-new-wave-R&B club hit “Last Night a DJ Saved My Life,” which inspired the 1999 book *Last Night a DJ Saved My Life: The History of the Disk Jockey* by Bill Brewster and Frank Broughton. Not only a history, this book also discusses the reverence that club and festival goers have for A-list DJs. This reverence stems from their consistent ability to create transcendent, life-altering experiences for those in the room or crowd. The meaning-giving power of music is potentially that much more powerful for artists, musicians, and producers because they are not only fans and listeners, but also creators. As producers, we can experience additional levels of connection to music not only during the creative process, but also as fans give back energy, either in the crowd or through other common fan/artist interactions.

“Music Saved My Life”: Three great examples of highly successful musicians on the record for how music saves lives are Mike Borden, Mary J. Blige, and Cee Lo Green.

- ▶ In the August 2007 issue of *DRUM!* is an interview with drummer Mike Borden, co-founder of Faith No More, about joining Ozzy Osbourne’s band. He tells us, “It’s no joke that Black Sabbath saved my life. I always dreamed of meeting Ozzy and telling him that.”
- ▶ In an October 2, 2010 NYDailyNews.com interview with nine-time Grammy winner Mary J. Blige, she is quoted as saying, “Music makes us want to live. You don’t know how many times people have told me that they’d been down and depressed and just wanted to die. But then a special song caught their ear and that helped give them renewed strength. That’s the power music has.”
- ▶ Before singer/producer Cee Lo Green co-founded Goodie Mob in the early 1990s, before he partnered with Danger Mouse to form Gnarls Barkley in the early 2000s, he was another teenage troublemaker heading down a bad path. In a July 14, 2011 article on Metrolyrics.com, Green is quoted as saying, “I was angry about being an outcast. I would have liked to fit in and have tons of friends, but I didn’t. So I’d cut school, drink beer and end up making examples of people. After a while I became so comfortably numb with violence I felt that my only purpose in life was to be a rudeboy. So really, music saved my life. I have always said that if I wasn’t famous, I would be infamous.”

There is no need to look up quotes by famous musicians. Just do a simple Web search on the topic. You might run across the posts from about 300 users who joined the group on experienceproject.com, “I Know Music Has Saved My Life.” You might also find dozens of positive responses to “How Downloading Music Has Literally Saved My Life,” an article posted to pitchforkreviewsreviews.com by a once morbidly obese teen. It is not a rare statement.

Music Is Fundamental

Of all the art forms, music more than any of the others is found in mixed forms that cater to multiple senses—for example in theatre, film, TV, dance, and even fireworks displays. There is something about music and sound that connects to us on all levels, from the primal and instinctual to the most sophisticated and evolved. Not only can we perceive sounds that are out of view, but we can also perceive the source's direction and distance from us. This ability is refined to mimic echolocation as used by other animals, such as bats and dolphins. This cultivated skill is best exemplified by Daniel Kish, founder of World Access for the Blind, an organization that teaches blind people how to use echolocation to navigate the world without the usual cane. Kish himself is completely blind, yet he gets around by himself completely unassisted, including riding mountain bikes, because of his developed echolocation skills.

Not only can hearing at times fill in for vision, but we also “feel” music and sound—not just emotionally but literally, through physical and kinesthetic sensations. This latter point helps explain why there are so many hearing-impaired individuals who still appreciate music. Famously, Ludwig van Beethoven continued to compose even after he lost his hearing, but it goes much further than that one anecdote. It is now common for big music festivals to have people doing sign language in front of the stage and projected onto the big screens. These “signers” allow the hearing impaired who are feeling the music to also perceive the lyrics. For a brilliant and entertaining example of a signer at a recent music festival, do a Web search for a video of ASL signer Holly, 2013 Bonnaroo Festival, Wu Tang Clan. Beyond genius composers and concert goers, how about a deaf professional DJ? Just look up Robbie Wilde, “That Deaf DJ,” online; there are a number of good interviews and mini documentaries floating around. You might also check out the 2004 documentary *Touch the Sound*, “which explores the connections among sound, rhythm, time, and the body by following percussionist Evelyn Glennie, who is nearly deaf (IMDb.com).” Given such diverse examples of the hearing-impaired involved in music, there must be something more to it than just audible sound.

Nature Is Musical

Many characteristics of music share patterns, relationships, and structures with the physical world around us. In addition, musical idioms pervade our language. (“It is time to face the music.” “Let’s play it by ear.” “Does that ring a bell?” “Your story rings hollow.”) Even more significantly, many musical terms are found in our language. When describing elements or structure in the composition of visual art, it is common to talk about their rhythm or harmony. Interpersonal relationships have rhythms; they can be harmonious or full of tension. The slang term “vibe” is short for vibrate or vibration. (“We just don’t vibe,” “I vibed to that song,” “That place gave me weird vibes,” or “That club has a nice vibe.”) It goes much further than colloquial language. All the quotes at the top of this chapter are from Joachim-Ernst Berendt’s 1991 book *The World Is Sound: Nada Brahma: Music and the Landscape of Consciousness*. A successful European jazz producer, Joachim-Ernst Berendt (1922–2000) had more than 200 album credits, including with legends like Don Cherry and Eric Dolphy. In the book, Berendt covers some of the material we are about to go over, but there is a lot more that is worthy of your attention. It’s just too much of a tangent to cover here, so check it out if you are interested in the subject matter that follows.

Music is sound, and sound is vibrations that correspond to pitches and timbres. In audio, we talk about a sound wave’s periodicity as cycles per second (cps) and use hertz (Hz) as our unit of measurement. The higher the frequency, the shorter the wavelength, and vice versa. The timbre of a sound is largely determined by the sum of its partials, each of which is essentially a sine wave with an amplitude and hertz measurement. Musical pitches are largely determined by the fundamental frequency, the lowest frequency partial. And just as the notes in a chord determine whether it is harmonious (consonant) or disharmonious (dissonant), the combination of partials determines whether any given timbre produces an identifiable note or an atonal sound. Analysis of the natural world reveals that such relationships are found everywhere and understood as combinations of mathematical ratios.

Music Is Mathematical

The golden ratio and its fraternal twin, the Fibonacci series, appear in patterns at all scales of the physical world, recognizably in spiral shapes ranging from pine cones to galaxies. For thousands of years, composers and architects have used these ratios to structure the harmonies and proportions in their compositions and designs. In 1995, HarperPerennial published *A Beginner’s Guide to Constructing the Universe: Mathematical Archetypes of Nature, Art, and Science* by math professor Michael S. Schneider. In 2007, Schneider posted an article to his website, www.constructingtheuniverse.com, entitled “The Amen Break and the Golden Ratio.” The six-second long drum solo from The Winston’s 1969 song “Amen, Brother” is the most sampled drum break of all time, and is known as “The Amen Break.” To figure out why that sample is so popular, Schneider analyzed its structure mathematically and discovered relationships with major similarities to the golden ratio (1.61803398875). He summarized these findings as follows:

The major wave peaks of the Amen Break, and many of its smaller ones, seem reasonably close to being an expression of the fractal nature of the wonderful Golden Ratio. Maybe it’s just an apparent coincidence or maybe it’s like thousands other approximations of the Golden Ratio that are not consciously planned but do appear in human designs....

The direct connection between music, math, and nature dates back at least to Pythagoras circa 500 BCE, who was one of the many great minds to ponder the Golden Ratio. This great interest in proportion and ratio led Pythagoras to historical experiments with a very simple instrument, the monochord. The monochord had one metal string attached to a hollow resonating piece of wood with a moveable bridge that was used to change the pitch. He figured out that the intervals—the relationships between notes—had precise ratios. For example, a perfect octave is a 2:1 ratio and a perfect fifth is a 3:2 ratio (see Figure 1.1). So if the string's 1:1 ratio was the note A, with the modern 440 Hz tuning, by moving the bridge exactly to the middle, we get 880 Hz, a 2:1 ratio or octave, which is the most consonant interval there is. If we move the bridge to create a ratio of 16:15, we get a minor 2nd, which is a very dissonant interval. Consonance and dissonance, or harmony and disharmony, are largely explained by the character of their ratio. Pythagoras then applied these insights to astronomy and cosmology to explain the movement of the planets. Believing they followed similar harmonic ratios, he coined the phrase “harmony of the spheres.” Fast forward 2,500 years, and string theory (also known as M-theory), which is at the forefront of theoretical physics, posits that the fundamental particles comprising atoms are actually like incredibly tiny one-dimensional vibrating strings. Just as different notes are created by different vibration patterns on the same string, so too are the different subatomic particles, according to string theory.

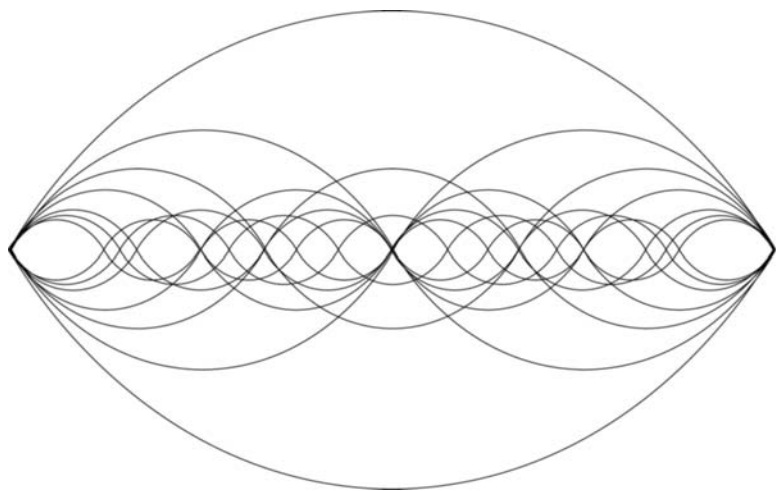


Figure 1.1 Ratios in the harmonic series. This image shows 1:1, 2:1, 3:1, 4:1, 5:1, 6:1, and 7:1. For example, the 5:1 wave also includes the 3:2 ratio [perfect fifth].

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Let's travel back to about 150 years after Pythagoras. As Socrates' star pupil, Plato is certainly one of the most important philosophers of the ancient Greek era, the foundation of classical Western thought. He is also well-known for identifying five unique geometrical shapes, known as the Platonic solids. If you think that the shapes found in role-playing dice with four, six, eight, 12, or 20 sides are a product of the early 1970s, think again. Plato singled out those five polyhedrons from all the others for their unique mathematical properties. The Platonic solids form the foundation of classical geometry to this day.

Yet, by the early 20th century, geometry was actually frowned upon by many mathematicians. In *Chaos*, James Gleick describes this state of mind among the elite mathematicians behind Bourbaki, a secret society of mathematicians that formed in 1935, when he tells us that “above all, Bourbaki rejected the use of pictures.... Geometry was untrustworthy. Mathematics should be pure, formal, and austere.” This attitude largely faded away over the last 50 years, not only because of the discovery of fractal geometry by Mandelbrot (who fled to the U.S. because of Bourbaki), but also because of other advances in chemistry pertaining to atomic and molecular structures. We've regained an appreciation for the shapes that seemed relegated to dungeon masters. We now know that the Platonic solids are the most efficient geometric shapes in nature. For example, near-perfect hexagonal shapes are found in honeycombs, the once-mysterious rock formations in Ireland, the Giant's Causeway (featured on the cover of Led Zeppelin's 1973 *Houses of The Holy*), and the 15,000 mile wide hurricane at Saturn's north pole. The intersections of soap bubbles display all of these shapes, depending on the number of bubbles, and salt crystals are known to grow in perfectly cubic crystals. Other than Saturn's storm, all of the above examples are well documented in part 2 of the three-part BBC Two documentary series from 2011, *The Code: Shapes*. Why do we care about Platonic solids when discussing music?

Almost 1,800 years after Plato, Johannes Kepler used the Platonic solids as the mathematical basis for his *Mysterium Cosmographicum* (1596), which showed how all of the planets could form orbits around the sun (see Figure 1.2), a radical idea proposed just a few decades earlier by Nicolaus Copernicus. Kepler's “music of the spheres” used the harmonic ratios discovered by Pythagoras and his “harmony of the spheres” to figure out the mathematics underlying the planets' distance from the sun and their orbital periods, which became Kepler's Third Law of Planetary Motion. He noted that all the orbits fell within a certain harmonic range except the interval between Mars and

Jupiter, which was the most dissonant of them all. Incredibly, it was not until a few decades later that we had empirical evidence to prove that the sun, not the Earth, was the center of the known universe. Moreover, the asteroid belt orbiting between Mars and Jupiter was not discovered until 1801, about 182 years later, and is believed to be the remnants of a failed planetary formation process. So the basic math of harmony and musical ratio spelled out by Pythagoras, with the geometry of Plato, allowed Kepler without a telescope to make incredibly good predictions about planetary orbits, and also to partially explain the asteroid belt between Mars and Jupiter. It is almost as if Kepler were able to analyze a hidden chord in a silent scale. Harmonic relationships are so fundamental to our universe that Kepler's theories, though now mostly obsolete, paved the way for where we are now. (Indeed, NASA's mission to find habitable planets in our galaxy is named after Kepler.) As to exactly where that is, and when, we get to those questions in the next chapter as we discuss the digital revolution and its implications for us as music producers in this new era.

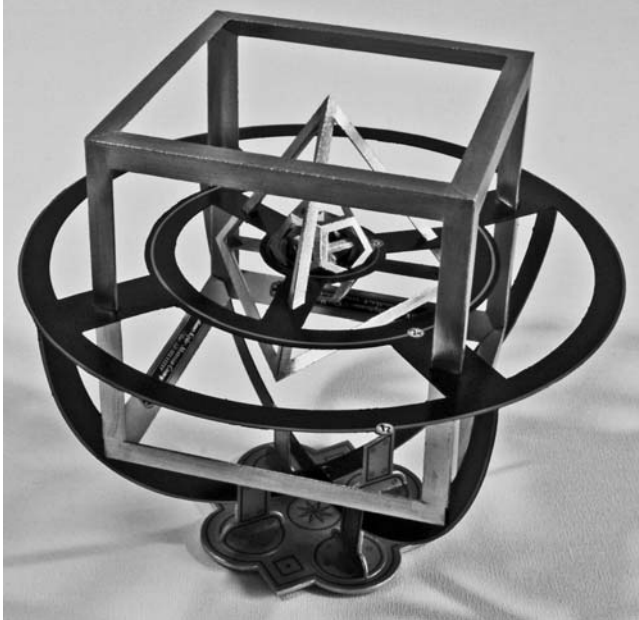


Figure 1.2 A model of Kepler's *Mysterium Cosmographicum*. In 1596, it was the best model of the solar system, based on Pythagorean harmony and the Platonic solids.

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Music Is Evolving

Now that we have a baseline understanding of music's central and important status in human culture, let's dig a bit deeper and focus on how styles and genres evolve. Although our focus is indie and electronic music, the core ideas are best illustrated when considering all music.

Music as a fundamental human form of expression mirrors the time and culture of artists. So, when considering the evolution of modern music styles in the last 125 years, we need to emphasize two variables characteristic of this time period: the simultaneous influences of modern technology and cultural cross-fertilization. Keep in mind that I am just touching on ideas that could easily be the focus of a few musicology graduate degrees.

Trying to make sense out of all the different forms of music through sorting and categorization is a chaotic affair. If you agree that music is universal, personal, and fundamental, then the following statement should sound reasonable: The exploration of new possibilities, expressions, and combinations of musical ideas is a natural incessant process. In other words, if we think of music as a continuous flow of water running over a creek bed, then just like water, it will flow into any hole, nook, crevice, and channel not already occupied. If we start with this idea, then making sense of how music evolves and how new styles are born becomes a lot easier. To further help in this endeavor, I am employing some of the basic concepts underlying chaos theory and complexity studies.

Music's Evolution Is Chaotic

I am going to try to keep things as simple as possible when talking about complexity, so if you are interested in more details, be sure to check out Appendix A, "Chaos Theory and Complexity Studies Primer." For present purposes, we are interested in three related topics that are used to both explain and model many aspects of natural and synthetic systems. Each of these is based on very simple non-linear

equations that iterate (repeat), with one of them additionally being recursive (feedback): bifurcation theory, L-systems, and fractal geometry.

It should not be surprising that one of the first people in the modern era to write about creative processes was also arguably the first chaos theorist: polymath Henri Poincaré. We will return to his thoughts on chance, the unconscious, and creativity in Chapter 7, “Creative Process.” Of immediate relevance is the term bifurcation, which he coined in the 1880s from *bi* (meaning “two”) and *furcation* (meaning “dividing into branches”). The top image in Figure 1.3 is an example of a bifurcation diagram—in this case, one that plots period-doubling bifurcation. What starts as one branch becomes two branches, then four, then eight, then 16, so on and so forth, with the rate of bifurcation also doubling at each split. Even with such simple math, complex and chaotic behavior quickly arises due to the non-linearity of the equation.

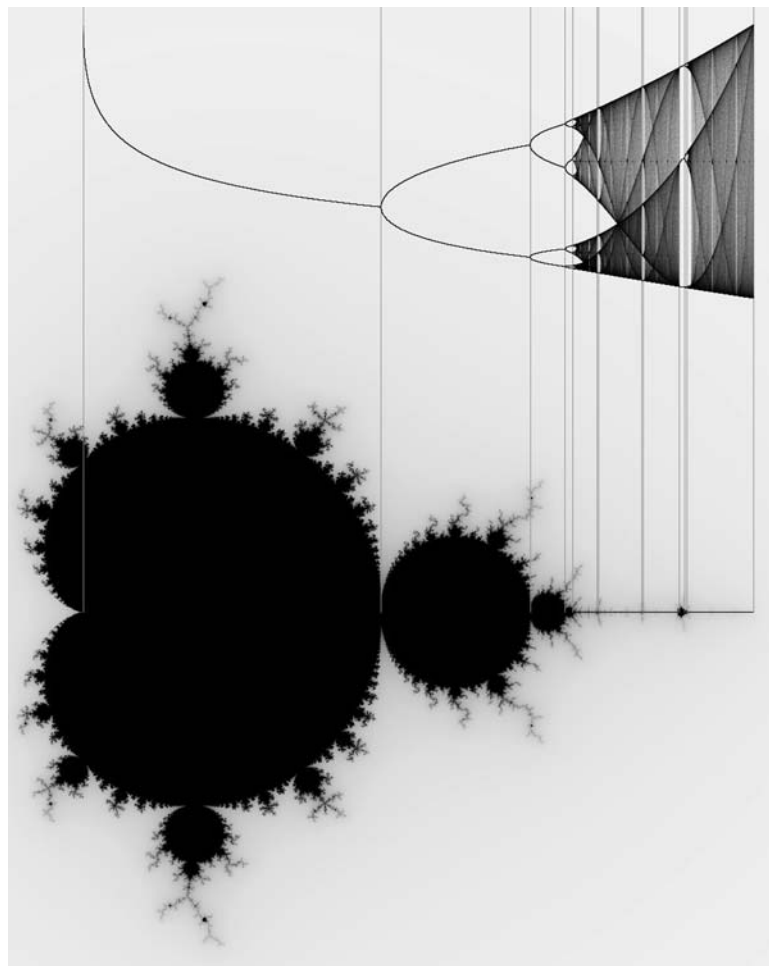


Figure 1.3 This image shows a bifurcation diagram (top) and the fractal Mandelbrot set (bottom). They are great visual metaphors when considering the evolution of musical genres.

Source: Georg-Johann Lay. Public Domain.

Fast forward to 1968, when Hungarian biologist Aristid Lindenmayer created a formalized algorithmic language to model the growth of plants known as L-systems. As you can see in Figure 1.4, both of the computer-generated plant-like structures are simply iterations of the same shapes. In Figure 1.5, you can see how this process is like a computer-generated imagery version of sound going through a delay effect. The top spectrograph shows just a single tone at $\frac{1}{4}$ -note intervals, with each spike representing the sound's partials. The bottom spectrogram shows the same tone run through a multi-tap delay effect. Delay effects also use linear feedback to evolve the sonic structure, but over very short durations of time—in this case, iZotope's Insight plug-in is set to have a history time of 15 seconds (from right to left). Different furcation maps are like various tempos and rhythms of simple branching algorithms growing through space. L-systems are the same except they include more variables, which makes them well-suited to their role as a basic foundation of modern computer-generated nature imagery. In the real world, shapes grow with similar geometry but with much, much, much slower tempo stretched out over days, years, or even decades.

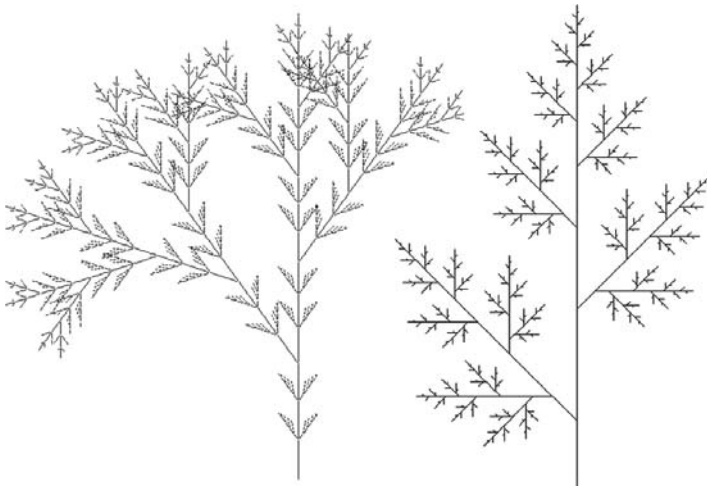


Figure 1.4 Two different L-systems generated with relatively simple math, outlining the basic structure of an algae (left) and a leaf (right).

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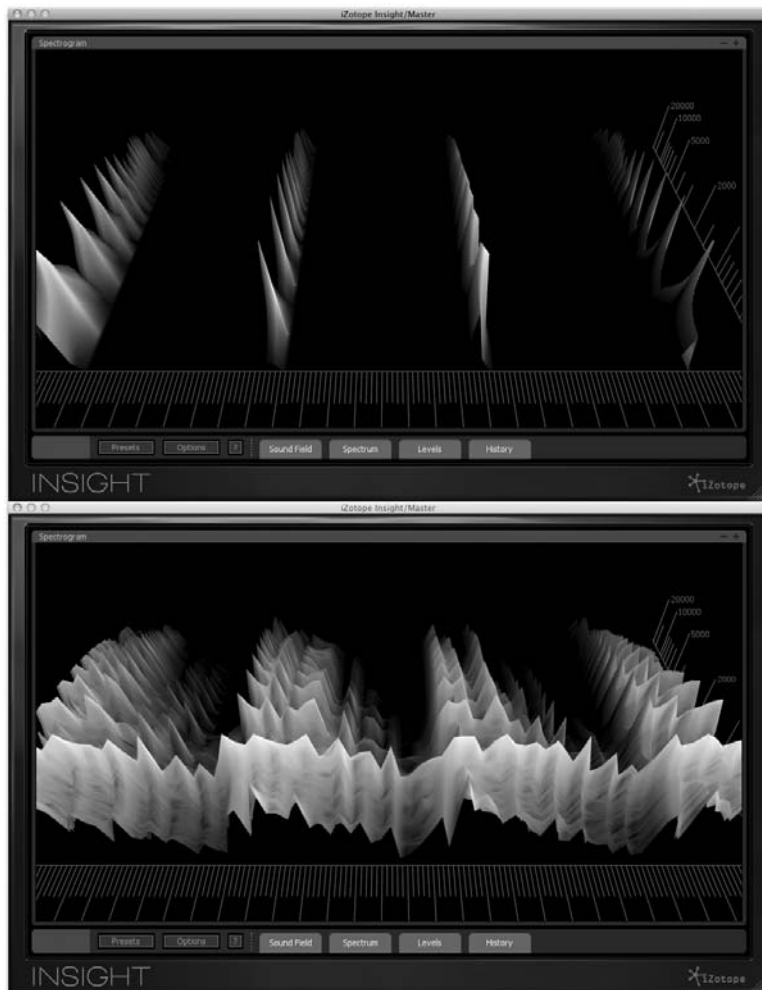


Figure 1.5 The top spectrogram is a simple tone. The bottom spectrogram is the same tone run through a delay plug-in. The feedback creates self-similar patterns.

Source: iZotope Insight.

As amazing and complex as are the results of bifurcation and L-systems, they pale in comparison to the undisputed king of chaos geometry. At the bottom of Figure 1.3, you can see the characteristic shape of the Mandelbrot set, the most complex mathematical object known to humanity. When rendered on a computer, you can “travel” through its endless vistas by zooming in forever because its non-linear equation is also iterative. The output feeds back into the input on an infinite loop until stopped by the programmer. That means if you attempt to perfectly trace its outline you will never finish unless you arbitrarily decide to stop iterating/zooming in and ignore further details. This is much like our attempts at categorizing music into genres, with some of them being more or less concerned with precision and therefore more or less zooming in to make out the detailed edges. In essence, we are talking about what is known as the “the coastline paradox,” which was finally solved by the creator of the Mandelbrot set.

Mandelbrot: Mandelbrot shared his discoveries in a 1982 book, *The Fractal Geometry of Nature*. Although full of math, it was targeted at popular audiences, not just academics. If you have seen any Pixar movie (or any other major digital animated movie in the last few decades) and marveled at how realistic it might seem, you can thank Benoît Mandelbrot. His book gave those animators new algorithms to try, and it revolutionized computerized graphics.

Mandelbrot was a genius, maverick mathematician who started working at IBM in 1958. There, he had access to mainframe computers, which he used to solve various problems such as getting rid of the noise that was present in the transmission of computer data over phone lines. His research into solving such problems resulted in a discovery of a revolutionary new mathematics that greatly expanded our understanding of the natural world.

Although he introduced the term *fractal* to the public in 1975, the ideas were spelled out almost a decade earlier in his landmark article on the topic from the May, 1967 edition of *Science* magazine, “How Long Is the Coast of Britain? Statistical Self-Similarity and Fractional Dimension.” The abstract to this article was as follows:

“Geographical curves are so involved in their detail that their lengths are often infinite or, rather, undefinable. However, many are statistically ‘self similar,’ meaning that each portion can be considered a reduced-scale image of the whole. In that case, the degree of complication can be described by a quantity D that has many properties of a ‘dimension,’ though it is fractional; that is, it exceeds the value unity associated with the ordinary, rectifiable, curves.”

There are two amazing insights here: Objects in nature often have fractional dimensions, and self-similarity is everywhere. In plain English, most shapes in nature do not have integral (whole number) dimensions, such as two or three. Rather, they have fractional dimensionality and therefore surfaces that are difficult to measure with standard math. Mandelbrot’s discovery of fractals fully explains “the coastline paradox,” also known as “the Richardson effect.” Although it seems counterintuitive at first, the fact remains that the measured length of natural features goes up as the unit of measurement gets smaller. If you measure the coast of England with a 200km or a 100km ruler, the measurement using the 100km ruler will be longer. Such infinite or undefinable curves also display self-similarity, which means that as you zoom in, you see similar patterns as when you are zoomed out. They repeatedly show up at different scales. So relatively speaking, if it looks like the same pattern but the zoom level is different, it is only natural to use a measuring standard according to the scale.

What happens if we define musical genres according to small differences between them because we are zoomed in and hyperaware of every little variation? We end up with more genres than if using the comparatively larger differences perceived when we are zoomed out. The level of zoom changes according to the desired level of precision when making distinctions. Does this not explain why there are so many micro genres of electronic music that seem indistinguishable from each other to the uninitiated? Does this not explain why all metal or punk bands sound the same as each other to the uninitiated? But, once people “get into it,” they start to notice the differences, which over time become clear as day and seem totally obvious.

Basic Dynamics of Genre Evolution

Each genre has defining characteristics—how it combines any of the following elements to give it its personality: instrumentation, rhythms, harmonic structures, tempo, meter, lyrical content, and other cultural references. We can think of these traits as different genes found in DNA. In the most simplistic sense, modern Western music is largely a result of the mixing of musical DNA of African rhythm and

European harmonic structures. Of course, there are many other elements commonly at play in modern music that integrate melody, harmony, rhythm, and timbre from Asia, Oceania, Africa, the Middle East, the Caribbean, Central America, and South America. However, our focus is electronic music and modern independent music, so we are not going to get lost in a full musicology exploration.

Let's use two metaphors to help us make sense out of the proliferation of musical genres and styles. The first metaphor is evolution itself. Musical styles are like species that fill a niche, which is appreciation by a group or groups of people. Like evolution, music tries out as many combinations as possible through random mutation, and the ones that have the best traits for survival (appreciation) continue to pass on their DNA. (We return to the misunderstood notion of "random" in Chapter 7.) This constant experimentation occurs naturally for many reasons—not simply the desire for commercial success or widespread appeal, as an evolutionary metaphor might imply—and can be motivated by personal exploration or for small scenes or peer groups. Some musical genres are more dominant than others, some are antagonistic and compete over the same niches, while others are symbiotic and support each other. Most species have recognizable characteristics within their phylogenetic family, though there are many cases of rare, bizarre, unique, or downright alien-looking life forms, such as the barreleye fish or, to a lesser extent, the platypus. In similar regards, most music is easily placeable within a family of similar traits by average music fans but some of it is *sui generis*, such as The Residents or to a lesser extent U.S. Maple.

The tree of life is a metaphor used in evolutionary biology to categorize and map related life forms with branching lines. Our second metaphor, then, is that of a tree, its branches, leaves, and connecting nodes. Branching shapes are the most efficient way for trees to maximize surface contact to sun, air, and water, their life-giving sources of nutrition. Some do this by growing bigger, thicker trunks with a few substantial branches and large leaves (fewer subgenres), while others cover equal area with many more smaller bifurcations and countless smaller leaves or needles (many sub or micro genres). The bifurcation diagram in Figure 1.3 shows how quickly simple binary splitting results in an incredibly complex structure, while the L-systems in Figure 1.4 show more tree-like geometry (although both of them are a bit too static to really capture what is happening). Things get more interesting if we represent these dynamics with the Mandelbrot set as seen at the bottom of Figure 1.3. This shape in our metaphor could represent budding instead of simple branching, which is that much more powerful when viewed as a dynamically evolving computer animation (as is easy to find online or in free software for your computer). In either case, let's place all these genres in a dense, vibrant jungle that is teeming with life, with each tree representing a major style of music, such as classical, blues, rock, funk, soul, jazz, reggae, *avant-garde*, or electronic. Each music form that is the base of a tree is also a root style, one that has spawned variations and new genres. Let's consider a few simplified examples:

- ▷ Blues spawned a few styles, including rock 'n' roll, which then spawned numerous subgenres, such as progressive rock, punk rock, Krautrock, post rock, math rock, and of course, eventually, the neologism of classic rock.
- ▷ Rock 'n' roll also spawned hard rock, which retained key elements of blues and mutated into heavy metal, that then spawned numerous subgenres such as progressive metal, thrash metal, speed metal, technical metal, black metal, death metal, and industrial metal.
- ▷ Disco mutated into house (Chicago) and garage (NYC), which then spawned numerous subgenres such as acid house, tech house, micro house, progressive house, Dutch house, French house, fidget house, U.K. garage, speed garage, two-step garage, U.K. funky, and countless others.
- ▷ Detroit techno emerged on the tail of house as a futuristic mixture of electro, funk, and new wave, which then spawned numerous subgenres, such as minimal techno, acid techno, ambient techno, and dub techno.
- ▷ Coming out of NYC on the tail of electro funk, rap, and B-boy culture was hip hop, which spawned numerous subgenres such as West Coast, Dirty South, G-funk, gangsta, abstract, turntablism, trip hop, and trap.

Each of these genres and subgenres forms the raw materials not only for countless micro genres but also whole new styles. As one of them catches on and blows up, what was once a small leaf can more resemble an acorn that grows its own roots and marks a new beginning in the iteration process. Sometimes this process is initiated by a specific artist or small scene of musicians who cut out recent complexifications in a genre and return to the fundamentals. This revisit to a style's essential musical elements is usually referred as "going back to the roots." Sometimes this return to musical origins is simply an enjoyable retro pursuit, but other times whole new branches emerge from it. These roots can be fairly close, such as when a current dance music producer finds inspiration from the first acid tracks such as those of Phuture 303. An exploration of the roots might also imply a much deeper journey and even include a "pilgrimage" to Jamaica, Haiti, Cuba, or Africa to meet native musicians steeped in the origins of our modern rhythms and other seminal stylistic innovations.

As musical styles diverge and converge to and from their parent branches and cross-fertilize with other branches, a few things tend to happen. As they diverge, they tend to get more extreme, complex, refined, or idiosyncratic, as is best illustrated in the many micro and niche genres found in electronic music and metal. As they converge, they tend to simplify and include more classic motifs. Sometimes traits skip a generation, while other times the energy and foci simply shift to accentuate other musical elements, such as transferring emphasis from drums to bass or exploring significantly slower or faster tempos. In either case, regardless of their current vector, once ideas have played themselves out, they either shrink down to small core followings, cross-breed with new growths closer to the roots and find new life, represent a dead end, or even go extinct, waiting to be dug up in a dusty record bin. Some styles and genres slow down their evolution to no more than small incremental changes and stabilize to become traditionals, standards, "folk" music, or a perennial favorite

for long periods of time. Regardless of the evolutionary vector, there are now so many styles of electronic music that even *Ishkur's Guide to Electronic Music* v2.5 leaves off at the end of the 1990s, as can be seen in Figure 1.6. *Ishkur's Guide* is the most ambitious project of its kind to be found on the Internet and is regularly cited on blogs about data visualization. There is no notable close second to be found, and although it is not perfect or 100% accurate in all cases, it is very fun, entertaining, and educational.

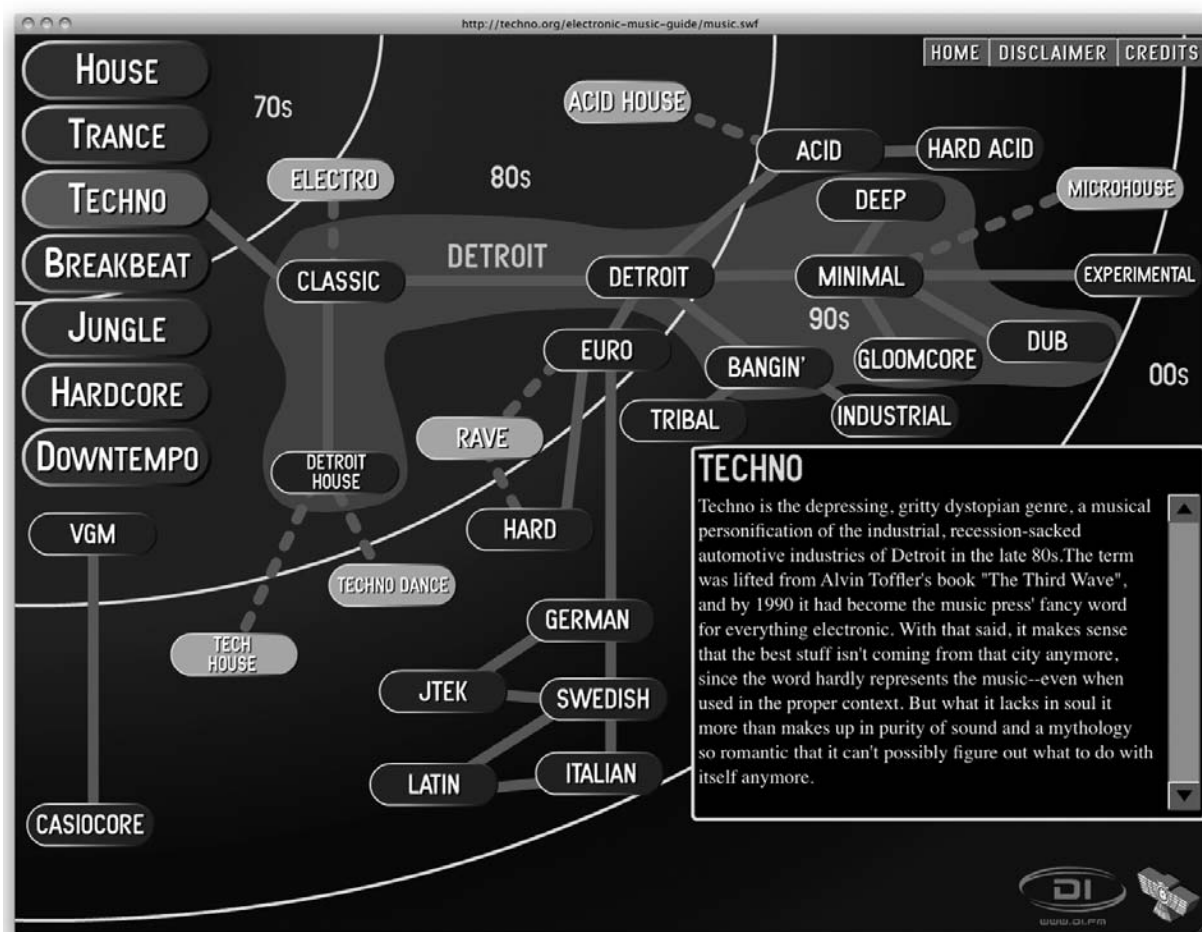


Figure 1.6 The Techno page from *Ishkur's Guide to Electronic Music* v2.5 (techno.org/electronic-music-guide/), an ambitious interactive multimedia taxonomy.

Source: techno.org.

Baker's Transformation

Can you hear James Brown's influence in the psychedelic trance genre? The answer surely is no—unless you are overdoing the psychedelic part, as it is no more apparent than the influence of Ada Byron on the computer I'm using to write this book. Yet that genre, at the opposite end of the musical spectrum from funk, has core elements that evolved out of house and techno, which have roots in electro funk, electro, and Kraftwerk, all influenced by James Brown. This isn't a game like "Six Degrees of Kevin Bacon"; it is more like researching a family tree. Although it is possible to trace many of a current artist's direct influences or some key elements that make up a current genre, at some point the elements of the older styles are so mixed up that it is impossible to tease them apart.

This mixing of styles is not unlike the experience of any kid who plays with finger paint until the whole sheet of paper is covered in that certain shade of green/brown, or at its best, like the delectable creations of a master pastry chef with no resemblance to the original separate ingredients. In physics, there are numerous mathematical tools that describe such irreversible mixing processes. One of these is commonly employed in chaos theory and is known as a *baker's transformation*. The name comes from the process of kneading bread, as the dough is first rolled out, then folded over, then rolled flat again, then folded over, again and again. Once the elements have completed this topological mixing process, the results are irreversible. The equations that describe the process leading to the mixture are solvable even though the final pattern of the elements is unpredictable. In other words, even if we know the initial position of every paint molecule, there is no way to predict their final position. Yet, we can mathematically describe how they got there once the process is complete. This weird reality is known as *deterministic chaos*, and is one of the most important discoveries from chaos theory.

In this sense, as music evolves, the genres that define themselves are the ones that have survived a baker's transformation to more resemble the metaphorical fine baked good than the kid's green/brown finger-paint mixture. These self-defining genres grow into a significant branch, occasionally even becoming a root to new subgenres that continue the process. Styles that are too complex, weird, or idiosyncratic are like exotic foods or odd paint colors, although they may attract a small hard-core following. Unless tastes evolve to appreciate these fringe, left-field, or "accident of nature" styles, which does happen from time to time, they are likely to be evolutionary dead ends with no more than a cult following. However, a lot of great music is very idiosyncratic with only small cult followings, and certainly has its place in the music ecosystem. The best-case scenario for such fringe styles or artists is that they are later rediscovered, a "hidden gem" that passes on some of their musical DNA as an obscure influence. Occasionally, an artist is so talented and interesting that his or her idiosyncratic uniqueness is a plus that sets him or her apart from all the rest. These artists are self-defining. Either they "transcend the genre" or are genre defying. There are of course numerous additional factors that influence music's evolution, and we will discuss many of them throughout *The Music Producer's Survival Guide*.

The Global Village and the Noosphere: The Information Age and the Internet perfectly fit predictions made in the 1920s by Pierre Teilhard de Chardin (1881–1955), and again in the 1960s by Marshall McLuhan (1911–1980). Their ideas help us to understand not only the ways music has evolved over the last 100 years, but also what is ongoing. Although very different in biography and intellectual approach, the common thread in their work is a global perspective. The cultural cross-fertilization and exchange of customs, ideas, and perspectives so common now were just emerging in their day.

Canadian-born Marshall McLuhan was information theory's first philosopher and a pioneer in what is now called *media theory*. The core of his essential ideas were first spelled out in his landmark books *The Gutenberg Galaxy: The Making of Typographic Man* (1962) and *Understanding Media: The Extensions of Man* (1964). He famously stated that "the medium is the message" to explain how new communication media change social interactions. People tend to notice only superficial incremental changes in information technologies and fail to recognize the big changes caused by such technologies. The effects of the medium are essentially invisible, taken-for-granted facts of life, so in that sense the message is a part of the social structure created by the medium, according to McLuhan.

As well-known as is that widely misunderstood phrase, the term *global village* is certainly his most popular linguistic invention. McLuhan considered media as extensions of the human senses just as a hammer is an extension of the human arm. The combined total of all information networks and media technologies, then, are like an extension of the human nervous system that surrounds the planet. So the term global village emerged from this concept of a planetary nervous system that allowed for the sharing of information as if in a small village. McLuhan did not necessarily consider a global village in the same positive light we tend to these days, in part due to the many unintended consequences resulting from global media. But his thoughts on the future of media technology were quite prescient. He posited that the next advances in media would be like an extension of human consciousness, which is a common way of thinking about the Internet. McLuhan was definitely ahead of his time, but he was not the first to discuss global information systems as leading to an evolution of consciousness.

Pierre Teilhard de Chardin, or simply Teilhard, was a French Jesuit priest who was also an accomplished geologist and paleontologist. In addition to his role with the 1920s expeditions that discovered the 400,000-year-old "Peking man" in China, he is equally famous in intellectual circles for his posthumously published book, *The Phenomenon of Man* (1955). This classic was actually completed in the 1930s but was published posthumously to prevent his excommunication from the church due to his belief in evolution. In this epic book, he traces the evolution of life on Earth through increasingly complex stages. First there is the *geosphere* (sphere of Earth), the geological foundations for the *biosphere* (sphere of life), which is the thin layer of living organisms covering the planet. The biosphere complexifies to support intelligent life, and humans spread out radially to surround the planet. Once *homo sapiens* (Latin for "wise/known man") complete this encompassing diaspora, evolutionary energy is tangentially directed away from the biosphere to form a new sphere that allowed consciousness to feed back on itself. Teilhard states in *The Phenomenon of Man*, "By a tiny 'tangential' increase, the 'radial' was turned back in on itself and so to speak took an infinite leap forward" (p. 169). This leap forward is manifested in the information networks that surround the geosphere and biosphere. To describe this evolutionary emergence of a "sphere of mind" superimposed on the two more

fundamental spheres, he coined the term *noosphere* in 1925, from the ancient Greek *noos* for “mind,” or “knowledge.” When he coined the term, we had the telegraph, phonograph, telephone, and radio, but not yet even TV, the epicenter of McLuhan’s work, let alone computers, cell phones, or the Internet. As such, it is understandable that Teilhard is widely considered the first person to essentially predict the Internet.

NOTE: From this point on, the material that follows significantly overlaps topics and discussion found in Chapter 6, “Producer Tips,” Chapter 7 “Creative Process,” and Chapter 8 “Selecting Your Tools.”

The Technology

The history of electronic music mirrors the history of the 20th century. Staying close together while swirling around the primary trunks of our modern civilization are the branches that represent the evolution of science, electrical engineering, computing, communication technology, music, and music culture. Over the last 150 years or so, most branches of knowledge underwent their own baker’s transformation, creating new technologies that appeared at a blistering unprecedented rate, with music and music technologies doing their best to keep pace. The appearance of the phonograph, microphones, analog tape recorders, mixers, audio effects, synths, samplers, drum machines, MIDI, personal computers, the DAW, and plug-ins are all concurrent with the various stages in the evolution of music production and electronic music. Although there are now many great products, amazing musicians, and brilliant producers from all over the world, most of the primary elements we take for granted today emerged roughly between 1880 and 1980 from just a handful of countries.

Question: Which countries were the source of the majority of the last century’s technological innovation?

Answer: U.S., U.K., Germany, Japan, France, and honorable mention for Switzerland.

Comment: We will discuss some of the major innovations here and there, but in-depth discussion is beyond the scope of this book.

Question: Which countries were the source of the majority of electronic music innovation?

Answer: U.S., Germany, U.K., France, and honorable mention for Jamaica.

Comment: Later in this chapter and elsewhere in this book, we cover a lot of ground on this question—which, when combined with the next Q&A, should be more than sufficient to make this point very clear (although a comprehensive discussion is beyond the scope of this book).

Question: Which countries are most responsible for the equipment and technology we most use in electronic music, music production, and pro audio?

Answer: U.S., Japan, Germany, U.K., and honorable mention for Northern Europe.

Comment: Later in this chapter and elsewhere in this book, we will hit a lot of key points on this topic, which should be more than sufficient to make this point very clear. A rudimentary perusal through any gear site or catalog easily shows that each of these countries is best known for manufacturing and developing certain electronic music and music production products. The following list is not meant to be comprehensive and emphasizes fortés:

- ▷ **Northern Europe:** Loudspeakers, audio software, and digital synths
- ▷ **U.K.:** Mixing consoles, EQs, compressors, loudspeakers, and analog synths
- ▷ **Germany:** Microphones, loudspeakers, analog tape recorders, digital synths, and audio software
- ▷ **Japan:** Analog and digital electronic musical instruments, microphones, loudspeakers, analog tape recorders, digital recording systems, personal computers
- ▷ **U.S.:** All of the above (see the following note)

NOTE: It is often suggested that the U.S. is so innovative because of its cultural diversity. The mixing and blending of cultures and ideas from so many places and cultures presents that many more opportunities for evolutionarily useful and successful baker’s transformations.

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Elsewhere in this book, we talk about all sorts of gear, software, and instruments with significant impacts on 20th century music and production. Roland deserves its own section, especially pertaining to what many think of as its golden era of influential electronic musical instruments and effects. There are others worthy of note, but the items in the following list are hands down the most important ones to the history of modern electronic music production in particular.

- ▷ 1974 RE-201 Space Echo
- ▷ 1980 TR-808 Rhythm Machine
- ▷ 1981 Jupiter-8 synthesizer
- ▷ 1982 TR-606 Drumatix
- ▷ 1982 TB-303 Bass Line
- ▷ 1982 Juno-60 synthesizer
- ▷ 1983 SH-101 synthesizer
- ▷ 1984 TR-909 Rhythm Composer
- ▷ 1985 TR-707 Rhythm Composer

“Nothing Sounds Quite Like an 808”

The reason there are quotes around “nothing sounds quite like an 808” is that it is from the lyrics of the Beastie Boys’ 1998 song “Super Disco Breakin.” Although each of the listed classics are worthy of further research, one is revered above all the others for the reasons just stated. Roland’s “Transistor Rhythm” model 808 is the most sampled drum machine of all time. Japan’s Yellow Magic Orchestra (YMO), co-founded by EM icon Ryuichi Sakamoto, was the very first band to use an 808 in 1980. The documentary *Planet Rock and Other Tales of the 808* is due out sometime in 2014. One of the producers of this documentary is Arthur Baker. Baker produced the landmark 1982 single “Planet Rock,” the first known American release to use an 808 (followed about five months later by its first use in a certified platinum release, Marvin Gaye’s “Sexual Healing”). On the IMDB.com page for this documentary, Baker is quoted as saying, “The day we recorded ‘Planet Rock,’ I went home that night and told my wife, ‘We’ve made musical history tonight.’”

In a February 10, 2010 editorial on KMAG’s website (kmag.co.uk), “Tunes That Shaped: Afrika Bambaataa—Planet Rock,” Dr. Khan stresses the historical importance of “Planet Rock.” This importance stems not only from the fact that “Planet Rock” “ushered in a whole new era for the fledgling genre of hip hop,” but also because the way they approached the production took “the whole culture into an entirely new direction.”

In the November 2008 edition of *Sound On Sound* magazine, writer Richard Buskin introduced that month’s “Classic Tracks” section with the following:

Man and machine, transporting rap to electro. That, within the historical context of popular music, was what the 1982 single ‘Planet Rock’ was all about, transforming rap by blending break beats, a vocoder and one of the first Fairlight synths in America, to create computerized, futuristic, robotic funk that paved the way for dance, trance, techno and house, whilst also being the first hip-hop/R&B track to utilize a Roland TR808 drum machine.

“Planet Rock” comes in at #240 on RollingStone.com’s 500 greatest songs of all time list. On that page, they include a quote from the Tommy Boy compilation album *Looking for the Perfect Beat 1980–1985*. The discussion between producer Arthur Baker, artist Afrika Bambaataa, and keyboard player John Robie went as follows: “Can you play stuff like Kraftwerk?” asked Bam, who played their records at DJ gigs. Baker worried about stealing the melody from “Trans-Europe Express,” but Robie said, “I’ll tear that s... up.” Why did *Rolling Stone* include that quote? Read on for the answer.

Arthur Baker’s Baker’s Transformation

Arthur Baker produced the landmark 1982 Tommy Boy Records release of “Planet Rock” by Afrika Bambaataa and the Soulsonic Force. Depending on your taste in musical styles, if you have never heard this song before, you might wonder why it is such a big deal. Whether or not you appreciate its aesthetics 30 years after its production, this classic record nonetheless perfectly illustrates cultural cross-fertilization of musical styles with technology from around the globe. As a quintessential example of a successful baker’s transformation, we have a perfect case study of different branches combining to form a new tree able to support new genres and styles. So as to not get sidetracked into a few other fascinating threads, let’s simply consider the ingredients that went into this mixture. The following details were sourced from interviews with Arthur Baker in *Sound On Sound* magazine (June 1997, November 2008) and Red Bull Music Academy’s website (redbullmusicacademy.com, Toronto 2007 transcript and 4/4/2013 Key Tracks).

From the onset, mixing elements from different styles was fundamental to the intended goal of the track’s production, which was to appeal to fans of both Talking Heads and The Sugarhill Gang. Moreover, it was also intended to have international appeal, so the whole theme was “global.” The planet theme goes beyond the song’s title; it was rapper MC G.L.O.B.E who wrote most of the lyrics, which were inspired by a list of countries from all over the world they generated as an internationalized version of U.S. cities James Brown would call

out at performances. In addition to James Brown, other stated background influences for the composition included fellow New Yorkers Kurtis Blow (U.S.) and Kool Herc (Jamaica/U.S.), with Yellow Magic Orchestra (Japan), Gary Numan (U.K.), and Kraftwerk (Germany) guiding the most obvious aesthetic elements that were combined with Bambaataa's Bronx stylings. This cluster of influences represents a full circle of sorts, as YMO cites significant influence by Kraftwerk, who cite significant influence by James Brown.

"Planet Rock" was produced in about 30 hours for about \$900 at Intergalactic Studio in NYC, which is known for many classic records by artists such as The Ramones, Swans, and Tibetan Monks of the Dalai Lama, and was the inspiration for the title of that famous Beastie Boys' song. Intergalactic's equipment list included a Neve console (U.K.), a Studer 24-track analog tape recorder (Switzerland), Urei monitors (U.S.), Sony Reverb (Japan), and a Lexicon PCM41 digital delay processor (U.S.) that was used to create the robot voice effect (not a vocoder). They also had one of the few Fairlight CMI Series II computer musical instruments (Australia) in the U.S., which was used for the explosion sounds and the song's signature orchestra hits. (We talk a lot about the CMI in Chapter 8.)

They decided early on that they wanted to use a drum machine and not sampled breaks or live drums so as to emulate the electronic drum sounds on Kraftwerk's 1981 album *Computer World*, specifically the song "Numbers." Once they heard an 808, they knew immediately it was the right tool for what they wanted to do. They saw an ad in the *Village Voice* for a guy offering his drum machine services for \$20 or \$30 per session (both are stated in interviews), which is where they found the Roland TR-808 drum machine (Japan) used on "Planet Rock." Keyboardist John Robie brought in his Micromoog (U.S.) and the Sequential Circuits Prophet-5 (U.S.), the latter of which was one of the few polyphonic analog synths on the market. (We talk a lot about the Prophet in Chapter 6.) The characteristic keyboard line from Kraftwerk's 1977 "Trans-Europe Express" was not sampled; it was performed by John Robie. Baker's concern about replicating that classic keyboard lead was well-founded. After its release drew attention from Germany, Tommy Boy Records agreed to avoid legal proceedings and pay Kraftwerk \$1 per single sold, which in the end worked out well for everyone. And as they say, the rest is history.

A Very Brief Intro to the History of Electronic Music

Here we are not talking about the use of electronic musical instruments in existing music forms, such as the electric guitar, Theremin, Mellotron, or synthesizers that started to appear in rock music and jazz in the 1960s. This brief history pertains to a music form that emerged in the 1950s and exists only because of electronic musical instruments and sound-reproduction technologies. Electronic music (EM) as defined here is a music form that broke ground in human musical history with innovations not found elsewhere. What music innovations might these be? Given the vast and diverse styles of music from many cultures all over the world over many thousands of years, what was left for EM to innovate? Let's consider a short list of non-electronic music forms, styles, and composers, in no particular order, before we answer this question.

Classical, big band, jazz, blues, funk, soul, rock, metal, punk, reggae, blue grass, dub, disco, salsa, meringue, tango, and shamanic/ritual music; traditional music from India, China, Tibet, Japan, the Middle East/North Africa, and West Africa; and the works of Beethoven, Bach, Wagner, Strauss, Mahler, Debussy, Bartok, Mussorgsky, Vivaldi, Stravinsky, Ligeti, Penderecki, Satie, Shoenberg, Gershwin, Barber, Charles Mingus, John Coltrane, Eric Dolphy, Ornette Coleman, Bob Marley, Fela Kuti, James Brown, Parliament, Ohio Players, The Beatles, The Beach Boys, The Rolling Stones, Pink Floyd, MC5, Black Sabbath, Black Flag, The Birthday Party, Slayer, Sonic Youth, Einstürzende Neubauten, The Police, Johnny Cash, Tom Waits, etc., etc., etc....

When considering all of the harmonies, melodies, rhythms, compositional structures, and timbres found in those styles and works of those artists, it doesn't seem like there is much left for EM. Even while EM was emerging in the 1950s, 20th-century classical composers were busy deconstructing all conventions with acoustic instruments and further laying the foundations for EM to build upon. Many of these purely acoustic musical explorations dating back to the turn of the previous century are now echoed in modern EM. Some amazing mid-century examples of acoustic parallels to early electronic music include the numinous atonality of György Ligeti's *Lux Aeterna* (1966) for 16 solo singers, or the serialist polyrhythmic explorations of cyclic harmonic structures found in Steve Reich's *Music for 18 Musicians* (1976). Moreover, some 20th-century classical composers like John Cage, Toru Takemitsu, and Iannis Xenakis also pioneered early electronic music, and along with some transitional-era composers who emerged in the 1950s, such as Stockhausen, represent exceptions to some of the following generalizations about EM.

So, as of 2013, we can say with certainty that modern EM is not known for melodic innovation. In fact, it generally is quite simple and no further along than the pop music up to about 1980 in those regards. EM is not known for new harmonic structures either, as the chords, scales, and progressions generally are no further along than the pop music up to about 1980 in those regards as well. In modern electronic music post 1980, we also don't find much innovation in terms of rhythm, although there are a few genres from the 1990s that serve as exceptions and demonstrate some integration of the innovations made by early *avant-garde* electronic music composers, such as Bernard Parmegiani. In regard to the latter point on rhythm, an example of early electronic music composers' influence is discussed in the sidebar about Stockhausen that appears later in this chapter. So what is left after mixing together all of the musical encyclopedia? In short, leaving aside a period of rhythmic innovation, EM's most significant contributions to music are innovations in timbre and creative process. Chapter 7 is titled "Creative Process," so we will just focus on timbre for the moment.

Even considering all of the timbres available with instruments from around the globe, electricity opened up completely new vistas. This innovation in timbre is a big deal, and every bit as important as the major innovations in rhythm, harmony, and melody from the previous thousand years. With analog, digital, and computer-based tools, EM pioneers offered up truly new sounds. Additionally, they invented completely new composition techniques and creative processes, many of which are related to the recent explosion of the democratization of music production. In EM we find rhythms, harmonies, and melodies from all over the world carried and modulated within new timbres. Consider electronic dance music, which is founded on repetitive trance-inducing ancient percussion rhythms and simple harmonic structures. When listening to the synthesized leads and basses in this music, we can hear the instrument's modulation capabilities creating rhythmic shifts in timbres and harmonic relations, which similar complexity in the acoustic realm would require at least an ensemble of musicians. Even with that ensemble of musicians, EM still offers a sound palette all its own.

EM's Two Timbral Sources

Because one of EM's two major innovations is in the domain of timbre, it makes sense to look closer at sound genesis methods. We can think of EM as having two basic schools that are defined by the primary source of sound generation, both of which are possible only with electricity. As we will discuss in the next chapter, recorded music and synthesized tones appeared around the same time. Yet, recording technology took off right away and it would take about another six decades before synthesis made its mark.

Source 1: Sound Reproduction

Turntables and analog tape machines were the original sound-reproduction media used in EM. These storage technologies served as the first sound sources for electronic music composition. When considering the manipulation of audio recordings as an art form, we find two parallel roots of equal significance—one starting in the 1940s and the other in the 1970s. The artists working with this source are responsible for most of the significant innovations in creative process.

AMERICAN AND EUROPEAN INTELLECTUAL AVANT-GARDE SCENES

As we will discuss in more detail in Chapter 7, the very first forms of EM emerged out of France, Germany, and the U.S. in the late 1940s and early 1950s. Pierre Schaeffer's first public *musique concrète* performance in 1950 France used only multiple turntables, a mixer, and a PA. Soon thereafter, Schaeffer founded GRM and worked with many influential composers such as Varese, Boulez, Parmegiani, and Karlheinz Stockhausen. Stockhausen was right there at the beginning and almost immediately settled into the now-famous, but new at that time, NWDR studio in Cologne, Germany. Evolving right alongside *musique concrète* was tape music, which included a variety of additional sound sources such as field recordings, tone generators, and acoustic instruments (out of this milieu emerged electroacoustic music). The Columbia-Princeton Electronic Music Center popped up in NYC around this time, associated with notables such as John Cage and later also Bob Moog. Then, in 1962, the San Francisco Tape Music Center was founded by Pauline Oliveros and a few others. Meanwhile, a completely different approach to working with existing sound recordings was bubbling up independently in Jamaica.

JAMAICAN DUB, SOUND SYSTEMS, AND AMERICAN DJ CULTURE

As an outgrowth of reggae, dub appeared in the 1960s and 1970s when King Tubby and Lee "Scratch" Perry became the very first remixers. At the same time, people began to build mobile sound systems, which by the 1970s were massive walls of speakers and amps attached to truck beds, vans, and other autos. As it is now, New York City was home to a lot of Jamaican immigrants, including Kool Herc, the originator of hip hop. (The New York State Office of Parks, Recreation, and Historic Preservation officially recognized Herc's home on Sedgwick Avenue in the Bronx as the "Birthplace of Hip-Hop" on July 5, 2007.) By the late 1970s, Jamaican sound systems found their place in NYC's emerging DJ culture. The modern DJ was born there as artists figured out how to play just the drum breaks off of records by juggling two turntables, thus giving break dancers an endless soundtrack. Thus was the birth of break beat and sampling.

While all of this was going on up in the Bronx, Larry Levan was pioneering club culture downtown on the West side of Manhattan at the Paradise Garage, the birthplace of garage, NYC's version of what was being called "house" in Chicago. This venue didn't sell food or drinks and was first to put the DJ at the center of attention. Although Levan was born in Brooklyn, he is credited as the person who introduced elements of Jamaican dub music to electronic dance music. He was exposed to those styles through the remixes he did for Island Records, including releases by the legendary dub production team of Sly and Robbie.

NOTE: The syncopated rhythm characteristic of the guitar parts in reggae/dub is now heard in a lot of modern electronic music. Instead of a guitar hitting on the up beat, also referred to as the "and" (as in 1 and 2 and, etc.), we hear a "pumping and breathing" synth. The rhythm is created by a compressor that ducks the synth each time a kick drum triggers its side chain's detector circuit, or what is commonly known as "side-chaining."

Source 2: Sound Synthesis

Electronic music as we know it did not exist until synthesis was added to the composer's toolkit. Synthesis is largely responsible for the electronic generation of sounds and timbres, and therefore the artists and inventors working with this source are responsible for most of the significant innovations in timbre. It is important to note that most drum machines were basically sequenced synths until the early 1980s, including all of the sounds produced by the TR-808.

ADDITIVE SYNTHESIS

Of all the major figures in early EM, Stockhausen is the only one who made an equal mark with both sound sources—although his invention of the additive synthesizer in the early 1950s puts him at the vanguard of pure electronic music (see the following sidebar). Due to its complex and over-wieldy nature, additive synthesis would not become common until the digital era decades later.

SUBTRACTIVE SYNTHESIS

Synthesis did not find its way into popular music until subtractive synthesis was invented, about a decade after Stockhausen invented additive synthesis. Subtractive synthesis is significantly more user friendly than is additive synthesis. We discuss the invention of subtractive synthesis in detail in Chapter 8, "Selecting Your Tools." In the early 1960s, Bob Moog was hanging around the Columbia-Princeton Electronic Music Center while Don Buchla was making friends at the newly founded San Francisco Tape Music Center. Based on discussions with composers at each of those centers, Moog and Buchla were inspired to simultaneously, independently invent the modular subtractive analog synthesizer. When people say analog synth, they mean subtractive synthesizer.

FM SYNTHESIS

While Moog and Buchla were busy creating the most popular synthesis method of all time, a few miles down the peninsula from San Francisco, John Chowning was inventing FM synthesis at Stanford in 1967. FM offers timbral capabilities not possible with any of the previous methods, but didn't appear in a commercially successful product until 1983. We will talk about John Chowning and the significance of that successful 1983 product in Chapter 6.

MISC. SYNTHESIS

Numerous other methods emerged once digital synthesis was viable in the 1970s and into the early 1980s, such as wavetable synthesis (Wolfgang Palm, PPG, Waldorf), granular synthesis (Iannis Xenakis, Curtis Roads), vector synthesis (Dave Smith), physical modeling synthesis, sample and synthesis, spectral resynthesis, and other variations on the above.

Karlheinz Stockhausen (1928–2007) Stockhausen was interviewed for the Nov/Dec 1977 issue of *Synapse Magazine*. Interviewer Janet Henshaw Danielson starts the interview with the following question: "What I'd like to know is something about your past career. What originally attracted you to electronic music?" Stockhausen replied: "The question is wrong, because I started the electronic music."

No one ever accused Stockhausen of humility, but his assertion is only a slight overstatement. In 1953, he composed and produced *Studie I*, which he claims is the first true electronic music composition. Stockhausen's invention of the additive synthesizer was an application of one of Joseph Fourier's theories, known as Fourier analysis. Fourier analysis states that all periodic functions, such as found in sound waves, can be deconstructed into a series of sine waves, each with a measureable frequency and amplitude. By implication, Stockhausen realized that sounds could be synthesized by generating a lot of sine waves, each with their own sine wave oscillator and amp. Although others previously utilized electronic instruments and tape recording, when it comes to synthesized electronic music, Stockhausen is in fact the single-most seminal composer, since *Studie I* is the first known composition using synthesized sounds.

The unimaginable horrors Stockhausen experienced as a teen in WWII Germany help explain his serious demeanor and reputation for obsessive control over every detail of the performances of his compositions. Every bit in the same league as other 20th-century intellectual giants, and like many German intellectuals of his era, Stockhausen was heavily influenced by Oriental philosophy (now just called Eastern or Asian philosophy). After the war, at the age of 20, he was so unsure of his future direction he started writing letters to Herman Hesse, author of *The Glass Bead Game*, *Siddhartha*, and *Steppenwolf*. They developed a serious pen-pal relationship that lasted for more than two years, with Hesse taking a role almost like that of master to apprentice, pushing Stockhausen to focus his life efforts on whatever it was that made him unique. In a 1950 letter to Hesse, Stockhausen thanked him for his help in forming his personality, and I paraphrase, in transforming him from tears of salt to crystalline stone. A few years later, after establishing himself as a serious

composer, the writings of Indian sage Sri Aurobindo are a cited major influence on the realization of *Kontakte*, completed in 1960. This is considered as one of the most important works in the evolution of electronic music.

Not only a serious composer, Stockhausen was also quite elegant when speaking about music. During a lecture to the Oxford Union on Four Criteria of Electronic Music in May 1972, he stated, “Whenever we hear sounds we are changed, we are no longer the same after having heard certain sounds. And this is the more the case when we hear organized sounds, organized by another human being...music.”

It is easily argued that Stockhausen is the most seminal figure on the timbre side of the EM equation. Chapter 7 spends a lot of time talking about an American composer of equal importance on the creative-process side: John Cage. And just as the preceding quote resembles ideas found in Asian philosophy, so too are many of the deep insights of this American pioneer—but manifested and applied to music and life in a completely different way. In the flowing current that is the evolution of electronic music, if Stockhausen was the positive charge, then John Cage balances things out as the negative charge. When you get to Chapter 6 and Chapter 7, make sure to check out Figure 6.6 and Figure 7.7, which show significant connections to and from Stockhausen.

Earlier, I mentioned innovations in rhythm from electronic music composers such as Stockhausen. *The Wire* magazine’s November 1995 edition asked Stockhausen what he thought about a number of current electronic music artists he had recently been asked to critique. Stockhausen replied:

I heard the piece Aphex Twin of Richard James carefully: I think it would be very helpful if he listens to my work Song of the Youth, which is electronic music, and a young boy’s voice singing with himself. Because he would then immediately stop with all these post-African repetitions, and he would look for changing tempi and changing rhythms, and he would not allow to repeat any rhythm if it were varied to some extent and if it did not have a direction in its sequence of variations.

After publication of that issue, Aphex Twin responded: “I thought he should listen to a couple of tracks of mine: ‘Didgeridoo,’ then he’d stop making abstract, random patterns you can’t dance to.”

Richard James was already recognized as a serious electronic musician upon the release of *Selected Ambient Works 85–92* in 1992, ambient music that picked up where Eno left off. And although he was producing other interesting music under a variety of pseudonyms, it was not until Aphex Twin that he really hit his stride with a trio of Warp Records releases widely considered to be his most groundbreaking and influential works outside of the ambient genre: *Richard D. James Album* (1996), *Come To Daddy* (1997), and *Windowlicker* (1999). It is interesting to note that these three releases are not only full of influential and innovative timbres and rhythms, but also abstract and random patterns you can’t dance to. Aphex Twin is one of the cornerstone artists of the Intelligent Dance Music (IDM) genre, which got its unfortunate name from the *Artificial Intelligence* compilation, released by Warp Records in 1992 and then licensed by Wax Trax for release in the U.S. in 1993.

Independent Label Pioneers

As more genres appeared, more labels appeared. There is a close synergy between the branching dynamics of genres and labels, since labels cater to the audiences of niche genres and subgenres. Some labels even define a genre’s identity such that certain artists are best described to those who have not heard them by mentioning their label. This last case is even more obvious when considering any of the boutique labels owned by established DJs or producers, which are often known for very small variances between artists on their label. In many cases, such labels mostly release music by the artist/owner and perhaps a few of his or her friends or collaborators. On the other hand, there are indie labels not as concerned with specific aesthetics and styles, and release a diverse assortment of music and artists based on commonalities in their approach to music or other shared cultural artistic inclinations, philosophies, or attitudes.

Most labels started out as independent labels. By the 1950s, numerous mergers and acquisitions created what we now think of as the major labels. Although independent labels such as Chess, Sun, and A&M continued to pop up in the 1950s and 1960s, by the early 1970s most of them had been acquired by the increasingly larger major labels. The modern indie label emerged in the 1970s and grew to such an extent in the 1980s that by the early 1990s, indies became standard feeding grounds for big-label A&R. This created a new dynamic in the industry wherein some musicians began to think of indies as no more than a stepping stone in their career on the way to getting signed by a major.

The Music Producer's Survival Guide

Major labels exist to make money, but there are a lot of different motivations for starting an indie label. These motivations are generally a combination of want and/or need along with any of the following: to serve as an alternative to big labels; to feed DJ and club scenes; music loving entrepreneurship; DIY passion; to be an impresario/curator expression of personal taste; to support a niche community or subculture; out of necessity for academic, experimental, *avant-garde* music with no commercial potential at all; or just foolishly hoping to make money on indie music.

Let's consider some of the most important indie labels related to the focus of this book. (If I omitted a label of significance, it was not on purpose.) It is important to point out a few things about all of the labels in the following list. All of them started out as indie labels, although many are now part of major label groups (and some of those later escaped and returned to indie status), while others are no longer around at all. I also chose to stop at 1990 because accounting for the proliferation of labels that began after that year would take up a whole chapter, and moreover, most of those essentially follow in the wake of the mentioned pioneers. The grouping is loosely according to similar genres, styles, and branches of influence. For those of you who are interested, and have a lot of time on your hands, looking into each of these labels and their roster of artists will reveal a universe of amazing influential music.

Jamaica, U.K., and New York

Labels include the following:

- ▷ Island Records (1962)
- ▷ Wackies (1974)
- ▷ West End Records (1976)
- ▷ Sugar Hill (1979)
- ▷ On-U Sound Records (1979)
- ▷ Tommy Boy (1981)
- ▷ Def Jam (1983)
- ▷ Relativity Records (1985)
- ▷ Axiom (1989)

NOTE: Island Records was the largest indie label in history until it was sold to Polygram in 1989, which is now Island Def Jam Music Group, part of the Universal Music Group. Axiom was started as part of Island when it was still indie.

American Punk, Metal, and Aggressive or Alternative Rock Styles

Labels include the following:

- ▷ SST (1978)
- ▷ Alternative Tentacles (1979)
- ▷ Discord (1980)
- ▷ Epitaph (1980)
- ▷ Touch and Go (1981)
- ▷ Metal Blade (1982)
- ▷ Combat (1983)
- ▷ Amphetamine Reptile (1986)
- ▷ Lookout! (1987)
- ▷ Matador (1989)

Various Styles of Adventurous Rock, Underground Metal, and “Industrial”-Related Genres from Germany, U.K., U.S., and Canada:

Labels include the following:

- ▷ Ohr (1970)
- ▷ Brain Records (1972)
- ▷ Sky Records (1975)
- ▷ Factory (1978)

- ▷ Mute (1978)
- ▷ Rough Trade (1978)
- ▷ 4AD (1979)
- ▷ Waxtrax (1980)
- ▷ Noise (1981)
- ▷ Ryko (1983)
- ▷ Netzwerk (1984)

Electronic Music Labels from U.S., Canada, Germany, and U.K.

Labels include the following:

- ▷ Trax (1984)
- ▷ Metroplex (1985)
- ▷ Transmat (1986)
- ▷ Warp (1989)
- ▷ Plus 8 (1990)
- ▷ Ninja Tune (1990)
- ▷ Basic Channel (1993)

NOTE: Basic Channel is the only label listed here that was founded after 1990. Moritz Von Oswald and Mark Ernestus are a Berlin-based production team known as Rhythm & Sound. They epitomize DIY to the extreme. After starting the Basic Channel label in 1993, they opened Hardwax, a record store and distribution company under the same name. They also have their own dub plate-capable mastering studio. Additionally, they run a few labels as part of the Basic Channel family, including their own Chain Reaction and Rhythm & Sound labels. Moreover, they have resurrected the Wackies label as an imprint under Basic Channel and reissue many of the seminal dub releases that have long been out of print.

Music Is Cybernetic

Cybernetics is the study of feedback loops, how inputs to systems influence their output that then influences the next input. Any time we are talking about networks and feedback loops, we are in the domain of cybernetics. Cybernetic concepts are applied in the study and practice of everything from behavioral psychology, to robotics, to communications networks, and beyond. Norbert Wiener coined the term in the 1960s from “cybernaut,” the ancient Greek for “helmsman,” the person who steered a ship to keep it on course by reacting to feedback from the water and then making adjustments. Cybernetics, then, is very useful when describing and understanding the behaviors of the Internet, which consists of numerous overlapping and interlinking networks rife with inputs and outputs. The term cyberspace was coined by science-fiction writers in the early 1980s and most popularized by William Gibson in his 1984 novel *Neuromancer*. So *cyber* is quite an old word, and it is only because of the postmodern sci-fi genre known as *cyberpunk* that its futuristic hi-tech connotations are so prominent. Now that you know a little bit about cybernetics, let’s consider the prominent role feedback loops play in the creation of music.

We can literally think of music as transmission of energy. As discussed, music can express any emotion and capture any mood or state of mind. Given our discussion on the lead role that cultural cross-fertilization plays in the evolution of musical genres, we can make a few statements about factors that influence the creation, production, and performance of music. These factors of influence include complex, multidimensional fractal networks from all domains of human experience, including but not limited to personal history and psychology, tools and the scientific knowledge used to create them, shared cultural meaning, and commercial markets. It is useful to view many of the interactions through the lens of cybernetics, feedback loops that each artist and producer experiences in his or her own way. As all of these influential factors set off the urge to create, there are correlated patterns of electrical impulses in the brain. Once we decide what we want to do, our brain sends electrical signals through our nervous system to set muscles into action.

Recordings are a result of unique combinations of a producer’s and artist’s life experiences and personal history. Transducers change energy from one form to another. So with those two givens, let’s consider this cybernetic process starting with the playback of a digital recording. Digital is a binary code that must be converted to a continuously variable (analog) alternating current. Once all those ones and zeros are a stream of variable voltages traveling through a metal wire, they can manipulate magnetic fields. Speakers use electromagnetism to drive electromechanical motors that create mechanical movement that pushes acoustic wave energy through air. These pressure waves are collected by the outer ear, which resonate in the ear canal to boost certain frequencies. As the wave energy hits the ear drum, three tiny bones act like pistons and match impedance for energy transfer from air to fluid. This then vibrates thousands of little nerve hairs that act

like microphones and convert energy to electrical signals for flow through the auditory nerves to the brain. The brain processes these patterns of electrochemical activity that our consciousness perceives as sound, and thus music. Upon hearing music, additional electrical patterns in the brain translate it into emotions, thoughts, and feelings, thus influencing our life experience and personal history.

Cadence

Hopefully, this chapter adequately conveyed how astounding, extraordinary, and amazing the processes and dynamics of musical history are that have brought us to where we are today. It is easy to lose sight of the big picture when we get too caught up in the latest trends, the newest plug-ins, the most complex LFO modulations, or the hottest venues and DJs. It happens to all of us at some point. When you notice it happening, just remind yourself what it is all about in the first place. As we gain more knowledge, learn more about influences and styles, and develop our skills, our taste changes in such a way that it is harder to be impressed or inspired by the mass of available music. Simultaneously, as the years go by our exposure to the negative sides of the business, being on the receiving end of raw deals, and run-ins with hacks, leeches, and other undesirable people can drain motivation and inspiration. Combined, these two dynamics increase the risk of becoming jaded or cynical. We all go through rough spots in life, but those should be temporary. Don't become that person on the scene who lets it become permanent and either always hates on "music these days" and/or goes on about all of their should'ves, would'ves, and could'ves.

There is a fine line between having a high threshold to be impressed and being bored or cynical about music in general. People obsessed with music have a lot more knowledge about it, which means they appreciate things others don't—but are also often harder to impress because they have seen or heard most of it before. A few years ago, while watching an indie electronic act at a small venue in Brooklyn, one of my good friends asked me what I thought of them. I said they were good at what they were doing, but nothing special in any way. She then said I was jaded. My snarky response, "I'm not jaded, I'm just over informed." We both laughed, but later I realized it was the perfect response from a music professional that addresses the difference between jaded and simply having a different frame of reference, although with no less enthusiasm, passion, and excitement for music in general.

Even if we do not share taste in one single artist, we at least share a passion for music. As we dig into more grounded, practical, and technical topics, it is crucial we never lose sight of this passion. With intense focus on the music industry, career planning and development, mastering technical skills, networking, people skills, file management, creativity, gear, and lifestyle, it is easy to lose perspective and forget what got us interested in dedicating our lives to music in the first place. Think about those moments when music changed your life. As producers, we are also on the other side of that equation, creating the music that does that for others. No matter what kind of music you want to produce, you have the potential to create powerful experiences that can resonate long after you're gone.