



R. MURRAY SCHAFER, THE SOUNDSCAPE

## Drawing the Line:

### Music, Noise, and Phonography

I frequently hear music in the heart of noise.

*George Gershwin*

Sea, wind, leaves, thunder, waters, cows lowing, the cattle market, cocks, hens don't crow, snakes hissss. There's music everywhere. Rutledge's door: ee creaking. No, that's noise.

*James Joyce, Ulysses*

Music is like sound to my ears.

*Paul DeMarinis*

Within the history of Western art music, noises were not intrinsically extramusical; they were simply the sounds music could not use. The determination of extramusicality rested not in a hard and fast materiality but in the power of musical practice and discourse to negotiate which sonorous materials will be incorporated from a world of sounds, including the sounds of its own making, and how. In the latter half of the nineteenth century, this task was aided by acoustics, itself still associated with that realm of scientific inquiry known as music. At the same time acoustics was separating itself out from music using new techniques of *visible sound* derived from graphic techniques and automatic recording instruments. Although increasingly alienated from one another, acoustics and Western art music were both in the business of determining what was music and what was noise. Sometimes they agreed, and sometimes they did not, but even in disagreement they were usually complementary. Two *lines* played an im-

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NOISE, WATER, MEAT.

portant role in this determination—the graphic line, whether visible or figurative, inscribed by hand, mind, machine, and nature, and the conceptual dividing line between noise and music, between sound and musical sound.

The line between sound and musical sound stood at the center of the existence of avant-garde music, supplying a heraldic moment of transgression and its artistic raw material, a border that had to be crossed to bring back unexploited resources, restock the coffers of musical materiality, and rejuvenate Western art music. To make extramusical material musical, the sounds of the world were processed in numerous ways. First, the sounds of the world were to be themselves categorized, explicitly or implicitly, into referential sounds and areferential *noises*, such that a noise could be incorporated into the areferential operations of music. Thus, there was an operative exchange between the distinctions of sound and musical sound from the perspective of music and sound and noises within the sphere of extramusicality, whereby the *sound* of the former was recuperated through the *noises* of the latter, with a remainder of sound usually dismissed as *imitative*. Second, these privileged *noises* of the sphere of extramusicality would align themselves with already existing musical attributes and elements, such as dissonance, timbre, and percussion. Third, these noisy correspondences within music were emphasized as themselves bearing traces of the world of true extramusicality; this was the basis of what I call the practice of *resident noises*. Fourth, sounds were technologically selected or manipulated to render them suitable as musical material, as in phonographic practices such as *musique concrète*, and finally, sounds were processed through the operations of aurality, a feature of John Cage's dictum to hear *sounds in themselves*.

The underlying presumption of all these was that the nature of music was sonic, thereby the importation of worldly sounds into music meant diminishing or eradicating sounds that were too significant. Most important, this process displaced significance to music itself, such that the most common way to make noise significant was to make it music, but by doing so the significance of sounds was rendered insignificant.

Resolve against the mimetic ran up against the changed conditions of aurality in the latter half of the nineteenth century represented most significantly by phonography, the mimesis machine that incorporated all classes of sounds. By *phonography*, within this context, I mean the phonograph as the technological device for recording and reproducing sound (including phonautographic and visible sound practices that predated and paralleled the inventions of Charles Cros and Thomas Alva Edison, the later developments of optical sound film, and so on) and also phonography as an emblem for a dramatic shift in ideas regarding sound, aurality, and reality from that time. Phonography was associated with a number of crucial developments: it foregrounded the parameters of *a sound* and *all sound*, presented the possibility of incorporating all sound into cultural forms, shifted cultural practices away from a privileging of utterance toward a greater inclusion of audition, placed the voice of presence into the contaminated realm of writing, and linked textuality and literacy with sound through inscriptive practices. The promise of phonography, before and after the actuality of the phonograph, added another player to older discourses and practices based on musical technologies, and when it pointed more toward the production and not the reproduction of music, phonography necessarily invoked the

world of *all sound*. The pressure of worldly sound brought to bear on musical practice was exacerbated in the 1920s with the marked development of auditive technologies and institutions—particularly improvements in microphony and the phonograph and the development of sound film—as practiced within music, radio, and cinema. It was within this complex that dramatically new approaches to sound began to materialize.

To make my way through the entanglements of Western art music, noise, and phonography, I concentrate on the inscriptive practices involved through the concentrated figure of the line. The line can draw the boundary between musical sound and noise by being the threshold at which too much of the world is detected. In this way the line is a sonic buffer, a silencing device. The line can also inhere the world of all sound, the most familiar instance being the intensification of the world packed into the jagged phonographic line, replaying what it has heard to make the world thicker with sound. Or the line can do both, remaining within music or demarcating music from the world while being suffused with its own plenitude. The inscriptive processes examined here cover a number of artistic practices up to the mid-twentieth century.

### Demarcated Sounds

There has been a line drawn between sound and musical sound, describing disciplinary demarcation and maintaining musical integrity at an historical juncture in which there were the means to do otherwise. In the absence of any practical challenge from the other arts, music was considered the *sine qua non* of the arts of sound, and what appeared to be a challenge mounted by avant-garde music was instead primarily a recuperation of sound into musical preoccupations. What little pressure was put on musical practices to change was largely discursive and had little positive effect in actual sonic practice. During the heyday of the avant-garde, some of the most provocative artistic instances of sound came from literature and other writings and were distant from the development of the arts or aurality of the time. In the latter half of the 1920s, with the increased technological sophistication of film sound, radio, amplification, microphony, and phonography, as well as a changed aurality shaped by mass-mediated culture, the questioning of musical integrity started to become more pronounced, as we see in the next chapter. Soon, however, economic collapse, consolidation and expansion of authoritarian regimes, exile and repression against artists and intellectuals, and military activities would remove what conditions had existed for major artistic revision and elaboration. Nevertheless, although the sporadic activities during the late 1920s and early 1930s failed to assume the broader continuities of an artistic practice, they did indicate a qualitatively different artistic approach toward significant sound.

The tradition of what is called avant-garde, modernist, and experimental music during this century is usually understood as the radical edge of the larger practice of Western art music, a small minority of composers

and other practitioners important for the evolution or assertion of different philosophies, poetics, politics, techniques, technologies, styles, and so forth within the larger realm of composition—a way to keep pace with the present. It can also be understood as an adaptive maneuver by which arts in the West confronted larger transformations in the social conditions of aurality and kept the full extent of their social, political, and poetic provocation at bay by recuperating significant sound into musical materiality. While the first understanding is regularly rehearsed and the second seldom so, they are in many instances functionally interdependent.

Despite the concentration of the bulk of Western art music activity on the music of past centuries, played on vintage classes of instruments couched within equally vintage rites, the actions of venturesome contemporary avant-garde composers grappling with changing conditions of aurality have given rise to an impression that Western art music as a whole has the capacity to respond to the world in which people presently live. Whether they responded admirably in musical terms is not the question here. It is merely whether, through the discursive dint of associating musical sound with sound in general, or through other aspects on an historical scale quite apart from the personal integrity or the value of the music of this or that composer, they responded as well they could to the changing conditions of sound and aurality. Likewise, the process of musicalization does more than act to rejuvenate Western art music practice, expanding the material and technical base while maintaining the autonomy of musical practice. More significantly, it casts musical premises far afield of their natural habitat, where music is further situated and supported through its incorporation into other practices and discourses of culture and aurality. Thus, from the timbral tactics of Russolo's art of noises, through the homegrown legitimation of resident noise, through John Cage's musicalization of aurality itself, Western art music has developed a number of means through its avant-garde to maintain its integrity and expand its resources in the changing auditive environments of this century.

One thing that remained tenaciously extramusical, however, was what was usually called *imitation*. However it may have been invoked past or present—noise, sound, reproduction, representation, meaning, semiotics—the primarily sonic has been recuperated into music with relative ease while significant sound has met with great resistance. Only the briefest and most infrequent instances of worldly sound were allowed into Western art

musical practice, while its broader applications of imitation, such as program music, were commonly considered to be lower life forms. Contraptional sounds produced by noninstrumental objects were banished to the circus, variety theater, novelty music, vaudeville, theatrical sound effects, and folk traditions, and even quotation from musics outside one's own tradition could be an exercise in extramusicality.

It was more difficult to keep "imitative" sounds at bay after the advent of viable phonographic techniques. Unlike the verisimilitude that painting and drawing were relieved of by photography, music was not relieved of any tradition or aspiration toward phonographic realism. Phonography did, nevertheless, promise an alternative to musical notation as a means to store sonic time and, in the process, deliver all sound into artistic materiality, and musical discourse responded by trivializing the complexity of significant sounds and their settings. Indeed, after a certain historical point, it was not so much the potential for musical practices of imitation that were debased as it was the concept of imitation within musical discourse. Only by distancing itself from attempts at a comprehension of the conditions of aurality within a particular time and place, including the operations of music itself within those conditions, could music protect itself from sound.

How could this be the case within the radical transformations that occurred during the vigorous days of modernism and the avant-garde? How could Western art music be so successful in protecting its own domain when, at the very same time, so many other arts inverted their representational modes? If painting could jettison the recognizable for the non-objective, how could Western art music not follow suit and jettison the nonobjective for the recognizable? What was the source of this sensorial asymmetry in modernism? One line of reasoning has to do with the conservatism of Western art music itself, against which a relatively modest departure would appear to be transgressive. Dissonance comes immediately to mind, but for our purposes a better case in point would be the reaction that avant-garde music incurred through its use of percussion, a reaction based on the failure to reproduce a certain set of instruments, conventions, and sounds. That percussion fell within the bounds of a musical materiality meant that it only had (decreasing) strength as a sign for extramusical sounds. In this way, modernist conflicts over representation could be reproduced internally, without appealing to an external sense of

representation. This was played out in terms of noise, resident noise, and figures of worldliness such as the glissando and eventually in the sphere of sound recording.

Another line of reasoning pertains to institutional and societal factors. The early avant-garde had relatively little to do with music; in fact, prior to midcentury the term *avant-garde music* was nearly oxymoronic. Relatively few composers frequented the bohemian haunts of artists and writers, breeding grounds for radicalism of all types, because their attendance could be better spent elsewhere. Unlike writers or painters, who needed relatively affordable technologies (pen and paper, brush, paints, canvas, and the like) to complete their art, composers were closely linked to string quartets or symphony orchestras to hear common forms of their practice realized. The artistic and literary avant-garde looked like a cottage industry when compared to the big factory of musical modernism. To gain access to their technologies, composers were required to circulate in the upper reaches of society, participate within the formal rites of high musical culture, and speak through the discourses attending these scenes. Edgard Varèse, one of the few composers to intersect with the ranks of bohemia, described in 1924 the stifling effects operating within a generational and class logic: "There is little hope for the bourgeoisie. The education of this class is almost entirely a matter of memory, and at twenty-five they cease to learn, and they live the remainder of their lives within the limitations of conceptions at least a generation behind the times."<sup>1</sup> The Surrealist Philippe Soupault put it more succinctly: "The area of music, a colonial possession inhabited by snobs."<sup>2</sup> John Cage understood it less as a class phenomenon and more a difference arising between individual and institutional modes of support: "The people who control taste and who give funds to buy things in the field of art are individuals. I think institutions in the case of art follow the lead of those individuals and individual collectors. Whereas in music, institutions get in the way in the very beginning and they close the doors to what they would consider to be rabid experimentation."<sup>3</sup>

According to Félix Guattari, the institutions and practices of music worked against music itself: "One has here to contrast the abstract machines of music (perhaps the most non-signifying and de-territorializing of all!) with the whole musical caste system—its conservatories, its educational traditions, its rules for correct composition, its stress on the impre-

sario and so on. It becomes clear that the collectivity of musical production is so organized as to hamper and delay the force of deterritorialization inherent in music as such."<sup>4</sup> If music has the deterritorializing capacities that Guattari attributes to it, then its inability to challenge basic premises regarding its artistic materiality can be traced in part to these conventions, economic, and institutional conditions. As we see below, however, Guattari would have disagreed since moves toward signification would deterritorialize the deterritorializing capacities he found inherent in music as such.

Another reason that music was not compelled to radicalize its representational means relative to the other arts was the privileged position that music itself held among the arts. Music was valued as a model for modernist ambitions toward self-containment, self-reflexivity, and unmediated communication. Its abstracted character was thought to have already achieved what the other arts were attempting. Apollinaire, in championing analytic cubism, was most interested in the relationality music had elaborated through polyphony, rhythm, counterpoint, harmony, melody, and so on. Simultaneity, the cohabitation of space underpinning cubism, was child's play for all types of music. What the aural equivalent to synthetic cubism would have been—with its incorporation of actual objects or, as with Picasso's chair caning printed on oil cloth, representations of actual objects—is another question entirely. Gabrielle Buffet-Picabia, a musician in a world of visual artists, was in a good position to make a statement typical of the time:

I had been initiated into the organization of sounds into music, into the strict discipline of harmony and counterpoint, which make up its complex and artificial structure. The problems of musical composition became for me a constant source of amazement and reflection. Consequently, I was well prepared to hear Picabia speak of revolutionary transformations in pictorial vision, and to accept the hypothesis of a painting endowed with a life of its own, exploiting the visual field solely for the sake of an arbitrary and poetic organization of forms and colors, free from the contingent need to represent or transpose the forms of nature as we are accustomed to see them.<sup>5</sup>

Music ceases being mere legitimization and becomes even more central to the work of many painters. Among the innumerable cases we could examine, let the obvious cases of Wassily Kandinsky and Piet Mondrian

suffice. Although music was for Kandinsky a powerful model for nonrepresentation, this produced a second-order imperative to avoid *the representation of music*. He confronted this problem in two phases marked by a change in his attitude toward Wagner's use of leitmotifs. At first an avid admirer of Wagner, he considered leitmotifs to operate as something more than a simple mode of identification, a motivated sound involved in naming. Instead, he associated identification with essence and considered its expression to be auratic, a radiance occupying the space of sound: "Wagner began to use the medium of his art—sound. The heroes of his operas are expressed not only by material form, but also by sound—the *leitmotif*. This sound is, as it were, the spiritual aroma surrounding and expressing the hero: each Wagnerian hero 'sounds' in his own way."<sup>6</sup>

However, as Kandinsky developed his notion of *inner sound*, a deeper and more pervasive vibrational being of which radiance would be an externalization belonging to the mundane world of appearance, his attitude toward Wagner changed. Kandinsky now thought that Wagner was preoccupied with externals; he had rendered music subservient to text and imitation, made it into a type of mechanical reproduction of the already apparent: "The hissing of red-hot iron in water, the sound of the smith's hammer, etc., were represented musically."<sup>7</sup> Wagner's recourse to leitmotifs represented a degeneration into unabashed identification: "This obstinate recurrence of a [particular] musical phrase at the appearance of a hero finally loses its power and gives rise to an effect upon the ear like that which an old, well-known label on a bottle produces upon the eye. One's feelings finally revolt against this kind of consistent, programmatic use of one and the same form."<sup>8</sup>

His change of heart toward Wagner pivoted on an association with the already degraded form of program music—that is, exercises in extramusicality using musical instruments unsuited to the task. This inadequacy of musical technology and thought consequently restated the perception of an ingrained difference between sound and musical sound. As he wrote in *On the Spiritual in Art*:

How lamentable are attempts to use musical means to represent external form is shown by program music in the narrower sense. Such experiments have been made right up to the present time. Imitations of frogs croaking, of farmyards, of knives being sharpened, are worthy of the variety stage and maybe very

amusing as a form of entertainment. In serious music, however, such excesses remain valuable examples of the failure of attempts to "imitate nature." Nature has its own language, which affects us with its inexorable power. This language cannot be imitated. If one tries to represent a farmyard musically in order to recapture the mood of nature and to put the listener in this mood, then it becomes clear that this is an impossible and unnecessary task. This sort of mood can be created by every art form; not by the external imitation of nature, but by the artistic recreation of this mood in its inner value.<sup>9</sup>

Here was an example of the well-rehearsed differentiation of *serious* music from other, lower forms of Western art music practice—specifically, program music and musical imitation—in the face of a nature too powerful to be imitated. This model provided Kandinsky with the rationale for his own amimetic art: "Music, which externally is completely emancipated from nature, does not need to borrow external forms from anywhere in order to create its language. Painting today is still almost entirely dependent upon natural forms, upon forms borrowed from nature. And its task today is to examine its forces and its materials, to become acquainted with them, as music has long since done, and to attempt to use these materials and forces in a purely painterly way for the purpose of creation."<sup>10</sup> Since nature's language was too powerful to imitate and music was self-sufficient and emancipated from nature, music became infused with the autonomy and power of nature. Thus, when Kandinsky wrote, "I do not want to paint music,"<sup>11</sup> he meant that he did not want to make his own painting programmatic of any music; he wanted his painting to have the same relationship Western art music already had to the program music within its own ranks. This would not make painting a purely personal social phenomenon, for the autonomy from nature would be only an apparent nature, and there would be resonance among all realms of existence at the deeper vibrational level of inner sound. Communication among humans—for instance, between Kandinsky, his painting, and viewers of his painting—would take place vibrationally, unmediated by signs. Similar to the general tactic of avant-garde musical noise with its exchange along a correspondence between the areferential sounds outside music and the noisy elements already existing within musical sound, Kandinsky circumvented imitation by setting up conduits of cosmic vibrations behind apparent reality.

Piet Mondrian—one of the high practitioners of modernist purgation, the painter of *Broadway Boogie-Woogie*—would go to wherever the music he loved was being played, even if it meant sitting through a string of circus acts just to hear a jazz interlude. Indeed, prompted by Luigi Russolo's noise music, in two long essays written in 1921 and 1922—"The Manifestation of Neo-Plasticism in Music and the Italian Futurists' *Bruiteurs*" and "Neo-Plasticism: Its Realization in Music and in Future Theater"—he went so far as to propose a new type of music with its own venue. Mondrian described his new music across a range of features, and when it came to the question of materiality, he not only exercised the usual proscription against imitation; he thought that Western art music itself was too close to nature: "Sounds in nature are the result of *simultaneous and continuous fusion*. The old music partially destroyed this fusion and continuity by decomposing noise into tones and ordering them in a definite harmony. But this did not transcend the natural. *This definiteness is not sufficient for the new spirit*. 'Scale' and 'composition' show regression to natural sound, fusion and repetition. *To achieve a more universal plastic, the new music must dare to create a new order of sounds and nonsounds (determined noise)*."<sup>12</sup>

Mondrian generally favored the *bruiteurs* (intonarumori, the noise-intoning instruments Russolo devised to play his art of noises) since he saw them as a step away from the old music and toward his new Neo-Plastic music, a mechanical music that would achieve a "perfect determination of sound" by eliminating human touch.<sup>13</sup> However, despite their actual non-imitative restriction to the resident noise of timbre, they likewise treaded too close to nature: "Naturalism, in the sense of the imitation of natural sounds (including machines), causes degeneration in music. Reality was introduced into music with the intention of making it more universal; but by following reality too closely, music on the contrary became more individual. *Natural reality did not achieve its true expression because it was not transformed into abstract plastic*. This is clearly shown by the *bruiteurs* whose noises remain reproductions of natural sounds."<sup>14</sup> In the new type of hall for playing Neo-Plastic music, people could come and go freely without missing anything because the compositions would be repeated just like in movie theaters. Long intermissions would provide time to view projected images of Neo-Plastic paintings, the electrical playback equipment would be hidden, and the space would meet the "new acoustical requirements of 'sound-noise.'"<sup>15</sup> Neo-Plastic music would be mechanical and electric

because "human touch always involves the individual to some degree and prevents the *perfect determination of sound*,"<sup>16</sup> and man, once he has "attained complete maturity" will "free . . . himself of his animality and achieve pure exteriorization of his deepest 'self.' Only then will animality be destroyed in art. *After this there will be no need either for the old plastic means or for the vocal organs of man*. Man will prefer sounds and noises produced by inanimate nonanimalized materials. He will find the noise of a machine more sympathetic (in its 'timbre') than the song of birds or men."<sup>17</sup>

About twenty-five years of Neo-Plastic maturation later, after moving to London, Mondrian wrote to his brother to detail his own revanchist animal instincts. These took the form of a fascination for Disney cartoon characters with special attention given to Snow White and the seven dwarfs. Moreover, he chose to fill his own room with the strains of a different type of music. Referring to his new neighbors, Mondrian's letter suggests the possibility of an infantilism operating in his valorization of music: "In the evening when the dwarfs return from work, I hear their music in the distance, a very cheering sound. . . . I have my gramophone here too with 12 of the latest records that I managed to save out of the many that I possessed. So I also have a record with the music of the dwarfs on it, and quite often play it. Sneezzy and the others like that too."<sup>18</sup> Underscoring this specific instance of a high modernist traffic in music, in a neighborhood quite distant from Lautréamont's cruel ecosystem, the rejection of animality, nature, and signification was definitely a move to a less complicated time, or, rather, it was a time for a move toward less complication.



## UBIQUITOUS RECORDING

**The Rotary Revolution**

In the mid-1920s a media revolution began that continued into the 1930s. A time not unlike our own, much excitement surrounded the artistic possibilities of new communications technologies. Whereas our present media upheaval is driven by the computer, earlier this century it was driven by audiophonic technologies: radio was new on the scene; film and animated cartoons were moving to sound; dramatic improvements were occurring in phonography, microphony, and other audiophonic technology; and the prospect of television was in the air. Likewise, the convergence involved in the digital mix of today had its forerunner in a mix of audiophonic equivalencies: sound began to complete the picture as phonography combined with film and promised to fuse the radio and cinema into television; recorded sound stretched over film sound, film music, music composition and performance, and the new realm of radio and threatened to establish its own autonomous artistic domain. Within this overall media environment, the rotary revolution shifted gears from the cranking motion of the siren and intonarumori to the steady spooling of the optical sound track and the gently tugging torque of the phonograph record's spiraling grooves.

Against the obstacles of musical thinking, the case for auditive imitation became increasingly compelling, and with it came a new sense of artistic possibility, a marked increase in theoretical and practical activity in the artistic use of significant sound and important experiments in asynchronous film sound. Unfortunately, radio art, audio art, and film sound experimentation based on recording technologies was cut short and postponed for decades. That radio or audio art was not firmly established early on

has no doubt contributed to the fact that the true potential of a radically asynchronous sound film has, to this day, not been adequately explored. The discontinuity of these artistic traditions stands as an historical lesson that, even though the technological and conceptual requirements exist and have generated sporadic material realization, these requirements are still insufficient for maturation into an artistic practice. For instance, as discussed below, although much has been made of the development of *musique concrète* by Pierre Schaeffer beginning in 1948, it was for lack of proper institutional settings, not for want of ideas or technologies, that it failed to occur some twenty years earlier. If compelling ideas could drive the production of artwork, then we would now be watching and listening to a much more interesting and sophisticated cinema thanks to Vertov, Eisenstein, and others from the ranks of Russian Revolutionary cinema.

The shift in the rotary revolution was experienced individually by the composer George Antheil, who happened to busy himself with both sirens and phonographs. Cranking the siren did not always wrench glides and gradations from the world; turning the crank could also place the performer among revolutionary circles. Antheil saved his siren for the climactic end of the American premiere of *Ballet Mécanique* in New York (1927), but it ended in climactic embarrassment. When the conductor Eugene Goossens gave the cue, the siren player cranked and then cranked feverishly, but absolutely no sound was produced:

The moment for the siren was by now long past, and Goossens was turning to the last page of the score. Disgustedly the effects man stopped turning the crank, as the last bars of the *Ballet* crashed out. And then in the silence that followed there came the unmistakable sounds of a fire siren gathering speed. Louder and louder it came as the last notes of the *Ballet* died away, and as Goossens turned to bow to the audience and Antheil rose from the piano, it reached its full force. We had all of us completely forgotten the simple fact that a fire siren does not start making any sound until it has been energetically cranked for almost a full minute. And also we had forgotten that it does not stop shrieking simply because you stop cranking. We remembered both of these things now as the wail from the infernal red thing on the stage kept dinning in our ears, drowning out the applause of the audience, covering the sound of the people picking up their coats and hats and leaving the auditorium.<sup>1</sup>

The siren in *Ballet Mécanique*, especially in the context of the other instruments, was an unabashed sign of modernism, which the formalism of a glissando could have masked only with great difficulty. Sirens signaled modernism in various ways—to call workers to mechanistic labor and, after the revolution in Russia, to call emphatically to the future. During the early 1920s in Russia, the proletarian zeal of the Smithy Poets could be heard in their love of “the power of steam and of the force of dynamite, the song of sirens and the motion of wheels and shafts.”<sup>2</sup> It was the same with the steam-whistle sirens in the versions of the *Symphony of Sirens* directed and described by Arseni Avraamov. These symphonies were on the grand scale of other spectacles in the early years of the revolution, at times employing the sirens of many factories, ships’ horns and bells, the noises of trucks and seaplanes, fireworks, gunshots, machine gun volleys, and artillery charges. There was also a specially made “steam-whistle machine” that would toot *The Internationale* and “On the half verse, a joint brass orchestra sounds and the automobile chorus with the *Marseillaise*.”<sup>3</sup> The symphonies were not merely praise songs to industrial life; they also echoed the collectivist cries and military actions of the new nation: “Then the revolution came. Once, at night—an unforgettable night—Red Petersburg sounded with a many-thousand mighty chorus of horns, whistles and sirens. And in response, thousands of trucks rushed to the outposts throughout the city bristling with bayonets. The Red Guard rushed to encounter Kornilov’s vanguards. In this formidable moment, the shrieking chaos had to be tied together with one single will in order to substitute the cries of alarm for the victorious hymn of *The Internationale*. The Great October Revolution!”<sup>4</sup>

Antheil flatly denied any connection between his *Ballet Mécanique* and things industrial, let alone politically proletarian: “It had nothing whatsoever to do with the actual description of factories, machinery—and if this has been misunderstood by others, Honegger, Mossolov included, it is not my fault. . . . It is true that at the time I did consider machines very beautiful, and I had even advised aesthetes to have a good look at them; still, I repeat again and again, even frantically, I had no idea (as did Honegger and Mossolov, for example) of *copying* a machine directly down into music, so to speak.”<sup>5</sup> He nevertheless found himself implicated, in the eyes of Wyndham Lewis, in a utopic vision of musicalized factories on the basis of a remarks made by his friend Ezra Pound: “It is possible to imagine

music being taken out of the chamber, and entering social and industrial life so completely and so splendidly that the whole clamor of a great factory will be rhythmically regulated, and the workers work, not to a deafening din, but to a superb symphony. The factory manager would be a musical conductor on an immense scale, and each artisan would be an instrumentalist. You think perhaps that George Antheil and I are foolish visionaries.”<sup>6</sup>

Antheil may have had no desire to copy a machine directly into music, but he was interested in the music made with the copying machine known as the phonograph. It had the advantage of being modern and, at the same time, more versatile in its connotations than other machines. Antheil had plans to use phonographs in *Cyclops*, his unrealized opera based on the episode in James Joyce’s *Ulysses* and animated by a huge mechanical ecstasy: “I saw thousands of electric lamps strung in the heavens and illuminated from one switchboard to create God; vast cinemas projected a new dimension in the skies; music machines large enough to vibrate whole cities.”<sup>7</sup> Unfortunately, its main impact at the time was a three-page extract of a piece called “Mr. Bloom and the Cyclops” in a 1925 issue of *This Quarter*. The score lists the following instrumentation: voice (from electric amplifier), chorus (from electric amplifier), sixteen mechanical pianos operated from a master roll and controlled from a switchboard, eight xylophones controlled from a switchboard, amplified gramophones containing all of the ordinary orchestral instruments registered on gramophone record and amplified and controlled from a switchboard, four bass drums, four electric buzzers, four pieces of steel, an electric motor (wood attachment), and an electric motor (steel attachment). Antheil, confident in the fidelity of gramophones, explained in a letter to Pound how the “phoneygraphs” will create a revelation of artifice:

The opera progresses. Orchestras and hugely augmented phoneygraphs both play simultaneously THE SAME THING . . . the orchestra stops, and one discovers the xxxxxxxxx phoneygraph HAS BEEN PLAYING SOMETHING ELSE. All of the combinations to make your belly give up. Colossal orchestra for a change . . . mostly mechanical. Like Ulysses . . . encyclopedic. Entirely different from Bal. MeK. Must come down in June to show you. After the Bal& Meca.<sup>8</sup>

In the second decade of the century composers began in earnest their experiments with mechanical musics (reproducing pianos and organs, automata, clockwork musics, and the like), and phonographs, and by the late 1920s such experiments were not uncommon. Phonographs were used as secondary aids to music, such as Nikolai Kulbin’s suggestion that “the improvisation of free tones may for the time being be taken down on Gramophone records” as a means of notation, or Cowell’s use of the phonograph to demonstrate complex rhythmical patterns.<sup>9</sup> A more active approach could be found in Kurt Weill’s “Tango-Angèle” (1927), in which a gramophone recording acted as a soloist: “I proposed achieving the [climactic] effect through a completely new sound form, and for me this was the gramophone, which enters for the first time as a soloist while the orchestra is silent, and whose melody is countered by the singers.”<sup>10</sup> Artistic experiments proper sought to manipulate musical sound through the mechanism of the phonograph in recording or playback or to directly manipulate the recording itself. Darius Milhaud reportedly conducted experiments as early as 1922, and there were many more by the time Varèse partook of his phonographic studies in 1936. One writer described the gramophone experiments presented in Berlin by Paul Hindemith and Ernest Toch in 1930: “This made-for-phonograph-record-music was accomplished by superimposing various phonograph recordings and live musical performances, by employing variations in speed, pitch height and acoustic timbre which are not possible in real performance. The result was an original music which can only be recreated by means of the gramophone apparatus.”<sup>11</sup> László Moholy-Nagy writing in 1933 described the experiments in terms of the voice:

The composers Hindemith and Toch have achieved some startling results by the application of the mechanical process of the phonograph. Thus, with the help of mechanical procedures, Hindemith transposed a vocal composition four octaves lower for one part, and four octaves higher for another. By increasing the speed with which he recorded a fugue made up of vocal parts only, Toch was able to produce an as yet unrecognized aspect of the human voice. Toch did the same with a choir composed of many voices, when he recorded a text that is simple but hard to pronounce (“Popokatepetl lieght nicht in Afrika, sondern in Mexico”) at increasingly greater speeds; at high speed the recording

gave back a perhaps never before suspected aspect of the human voice, one never even heard before, impossible to produce in any other way. This is the principle of sound-time expansion.<sup>12</sup>

Most composers were interested in the manipulation of musical sounds for musical purposes; some sought to import extramusical sound for musical purposes. One such person was Russian-American composer Nicolai Lopatnikoff (1903–1976). In 1931, while Lopatnikoff was still living in Germany, Henry Cowell praised him as the composer “writing for mechanical instruments in the most penetrating fashion.” Cowell believed Lopatnikoff was alone among composers because he wrote music for recording instruments that could only be performed mechanically, being “impossibly fast, [or with] combinations impractical for the hands of players, no matter how many should take part in a performance.”<sup>13</sup> Cowell also noted Lopatnikoff’s “plans to make phonograph records of various factory and street noises, synchronizing and amplifying them as a percussion background for music written for keyboard recordings.”<sup>14</sup> (It is significant that percussion, once again, was to act as the musical intermediary with noise.)

Turntable phonographics were concurrent with similar experiments using sound recorded on film. With both sound could be sped up and slowed down, reversed and amplified, but the advantages of film included the way sound could be edited and generated through “drawn sound” techniques (not to mention the advantages of inhabiting the realm of moving pictures).<sup>15</sup> These techniques proved to be well suited to integrating music in an innovative manner into different cinematic contexts. Maurice Jaubert used sound track reversal, splicing, and variable-speed-turntable methods in a number of his film scores, most notably for Vigo’s *Zéro de conduite* (1933), and, as Richard Schmidt James put it, “He might well have taken part in the development of *musique concrète*, itself, if the war that temporarily stifled his art had not also taken his life in June of 1940.”<sup>16</sup> Arthur Hoérée, at times in collaboration with Arthur Honegger, used reversible sound and collage techniques for his film scores, as well as drawn-sound techniques in which shapes photographed, drawn, and painted on the sound track were used to generate an early form of electronically synthesized sound and music. Drawn sound enabled him to visualize the long-standing periodic-aperiodic distinction between *musical sound* and *noise*, as discussed previously, and to entertain the ambiguity involved: “The sound

written like this, you see [indicates a sine curve with his hand], by a sinusoidal curve is a musical sound but noise is less symmetrical. When it is written like this [indicates a somewhat irregular sine curve], it is somewhat musical and somewhat non-musical, it is a mixture.”<sup>17</sup>

This class of phonographic experiments, where music and cinema met, point out a certain irony about the *intonarumori*, the instruments that Luigi Russolo devised to play his art of noises. For all the claims of Futurism, they are constructed as a composite of some very old instrumental technologies; the most modern element lurking within their design was the crank, which summoned up the rotary motion of Helmholtz’s clinical sirens. He might have exploited the phonograph had he actually been interested in bringing sounds of the world into musical or artistic practice. As it was, phonography was to haunt him in one form or another for years and finally spell the end of his career. After assiduously avoiding imitation in the early development of his *art of noises*, during the 1920s he designed a new class of instruments premised, in part, on a capacity for imitation. The three different types of *rumorarmonio*, based on the *intonarumori*, had the capacity to imitate wind, water, animals, and the like, and thus, Russolo thought, they could be marketed for use in silent film accompaniment. One was installed in the late 1920s in the Studio 28 in Paris, where it was damaged during the ransacking of the theater by right-wing groups following the showing of Luis Buñuel’s *L’Age d’or* (3 December 1930). Russolo’s hopes for commercial success would be dashed, since they were based on trying to design a version of the sound-effects organs already used to accompany silent films,<sup>18</sup> at a time when sound film technology itself would soon eliminate the need for either. In short, the ascent of sound film signaled the descent of Russolo’s musical career. The filmmaker Eugene Deslaw was curiously positioned on either side of Russolo’s demise. In 1930 he announced that his film *Towards the Robots* would be accompanied by Russolo’s “rumharmonium.”<sup>19</sup> The very next year he made a sound film and submitted a composer to an exercise using its material: “I had ten sounds extracted from my film projected to a friend who is a composer. He only recognized and identified three. He thought the others were the result of unknown and new musical instruments. And there were no limits to his enthusiasm after the projection. ‘What marvelous perspectives for the art of tomorrow.’ I can still hear his phrase in my ears.”<sup>20</sup> Deslaw left this composer unnamed. It would be a surprise if it had been Russolo; if it was, then

he clearly chose not to translate his enthusiasm into instrumental design and musical practice.

Carol-Bérard (1881–1942) was a French composer and theorist who composed a noisy pre-Russolo *Symphonie des forces mécaniques* (Symphony of Mechanical Forces) (1908) using motors, electric bells, whistles, and sirens as well as *L'Aéroplane sur la ville* (n.d.) composed with phonograph recordings of noises. In 1929 he wrote an article criticizing Russolo for not following up on his initial breakthrough: “The noisemakers were dedicated in purpose to the music of the future, but their realization fell far short of the goal. For all the hammers, the exploders, the thunderers, the whistlers, the rustlers, the gurglers, the crashers, the shrillers, and the sniffers of the ‘futurist’ orchestra obey the same laws of execution as the common violins, violoncellos, flutes, oboes, and other instruments in the traditional orchestra. No matter how new the acoustic effects they create, they are always in need of performers.”<sup>21</sup> Still, he believed that “noise . . . holds the secret of the future” for music and that the secret could be unlocked “if we take a definite noise, capture and associate it with other noises according to a definite design; an act of composition is [thus] performed and a work of art authentically created.”<sup>22</sup>

Why, and I have been asking this for fifteen years, are phonograph records not taken of noises such as those of a city at work, at play, even asleep? Of forests, whose utterance varies according to their trees—a grove of pines in the Mediterranean mistral has a murmur unlike the rustle of poplars in a breeze from the Loire—? Of the tumult of the crowds, a factory in action, a moving train, a railway terminal, engines, showers, cries, rumblings? . . . If noises were registered, they could be grouped, associated and carefully combined as are the timbres of various instruments in the routine orchestra, although with a different technique. . . . We could then create symphonies of noise that would be grateful to the ear. There are plenty of symphonies today which are anything but agreeable, while at large and unregistered are a myriad of delightful sounds—the voices of the waves and trees, the moving cry of a sailing vessel’s rigging, an airplane gliding down, the nocturnal choruses of frogs around a pool.<sup>23</sup>

He was willing to admit phonographic sounds directly into music without either intimating them through timbral effect, as had Russolo, or manipu-

lating them beyond recognition, as *musique concrète* would do twenty years later. He nevertheless avoided venturing too far from conventional musical signification: “Once registered, naturally no significance other than that of sound can attach to individual noises. They will cease to be the creaking of a bus axle, the rumbling of a cauldron, the roaring of a cataract. They will have become merely noise factors, as saxophones, clarinets, violas or oboes are factors of musical sound.”<sup>24</sup> These sounds may not need performers to be played, such was his criticism of Russolo’s *intonarumori*, but he did not want them to depart materially from the identity of sounds trafficked by conventional musical instruments.

There were others who imagined artistic uses of phonographic and sightless cinematic recording that would incorporate extramusical sounds to such an extent that the result might not be music. In the early 1920s Moholy-Nagy, as he began to propose experimentation with sound film, effectively called for an autonomous phonographic art because he stated that sound should initially stand on its own before being integrated with visual images.<sup>25</sup> In Russia, Dziga Vertov, as we see below, attempted a phonographic art as early as 1916, an impetus that led him into film itself and into his innovations with film sound; Serge Eisenstein argued for an asynchronous sonic counterpart to his sophisticated notions of visual montage; and Grigori Alexandrov attempted to “play with sound” in his ill-fated film *Romance Sentimentale*. In France, Raymond Lyon suggested in 1930 that one need not be restricted by the aural primacy of music and the voice; instead, by using recorded sound on film stock, with which one could “impose and direct the deformations of phonographic reproductions,” a person could “splice phonographic scenes, from whence the phonograph gains access to all the techniques of representing associations of ideas, symbols, and memories employed in the cinema.”<sup>26</sup> In Germany during the Weimar republic, Hans Flesch, the director of the *Berlin Radio Hour*, promoted the artistic possibilities of using sound film in the context of *Hörspiel* production. He was responsible for commissioning Walter Ruttmann’s 1928 audio montage *Wochenende* (Weekend), which Hans Richter called “among the outstanding experiments in sound ever made. There was no picture, just sound (which was broadcast). It was the story of a weekend, from the moment the train leaves the city until the whispering lovers are separated by the approaching, home-struggling crowd. It was a symphony of sound, speech-fragments and silence of women into a poem.”<sup>27</sup>