Keys to Play
Roger Moseley

Published by University of California Press

Moseley, Roger.
Keys to Play: Music as a Ludic Medium from Apollo to Nintendo.
PART I

Fields and Interfaces of Musical Play

How oft, when thou, my music, music play’st
Upon that blessed wood whose motion sounds
With thy sweet fingers, when thou gently sway’st
The wiry concord that mine ear confounds. . .

—SHAKESPEARE, SONNET NO. 128, LINES 1–4
How is music played? Responses will vary depending on where the stress falls in the question. “How is music played?” interrogates the agencies and mechanisms responsible for music’s coming into audible being. It asks how “play” can operate as a verb flexible yet precise enough to describe the striking of a drum, the agitation of a string, the vibration of a column of air, the depression of a key, and the tapping of an onscreen triangle: in other words, it inquires into the means of music’s embodied and instrumental mediation. Asking “How is music played?” shifts the emphasis to the ludic dynamics that can motivate the bringing forth of music and the senses in which the processes of improvisation, performance, and recreation are comprehensible as ludic modes of behavior. Finally, “How is music played?” asks how music might be akin to other things one plays, such as solitaire, chess, rugby, roulette, Tetris, the fool, footsie, or truant. In these senses, the playing of music can be related to the playing of games, to role-play, simulation, and deception, to calculation and strategy, to risk and uncertainty, to sociality and flirtation, even to the wanton—sometimes violent—pursuit of euphoria and self-abandonment. The elucidation of these relations is this book’s raison d’être.

Prompted by the sound and sight of the mysterious Dark Lady at the keyboard, the Shakespeare sonnet from which the epigraph for Part I is drawn revolves around the axis of play as topic and mode. Music issues from the motion of the Dark Lady’s “sweet fingers” while standing as a metaphor for the beloved herself: music at once plays and is played by music. At the material interface of the virginals (“that blessed wood”), her digital maneuvers are transduced into vibrations that delight the poet’s ear, leaving him tantalized and disoriented. The whimsy of Shakespeare’s textual play derives from the play of fingers and keys, the oscillation
of strings and sonic waves; the to-and-fro of repetitive motion carries an erotic charge that throws distinctions between subject and object, cause and effect, into pleasurable disarray. Framing music and play together in this way suggests that musical activities can realize playful concepts and, conversely, that play can be conceived in terms of musical engagement. Musical play and playful music take shape in the spaces that open up between sign and sound, instruction and execution, the probable and the implausible, the permissible and the imaginable.

Play’s resistance to definition is one of its defining qualities. Typically negotiating between subject and object, the verb “to play” connotes a relational mode at the same time as denoting a particular type of ludic action. Even when “the play’s the thing,” which is to say masquerading as a noun, play never stops playing. Correspondingly, music is not merely the outcome of a certain type of play, but constitutes a set of cognitive, technological, and social resources for playing in and with the world through the medium of sound, its mechanisms, and its representations. Play, in turn, becomes the means by which such musical behavior is made audible. In these multiple senses, play activates music via patterns of actions that can be identified as ludomusical. Within (and against) the constraints that regulate it, ludomusical play fluctuates between the preordained and the unforeseeable, emerging in relation both to the performance of familiar cultural scripts and to the imperative to improvise.

Although play is often cited as an intrinsic attribute of humankind, it has long been observed that play is not exclusive to people, or even to gamboling animals. Play can also describe mechanical processes that animate inorganic matter by accident or design: we speak of the play of light, the play of a loosely fitting drawer, and the playing of chess by machines such as IBM’s Deep Blue. Navigating the shifting material and cultural formations that regulate any given mode of musical play thus involves the traversal of both human and nonhuman realms. In Shakespeare’s sonnet, the reciprocal relations of musical subjects and objects pivot around play, bearing out Gadamer’s claim that “all playing is a being-played.” Cornelia Vismann reframed this chiasmus in the discursive terms of media theory:

> If media theory were, or had, a grammar, [the] agency [of media and things] would find its expression in objects claiming the grammatical subject position and cultural techniques standing in for verbs. Grammatical persons (and human beings alike) would then assume the place assigned for objects in a given sentence.

As the Dark Lady and her virginals bear witness, such chiastic encounters have often played out at the interface of the keyboard, where human meets mechanism and operation becomes technique. From the fourteenth-century chekker to contemporary digital games, the keyboard has formed a field of play on which musical epistemologies have been allegorized, tested, and challenged via the cybernetic configuration of input and output. While keyboards invite us to play music, the
automatism with which well-drilled fingers navigate them has been repeatedly invoked to illustrate how music can “play” us.\(^8\) Keyboards even help account for how music can play on its own: the player piano testifies to the possibility of musical recreation without anthropic contact.

When activated by human digits, however, the keyboard’s mechanisms become entangled in play as embodied and social experience. As Huizinga pointed out in his classic book *Homo Ludens*, the association between play and instrumental skill is most directly embodied by “the nimble and orderly movement of the fingers.”\(^9\) While such motion requires effort, it need not involve toil or strain: Sigmund Freud famously conjectured that the infantile origins of the delight taken in play’s to-and-fro oscillations have less to do with the arduous accomplishment of a particular task than with the pleasure taken in shaping, ordering, and repeating bodily movements that convert anxiety into security.\(^10\) Across many Indo-European languages, moreover, the roots of “game” and “play” are etymologically associated with movements that give rise to communal joy as well as personal pleasure.\(^11\) The gestural qualities of such motions also reflect the social connections between playing, dancing, and miming observed by both Theodor W. Adorno and Gadamer in the context of the word *Spiel*.\(^12\) Insofar as it reiterates such motions, even solo play responds to the play of other bodies.

As is most evident in its theatrical sense, play is also bound up with make-believe, the exercising of the imagination, and the fantastical possibilities afforded by the subjunctive mood. The phenomenological characteristics of play have less to do with intention and emotion than with entrainment and affect.\(^13\) Even without consciously simulating or dissimulating, one plays “as if,” thereby forging the connections between musical performance and role-play noted by Nicholas Cook.\(^14\) As a performative mode, play preempts and subverts questions predicated on linguistic concerns with communication, meaning, truth, and sincerity.\(^15\) More enactive than representational, play insists on the reality of pretense, allows for the simultaneous acceptance and circumvention of constraints, and thrives on the inevitability of uncertainty.

Since musical play often involves the abandonment of the self, or at least the temporary occlusion of its ulterior motives, it maintains a close relationship with ritual.\(^16\) As objects of play, both music and games are part of quotidian life, and yet they tend to take place in realms where everyday protocols are suspended. Whereas Huizinga went so far as to claim there to be “no formal difference between play and ritual,” however, Claude Lévi-Strauss placed the two in reciprocal relation: while rites transform events into structures, play transforms structures into events.\(^17\) This function of play is most apparent in ludomusical practices that, like sporting occasions, shift focus from the prevailing rules (often articulated and enforced by social conventions and incarnated by a particular body of repertoire) to the playing out of singular, unrepeatable events that emerge from
a particular ludic environment and its affordances. In the performance of much folk music, for instance, sonic and affective experiences are informed not only by the selection and transmission of musical materials, but also by factors such as the moods of musicians and audience, the tuning of instruments, and even the weather. Conversely, the traditional circumstances of Western art music in performance are closer to ritual insofar as the contingency of the individual event is typically downplayed in favor of a quasi-atemporal presentation of (more or less) fixed musical material. The ritualistic qualities of such performances are intensified by their circumstances: the hushed, darkened hall and the spatial separation of performers from spectators amplify the tacit signals governing the voluntary yet constrained actions taken by participants. Under these conditions, play is regulated by one of its antipodes, the musical work; as a result, particular concordances with and departures from the “rules” of the score are magnified and invested with interpretive significance.

To a greater or lesser extent, however, regulatory functions are to be found in all forms of presentational and participatory musical praxis, no matter how differently their parameters might be defined. In the jazz club as in the opera house, the fascination of ludomusical play lies in its shuttling between structure and event, the criteria established by formal and social models on the one hand and the quaslia of an individual experience on the other. Accordingly, Huizinga noted that certain social sites, from the tennis court to the concert hall and the sumo ring to the court of law, are reserved for the staging of encounters and exchanges enacted according to particular rules. Such “magic circles” form ritual frames wherein the internal coherence of rule-bound systems is temporarily granted primacy over—or protection from—external exigencies.

Huizinga’s concept of the magic circle has recently come under fire, particularly from sociological angles. Critics bent on demystification have pointed out that all attempts to transcend the social are themselves symptomatic of social forces at work, and have thus dismissed the magic circle as an invidious formalist delusion. As Edward Castronova observes, magic circles are always materially and historically grounded, and the political processes by which they assert territorial integrity are subject to interrogation and negotiation: their membranes are permeable and the spells they cast can be broken. Even as they circumscribe play-spaces, the boundaries of magic circles connect them to the world outside; concomitantly, as Clifford Geertz noted, play takes place both within such circles and through their relations to what lies beyond. Nonetheless, taking the illusory aspects of magic circles seriously can help us grasp the subjunctive, metacommunicative, and even paradoxical logic by which systems of play can frame arbitrary objects and contingent events as absolute and necessary. With the creation of a magic circle, a line is drawn that simultaneously marks and makes a difference in the world. To frame this in the recursive terms of Luhmann’s systems theory,
games are played in accordance with a digital logic based on epistemological distinctions (such as inside/outside or fair/foul) that make games themselves conceivable in relation to all that is not a game. At the same time, as Jesper Juul puts it, “a game must be integrated into a context in order to be experienced as separate from that context.” Oscillating between participation and observation, this double function can help clarify the specific topology of any given magic circle, where it is grounded, how and why it is drawn, and the genealogical shifts that its changing forms chart over time as particular elements of play are successively incorporated, privileged, marginalized, or excluded from social and historical configurations.

Schiller observed that play constructs relationships between material and formal impulses so that “the operation of the one simultaneously confirms and limits the operation of the other.” Negotiations between internal, quasi-autonomous rules and external forces account both for the courses taken by play—the unforeseeable and yet strangely inevitable way that things “play out”—and for its compelling appeal as event and spectacle. Those who play (with) music can transgress and subvert as well as obey the protocols that constitute the unwritten rules of engagement, and such play can on occasion transform the rules themselves. As exhibited within and by artistic movements such as Fluxus, Situationist International, and OuLiPo, many of whose members were devotees of the surrealist parlor game known as cadavre exquis, play has often realized the tactical potential to mock, shock, and critique, whether by ignoring rules, observing them in the breach, or breaching them via absurdly literal observation. From Dada to digital games, instances of transformative play reveal how subversion can either be integral to gameplay dynamics or emerge through imaginative counterplay with (and against) the rules that shape them. In itself, neither the following nor the flouting of rules is necessarily aligned with a particular aesthetic or political stance: the transgression of conformity often involves conforming to transgressive norms, and the representational implications of a game’s range of possible actions must be considered in relation to its underlying formal and mechanical principles.

In this regard, it is telling that both Schiller’s and Gadamer’s perspectives on play were indebted to Immanuel Kant’s Critique of the Power of Judgement, in which the free play of the imagination is identified as the animating principle behind intellectual pleasure. For Kant, such pleasure derived from the law-bound exercising of freedom. Crucially, however, these laws are not necessarily either specific or universal, but rather issue from a sense of lawfulness that can itself be created by the imagination. This aligns with Kant’s distinction between the purposeful and the purposive: to the extent that they are legislated in the name of pleasure, the laws of play are arbitrary and lack moral purpose, rendering any beauty that results ultimately inconsequential, no matter how delightful it might be.
Herder condemned what he saw as the meaningless frivolity of Kant’s formulation and drew on musical analogies in the course of rebutting it. For Herder, art had to do not with the playing of “amusing or tedious ape-like games,” but rather with the perception of “good order and good form” via resonances between mind and world in accordance with the principles of natural law that regulate the harmonious relations of bodies and sensations. Herder’s claims were echoed by Georg Wilhelm Friedrich Hegel, for whom art was concerned not with “child’s play, but . . . with an unfolding of the truth.” Combining Kant’s receptivity to the aesthetic qualities of play with a Herderian concern for ontology and ethics, however, Schiller argued in his *Letters on the Aesthetic Education of Man* that the *Spieltrieb* (“play drive”) had to do with far more than the childish pursuit of diversionary pleasure. Through interplay between life and form, power and law, nature and reason, “the freest and most sublime state of being” could be attained: “Man plays only when he is in the full sense of the word a man, and *he is only wholly Man when he is playing.*” In his “Conversation on Poetry,” Friedrich Schlegel went even further, holding the play principle to account not merely for aesthetic beauty, but for the very formations of the universe, at once autopoietic and autotelic: “All the sacred games of art are merely distant imitations of the endless play of the world, the eternally self-creating work of art.”

Although the immediate occasion of Schiller’s *Letters* was his disillusionment with the French Revolution, his own faith in the profound power of play was drawn from Plato’s *Laws*, in which the Athenian stranger decrees that men and women “should live out [their] lives playing at certain pastimes—sacrificing, singing, dancing—so as to be able to win [the gods’] favor.” In this sense, Schiller echoed Marsilio Ficino’s praise of the oxymoronic capacity, shared by Plato, Socrates, and Pythagoras, for “joking seriously and playing assiduously [*iocari serio et studiosissime ludere*].” As well as projecting his vision of a neo-Hellenic play-space to be realized via the cultivation of *Bildung*, Schiller’s formulation of the *Spieltrieb* reflects the close relationship between the Greek terms for play (*παιδία, paidia*) and pedagogy (*παιδεία, paideia*) as well as their common root in *παῖς* (*pais*, “child”). As educational method and outcome, play can afford a childlike clarity of vision into the workings of the world as well as childish diversions from serious matters, a paradox encapsulated by Heraclitus’s gnomic dictum: “Lifetime is a child at play, moving pieces in a game. Kingship belongs to the child.”

Yet Schiller’s invocation of what he imagined to be the ancient Greeks’ pure delight in the edifying beauty of physical contests and intellectual rivalry reveals how tightly the phylogeny and ontogeny of play are bound together. As memories of childhood attest, play was purer in the past, while its concrete manifestations in the present are always less than ideal. For Sven Lütticken, Schiller’s paean to Greek play “introduced the *topos* of the fundamental inadequacy of
actual games, of their betrayal of the idea of play.” Schiller’s nostalgia for ancient Greece, his dissatisfaction with the present, and his vision of a better world to come were both inspired and tempered by his horror at the gulf that separated revolutionary ideals from the violent acts that made them matter. His ostensible rejection of Kantian dualism notwithstanding, Schiller maintained a crucial distinction between physical, animalistic play and the type of high-minded aesthetic play that formed both the apogee and the repudiation of human striving, for the former was too readily associated with the bloodlust of the Roman ludi or the Jacobin mob. As Mechthild Nagel observes, the material was synonymous with the abject for Schiller, who railed against the “mechanical artists” of the French Revolution in terms redolent of Herder.

Despite Schiller’s idealizing desire for play to transcend its mechanical basis, however, his acknowledgment of the relations between its material and its formal aspects echoed Kant’s claim that “in all liberal arts there is nevertheless required something compulsory, or, as it is called, a mechanism, without which the spirit, which must be free in the art and which alone animates the work, would have no body at all and would entirely evaporate.” In this light, the changing relation between the shifting valorization of play and instrumental music in eighteenth-century German thought is revealing, as Peter Pesic and Felix F. Diergarten have noted. The mechanical constraints of musical instruments enabled free play that was not subject to rational, emotive, or mimetic decoding (as was held to be the case for the sense and sound of vocal music). After being roundly disparaged by Johann Georg Sulzer, instrumental music’s semantic coyness was deemed praiseworthy by Christian Gottfried Körner and Christian Friedrich Michaelis, for whom instrumental music granted “the imagination [der Fantasie] lighter and freer playfulness . . . than when it is fixated on definite thoughts.” In a similar vein, Ludwig Tieck remarked that instrumental music “fantasizes playfully.” Read in the contexts of contemporaneous musical genres and their associated behavioral codes, these comments invoke the tendency of the late-eighteenth-century fantasía and capriccio to call upon—yet ultimately to elude—a sense of quasi-semantic logic by way of rapid affective feints and textural oscillations. Such “free play” enabled hand and mind to join forces in enacting an organic process of discovery and creation. By 1826, Hans Georg Nägeli could confidently assert that music’s very “essence is play, through and through,” and that “the more . . . playful a musical composition is . . . , the more successful it is.”

While musical freedom from semantic strictures took the form of imaginative invention, such lofty play was typically articulated and materialized at the digital interface of the keyboard. Analogously, the free motion by which sound itself became audible was mechanically limited in order for it to be parsed as distinct pitches and rhythms, whether produced by the vibration of a string, the excitation of a column of air, or the play of the keys that could initiate either. Instruments and
the conceptual possibilities afforded and foreclosed by tonal systems combined to form epistemological structures that also outlined ludomusical fields of play. Such play takes shape as a realization of the potential for unpredictable interaction between players and objects and the constraints that regulate their motion: freedom on the one hand, limits on the other. From this perspective, the keyboard emerges as a digital means of articulating the distinctions by which play is defined and between which it oscillates.

How might we begin to identify the laws—explicit and tacit, material and conceptual—observed and breached in the course of ludomusical play? According to the principles of cultural techniques, a philosophical and anthropological assemblage of concepts and critical tools with which Vismann was associated, the answers should precede rather than follow linguistic models. In other words—or perhaps with no words at all—we should take seriously Huizinga’s contention that play is constitutive rather than illustrative of knowledge, and that this knowledge is typically produced at interfaces between limbs and objects. If, as Thomas Macho supposes, humans counted before the invention of numbers and singing came before the scale, then musical play surely preceded the devising of instruments and the tallying of scores. Once those technologies had been developed, however, ontological formations and ontographic operations combined to enable music and games to be played in accordance with rules—understood here as arbitrarily binding directives that both prescribe and proscribe—for entering into material and imaginary relationships with the world.

Before analyzing musical play and the ends to which it has been put, then, we should acknowledge the ways in which its chiastic configurations supplement the oral, literary, and numerical methods by which subjects have been formed and cultivated. Music and the techniques that shape it simultaneously trace and are traced by the materials, technologies, and metaphors of play. It is in this sense that play does not represent so much as it simulates: rather than enacting “a passive, interior mimesis” of other phenomena, as Roland Barthes put it, the play of musical bodies and objects is emergent, procedural, generative, and recursive. It has to do not with the production of meaning, but with the distinctions and oscillations on which meaning is predicated and by which it is processed.

This helps account for the cognitive and linguistic dissonance between the registers of musical discourse most explicitly associated with theory, praxis, and history. In their own ways, all three idioms are as remote from play as it unfolds in the here and now as they are from those who bore witness to the play of the past. How, then, might we speak of ludomusicality in a way that reflects both its currency and its historicity, its immediacy and its mediation? This Key attempts to unlock answers from five perspectives. By way of musical examples both mythical and historical, the first presents Caillois’s taxonomy of play as a means of recognizing its various forms and their associated characteristics.
considers play’s antonymic relationship with work in the context of a nineteenth-century ontological and aesthetic agenda that continues to exert a strong influence over today’s musical cultures. Since the proceedings of play have so often gone unratified by the archival record, it has largely eluded the discursive grasp of historiography. The Foucauldian concepts of archaeology and genealogy suggest alternative ways in which play itself might constitute an epistemological mode capable of registering the spatial and temporal dimensions of musical phenomena. Accordingly, this Key’s third component introduces the digital game as a contemporary manifestation of play that is historically and technologically implicated in audiovisual representations of conflict, while the fourth traces a media-genealogical lineage connecting seventeenth-century hydromechanical organs, eighteenth-century musical automata, nineteenth-century telegraphic interfaces, and late twentieth-century “rhythm-action” games. Finally, the fifth focuses on the haunting figure of Frédéric Chopin in order to tease out ways in which digital gameplay at the keyboard can obtrude from the passage of historical time, invoking and betraying the past in order to offer visions, at once utopian and dystopian, of how the future might play out.

**1–1 ORDERS OF PLAY**

Let us begin where Schlegel’s “Conversation on Poetry” ends, accepting its invitation to loop back to what might be deemed a ludomusical origin myth: the fateful contest between the Greek god Apollo and the satyr Marsyas.\(^{54}\) The myth’s ludic drama and lurid violence have long fascinated artists and scholars, particularly those concerned with the establishment of hierarchical relations within and between artistic realms. In recent years, it has attracted the attention of Daniel Albright, John T. Hamilton, Lydia Goehr, Richard Leppert, Andreas Dorschel, and James R. Currie.\(^{55}\) As is made evident in Key 2–1, the reading of the myth presented here is willfully anachronistic insofar as it brings out themes that resurface at unexpected historical junctures, foreshadowing or echoing techno-epistemological shifts that reach far beyond the ancient world.\(^{56}\)

The basic outline of the myth is well established, although significant details vary among its sources.\(^{57}\) Marsyas, a satyr from Phrygia, picked up an aulos discarded by Athena, who had been disgusted by its distortion of her facial features when she played it. Having been inspired by the breath of a goddess, the instrument produced beautiful music as soon as Marsyas blew into it, which delighted and emboldened him. The satyr rashly challenged Apollo to a musical contest to be judged by the Muses: the winner, it was agreed, could do whatever he pleased with the loser. Apollo played the kithara while Marsyas played the aulos (or perhaps two auloi at once).\(^{58}\) After the first round, Marsyas seems to have held the advantage, forcing Apollo to resort to dubious tactics.\(^{59}\) In one version of the myth
he added his voice to his kithara, while in another he played his kithara upside down, feats he knew Marsyas would be unable to match. The Muses thus ruled in Apollo’s favor; as punishment, Apollo had Marsyas bound to a tree and flayed alive. According to Ovid, his blood mixed with the tears of the satyrs and nymphs who mourned him to form a river that took his name, while others reported that Apollo repurposed the satyr’s hide as an askos, a flask or pouch that could serve as wineskin, windbag, or drum.

At first sight, this myth is hardly playful; on the contrary, it teaches a stern object lesson on the dangers of hubris and the provocation of divine wrath. The neo-Pythagorean music theorist Aristides Quintilianus was among many who rebuked Marsyas for “dignify[ing] his music beyond its worth.” Contemporary readings of the myth thus have no trouble in identifying or extrapolating the illiberal forces that predetermined the contest’s outcome. The field of play was certainly tilted heavily in Apollo’s favor: exoticized, feminized, and stigmatized by his choice of instrument even before he dared challenge a god, Marsyas was a marked satyr. Just as the aulos had deformed Athena’s features, so Apollo ensured that it led to Marsyas’s excoriating. The officious savagery of the punishment continues to elicit horror and sympathy, as it presumably did from the Roman courtesans who adorned the statue of Marsyas in the forum with flowers.

It is nonetheless important to acknowledge that Apollo and Marsyas engaged each other in a form of play. Throughout the ancient world, play was often as brutal as it was divine: from the παγκράτιον (pankration, a mixed-martial-arts staple of the Olympic Games that could bring death as well as glory) to the Roman ludi (which incorporated athletic events, chariot racing, and gladiatorial combat into votive offerings and funerary rituals), games could have consequences wholly disproportionate to their nominal stakes, especially when staged as public spectacles. In this light, it is telling that the Pythian and Isthmian Games featured kithara and aulos competitions alongside displays of athletic and martial prowess.

The Greek term ἀγών (agōn) captures the notion of competitive struggle in terms of both its ludic structure and the physical toll it can exact. Although agōn was initially used simply to denote public ludic events from races to musical contests, the word “agon” became synonymous with the writhing contortions of bodies—like Marsyas’s—that suffered the harrowing effects of play. Huizinga perceived the principle of agōn, which he construed as the exhibition of prowess in specially demarcated locations under rule-based competitive conditions, to lie at the heart of culture sub specie ludis: “play is battle and battle is play.” Huizinga also remarked on how the display of skill, the testing of one’s own and others’ limits while vying for victory, and sometimes even the endangerment of safety and well-being for no rational reason pervade many societies, often to an extent that defies all attempts at utilitarian explanation. The central thesis of Homo Ludens...
Ludomusicality holds that a culture’s most vital elements should be understood as fundamentally playful to the extent that they involve challenge, competition, theatricality, virtuosity, and improvisation. For Huizinga, play in the simultaneously primal and rarefied form of agōn was responsible for the flourishing of cultural practices, networks, and institutions from dialogical philosophizing to the adversarial legal system, professional sports to the theater, and love-making to music-making. (This ludic perspective on the theatrum mundi was shared by Johann Mattheson, Handel’s friend and dueling partner, for whom life’s most intense and meaningful experiences “always had something playful” about them.)

The enduring importance of agōn to the staging of musical drama can be tracked across musical history. Goehr links the mythical clash of Apollo and Marsyas not merely to the god’s analogous contest with his satyr-like counterpart Pan, illustrated in Figure 12 and recreated in J. S. Bach’s cantata Der Streit zwischen Phoebus und Pan, BWV 201, but also to the bitter contest at the heart of Wagner’s Die Meistersinger von Nürnberg. Heinrich W. Schwab suggests that this lineage might be traced back to Robin et Marion, a thirteenth-century pastoral attributed to Adam de la Halle in which a shepherd and a knight vie for Marion’s affections via reports of sporting activities—a game of football and a tournament—that map onto their disparate social ranks. Gioachino Rossini’s La regata veneziana, a set of three whimsical canzonettas in Venetian dialect, also entwines agōn and eros: over the piano’s figuration, alternately lilting and intensely kinetic, the feisty Anzoleta coquettishly spells out the stakes of a gondola race to her would-be beau Momolo, offers breathless commentary on the event itself, and subsequently rejoices in Momolo’s victory.

Numerous other musical productions have taken competitive activities as their subject matter: Pietro Metastasio’s libretto L’Olimpiade was set more than fifty times in the eighteenth and nineteenth centuries. Only in the twentieth century did ludomusical events emulate the format as well as the theme of ancient competition, however. Pierre de Coubertin’s revival of the Olympic Games featured composition among a lineup of artistic contests staged from 1912 until 1948. (With the notable exception of the silver medalist Josef Suk [1932], the entrants have generally failed to trouble the scorekeepers of music history.) Drawing on explicitly ludomusical works by composers such as Charles Ives, Erik Satie, Arthur Honegger, Bohuslav Martinů, and Constant Lambert, Anthony Bateman argues that the codification and international dissemination of sporting protocols were coeval—if sometimes at odds—with particular brands of musical modernism, the testing of aesthetic and political limits, and the quasi-veristic imperative to reflect and incorporate the clamorous registers of early-twentieth-century urban life.

In the orchestral arena, Honegger sought musical analogs for the “savage, brusque, untidy, and desperate rhythm” that marked the “attacks and ripostes” of rugby; his eponymous symphonic movement (1928) followed in the programmatic
footsteps of Franz Berwald’s sprightly depiction of a race (Wettlauf, 1842). Meanwhile, the avid soccer fan Dmitri Shostakovich made good on his apocryphal description of the sport as “the ballet of the masses.” The Golden Age (1930), a satirical ballet set to a libretto by Alexander Ivanovsky, treats sport as a metaphor for class warfare and the international agon of communism and capitalism, conducted via fair socialist means amid foul bourgeois chicanery.

In the wake of Battez Philidor! (1882), an opéra-comique by Amédé-Jean Dutacq and Abraham Dreyfus featuring eighteenth-century composer and master player François-André Danican Philidor as the principal antagonist, the cerebral conflict of chess was subjected to numerous twentieth-century musical representations, most notably in ballets featuring anthropomorphized chessmen composed by Martinů (Échec au roi, 1930) and Arthur Bliss (Checkmate, 1937). The serial maneuvers of Stravinsky’s Agon (1957) enacted both an abstraction and a politicization of agonistic dynamics: George Balanchine’s choreography mapped the black and white of chessboard and keyboard onto the costumes, and even the racial identities, of its twelve dancers.

Beyond the aesthetic and historical ambit of modernism, and in their way more telling than the overt representations of ludomusical activity on which Schwab and Bateman focus, are instances in which music is associated with the performance as well as the scripting and staging of agonistic action. From Handel vs. Domenico Scarlatti to the two-player battle mode of Konami’s beatmania digital games, the trope of the musical duel resonates by way of legendary contests based on the evaluation of technē at the keyboard. Such contests tend to place a high value on improvisation as a measure of wit, ingenuity, and flexibility as well as skill: in competition, successful players read and respond to the game’s shifting state and the actions of their opponents in real time rather than according to a script. But conventional musical scores are also capable of prompting agonistic play, as is illustrated by Mozart’s Sonata for Two Keyboards, discussed in Key 4–2. Rather than a “work,” the score constitutes the written-out rules for a light-hearted two-player game that is at once collaborative and competitive. On paper, Mozart’s meticulous rotation of thematic material between the two instruments might be seen to typify the “classical” virtues of balance and symmetry. In performance, however, it can give rise to feuding and jesting in equal measure: the evenhanded alternation of roles compels each keyboardist to play each phrase more beautifully, virtuosically, or wryly than the other.

Since this type of good-natured agonistic play is predicated on the mutual pleasure that arises through the sharing of ludic endeavor, it exposes certain limitations of Huizinga’s approach. In his book Les jeux et les hommes (translated as Man, Play and Games), Caillois applauded Huizinga’s fundamental insight into the significance of play, but complained that Huizinga’s privileging of agon failed to do justice to the diversity of play’s forms and functions. Via a searching critique of Homo Ludens, Caillois sought to arrive at a structural taxonomy
of play. He affirmed Huizinga’s view that play must be voluntary (one must choose to play, free from coercion, which disqualifies gladiatorial combat) and separate (insofar as play unfolds in spaces akin to Huizinga’s magic circles, areas physically and epistemologically delimited from everyday life even though they constitute—and are constituted by—its material and social fabric). By insisting on the multifariousness of play, however, Caillois diverged from Huizinga’s almost exclusive focus on \textit{agōn}. Acknowledging the ludic history of probability (the calculation of which often involved the rolling of dice), Caillois stressed the uncertainty of play and the principle that its outcome not be knowable in advance. (The stigma attached to those discovered to have breached this principle by cheating indicates the importance of regulation to all forms of play, whether imposed by explicit rules, customs, or taboos.) Caillois also drew attention to play’s fictiveness, its disruptive and disorienting powers, and its disregard for productivity: the objective of a game is not to generate goods or capital, although they may be acquired or redistributed as a condition or consequence (as occurs in professional play and gambling, respectively).

Having established these defining qualities, Caillois presented a taxonomy of games and playful activities (recreated in Table 1) that classifies them according to their blend of formal attributes as well as the physiological and psychological states they engender. After addressing agonistic competition, Caillois accounted for games of chance and fortune (\textit{alea}), the play of make-believe, simulation, and deception (\textit{mimicry}), and the dizzying, unruly play of motion (\textit{ilinx}).

While agonistic play has to do with the assertion of self, the exertion of power, and the dividing of participants into winners and losers, \textit{alea} involves the abdication of the self to the arbitrariness of external events. Marsyas’s reckless challenge to Apollo involved an element of \textit{alea} in that the satyr could not have foreseen its outcome, despite his confidence in his own musical skills. Unfortunately for him, he was competing with Apollo, to whom belonged “the lots of the diviner and

<table>
<thead>
<tr>
<th>\textit{agōn} (competition)</th>
<th>\textit{alea} (chance)</th>
<th>\textit{mimicry} (simulation)</th>
<th>\textit{ilinx} (vertigo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textit{paidia}</td>
<td>races</td>
<td>games of make-believe and illusion</td>
<td>swirling</td>
</tr>
<tr>
<td></td>
<td>fights</td>
<td>dolls</td>
<td>swinging</td>
</tr>
<tr>
<td></td>
<td>athletics</td>
<td>masks</td>
<td>riding</td>
</tr>
<tr>
<td></td>
<td>boxing</td>
<td>disguises</td>
<td>waltzing</td>
</tr>
<tr>
<td></td>
<td>fencing</td>
<td>theater</td>
<td>skiing</td>
</tr>
<tr>
<td></td>
<td>football</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>billiards</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>checkers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>\textit{ludus}</td>
<td>chess</td>
<td></td>
<td>tightrope-walking</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>\textit{Paidia}</th>
<th>\textit{Races}</th>
<th>\textit{Children’s games of make-believe and illusion}</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textit{Spectacle}</td>
<td>\textit{Whirling}</td>
<td>\textit{Swinging}</td>
</tr>
<tr>
<td>\textit{Aldus}</td>
<td>\textit{Chess}</td>
<td>\textit{Tightrope-walking}</td>
</tr>
</tbody>
</table>

\textit{Man, Play and Games}, 36.

\textit{Les jeux et les hommes}, 91

\textit{Table 1} Roger Caillois’s taxonomy of play. Adapted from \textit{Les jeux et les hommes}, 91

\textit{(Man, Play and Games, 36).}
. . . the seers,” as Callimachus observed. Whether figured as the result of divine (im)providence in the name of necessity (the primeval goddess Ananke) or blind contingency (the tutelary deity Tyche), Marsyas’s fate was thus always already sealed: as Nietzsche put it, “we shake the dice box with iron hands; even in our most intentional actions, we do no more than play the game of necessity.”

As Nietzsche implied, and as Rüdiger Campe has scrupulously documented, the ludic form of alea traces historical tensions between theological concepts of fate and mathematical calculations of probability. In Jacques Derrida’s formulation, the concept of play brings together chance and necessity “in an endless calculus,” combining the unknowability of fate with the quantification of likelihood: in refusing to submit one to the other, play challenges the notion of a divinely ordered universe.

Much of the stigma attached to gambling issued from religious broadsides against games of chance such as the third-century Liber de aleatoribus, which warned that “the devil is always present at the dice table,” and Gerolamo Cardano’s Liber de ludo alae (ca. 1526). For Paul Schleuse, Alessandro Striggio’s “madrigal comedy” Il gioco di primiera (1569) illustrates “both the pleasure and danger of gambling” by dramatizing the threat it poses to self-control and social decorum alongside the cunning ruses by which players attempt to control their destinies amid the thrill of uncertainty and risk: ultimately, communal harmony must be restored by way of a dance in which winners and losers all participate. But while Striggio depicted card-playing as a form of social allegory, life itself could also be construed in terms of the arbitrariness and amorality ascribed to play: Chaikovsky’s operatic adaptation of Pushkin’s The Queen of Spades (1887) imbricates fortune, destiny, and the supernatural to underlie the nihilistic credo that “life is but a game.”

Beyond depictions of card and dice games, aleatoric procedures have infiltrated the generation and realization of musical texts. As both compositional method and performative mode, the play of alea helps account for such music as John Cage’s Music of Changes (1951) and Fontana Mix (1958), the choose-your-own-adventure of Pierre Boulez’s Third Piano Sonata (ca. 1955–63), Witold Lutosławski’s Jeux vénitiens (1961), and the triple-LP box set of Henri Pousseur and Michel Butor’s opera Votre Faust (1973), which included game boards, playing cards, and a spinner that enabled listeners/players to determine the course of musical events.

Despite the vast differences in their ideological and aesthetic underpinnings as well as their means of prompting and determining sonic consequences, the epistemological principles of all such texts can be traced back via the paper machinery of eighteenth-century musical dice games (Würfelspiele), technological forebears and descendants of which are examined in Key 3.

Caillois’s adoption of the English term mimicry emphasizes the playful, teasing aspects of mimesis, the etymological roots of which lie in μῖμος (mīmos), meaning “mime,” “imitator,” or “actor.” From Plato to Alan Turing by way of the sixteenth-century poet and historian Gregorio Comanini, the imitation games
of mimicry have tested the limits of resemblance and its intelligibility by way of pretense, illusion, and outright deception. Mimicry suggests ways of theorizing the performance of identity via forms of imaginative role-play while calling attention to the representational strategies of media themselves. The late antique poet Nonnus reported that when Marsyas’s hanging hide was transformed into a windbag, “the breeze often entered, swelling it out into a shape like his, as if the shepherd could not keep silence but made his tune again.” The “as if” of Nonnus’s poem brings out the subjunctive mood of myth and its generativity as a playful simulacrum, at once real and imaginary.

Even as we lament Marsyas’s violent demise we can, like Philostratus the Younger, delight in its fictive status and the play of its many representations. Describing a painting of the fateful instant before Marsyas’s death, Philostratus drew the viewer’s eye to the dread of the satyr, the serene joy of Apollo in his moment of victory, and the savagery latent in the knife-grinder about to administer punishment on the god’s behalf. Last, but not least, Philostratus bid the viewer pay attention to Marsyas’s fellow satyrs, who, as they tearfully lament his fate, cannot help but exhibit “their playful spirit and their disposition to leap about.”

Through this inferred behavior, the chorus of satyrs embodied the tragicomic register typical of the satyr play, a theatrical form often inserted within or following a sequence of tragedies that performed a comic function somewhat akin to that of the eighteenth-century operatic intermezzo. (Needless to say, opera writ large evinces an intense engagement with fictive play through mimicry: its masks, costumes, pyrotechnics, and other theatrical accoutrements shore up its demand that the audience suspend the disbelief occasioned by its flagrant violations of veristic behavioral norms.) The comic elements of satyr plays did not typically reside in the action itself, which typically unfolded in line with the tragic dynamics of mythical narrative. Instead, they emerged from the subversive relation of the chorus of satyrs to the high drama they were witnessing, as was the case regarding Philostratus’s ekphrasis of the painting of Apollo vs. Marsyas. While the exuberance of satyric drama was most obviously manifested via bawdy props and skits, the playfulness of satyr plays also emerged from the multiple levels of their theatricality, the back-and-forth between role and actor as well as protagonist and chorus. For Philostratus, such metaplay was a mode of engagement derived from—and formed by—arbitrary yet reciprocal relations between subjects and objects often operating at cross-purposes to normative vectors of signification, interpretation, and even morality. Just as the player is also played, the actor is also acted upon according to the analogical dynamics of theatrical mimicry.

As illustrated in Figure 1, the ludic category of ilinx is also satyric and subversive insofar as it embraces behavior that is animalistic, intoxicating, and libidinous. If agonistic play has to do with challenging others, then ilinx tests—and often exceeds—the limits of the self, engendering risky behavior that the transformation of Marsyas’s
hide into a wineskin at once bemoans and celebrates. Caillois took its name from τὴνγξ, a term connoting the whirling of maelstroms that reflects both a relation to the spinning tops associated with ἀλεα and a vortical propensity to “destroy the stability of perception and inflict a kind of voluptuous panic upon an otherwise lucid mind.”

The play of ἤλινξ is frenzied and carnivalesque, like the orgiastic rites associated with the goddess Cybele in Phrygia, whence Marsyas hailed. Its emphasis on risk-taking and self-abandonment allies ἤλινξ to the virtuosic display of musical kineticism, the disorienting effects of which are readily transmissible to others (as demonstrated by the mania induced by charismatic performers from Liszt to the Beatles and beyond). Issuing from and yet eclipsing the body’s sense of itself, ἤλινξ eliminates the reflective distance between artistic stimulus and corporeal response, rendering aesthetics a strictly physiological matter. It stands for a Nietzschean state of ecstasy “in which sounds, rhythms, and dance figures . . . emerge and vanish endlessly,” short-circuiting the representational strategies of symbolic signification.

In terms of form as well as function, ἤλινξ becomes musically tangible in the whirling motion of dances (as noted by Eric McKee in the context of the late eighteenth century), the rough-and-tumble of spirited finales, the overtly ludic genres of the scherzo and badinerie, and the quicksilver whimsy of the capriccio. Since
**Ludomusicality 31**

**ilinx** issues both from repetitive, rhythmic motion and from its unpredictable disruption, the distinction between its enactment and its representation is difficult to draw. In the case of his boisterous scherzos, Beethoven apparently relished the fact that depictions of **ilinx** were also liable to engender it.

When, especially in the scherzos of his symphonies, sudden, unexpected changes of tempo threw all into confusion, [Beethoven] would laugh tremendously, assure the men he had looked for nothing else, that he had been waiting for it to happen, and would take almost childish pleasure in the thought that he had been successful in unhorsing such routed orchestral knights.106

**Bizet’s Jeux d’enfants**, a set of twelve miniatures for piano duet, invokes the same phenomenon via its mesmeric presentation of the oscillation of a swing and the rotation of a spinning top alongside the more rambunctious ludic experiences of leapfrog and blindman’s bluff.107 But while Beethoven’s scherzos rejoice in thigh-slapping humor and Bizet’s assortment of toys and games is bathed in a nostalgic glow, other manifestations of **ilinx** are darker. György Ligeti’s vertiginous piano études, for instance, disorient the listener via the Escheresque manipulation of musical pitch-space and dizzyingly complex metrical layering: for all concerned, their impact in performance derives from the rapturous (con)fusion of bravery and terror in the face of physical demands that are at once perfectly logical and profoundly irrational.108 From the waltz to the mosh pit, the unbridled power and attendant risks of **ilinx** are often framed by buffer zones and mitigated by safety nets that, like magic circles, are at once socially, materially, and ideologically constituted.109

Across all four of Caillous’s categories, a perpendicular axis of play measures the degree of **paidia** and **ludus**.110 **Paidia** represents the player’s childlike delight in defying or simply ignoring constraints, and the pleasure taken in tumult, improvisation, and contrary behavior (somersault-turning, thread-pulling, or queue-jumping, for instance). **Ludus**, conversely, indexes the player’s willing submission to the nonnegotiable rules that govern the pursuit of games and registers the pleasure taken in confronting—or ingeniously circumventing—arbitrary and recurrent obstacles (as in crosswords or Sudoku puzzles, for example).111 The **paidia-ludus** continuum reflects social mediation and the player’s psychological state as much as it characterizes activities themselves: even chess, which for Caillois is paradigmatic of **ludus**, can be played with a devil-may-care, indifferent, or actively disruptive attitude that introduces an element of **paidia**.112

Thinking in terms of **paidia** and **ludus** can open up fresh perspectives on the roles played by rules and regulations, whether internally or externally mandated and whether obeyed or flouted. In *Sports et divertissements* (1914), an album containing twenty-one piano pieces adorned with handsome illustrations of ludic activities, Satie resisted the tyranny of forced enjoyment by conveying the ennui of play and leisure when smilingly imposed by social convention. In part, these metaludic strategies can be read into Satie’s willful refusal to adhere to the usual
protocol governing music’s mimetic relations with images and ideas: in ironic contrast to the approach adopted by Bizet, he undercut the very notion of coordinating ludic motions with appropriate musical inflections. As is typical of *paidia*, Satie played with the rules rather than by them. In the collection’s final piece, “Le tennis,” the game (such as it is) emerges from the discrepancy between the musical figures scattered across the page and the laconic dialogue overlaying them, which makes it clear that erotic subtexts are far more compelling than Major Wingfield’s rules of play. The same could be said for Debussy and Vaslav Nijinsky’s ballet *Jeux* (1913), in which tennis serves merely as a metonymic pretext for amorous encounters, although Debussy cultivates a much more intimate relationship between the sensuality of (fore)play as manifested via the subtle dynamics of oscillation, undulation, repetition, and variation.

The Kantian discipline of *ludus* emphasizes that structural beauty and complexity can be achieved both despite and owing to strict constraints. Cultural artifacts that display such qualities include architecture, textiles, origami, mathematics, canons, puzzles, and computer code: they generally emerge from and represent systems that are both governable and circumscribable by rules that are at once logical and arbitrary. In this respect, the rationality of *ludus* is closely associated with the codification of game theory by John von Neumann and Oskar Morgenstern. Their *Theory of Games and Economic Behavior* (1944) enabled social and economic interactions to be comprehensively formalized in terms of strategies designed to confer optimal advantages to rational players of zero-sum games. By articulating the mathematical rules governing agonistic encounters from courtship to war games, a group of scholars including von Neumann, Morgenstern, and the mathematician John Nash established the algorithmic logic that proceeded to guide diplomatic and military strategies throughout the Cold War. In ludomusical terms, this type of play is most directly found in Iannis Xenakis’s *Duel* (1959) and *Stratégie* (1962), which pit two orchestras and conductors against each other: their scores are calculated from the particular combinations of musical modules chosen by each, and at the end the audience salutes the victors.

The discipline imposed by *ludus* and its relation to education, edification, systematization, and order can be directly gleaned from the games of tones devised by Samuel Scheidt (*Ludi musici*, 1621), Josef Hauer (*Zwölftonspiele*, 1939–59), and Paul Hindemith (*Ludus tonalis*, 1942) as well as from the development and deployment of arcane isorhythmic and contrapuntal techniques. Rules are omnipresent, as Foucault observed: their epistemological and material codes of conduct govern the behavior of human bodies as well as social systems and relations. Like the laws of chance, such rules emerged from theological doctrine, most obviously in the form of monastic *regulae*, before gradually forming the basis of philosophical, mathematical, and musical early-modern thought, as manifested by texts such as Johann Joseph Fux’s *Gradus ad Parnassum* (1725).
In the nineteenth century, such rule-bound systems came under sustained attack. A staunch advocate of both *ilinx* and *paidia*, Nietzsche was equally averse to the formulaic application of rules and to Hegel’s opposition of “child’s play” to the pursuit of artistic truth: he defined maturity as the recapturing of “the seriousness one had as a child at play.”

Channeling Heraclitus while wreaking havoc on Kant’s configuration of freedom, purposiveness, and play, Nietzsche claimed that “absolute free will can only be imagined as purposeless, roughly like a child’s game or an artist’s *Spieltrieb*.”

In this world, only play, play as artists and children engage in it, exhibits coming-to-be and passing away, structuring and destroying, without any moral additive, in forever equal innocence. And as children and artists play, so plays the everlasting fire. It constructs and destroys, all in innocence. Such is the game that *aiōn* plays with itself. Transforming itself into water and earth, it builds towers of sand like a child at the seashore, piles them up and tramples them down. From time to time it starts the game anew. . . . Not hubris but the ever self-renewing impulse to play calls new worlds into being.

At first glance, *paidia* seems closely bound up with Dionysian qualities, allied with Marsyas against the Apollonian attributes of orderly *ludus*. Yet the capricious behavior described by Nietzsche invokes Apollo’s deadly destruction of an Achaean rampart during the Trojan War, which Homer likened to a child’s petulant demolition of a sandcastle. It is Apollo, not Dionysus, who ruthlessly bears out the claim of Plato’s Athenian stranger that humans serve as divine playthings and should behave accordingly, echoed by King Lear’s rueful remark that mortal fate is no more than divine caprice: “As flies to wanton boys are we to th’ gods./ They kill us for their sport.” Accordingly, the question of whether play is tragic or comic, profound or whimsical, has always been a matter of perspective as well as scale. Like Schlegel, Nietzsche suggested that the logic of *ludus* persists across cycles of creation and devastation: “The child throws its toys away from time to time—and starts again, in innocent caprice. But when it does build, it combines and forms its structures regularly, conforming to inner laws.” Rather than being opposed, *paidia* and *ludus* keep each other in check—and thereby in play.

1–2 BEYOND WORK AND PLAY

Throughout Western thought and culture, play’s checkered history can be related via its shifting antonyms: earnestness, utility, efficiency, industry, labor, and, above all, work. In the nineteenth century, these antonyms conspired to put play on the defensive. Play was feared, demeaned, and infantilized for representing a subversive threat to the work ethic that, as Max Weber grimly observed, drove the twin pursuits of spiritual salvation and economic growth. As Bill Brown
points out, Huizinga’s insistence on play as a fundamental principle that precedes its antitheses must be balanced against Herbert Marcuse’s contention that precisely insofar as play marks “a breaking off from labor,” it betrays its roots in work. In terms of nineteenth-century music, the production of the reified musical work, personified by the Herculean figure of Beethoven and borne out by the transformative effects of his compositional labors, stands as evidence for Marcuse’s argument: painstakingly documented and represented by thematische Arbeit, the work regulates, and even justifies, the instrumental play that fleetingly animates it.

Gooley has shown that Robert Schumann progressively distanced himself from ex tempore play at the keyboard as a primary form of creative activity, stressing instead the virtues of conceiving and elaborating musical designs as a purely mental process. Despite his own youthful indulgence in six-hour improvisatory marathons, in 1838 Schumann warned his wife-to-be Clara “not to improvise too much” since valuable material “gets uselessly lost that way.” Gooley accounts for this shift in terms of the burgeoning “moral economy of the German bourgeoisie,” which insisted on the evidence of tangible productions wrought via compositional thrift and motivic efficiency. Even at the turn of the century, the rise in the aesthetic stock of instrumental music, reflected by Tieck, Michaelis, and Nägeli, had been coeval with disparagement of its means of production. Goehr notes that at the hands of Herder, performance was associated with “impure labor” and instruments became synonymous with lowly tools (Werkzeuge) that were put to artificial ends. In Goehr’s reading, such instrumentophobia reached its apex with Wagner’s Die Meistersinger, the agōn of which reassigns aesthetic and political power from “those who perform upon [instruments] in favor of those who become them,” from those who merely play to those who prove themselves worthy of being played by a higher power.

In the face of concerted attacks from Wagner and his supporters, who followed the lead of Herder and Hegel in targeting play’s virtuosic instrumentality and meaningless formalism, the articulation of play as a viable aesthetic mode required the appropriation of its detractors’ critical weapons. It was in this spirit that Eduard Hanslick appealed to his readers’ memories of childhood when praising instrumental music’s purposive, kaleidoscopic “play with colors and forms,” treating such activity not as autonomous but rather as evidence of (and stimulation for) human consciousness and creative cognition. Although Hanslick’s Kantian definition of music as tönend bewegte Formen echoes Nägeli’s emphasis on music’s Formenspiel and anticipates the tautologically gnomic terms in which Gadamer would define play as “the self-representation of its own movement,” it was nonetheless born from the Herderian conviction that these motions resonated with “the great motions of the universe” as well as the tremors of the soul.
The dazzling play of the virtuoso left Hanslick cold insofar as its exploitation of corporeal techniques and sensations left precious little to the imagination: while he sought to distance music from language, function, and utility, he nonetheless insisted on its spiritual as well as its aesthetic attributes. In this sense, Hanslick’s attitude neatly reciprocated that of his nemesis Franz Brendel, who backhandedly acknowledged Kantian aspects of musical play even while insisting on the primacy of programmatic texts and concepts.¹³⁵

Weber connected the elevation of the work ethic and concept with the rise of Protestantism and industrialized capitalism, implicating both in the rational and systematic development of institutions and instrumental technologies such as the symphony orchestra, the hierarchical organization of which precluded improvisatory play and other informal interactions. Huizinga adopted a similar line, bemoaning the effects of industrialization that had weakened play’s ritual force and communal functions. While the narratives of Weber and Huizinga recapitulated Schiller’s nostalgia for an older, purer world in which play was unsullied by material considerations, Weber’s analysis also registered the discursive effects of historical musicology, in which music was understood primarily in philological terms as a library of texts in need of ontological grounding beyond their functions as cultural scripts. J. Q. Davies argues that the concept of the musical work only became imaginable in an age of mass reproduction, since the disenchantment wrought by ubiquitous commodification brought with it the implication that music’s essence must reside elsewhere.¹³⁶ Analogously, the anxiety shared by Herder, Schiller, Wagner, and Hanslick concerning the rational, mechanical aspects of instrumental play simultaneously obscures and reveals the extent to which Romantic aesthetics relied on them, if only as a point of departure.

Unlike the relationship between singer and song in Die Meistersinger, the ludic oscillation between playing and being-played is subject to inversion at any moment: it can bypass intention, consciousness, and even life itself (as Nonnus’s description of Marsyas’s resonating hide suggests). For Caillois, as for Weber, such meaningless fluctuations were at odds with the pragmatic commitments to productivity and utility that underwrite the moral and economic codes of industrialized societies: “Nothing has been harvested or manufactured, no masterpiece has been created, no capital has accrued. Play is an occasion of pure waste: waste of time, energy, ingenuity, skill, and often of money.”¹³⁷ Yet the liminal forms of play that unfold at society’s fringes, even those implicated in immorality, corruption, and dysfunction, also lie at the heart of “civilization.”¹³⁸ Agonistic conflict, competition, and cheating thrive in the economic and educational systems; speculative gambling fuels the stock market; and codes of costume and conduct legitimate institutional power in the guises of dress-up (uniforms) and role-play (etiquette).
This exposes the economic, sociological, and psychological stakes of describing an activity as either “work” or “play.” According to the *Oxford English Dictionary*, work moves objects through effort and exertion, while in play they oscillate and revolve freely; work transforms things from one state into another via laborious activity, while play involves quicksilver changes from one state to another and back again; work is tiresome while play is pleasurable; work is real while play is make-believe; and work has to do with the production of tangible artworks, whereas play has to do with the (re)enactment of drama and music. Yet how can we explain the fact that the very conditions and characteristics that make play enchanting—repetition, entrainment, the enforcement of rules typical of *ludus*, the tumult of *paidia*—can be indistinguishable from those that make work arduous and tedious? As Tom Sawyer discovered when confronted by a fence that needed to be painted, there is nothing intrinsic about an activity that defines it as either “work” or “play”: it is categorized as such according to the values, functions, and imperatives that govern whether and how it is performed. The criteria by which “work” and “play” are told apart shed as much light on the esteem and stigma attached to a particular activity as on the activity itself.

In their influential schematic representation of play, digital game theorists Katie Salen and Eric Zimmerman reflect this state of affairs by concentrically nesting “game play,” “ludic activities,” and “being playful.” At the center lies the relatively narrow definition of “game play” as the formalized interactions that take place when players experience the logic of a ludic system through play (as in an organized game of baseball, for example). Moving outward, “ludic activities” accommodate behavior that is not bound by formal rules but that incorporates ludic elements (such as an impromptu game of catch). At the periphery, “being playful” implies a playful attitude or modality that can be applied to ostensibly non-ludic situations or actions (such as popping bubble wrap, dressing up, or painting a fence) as well as to the playing of games themselves. In Salen and Zimmerman’s neo-Kantian formulation, play “takes advantage of the space of possibility created from the system’s structure”: it owes its existence to rigid rules or material constraints, but takes place despite—and sometimes in opposition to—they. This type of relation accounts for both the orderly principles and the stochastic flow of a soccer match or a bebop performance, in which the ludic distribution of agency among and between actors, objects, rules, and strategies is clearly apparent, even (and perhaps especially) when those rules are being breached.

For Foucault, the task of representing such principles and agencies was both archaeological and genealogical: it had to do not only with the affordances and restrictions of particular systems of thought (*épistèmes*), but also with their temporally shifting formations. Foucault believed the generation and storage of knowledge to be governed by epistemological rules distinct from those that regulate grammar, logic, and history. While these rules delimit conceptual possibilities,
they both effect prohibition and enable transgression via vectors of power and discipline that, in conspicuously ludic terms, rehearse the dynamics of \textit{agōn}, “the endlessly repeated play of dominations” and its associated maneuvers, tactics, and techniques.\textsuperscript{143} Adopting and adapting the term from Nietzsche, Foucault claimed that genealogy eschews the purposeful teleology associated with work, uncovering ludic recurrence where others sought evidence of serious historical progress. Genealogy “operates on a field of entangled and confused parchments, on documents that have been scratched over and recopied many times.”\textsuperscript{144} It traces archaeological methods as well as remains, taking as its subject matter not only archival evidence, but also the discursive formations of the archive itself, which constitutes “the set of rules governing the range of what can be verbally, audiovisually, or alphanumerically expressed,” as Wolfgang Ernst puts it.\textsuperscript{145} Ludomusical fields of play are Foucauldian palimpsests that at once enable, regulate, and erase the inscriptions of bodies in motion: rather than determining specific outcomes, the prevailing rules provide a framework within which a range of possible outcomes becomes imaginable and simulable.

Although indebted to Foucault, Ernst’s technical terminology leads away from the \textit{épistème} and toward Kittler’s \textit{Aufschreibesystem}, which Kittler defined as the assemblage of technologies and institutions “that allow a given culture to select, store, and process relevant data.”\textsuperscript{146} By focusing on media mechanisms and techniques, the work of Kittler and Ernst draws attention to the material conditions that make an utterance, transcription, or genealogical palimpsest possible. This is particularly important when it comes to ludomusical praxis, since games and music cannot be directly accessed from within an archive or repository: insofar as their documentary remains are always static and fragmentary, their reanimation requires technologies of recreation (bodies, instruments, and other devices) as well as textual modes of transmission.

In humanistic scholarship, the archive has typically provided the lettered basis for recovering the past through the activation of the literary imagination. For music, as for theater, an analogous function is performed by the corpus of texts grouped under the rubric of a repertoire, which serves to index the conceptual range and limits of a particular form of cultural praxis. Emanating from the field of performance studies, recent debates over the ontology of audiovisual materials and their functions as documents of the performed past have given rise to new formulations of relations between archive and repertoire, text and performance, event and trace.\textsuperscript{147} As a challenge to the nomological imperative of the archival record, which guides and ratifies accounts of the past insofar as they form sums or subsets of its documentary evidence, Rebecca Schneider has explored how the embodiment of remembered or imagined experience under the simulative rubric of reenactment can itself constitute a form of historical substantiation when performed and recorded.\textsuperscript{148} Her work problematizes distinctions between
texts, acts, and material evidence, suggesting new ways in which we might register performance and the technologies deployed to capture it.

From another perspective, acknowledging the drastic power of acts in and as performance involves locating them within Vismann’s chiastic syntax of media. To understand how bodies store and transmit cultural knowledge, we must apprehend how communicative media are themselves materialized and physiologically embedded, which opens the archive to media-archaeological forms of inquiry. Georges Didi-Huberman claims that the past “can impose itself as an alienating element of . . . historical interpretation itself.” Via historical research, we “gain access . . . to the subtleties of a given period, which we then try to understand through its own intelligibility. But we must also know how to smash the ring . . . , insofar as we want to understand the intelligibility itself.” To this end, Ernst highlights the predominance of historiographical metaphors that frame the flight of time’s arrow in the organic terms of embryonic development, maturation, and senescence. Such narrative strategies emerge not merely from the chronological ordering of events, but from the logic of the alphabet and the cultural techniques of literacy that naturalize the serial concatenation of words and events alike.

In recent years, digital humanists of various stripes have demonstrated that numbers (and numerical procedures) can supplement letters (and literary theory) in accounting not merely for inscriptive techniques, but for the sequencing of cultural operations writ large. In the contexts of communication and bureaucracy, Siegert notes that while ink and paper might primarily be associated with the development and dissemination of literary content, they have also been implicated in networks based on signals rather than utterances, relays rather than communications, and instructions rather than expressions. Similarly, Markus Krajewski’s intellectual history of the card catalog draws structural analogies between “index cards and bank notes, house numbers and book shelving, card catalogs and Turing machines.” Krajewski frames these various exempla of informational technologies as “paper machines,” a maneuver that can be read in terms of Foucault’s genealogical palimpsests. Chronological contiguity alone cannot account for the observability of isomorphic relations between disparate instantiations of the same technological and epistemological principles. Tracing such techno-epistemological strands through time and space while remaining steadfastly in the present tense, Krajewski self-consciously deploys the rhetorical strategy of catachresis, which he defines as “a failed transfer, a juxtaposition of incongruous elements” that produces “a surplus of meaning that stimulates thought” as it makes explicit the fictiveness of the historiographical mode and its imputation of cause and effect.

As Krajewski shows with regard to Gottfried van Swieten (Prefect of the Viennese Imperial Library, inventor of the card catalog, and patron of Haydn and Mozart), the principles and means of organizing knowledge can be named and described via the retrojection of latter-day technical terminology even as they are
grounded in their native historical milieux. At once revealing and demonstrating the multiplicity of the means by which cultural techniques can be represented, such maneuvers reconfigure temporal and cultural distance as space to be negotiated by contemporary and historical observers alike.

By ultimately returning to the trope of history as fiction, Krajewski becomes embroiled once more in the literary terms from which he departed, just as his provocative thoughts on paper machinery are nonetheless framed and bound in the traditional format of the book. But Krajewski’s literary feedback loop suggests a means by which the playing of musical texts, which have long been recognized to blur the boundaries between expressive utterance and performative instruction, might offer alternative modes of navigating beyond the realms circumscribed by literary tropes of signification and meaning. Such texts themselves can be apprehended as paper machines, as algorithmic programs that order and process information via ludomusical play.

Ghiselin Danckert’s Ave maris stella (1535, Figure 2) is a puzzle canon presented in the form of a chessboard, on each square of which is notated a musical fragment. According to Hans Westgeest, who claimed to provide the first comprehensive solution in 1986, twenty viable four-voice motets in addition to Ave maris stella can be derived by partitioning and navigating the board in various ways. As well as representing a game, Danckert’s canon constitutes one: it operates as a paper machine that guides and regulates the moves of its players in nonlinear and yet systematic ways in order to produce multiple viable musical outcomes. As a field of play, the chessboard is thus capable of staging the devising and execution of ludomusical strategies, a relationship observed by the chess-loving violinist in Vladimir Nabokov’s novel The Defense: “What a game, what a game. . . . Combinations like melodies. You know, I can simply hear the moves.”

The epistemological common ground shared by Danckert’s chessboard, an allegorical fifteenth-century illustration of a chekker, eighteenth-century Würfelspiele, and contemporary digital games will emerge over the course of the Keys to come. For now, these disparate phenomena are grouped together not only to indicate a particular lineage of contemporary ludomusical praxis, but also to suggest that modern technologies and discourses might provide a catachrestic lexicon with which to describe objects and techniques that are temporally and geographically remote but morphologically related. In this sense, musical scores might be understood not merely as quasi-literary utterances or architectural blueprints, but as sets of rules based on the play of correspondences between signs and actions, graphē and phōnē, logos and technē. Analogously, and reciprocally, digital games can be apprehended in terms of the ludomusical performances they prompt and regulate.

To this end, Krajewski’s deployment of catachresis can be supplemented by the concepts of retronymy and skeuomorphism. A retronym is a term introduced to distinguish a long-standing object or practice from successors that bear the same
name in spite of decisive technological transformations that are masked by lexical continuity. In the wake of electrification and recording, for instance, a guitar or a musical performance must be retronymically qualified by the prefixes “acoustic”
or “live,” respectively. Conversely, a skeuomorph is a derivative object that retains ornamental design cues to elements that used to be—but are no longer—integral to its structure or operation. While retronyms recognize and sharpen distinctions between the past and the present, skeuomorphs smooth them over, and yet the identification of either is predicated on the assumption that phenomena change over time in line with a logic of supersession and obsolescence.

From a media-archaeological perspective, the insights of retronymy and skeuomorphism can be combined to form the concept of the reverse skeuomorph, which Alan Liu defines as a feature that seems ornamental, coincidental, or inessential in historical terms, but that proceeded to assume structural significance in concepts, practices, and objects derived from it. Such “prophetic relics,” as Liu calls them, “are epistemological rather than instrumental stitches between past and present. They are an index or placeholder (rather than cause or antecedent) of the future.”\textsuperscript{160} Once they have been situated as such, the process of navigating between these indices and placeholders becomes recursive, as Geoffrey Winthrop-Young observes vis-à-vis Krajewski’s work: tracing their genealogical relations transforms their historical contexts, which in turn alters their status and significance in the present.\textsuperscript{161} Instead of ordering events in a series governed by the logic of antecedence and consequence, the cross-referencing of such indices configures them in terms of prolepsis and analepsis: they come into being by shuttling between the not-yet and the always-already.\textsuperscript{162}

Historical instances of ludomusical mechanisms often take the form of reverse skeuomorphs insofar as their distinctive attributes were later identified as such under drastically different techno-epistemological conditions. At the same time, since contemporary digital games are themselves thoroughly historical phenomena, the playing of such games and the music they enact, recreate, and prompt can retool our understanding of ludomusical activities that are stranded in the past. To take two examples to be discussed toward the end of this Key, digital gameplay suggests how performances of Chopin’s “Minute” Waltz can be construed as speedruns and how chamber music might be played as an asymmetrical cooperative multiplayer game.\textsuperscript{163} In part, such juxtapositions are whimsical gambits designed to jar the reader into taking their implausibility seriously. At the same time, they constitute an attempt to recognize the historicity and coexistence of performative aspects of ludomusical play that stubbornly elude literary description and are thus absent from the historical record. On yet another level, they lodge a deeper claim concerning how information becomes conceivable and transmissible via digital means of arraying and accessing it.

In this light, it is notable that it took more than three hundred years for a comprehensive solution of Danckerts’s puzzle to be registered, indicating that it resonated in sympathy with twentieth-century ludic mechanisms. For Nabokov’s violinist, certain rare sequences of ludic moves could be both tactically irresistible
and aesthetically harmonious; the elusiveness of such combinations are reflected by the fact that the sixty-four squares of the chessboard also formed a test bed for problems involving permutational and exponential functions. Inquiry into the means by which an unfathomably large range of patterns could be algorithmically generated from a relatively small collection of fixed elements was pursued under the logic of the ars combinatoria first described—and materialized by way of paper machines—by Ramon Llull at the turn of the fourteenth century. More recently, Deep Blue’s digital computation of optimal chess strategies involved brute-force combinatorial calculations as well as reference to a vast library of previous games.

Such processing also informed the ludic turn taken by poststructuralist thinkers such as Derrida, for whom the permutational mechanics of play worked against the logic of totalization, the establishment of centers, the pursuit of origins, and the construction of unequivocal meaning: ludic infinitude was constituted by the endless serial interplay of discrete elements, whether notes or letters. In a similar vein, Barthes noted that textual play opens up infinite possibilities while sidestepping the ineffable, just as it is generative without being productive. For Barthes, play was the means by which text could mobilize and propagate in the face of potential ossification into a work fit only for philological or hermeneutical exhumation.

Significantly, Barthes—an amateur pianist as well as a lover of games—invoked music as a paradigm for the collaborative process of “play[ing]” a text, of “mak[ing] it go.” For Huizinga, the performance of music and the fort-da of its rhythmic unfolding were indispensable to the very notion of artistic play; for Laurence Dreyfus, the dream of “unfettered play” offers reciprocal access to “music’s greatest joy.” In different ways, all three divert attention away from the cultural functions that texts, games, and music fulfill and toward how they (enable people to) play by investing actions with transformative power. In this light, the rules of musical play can be understood as performative as well as discursive. Similarly, its materials are subject to social and historical flux while also forming structures that obtrude, resisting straightforward assimilation by progress, entropy, and other narrative strategies. Treating play as principle and mode as well as object of inquiry, we might deploy other means of tracing the forces that have shaped particular forms of play over time. Rather than attempting simply to describe ludomusical play, we can set out to transcribe the rules, both tacit and explicit, according to which it has been imagined, materialized, mediated, and experienced. Along the way, we might register play’s idiosyncrasy and promiscuity, its violence and its rapture, its carefree yet contingent transgression of the boundaries drawn between divine, human, animal, natural, and mechanical realms.

Any instance of play can be historically indexed and situated only once its formal properties have been identified; conversely, such properties assume significance only
when embedded in the historical and cultural milieux that furnish the terms on which their legitimacy is granted, demonstrated, and questioned. If, as Dreyfus suggests, the playful oscillation between seemingly incommensurable criteria can obviate the temptation to subjugate one set to the other, then the keyboard’s most overtly ludic manifestations and associations offer the best chance of capturing the full range and variegated shades of its digital analogies, as explored in Key 2. Whether real or imagined, historical interactions between sweet fingers, blessed wood, and wiry concord can inform our understanding of contemporary ludic phenomena. Reciprocally, and in keeping with play’s commutative logic, a full account of today’s ludic environment, which is predominantly characterized by digital games of conflict (agôn), fortune (alea), role-play (mimicry), and sensory overload (ilinx), can enrich our attempts to construe how the musical past played out.

1–3 THE SOUND OF GUNPLAY

While all media reflect the material and ideological conditions under which they became conceivable, the case of the digital game is particularly revealing. The twenty-first-century media landscape has been profoundly shaped by the rise of games to an unprecedented level of cultural prominence. Most commonly registered through their seismic impact on the economic terrain of the global entertainment sector, digital games have transformed the stock of financial, symbolic, and social capital in which popular culture has traded since the late 1970s. Such games channel a dizzying array of preexistent art forms, media, and genres that includes calligraphy, painting, manga, anime, graphic novels, science fiction, board games, theater, opera, film, television, radio, advertising, recorded sound, electronic music, dance, and performance art. Fabricated as an unruly assemblage of technologies and delivered as a multipronged sensorial assault, the digital game indexes the Gesamtkunstwerk not only via its promiscuous (re)mixing of media, but also by the scope of its ambition, its susceptibility to violence and bathos, and its seductive promise of transcendence. Whether as simulation or simulacrum, and whether it conceals its representational means or draws attention to them, the digital game symbolizes imaginary worlds in a subjunctive mood that discloses much about the fears and desires haunting the contemporary unconscious. As dispatches from technology’s front line in registers ranging from the defiantly subcultural to the elegantly neoclassical and the elaborately baroque to the self-consciously avant-garde, digital games have opened up new modes of representation, expanded the critical lexicon, and stimulated distinctive contributions to debates surrounding the visual arts, film, literature, and new media. In the wake of groundbreaking contributions by William Cheng, Karen Collins, K.J. Donnelly, William Gibbons, Miki Kaneda, Fares Kayali, Neil Lerner, Elizabeth Medina-Grey, Kiri Miller, Peter Shultz, Tim
Summers, Chris Tonelli, and a growing band of others, digital games have also begun to infiltrate the discourse and practice of (ethno)musicology, while their soundtracks have been analyzed by an increasingly sophisticated music-theoretical apparatus. A chasm nonetheless yawns between the status of mainstream digital games—replete as they are with ugly stereotypes, pulpy plots, and violent action—and attempts to ennoble them with high-flown theory (despite the precedent set by Wagner, not to mention Greek mythology, on each of these counts). For Alexander R. Galloway, this rift is to be celebrated rather than bridged, for it reveals how the immediacy, vitality, and presence of digital games fly in the face of the taxidermic academic impulse. Yet, as Pierre Bourdieu observed and Galloway’s own work bears out, high theoretical stakes can on occasion be raised with particular acuity by “apparently mundane, if not derisory, objects.”

The digital game unites two of the furthest-reaching innovations of the twentieth century, both closely associated with von Neumann: the discipline of economic game theory, which he developed with Morgenstern in the years leading up to the Second World War, and the computer architecture developed in the postwar years that bears his name. It should be no surprise, then, that the digital game has served as a lightning rod for debates concerning the representation of violence, the rationalistic quest for domination in zero-sum conflicts, and relationships between reality and simulation as well as human and machine: it stands in synecdochically for the economic, technological, and militaristic operations of late capitalism writ large.

A strain of ludic evangelism has countervailed the opprobrium piled upon digital games and those who play them. Jane McGonigal argues that games possess the potential to transform twenty-first-century lives for the better, teaching us how to enrich and inspire rather than—or as well as—how to “frag,” “troll,” and “grief” one another. Conversely, Nick Dyer-Witheford and Greig de Peuter contend that the military technology that powers digital games and the ideologies of production and consumption that underwrite them expose their abject complicity in the workings of corporate capitalism and empire. From their Marcusian perspective, the freedom of play is merely a Trojan horse concealing the nefarious means by which games induce people to labor for scant reward. For those in positions of power, moreover, the playing of games becomes indistinguishable from gaming the system, with little heed paid to the ethical and environmental fallout that can accrue.

Just as interpretations of Apollo vs. Marsyas must negotiate the myth’s ludic drama and its shocking violence, approaches to digital games must navigate between aesthetics and ethics when confronting the dystopian fantasies that they so often enact. Tellingly, the most provocative recent work in play studies has issued from digital game scholars whose research interfaces with critical theory and political activism as well as the praxis of game development. On the former
Ludomusicality

front, Galloway and Ian Bogost have focused on systemic, procedural, relational, and algorithmic aspects of games; on the latter, Bogost, Mary Flanagan, Celia Pearce, and Anna Anthropy have explored historical and political dimensions of the technologies that drive digital gameplay and its design, thereby elucidating the ideological forces that establish, enforce, and subvert its rules. Collectively, their work takes account of how digital games operate and of the phenomenological and social experiences that they afford, demonstrating that the technical and representational means of digital games are thoroughly intertwined.

Players of digital games acquire literacy across an array of visual, sonic, tactile, and affective codes. The syntax, grammar, and tropic logic of these codes can be processed semiotically through representations native to the digital game and those incorporated from other media. Players can choose whether to submit to a game’s ludic logic, to circumvent it via exploits, to subvert it via forms of unconventional play, to redefine its constraints by altering its code, or to reframe its representational strategies and outcomes. The blending of simulation and mimesis that is so characteristic of digital games thus requires a bifocal approach. Mimesis interacts and interferes with the logic of simulation, creating a parallactic play-space that can be perceived—and occluded—from multiple vantage points. The elements that define and distinguish the digital game have their own historical and epistemological lineages, but they also reflect the ecology in which games participate today, an ever-shifting environment that shapes the meanings derived from the processing of binary code and its modulation into signals that impinge on the human sensorium.

For the purposes of architects, sound engineers, surgeons, and drone operators as well as the players of games, computers calculate or approximate the relevant optical, acoustical, and geometrical data required to simulate environments via complex sets of rules. While doing so, the computer’s central processing unit (CPU) is insensible to distinctions between different types of data, since all information must be transcoded into bits. In the terms of Luhmann’s systems theory, the computer is “operationally closed” insofar as its relatively high levels of internal order and complexity rely on the identification and isolation of information from noisy environments according to strict protocols. But while it cannot communicate directly with those environments (as anyone who has sworn at a crashed computer knows all too well), a computational system is nonetheless deeply embedded in and promiscuously “coupled” with them by way of input and output devices that modulate information into stimuli to which both human and nonhuman actors can respond. For the computer, a keystroke converts an alphanumerical symbol into a snippet of binary code; from a sensorial perspective, the digital distinctions supplied to and processed by the CPU can be represented as pixels or pitches, flashes or rumbles, animations or syncopations. Both despite and owing to its foundation on digital operations, the significance of such events...
cannot be foretold or circumscribed, but rather emerges via the asynchronous and unpredictable collusion of artists, developers, hardware, code, interfaces, screens, speakers, and players.

Beyond its immediate history, media-archaeological fragments of the digital game are scattered among the mathematical and technological innovations of philosophers, inventors, and polymaths ranging from the ancient Greek philosopher and statesman Archytas to Filippo Brunelleschi, Leibniz, and Athanasius Kircher. As mathematician, acoustician, astronomer, engineer, strategist, and acquaintance of Plato, Archytas explored the calculability of sonic phenomena as well as the trajectories of airborne objects. In the early fifteenth century, Brunelleschi established geometrical optical linear perspective as a painterly technique, which was codified and demonstrated by his acquaintances Leon Battista Alberti and Masaccio. In the seventeenth century, Leibniz had a hand not only in the invention of binary, but also in the development of differential calculus, which offered a means of digitizing the continuous trajectories of bodies in motion and thus rendered them computable. For his part, Kircher developed the *lanterna magica*, a forerunner to the slide projector that beguiled onlookers by throwing ghostly images of demons and skeletons onto walls. As documented in his *Musurgia universalis* (1650), Kircher also developed combinatorial systems of music composition, codified modes of musical encryption, and worked on technologies related to mechanical musical recreation.

As Kittler pointed out with relish, a thread connects these innovations: all are related to the waging of war. While Archytas’s observations on the proportional relations between pitch and velocity may have been inferred from the aulos, they were equally applicable to the motion of projectiles on the battlefield. Perspective, as deployed by Leonardo da Vinci and Albrecht Dürer, became a technological means of aiming firearms accurately. Similarly, the benefits of the capability to calculate the ballistic properties of cannonballs were an impetus behind Leibniz’s development of calculus, while Kircher’s *lanterna magica* and musical codes were conceived in order to transmit military intelligence over long distances. Through and beyond these examples, Kittler notoriously argued that all technologies of diversion owed their very existence to the war machine: “The entertainment industry is, in any conceivable sense of the word, an abuse of army equipment.”

Even with Kittler’s militaristic bias set to one side, it is indisputable that digital games do not merely draw on an agonistic media-genealogical legacy, but were directly spun off from technologies initially developed for and by the US military-industrial complex. Correspondingly, the operations that govern them issued from the development of the earliest computers by von Neumann and his collaborators and competitors in the aftermath of the Manhattan Project, in which von Neumann played a critical role. This helps explain why the development of
the digital game was closely tied to the relationship between the United States and Japan, nations whose military and technological fortunes were bound together by conflict, trade, and cultural exchange.

William Higinbotham’s *Tennis for Two* (1958), one of the earliest electronic games made accessible to the public, illustrates these relationships and codependencies.192 Higinbotham had worked on the Manhattan Project before becoming head of the Brookhaven National Laboratory’s Instrumentation Division, and his game was played not on a television but on a triggered-sweep cathode-ray oscilloscope. This analog display technology had been developed as a means of mapping the presence of invisible objects as identified by sound waves (sonar) or radio waves (radar); it was concerned with providing data that tracked sea- and aircraft for military purposes.193 From its formative moments, then, the predigital video game traced the trajectory of Leibniz’s calculus in dealing with representations of bodies in motion, whether they took the form of airplanes or tennis balls. (In this light, it is telling that Nijinsky had initially envisaged that his and Debussy’s *Jeux*—which Higinbotham might have called *No Tennis for Three*—would conclude with a plane crash.)194 *Tennis for Two* challenged players to process images in order to enter timely and accurate input that coincided with (and brought about) spatial collisions. The agonistic and violent qualities of such games were thus integral to their development rather than overlaid onto it. The repurposing of hardware for ludic purposes simply enacted a shift from the mimetic representation of external phenomena (such as airplanes) to the simulation of physical laws governing the motion of imaginary objects (“tennis balls”) via analog or digital computation and the modulation of relevant data into audible or visible signals.195

Although audio-related technologies from sonar to stereophony made contributions to the development of the computer and the waging of war, early digital games such as *Spacewar!*, developed by a team at the Massachusetts Institute of Technology in 1962, produced no intentionally musical sounds.196 As Claus Pias observes, however, the very title of Atari’s *Pong* (1972) signaled the supplanting of the relay clicks of *Tennis for Two* by the onomatopoeic bleeps and bleeps of audible sine waves: hardware designed for video display was repurposed to deliver sonic feedback that synchronized and represented the binary logic of colliding and missing through distinctions of frequency.197 In human terms, these different pitches articulated the zero-sum representation of victory, defeat, and their ludic deferral.

When ballistic data were processed by the digital computational power of von Neumann’s serial architecture rather than by televisual relays and gates, relatively complex artificially intelligent responses could be calculated and performed by the machine itself. This facilitated the pseudoapocalyptic drama of Tomohiro Nishikado’s *Space Invaders* (1978), in which a lone human is pitted against endless waves of computer-controlled alien adversaries. In *Space Invaders*, it is immediately apparent that the computer has transformed from neutral arbiter into
implacable (and unbeatable) enemy: the phalanx of aliens unremittingly traverses and descends the screen in a pattern that emulates in slow motion the sweep of the electron beam that plots their bitmapped images. As the player reduces their number via laser cannon, the decreased load on the CPU accelerates their movement. This effect is matched by an increase in the tempo of the soundtrack’s reiterated descending tetrachord that, in a positive feedback loop, both registers and stimulates the player’s quickening pulse as the stakes rise.198 The increased motion that accompanies the redistribution of the burden of execution from CPU to human is thus represented both visually and aurally.

As this synchrony suggests, the computer can both visualize auditory data and “sonify” visual data as commanded, and this media-agnosticism is often identified as a hallmark of the digital age. That notwithstanding, the mechanisms by which computers store and process binary information evoke Gotthold Ephraim Lessing’s distinction in Laocoön (1766) between the “spatially juxtapositive arts . . . of painting, sculpture, and architecture, and the temporally progressive arts of . . . poetry and music,” in Albright’s paraphrase.199 Bits are either stored as spatially divergent but temporally fixed structures of memory, or executed serially in temporal sequence as code. The static configurations of bits as memory can be correlated with the spatial properties of the image (and in some early computers they were even visible as such); the execution of bits as code and the resultant “syncopations of changes in registers,” as Bogost describes them, are more closely analogous to the transformation of a score into a musical performance.200 Describing the CPU as a “sonic, highly rhythmical mechanism,” Ernst makes this connection explicit: “digitized signals resemble the tradition of music notation” insofar as “they wait to be algorithmically executed within the CPU.”201

The *accelerando* of *Space Invaders* illustrates this isomorphism between digital gameplay and the performance of music. When Galloway points out that “[one] *plays* a game. And the software *runs*. . . . Here the ‘work’ is not as solid or integral as in other media,” he is preoccupied with differentiating digital games from photography and film.202 In the process, however, he echoes Vladimir Jankélévitch’s claim that “music is not made to be spoken of, but for one to *do*: it is not made to be said, but to be ‘played.’”203 Insofar as players’ timely input is routed via fingers, thumbs, and other technological devices, digital gameplay has more to do with the choreography of instrumental performance than with spectatorship or discourse.204 Both games and music are better conceived as drastic than gnostic, in Jankélévitch’s terms: they are activities to be performed rather than texts to be deciphered. Their unpredictable unfolding in time is a defining characteristic, a paradox that simultaneously distinguishes and problematizes their ontological status. Furthermore, thinking about games musically affords the possibility of coordinating their audiovisual elements into a ludic counterpoint that signifies more than its voices can individually convey.
Music’s elusiveness reduced Jankélévitch to a plaintive litany of questions as to where it might ultimately reside: “Is it in the piano, or on the level of the vibrating string? Does it slumber within the score? Or maybe it sleeps in the grooves of the record? Is it to be found at the tip of the conductor’s baton?” Analogous questions might be asked of the digital game: Does its essence lurk in software, in the binary code etched into optical media or corralled by the logic gates of flash memory? Does it spring into being with the execution of that code, animated by the operational logic that sends it coursing through the console’s CPU and audiovisual hardware and modulates it into multisensory stimuli? Or could it be said to emerge at the interface of the game controller with the player’s body, distributed across the circuitry of mind, machine, and social network?

Rather than offering categorical answers to these questions, we might observe that all admit—or even invite—a certain ambivalence, a *fort-da* oscillation between affirmation and demurral that hints at underlying ludic dynamics. Music and games may (not) be apprehended as texts, objects, phenomena, and modalities: both forms of activity can be at once rational and irrational, tender and violent, human and inhuman. But digital games differ from music in that their constituent elements are combined and remediated under the technological aegis of the computer, which recursively establishes and enforces the protocols that govern their interaction. In a radical shift from the traditional ontology and aesthetics of mimesis, the computer creates the worlds it represents, realms governed by laws it both reads and writes. In the words of the Atari pioneer Nolan Bushnell, the computer serves simultaneously as “an arbiter, an umpire, a scorekeeper, and a dungeon master.” Its binary protocols transcode sensible representations of language, number, sound, image, gesture, and affect by way of audiovisual modulations and input devices that operate both as formal mechanisms and as digital interfaces. In this regard, the device that most conspicuously brings the historical, cultural, technological, and epistemological properties of music and digital gameplay into direct contact is the keyboard.

*1–4 BITS AND BEATS*

If play mediates between the cultural techniques by which human subjects are formed and those that bring the world to hand, then the keyboard is perhaps the paradigmatic instance of a ludic interface. *Negotiating between the epistemological limits of Lessing’s juxtapositional and progressive categories, the keyboard and its derivatives materialize and order bits of information, making them available for digital processing by humans and machines.* Keys and buttons (re)present bits as spatially discrete entities that are configured and mapped according to specific formations of cultural memory, the elements of which are stored and retrieved by recourse to notes, letters, numbers, tunings, and temperaments. Temporally, the
keyboard enables these bits to be processed in succession, configuring sequences of events that can be programmed (composed), executed in real time (performed), or both at once (improvised).\textsuperscript{209}

Keyboards allow for infinite variation via permutational and combinatorial processes. In true Kantian form, however, this infinitude is only conceivable owing to the imposition of strict limits and an insistence on absolute distinctions. In conjunction with the storage medium of notation, the keyboard represents and implements a set of rules for selection, processing, and transmission that are at once inseparable from and independent of its physical instantiations and cultural functions, plotting the conceptual trajectory of encoding and decipherment delineated in Key 2–2. Most relevant here is the role played by the keyboard as a point of contact between what Patrick Feaster terms “oscillographic” and “melographic” forms of musical inscription, both of which supplement and relativize the technologies of conventional notation.\textsuperscript{210}

Édouard-Léon Scott de Martinville’s phonautograms (1853–61) exemplify oscillographic notation, which registers the amplitude of sonic signals.\textsuperscript{211} Conversely, melography is closer to traditional music notation inasmuch as it symbolizes information in terms of the contiguous domains of pitch and rhythm, frequency and duration. Whereas pitches are typically iconized by individual notes, accidentals, and their relative positions on the page’s y-axis, however, their rate of temporal succession must be inferred via the decoding of linguistic directives, expressive indications, and arbitrary symbols as well as by the spatial distribution of these signs along the x-axis, which is broadly suggestive rather than explicitly prescriptive. Melography offered an alternative that was isomorphic with the regulated passage of time as well as the keyboard’s topological layout.

The term “melograph” can be traced back to a device designed by the mathematician Leonhard Euler in 1752 that aimed to capture extemporized keyboard playing by attaching pencils to the action of each key that marked pitches and durations on a spool of paper.\textsuperscript{212} As a means of musical programming, storage, and recreation, however, the principle of melography can be extended back to the mechanical flute player described in the ninth century by the three Persian brothers known as the Banū Mūsā and forward to today’s MIDI sequencers.\textsuperscript{213} In 1842, the musicographical reformer V.D. de Stains observed that melographic notation, illustrated in Figure 3 by the Huguenot engineer Salomon de Caus’s design for a hydromechanical organ (1615), plots pitches and durations on a Cartesian grid that allows their relations to be precisely quantified, coordinated, and digitally processed in—and as—space and time.\textsuperscript{214} Owing to their unambiguous calculability, the periodic processes by which pitch and rhythm could be encoded readily lent themselves to the technologies of automation in which Caus specialized: the machine-readable tablature of Striggio’s madrigal “Chi farà fed’al cielo” takes the form of pegs that activate the keys at the bottom of Caus’s illustration.\textsuperscript{215}
FIGURES 4 & 5. The studded barrel, humanoid digits, and curved keyboard of la musicienne, built by Pierre and Henri-Louis Jaquet-Droz (1774). Photographs reproduced courtesy of the Musée d’art et d’histoire, Neuchâtel, Switzerland.

As reverse skeuomorphs, and insofar as they constitute discrete units of information that convey presence or absence at a given coordinate, the pegs of Caus’s barrel are bits that are stored spatially upon the barrel’s cylindrical “memory” and executed in temporal sequence at the keyboard as musical “code.” This formulation of the means by which musical data are simultaneously stored on the barrel’s surface and made available for digital performance amounts to a rephrasing of Carolyn Abbate’s resonant observation that barrels and cylinders occupy a “space within the machine where notation and fingers become one.” In retrieving and reanimating stored information by running it as code, moreover, the recreation of such music demonstrates that “memory locations . . . are just wires turned sideways in time,” as noted by W. Daniel Hillis.

Whereas Caus’s illustration exposes the mechanisms of automation, constructors of android automata sought to conceal them as artfully as possible. From this perspective, one of the famous android automata built by Pierre and Henri-Louis Jaquet-Droz in the 1770s—a keyboard player known as Marianne or la musicienne (Figures 4 and 5)—is particularly telling. Although Terrance Riley points out that all eighteenth-century automata were “fundamentally musical machines” to the extent that they depended on the pinned barrels and clockwork mechanisms that had long been associated with musical reproduction, the performance of la musicienne is unusual in its imbrication of the human, the mechanical, and the musical. The android’s complex engineering coordinates cams that direct the continuous sweep of her forearms (and the rise and fall of her chest) with a studded barrel that does not directly activate sonic production, but rather operates her digits—and digitizes her operations—at the ergonomically curved keyboard. In line with contemporaneous pedagogical treatises, her digital and analog technologies are brought together in the interest of mechanizing human actions as well as humanizing their mechanical counterparts.

As Abbate points out, la musicienne does not simply reproduce music, but plays it. In the process, she stages and performs the isomorphic relationship between the keyboard and melographic tablature. At the same time, her doll- and childlike qualities present la musicienne as a Gadamerian object of play. Beyond that, her mechanized femininity suggests that the processing of melographic data might do more than provide passive entertainment for human onlookers and listeners: assigning them roles in the digital recreation of music can engage them as players while making them “playable” too.

As historical artifact, digital protocol, and reverse skeuomorph, la musicienne’s melographic barrel indexes a wide range of phenomena. Across today’s ludomusical landscape, such technologies and their audiovisual properties collide most spectacularly in the rhythm-action genre of digital games, popularized by the beatmania (Figures 6 and 9), Dance Dance Revolution (1998–2014), Guitar Hero (2005–15), and Rock Band (2007–16) franchises, which draw directly on the functions represented by
la musicienne’s digital “memory” and humanoid digits. The “rhythm” and “action” in such games derive from the digital or podial activation of the appropriate keys, buttons, or foot switches in a timely fashion. Programmed by the representation of a rotating studded barrel, the digits of the beatmania player activate a keyboard in order to recreate music, just like those of la musicienne. In the context of play, such devices become platforms for the exhibition of timing, rhythm, and dexterity, attributes that are as integral to digital games as they are to musical performance.

From Caus’s organ to beatmania, and whether performed by human or machine, the operation of mechanisms that enable this type of musical recreation requires a consistent source of energy (whether supplied by air, water, solar power, muscles, gravity, or electricity) and temporal regulation (whether imposed by counting, entrainment, clockwork, or crystal oscillators). This hints at a genealogy that reflects the organ’s long-standing associations with musical timepieces. At certain junctures, “mechanical clock” and “mechanical organ” became virtually synonymous insofar as both types of instrument were closely associated with the passing of earthly time, the evocation of eternity, and the marking of festivities. The earliest notable digital games from which evidence of this media-archaeological lineage can be excavated are Nintendo’s Game & Watch systems (1980–91, Figure 7), which invite players to test and refine their
abilities to perform sequences of precise audiovisual synchronizations in pursuit of the highest possible score. Both functions of the Game & Watch, the “trivial” game and the “serious” timepiece, are programmed and realized via the pressing of buttons, the oscillation of quartz, and audible feedback. On the one hand, this involves the mechanical simulation of musical time as experienced by humans; on the other, it entails the human emulation of the measurement and partitioning of time by mechanical means. The indiscernible rapidity with which an electronic clock’s liquid crystal display flickers and the slowness with which its numerals succeed one another are both concessions to the normative limits of human perception; conversely, a player’s button presses must be measured and converted into machine code if a difference is to be made within the ludic system. In other words, if coupling is to occur between the operationally closed systems of player and game, the human must become “machine-shaped,” and vice versa.

As the anthropomorphic form of la musicienne goes to show, absolute distinctions between the human and the mechanical have long been open to question. In La tonotechnie (1775), a fastidious treatise on the melographic art of pinning musical cylinders, Marie-Dominique-Joseph Engramelle repeatedly located the elusive quality of “taste” and evidence of a good ear in the microtimings of musical execution, without which music was “cold, mechanistic, insipid, and lifeless.” Conventional notation was incapable of prescribing or capturing these nuances, but they could be accurately rendered via correspondingly subtle processes of calculation, since “nothing in music cannot be exactly measured.” The most refined musical expression was itself expressible by nothing more (or less) than the “measurement of notes by numbers, the division of the circumference of cylinders into so many equal parts as required to apply prongs at precise and regular distances, and the disposition of such prongs in a manner that plays pieces of music with taste and precision.” By enumerating and classifying the fine-grained agogics of a performer’s touch at the keyboard under the rubrics of tenues, tactées, silences, and ornamental modules, Engramelle—who numbered clock-makers among his intended readership—laid the claim that musical time was not simply composed of rhythm and meter as conventionally conveyed. On the contrary, and on scales ranging from the subtactile module to the twenty-four-measure formal span of a minuet, discrete units of time (which, in the case of cylinders, were synonymous with the spatial partitions of circumferential planes) could be transformed into periodic waves and arcing parabolas by way of Engramelle’s musical calculus.

By yoking play to a metronomic clock, digital games such as the Game & Watch stress not only the primacy of ludomusical rhythm, but also what Pias describes in self-consciously Kantian terms as “the game player’s duty.” In an analogous vein, Nietzsche’s characterization of the “rhythmic tick-tock” of ancient verse as a quasi-sacred “compulsion” that “engenders an unconquerable desire to yield, to join in” suggests how digital gameplay configures a dialectic between ludus (the player’s
voluntary submission to the arbitrary and intransigent conditions imposed by the CPU) and paidia (represented by the association of games with toys, most clearly conveyed by their simulative functions and miniature scale). Experientially, this dialectic between ludus and paidia can be construed in terms of Mihály Csíkszentmihályi’s cybernetic theory of “flow.” By presenting a clear goal that becomes increasingly challenging to attain, monitoring progress, and communicating the state of play through a continuous feedback loop, rhythmical gameplay allows the player to navigate between boredom and frustration on the one hand and control and abandonment on the other, ideally leading to an intense state of focus, joy, even rapture.

Konami’s beatmania series established the blueprint for the performance of rhythm-action gameplay at a keyboard interface (Figure 6). The media-archaeological connection with la musicienne is clearly visible, as both illustrated and iconically represented in Figures 4, 5, and 6, but the genealogical ramifications of beatmania’s digital interface also extend in other directions. In 1874, Jean-Maurice-Émile Baudot introduced a five-bit choded interface (Figure 8), configured in the two-plus-three layout of the piano’s black keys, as the input device for his multiplexed telegraph system. The conceptual basis for Baudot’s five-bit system of alphanumeric encoding had been articulated by John Wilkins in 1641; its optical and acoustical materialization, involving a machine “designed to resemble a piano” and a keyboard “with a minimum of five keys,” was first detailed by the keyboardist, composer, and conductor József Chudy in 1787. As Ivan Raykoff notes, Baudot’s keyboard was denigrated as unwieldy and inefficient before being rendered obsolete by the automation of its functions. More than a century later, however, the long-defunct keyboard returned, interleaved in black-and-white formation and set alongside the digital simulacrum of an analog turntable, as the interface for beatmania’s ludomusical gameplay (Figure 9).

Such latter-day extrusions of Baudot’s interface might suggest a chronological narrative based on the ways a communicational protocol was itself communicated. At the same time, it invites us to consider other modes of relating its various iterations to one another, even if—or perhaps especially when—our historicizing instincts are unsettled in the process. Just as Krajewski forges connections between Turing machines and card catalogs, the representational lineage of beatmania’s material forms and notational principles can be traced across a broader network, among the nodes of which can be counted not only the MIDI sequencer, the player piano, and Caus’s hydromechanical organ, but also the punched cards with which Basile Bouchon, the son of an organ maker, first programmed a textile loom in 1725. These technological artifacts index a protocol by which musical information could be codified and transmitted, revealing the degree to which all music notation is a storage medium that makes information visibly available for audible transcoding. Beyond that, however, the same constellation of objects and principles also represents a clustering of musical and industrial technologies implicated in the epistemology of
Figure 8. Keyboard of Jean-Maurice-Émile Baudot’s multiplexed telegraph system (1874). Photograph reproduced courtesy of the Collection Fons Vanden Berghen, Halle, Belgium.

Figure 9. *beatmania* DJ Station Pro controller for Sony’s PlayStation console (Konami, 1998). Photograph reproduced courtesy of Takahito Saiki, Kobe Design University.
In this regard, the keyboard, notational system, ludic principles, and computational technology that inform beatmania simultaneously constitute and represent the game’s own media archaeology, encapsulated by Figure 6.

From beatmania to Guitar Hero and beyond, all iterations of Baudot’s five-bit interface are digital in the narrow sense: their keys are discrete switches that can convey only the binary states of on or off, 1 or 0. That notwithstanding, their entanglement in cognitive, linguistic, social, and affective systems has enabled them to communicate via encryption, to touch via mechanical processes, to give form to imaginative impulses. Their functions should thus be understood in terms of praxis, “a set of executions or actions in relation to a world,” as Galloway puts it in the context of computation, rather than merely in terms of formal ontology.

Reinterpreting the performance of five-bit telegraphy in parallel and serially as the chords and sequences of musical recreation, rhythm-action games from beatmania to Rock Band 4 demonstrate that the logic governing both systems is chiastic, reversible, and capable of engaging its players at a tactile and affective level even while ostensibly restricting them to the automatable task of mechanical reproduction. Baudot’s telegraph indexed the waveforms of spoken or imagined utterances in symbolic form for the purposes of transmission and storage; conversely, players of beatmania convert stored symbols into sound via the same digital operations. In the process, unwieldy transmissive inefficiency is transformed into a pleasurable ludomusical challenge, bearing out Bernard Suits’s definition of playing a game as “the voluntary attempt to overcome unnecessary obstacles.”

The ludomusical dimensions of Baudot’s interface as realized by beatmania reveal ways in which communicative technologies can become playful when put into digital practice, embodied by “the nimble and orderly movements of the fingers.” But the original function of Baudot’s device—to make present a trace of that which is physically absent—remains. Accordingly, the performance of communicative techniques can connect subjects and objects across time as well as space, mediating between past and present in the course of bringing remote phenomena into contact.

Materialized via binary formalism, enabled and constrained by game-theoretical dynamics, and driven by cybernetic feedback loops, the praxis of digital gameplay reflects the culturally embedded precepts that underpin the von Neumann architecture as well as the psychological and affective impact of its operations. In Nietzschean terms, the digital game’s Dionysian excesses and its mythic, otherworldly qualities follow, quite logically, from the Apollonian rationality that determines the course of proceedings: its paidia and ludus are entwined. Games render rationality palpable: their significance derives from a vast array of visual, sonic, tactile, and affective representations that issue from the spatiotemporal
modulation of digital operations. In the terms of mimicry, these modulations can be perceived as analogous as well as simulative in that they index the distance between a concept, object, or praxis and its representations, testifying to the ubiquitous truth of technological deception.

Digital games such as beatmania, Guitar Hero, and Rock Band that take musical recreation as their primary subject matter form only a small subset of titles that might be considered ludomusical. From the Tron-like technoscapes of Rez (2001) to the musical ramifications of the narrative binary trees presented by L.A. Noire (2011) via the platforming hijinks of the bongo-controlled Donkey Kong Jungle Beat (2004), games distribute the responsibility of ludomusical enactment in innumerable ways across the nexus linking composers, developers, hardware, code, interfaces, and players. In the present context, and for reasons that extend beyond its thematic and mechanical foundations, the relatively obscure Frederic: The Resurrection of Music (2011–14, Figure 10), developed by the Polish studio Forever Entertainment, provides the most striking combination of the ludomusical tropes introduced thus far.

Cutting across the registral divide separating the elitism ascribed to “classical” music from the putative philistinism of digital games, the liminal figure of Chopin has formed an unexpectedly persistent locus of ludomusical encounters that unfold at keyboards, whether they involve the relaying of single bits of information, the activation of complex acoustic events, the realization of the ineffable, or all of the above. His music reveals how the play of fingers over the keyboard allows for the creation of sonorous effects that simultaneously reinforce and defy its black-and-white gridding of frequency. In 1852, for instance, the exiled German composer, author, and pedagogue Johanna Kinkel heard Chopin’s piano music to herald the “emancipation of quarter tones” by “rattling the gate” that both barred and disclosed “Nature’s eternal sounds.” Condemned to “slink reluctantly by way of semitones,” Chopin’s melodies “grop[e] for finer spiritual nuances than current intentions can realize.”

Kinkel’s dissatisfaction was framed as both symptom and diagnosis of the piano’s crude temperamental partitions, but its ramifications extend deeper, infiltrating the foundations of the keyboard’s digital epistemology. Thinking of such interfaces not merely in terms of the work accomplished, or the information transmitted thereby, but as facilitators of play opens up different genealogical perspectives, however. Like the narrow voids at the intersections of paving stones, the cracks between the piano’s keys present ludomusical challenges, successful navigation of which entails both acknowledgment and circumvention. On the one hand, the keyboard’s crude partitions could be heard to distort natural continua; on the other, as Siegert describes the latticed “veil” through which Alberti rendered natural phenomena as veristic images, its gridwork formed frames through which Chopin’s swooping curves could become observable, calculable, graspable, and recreatable in a lifelike manner.

From Kinkel’s day to our own, the keyboard has consistently mediated Romantic fantasies that at once admit and deny the mechanisms that bring them to life.
An analogous logic obtains in relation to the temporal dimensions of digital play. Whether taking the form of the microtimed desynchronization of melody and accompaniment in a Chopin nocturne, the improvisation of a Hammond organ
solo, the expert playing of *Guitar Hero*, the dexterous transmission of an urgent text message, or the destruction of an enemy base, such play is predicated on *kairos* rather than *chronos*, on strategically seizing the right moments to syncopate the metronomic spacing of the matrix that partitions milliseconds and centuries alike.  

Chopin reportedly bestowed the title “*valse du petit chien*” on his Waltz in D flat, op. 64, no. 1, after being amused by the *ilinx* of a small dog chasing its tail. While the waltz’s subsequent reception history might have been predicated on an accentual misplacement (the adjective “minute” was first applied as a simple diminutive), the fact that so many pianists have responded to the challenge of completing a performance within sixty seconds testifies to its ludic qualities. Such recreations of Chopin’s music cannot be understood in terms of mimesis, and still less within the normative rhetoric of performance practice, but they make explicit the scope—which is also to say the limits—of simulation as a fictive mode of play. On the one hand, an emphasis on speed might seem to reduce the waltz to a mere pretext for the display of mechanistic virtuosity; on the other, it need not preclude the imaginative demonstration of qualities more typically associated with the performance of Chopin’s music.

This quickly becomes evident from a perusal of speedruns of digital games, in which players also aim for completion in the shortest possible time under regulated conditions that either prohibit or mandate the availability of technical assistance from software or hardware tools. In the former case, phenomenal dexterity is a prerequisite for the accomplishment of such feats, but the most impressive performances of both types rely less on mechanical proficiency and more on an intimate knowledge of the logic on which the game’s mechanics are based. The acquisition of such skills and knowledge requires creativity, acuity, and sensitivity as well as painstaking practice.

As in *Guitar Hero* and countless other rhythm-action games, the outcomes of *Frederic’s* gameplay are calculated according to the speed and accuracy with which players can “match” the notes that, like the pegs on Caus’s rotating barrel, travel toward the piano keyboard at the bottom of the screen (which, on the PC and Macintosh versions of the game, is mapped onto its QWERTY counterpart). For Adorno, the code of the barrel organ’s cylinders (“*die Geheimschrift der Walzen*”) enabled the seizure of all “unclaimed musical goods” from both past and present, whether sacred or profane, comic or tragic; as a result, they were flattened, rationalized, commodified, alienated, and rendered “prehistoric” by its technological “magic.” From Caus to *Frederic*, an isomorphism persists across devices and technologies that involve the transduction of such code—whether it takes the form of staff notation, tablature, real or virtual pinned barrels, MIDI data, or C++—via mechanisms of play enacted by humans and machines.

While its subject matter might be relatively unusual, *Frederic* is thus a typical digital game insofar as it unabashedly remediates its narrative, visual, and mechanical elements—not to mention its soundtrack. *Frederic* presents nine “catchy remixes”
of Chopin’s greatest hits in the form of “epic musical duels” between Chopin—who, according to the game’s promotional materials, has returned from the dead to “save the world from soulless, mass-produced music”—and stereotypical representatives of the various popular genres in which his music has been remixed, mashed up, and mercilessly quantized for the sake of digital synchrony. Ludicrous though it may seem, Frederic’s premise is typical of its genre: many rhythm-action games launch the player on a quasi-Pythagorean quest to restore harmony and order to a world under attack from alien forces whose hostility can be gauged in terms of dissonance (and vice versa). In this regard, Frederic’s violent imagery is directly extrapolated from the nineteenth-century piano duel and its agonistic genealogy: like Apollo vs. Marsyas, it represents a musical game of life and death.

Needless to say, irony abounds in Frederic’s lambasting of “soulless, mass-produced music” and its shameless caricature of Romantic ideals concerning genius, sensitivity, and performance, a genealogy of which is mapped out in Key 2–3. Even here, however, strange symmetries and resonances emerge between Chopin’s limning of death both as a historical figure and in his digital afterlives. In Giorgio Agamben’s terms, the objects and referents of play constitute “an utopian topology of historyland, which has no site except in a signifying difference between diachrony and synchrony, between aiōn and chronos, between living and dead, between nature and culture.” The plot of Eternal Sonata (2007–09, Figure 11), a sensorially opulent role-playing game, unfolds within the composer’s tubercular fantasies as he lies on his death bed; conversely, the monochrome figure of Frederic represents Chopin on the other side of the threshold separating life from death, inhabiting the realm of the “undead” populated by ghouls, zombies, and other denizens of digital game-worlds. As productions of Chopin’s consumption, Frederic and Eternal Sonata represent the senses in which music and play unfold beyond the limits of history’s temporal flow and yet bear haunting traces not only of beauty, but also of conflict, entropy, death, and decay.

With the keyboards of la musicienne, Baudot, beatmania, and Frederic in mind, and thus attuned to the temporal transformations that media technologies effect as well as undergo, we might detect the objections of musical objects to the uncritical application of biographical or historical narrative as a means of describing their passage through—and creation of—time. The chronological ordering of such phenomena is, in Ernst’s words, “less about temporal antecedence than about the techno-epistemological configurations underlying the discursive surface.” In ludomusical terms, we might go further: while these technologies materialize particular epistemological strands and afford specific types of behavior, they are interwoven with others that reflect distinct aspects of both music and play.

Digital games instrumentalize a form of play predicated on the miniaturization of objects as toys and the concomitant flattening of the past into a single frame of reference, animated and yet bound by the in(de)finently iterative cycles of the
CPU’s clock. But these tendencies are already apparent in the musical technology of Caus’s barrel. For a grotto in the famous hortus palatinus at Heidelberg Castle, Caus designed an elaborate mechanical staging of Apollo’s contest with Pan (Figure 12), in which the contrasting instrumental means by which each god performs covertly share the same digital and cylindrical mode of programming. This foreshadows Adorno’s observation that the demotic technology of the barrel organ is associated with the injection of the banal into the holy: whether its music is heard to issue from god, man, or beast, and whether its (re)creation relies on the sonic activation of pipe or string, the barrel remains sublimely indifferent to the provenance and functions of the information that its rotation processes.

Perhaps even more telling is Adorno’s construal of the relationship between a barrel organ and its mighty Baroque counterpart as analogous to that between a “puppet show and a tragedy.” For Caus’s contemporary Markus Sittikus von Hohenems, archbishop of Salzburg and tenant of the Hellbrunn Palace, Marsyas’s tragic end became an automated puppet show by way of the techniques of mechanization described and illustrated by Caus. Reenacting the scene rhetorically conjured by Philostratus the Younger, Sittikus’s knife-wielding Apollo and tree-bound Marsyas endlessly rehearse and replay the harrowing moments preceding the latter’s execution (Figure 13 and Video 1). Hovering between life and death in mimetic as well as narrative terms, their repetitive motions animate Apollo’s divine power and Marsyas’s desperate protestations by harnessing inanimate forces.

Despite its Promethean pathos, however, the scene is undercut by the very technological means that produce it. Mechanized and miniaturized, Apollo and Marsyas are turned into playthings that, like Chopin in Frederic and Eternal Sonata, are neither alive nor defunct but rather undead. Like a short-circuiting digital game or an animated GIF, they are trapped in an infinite loop and thereby suspended from historical time. For Agamben, the paradoxical effect of such dehistoricization is to render history all the more vivid: the toy “makes present and renders tangible human temporality to itself, the pure differential margin between the ‘once’ and the ‘no longer.’” The value of relating Frederic and Eternal Sonata to Chopin lies within this differential margin, which can also be measured by the keyboard as a techno-epistemological configuration capable of synchronizing the desynchrony between the present and the past. Regardless of its avowed historical orientation, any performance of Chopin’s music performs an analogous act of (de)synchronization.

Accordingly, the mode of play also allows us to project the differential margin between the “now” and the “yet to be.” In “Chamber Music,” a speculative essay written in the 1980s, Vilém Flusser imagined playful praxis at keyboards to encapsulate the archetypal mode of interaction in what he foresaw as the interconnected, “telematic” society of the future.


VIDEO 1. Excerpt from “Apollo & Marsyas: Hochmut vor dem Fall” (youtube.com/watch?v=jtrM8sfUJmc), featuring the automata shown in Figure 13. Narrated by Cay Bubendorfer. Music by Leo Ferner/Agentur Orpheus. Written and directed by Karl Schupfer. Filmed and edited by Johannes Killer. Reproduced courtesy of the Information Center of the City of Salzburg.

To watch this video, scan the QR code above with your mobile device or visit DOI: http://doi.org/10.1525/luminos.16.1
People will sit in separate cells, playing with their fingertips on keyboards. The prevailing state of mind will be reminiscent of the one we experience in our creative moments, the experience of being out of oneself, of adventure, of orgasm. The basis for such music-making is an original score, a program, a set of rules. I imagine these musicians meeting not to read scores but to improvise from available scores, as was common in the Renaissance. [But such scores] will soon disappear behind the horizon of musicians who are improvising with continually reprogrammed memories. The recording device is nothing like the work of chamber music (the result of the work); rather it serves as its memory, which is durable and can be randomly replayed. Chamber music is pure play, by and for the players, for whom listeners are superfluous and intrusive. It employs participation (strategy) rather than observation (theory). It is futile to look for the meaning of the information that emerges in this way anywhere but in the game itself, in the players and the rules they follow.

Within the confines of this brief thought experiment, Flusser combined and compressed the introversive significance and rule-bound premises on which Kantian play depends, a Gadamerian acknowledgment of play’s chiastic motion, Csikszentmihályi’s immersion in the intense pleasure and excitement of ludomusical experience, Foucault’s genealogical sensibility, a Nietzschean consciousness of play’s ever-emergent nature, and recognition that the generative powers of memory and recording are recreative as well as reproductive.

In certain ways, Flusser’s prophecy of the “chamber music” to come also recapitulated Adorno’s bleakly elegiac chapter on the same topic in his Einleitung in die Musiksoziologie. Like Flusser, Adorno stressed the interaction of players over the passivity of listeners, invoking the Kantian function of functionlessness in describing “a production process without an end product. In a double sense, the players are merely playing.” Although Adorno acknowledged the agonistic elements of chamber music, its ludic give-and-take was subsumed under the ideal of “fair play [as] in the old English sports,” ultimately “anticipating a state in which labor becomes play.” As it transpired, however, the reverse happened: in music as in sport, the noble amateurism of play was either professionalized or relegated to the nonproductive margins of bourgeois life. In the process, its autotelism was coopted by the pressing demands of both work and leisure, and the primary connotation of “amateurism” slid from ardent love to rank incompetence.

While Adorno’s gloomy prognostications might have been overdetermined by historical consciousness, its patina has also dulled the gleam of Flusser’s imagined future. For the moment, we can choose to focus instead on responding to the playability of the music that surrounds us today, whether conceived as a reconstruction of a prior event, as a simulation of praxis under a particular set of historical conditions, or as a simulacrum bearing no particular relation to the past. From a ludomusicological perspective, all these forms of play forge connections that enable us to historicize the new and to renovate the old via
techniques of projection and retrojection. These techniques should be understood as supplementary rather than self-sufficient: they can neither supersede historical investigation nor obviate its attendant responsibilities. But by interrogating the qualia of historical events and attempting to reconstruct their ludomusical logic, they offer the tantalizing prospect—however elusive, illusive, or delusive it may turn out to be—of bringing the future of the past within range of twenty-first-century sensoria.