Mechanical Sound

Technology, Culture, and Public Problems of Noise in the Twentieth Century

Karin Bijsterveld

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Listening to Technology

A Persistent Issue

In 1875, the British hygienist Sir Benjamin Ward Richardson described an imaginary city of health named *Hygeia*. "The streets of our city, though sufficiently filled with busy people," he said, "are comparatively silent." Beneath each of the main boulevards "is a subway, a railway along which the heavy traffic of the city is carried on. . . . The streets of the city are paved throughout in the same material. As yet wood pavement set in asphalt has been found the best. It is noiseless, cleanly, and durable. . . . The subways relieve the heavy traffic, and the factories are all at short distances from the town, except those in which the work that is carried on is silent and free from nuisance" (Richardson 1875: 950–951). Needless to say, no such city existed at that time, and still today there is no city that is so silent that the discussion of noise has disappeared from public life—even though we have asphalt, subways, and industrial parks.

Complaints about noise have been recorded throughout history. Yet beginning in the last quarter of the nineteenth century, such complaints became increasingly focused on new technologies: on the sounds of factories, trains, steam tramways, automobiles, and gramophones. In essays and pamphlets, lively descriptions of all kinds of noise were given. By the early 1900s, antinoise

leagues had been formed all over Western Europe and North America, organizing antinoise campaigns, antinoise conferences, antinoise exhibitions, and "silence weeks." The ensuing public debate about noise has never died down. What made noise such a persistent issue on the public agenda? How did sounds become the subject matter of public problems, that is, of problems pushed into arenas of public action? And what rendered these problems of noise so hard to tackle?

Today's popular publications, policy documents, and academic reflections on noise provide three answers to the question of why noise is such a persistent problem. The most common response relates to economic and population growth. This growth has led to a world inhabited by ever more people who are ever more mobile and possess ever more noisy equipment. The sheer increase in the quantity of sound sources has left all the improvements in noise control inaudible, as it were. A second response considers the specific characteristics of hearing a major factor. Unlike our eyes, so this argument begins, we cannot close our ears. We continuously need our ears for information and communication, so sound, even though inherently transient, is always around. Hearing has a highly subjective side to it: sounds that annoy some people are music to the ears of others. Since noise is widely defined as "unwanted sound," the subjectivity inherent in this definition complicates legal intervention when rival definitions of noise arise. Finally, there is the so-called visual regime of Western culture: in the West's hierarchy of the senses, the eye dominates the ear. This makes sound into a neglected issue. Even worse, our culture is deadly afraid of silence and of the passiveness associated with the absence of sound. Those who try to explain the difficulty of managing public problems of noise, then, tend to invoke arguments that refer to our culture's interest in, if not its obsession with, economic growth, to the innate characteristics of hearing, and to the apparent sensory priorities of our culture.

To be sure, many of these answers make sense. They refer to basic dilemmas and features of Western society. Yet they suggest a degree of continuity in explanations for the difficulties of dealing with noise over time that conflicts with even a superficial encounter with our sonic past. What, for one, are we to make of the observation that in the 1930s the problem of noise was predomi-

nantly phrased as a "honking problem," whereas this problem has now virtually vanished from the public agenda even though we still highly value automobiles as a means of transportation? And what do we do with the finding that the subjectivity of sound perception we now believe in had a quite different status in 1875 and may not have hampered the approach to noise in the same way as it does today? Such changes in the definition of the public problem of noise over time imply a succession of *different* public problems of noise and make ahistorical explanations for the persistence of noise on the public agenda less powerful.

A comparison with stench may further enhance our awareness of the significance of the relation between the definitions of problems and their context. In the nineteenth century, the public nuisance of stench was a problem of sense and sensibility that came to be dealt with in a far more comprehensive way than noise has ever been. The identification of stench as the seed of contagious and dangerous disease by an elite that managed to intervene deeply in private households led to its confinement. It is no coincidence that the strategies Richardson proposed to abate city noise were perfectly analogous to the ones he thought fit for getting rid of "the foul sight and smell of unwholesome garbage" (Richardson 1875: 950). The subways for heavy traffic resembled the sewage-subways for washing away mud, and putting industry at a distance was like compiling trash at the margins of the city. Yet the contexts for noise abatement happened to be rather distinct from the ones in which stench came to be tackled.

In order to be tackled thoroughly, public problems need convincing drama, robust definitions, and empowering coalitions, both within and, increasingly, across nation-states. The problem of noise, however, has never, or only temporarily, met these requirements. Instead, this book argues that the rise of new machine sounds and the process of stacking various forms of noise legislation on one another over time created a *paradox of control*. Experts and politicians increasingly promised to control noise by measuring and maximizing sound levels. Yet they defined some problems, such as neighborly noise, as difficult to capture in quantitative terms, and left it up to citizens to talk their neighbors into tranquil behavior, while wrapping other issues, such as aircraft noise, in formulas beyond citizens' reach. Citizens have thereby been made responsible for dealing with the most slippery forms of noise abatement and distanced from the most

tangible ones. This has not exactly helped to wipe noise from the public agenda. The *spatial* character of many of the interventions has similarly contributed to the persistence of public problems of noise. It is remarkable that sound, crossing the borders between neighbors, cities, and nations so easily, has often been handled spatially, for instance, by imposing zones, canalizing traffic, and drawing noise maps. We have been trying to create islands of silence, yet have left a sea of sound to be fiercely discussed.

This book explains how we ended up like this. It focuses on four crucial episodes in the Western history of noise between the late nineteenth and the late twentieth century: public discussions of industrial noise, of city traffic noise, of neighborly noise of gramophones and radios, and of aircraft noise. A fifth chapter highlights the celebration of noise in the avant-garde music of the interwar period, and thus serves as a *counterpoint* to the other chapters. It both illustrates how such reverence embodied the positive connotations of mechanical sound that antinoise activists had to cope with, and shows how the introduction of machines in music re-enacted the issue of who was to control sound. The remaining chapters explore the decades immediately succeeding the rise of the public debate over the roar of new, or recently ubiquitous, machines. In doing so, this book centers on society's struggle and occasional success with controlling mechanical sounds. It also underscores how the strategies for solving earlier noise problems—embedded in law, scholarship, scientific instruments, and techniques—recurred in and often structured the approaches to newer ones, which at times created new problems. How can we account for such continuities? And what can we learn from the fate of former noise abatement strategies when thinking about contemporary problems of noise? But let me first unpack and underpin some of the statements above.

"We Can't Stand It Anymore": Public Problems of Noise

Noise is a popular topic among today's Dutch newspaper columnists. One of them mocks men who come home from work at five o'clock only to mow the lawn and trim the hedge with as many noisy machines as possible (Mulder 2000).

Another columnist regrets that even in the most expensive hotels one tends to hear the neighbors, except if one has the air conditioning on (Lagendijk 1998). Others lament over the boom box of some carpenters at work a few homes down the block, over the noise created by the seemingly eternal remodeling project that is going on next door, or over the everyday noise of the buses and trucks down the street. The sound of aircraft traffic, mobile phones, restaurant music, and the steam explosions of cappuccino machines—it is just too much (Vreeken 2000; van't Hek 2000; van der Laan 1999; Abrahams 2000; Ritsema 1995; Pessers 1997). People cannot stand it anymore: the noise of compressors, the radio at work, the music in the supermarket—the absence of silence (van Delft 1995; Campert 1997; Doves 2004; van Renssen 2002). Many columnists emphasize the omnipresent sounds of today's technology: the whirring of the video tape, the hiss of the television standing by, the hum of the refrigerator, the buzz of the electricity gauge, the click of the heating pipe, and the roar of the fan (Blankesteijn 1998).

The subject of noise is so common in these occasional pieces in Dutch newspapers and magazines that one can speak of a distinct genre. The columnists respond to the politics of the day, or aim to raise public consciousness. In many ways, perhaps, their choice to discuss this topic is an act of distinguishing themselves from the ordinary people. *We,* they seem to be saying, are not like all those men who come home from work and have nothing else to do than start making noise; we are not the neighbors who endlessly remodel their homes; nor are we the owners of boom boxes. Others may not notice, they suggest, but we certainly *hear* all the sounds that others somehow feel the need to generate. Tellingly, many of these columnists discuss the topic of noise with a sense of humor, a touch of self-irony, or just enough feeling for rhythm to allow the reader who does not sympathize with their complaint to at least admire their style of complaining.

If the sounds that prompted these Dutch columnists' reflections are rather new, complaints about noise in the popular press are not. The World Soundscape Project, a research project housed at Simon Fraser University (Vancouver, Canada) directed toward documenting a history of the world's changing sonic

environment, has examined how often "noise" has shown up in the news in the past in a study based on a survey of sixty-five magazines published in North America between 1892 and 1974. Until 1926 there were usually fewer than five entries on noise each year. The titles of many of these early articles refer to city and street noise. In the second half of the twenties the number of articles featuring noise began to increase, peaking at twenty-one in 1930. After 1930, the annual number of popular articles on noise never exceeded thirteen, until 1968, when a second peak occurred. In 1974, the last year of the study, the situation is back to "normal." [1] Most likely, the total number of popular articles on noise has even been higher. A campaign against city noise undertaken by the New York Noise Abatement Commission between 1929 and 1930 was accompanied by at least "130 newspaper articles throughout the United States and Europe commenting on this project" (Dembe 1996: 201). In 1962, "one day's press cuttings" by the British Noise Abatement Society produced 151 items. Among the headings focusing on one type of noise, aircraft noise was the most dominant (Some Headlines 1962: 22–24).

There is clearly a correlation between articles about noise and particular antinoise campaigns or activities. This suggests that heightened noise abatement activity indeed fuels public debates about the issue. However, it would be wrong to suggest that there is a one-to-one relationship between the level of attention given to noise in newspapers and magazines and citizens' complaints about the nuisance of everyday noise. The findings of a study on self-reported nuisance conducted by the Dutch National Data Agency in 1997 are illustrative. It found that 27 percent of respondents said they were disturbed by traffic noise, 21 percent by neighborly noise, 19 percent by aircraft noise, and 11 percent by industrial noise (de Jong et al. 2000: 66). The same year, the Dutch Noise Abatement Foundation published a report on the number of times the issue of noise appeared in Dutch newspapers between May and October 1997. Aircraft noise topped the list with 2,663 news items, whereas road traffic was mentioned in only 293 items, neighborly noise in 240, leisure-related noise in 237, noise related to industry in 231, and noise related to train traffic in 193 (Aantal 1997: 3). These data suggest that the nature and level of attention paid to the issue in

the press does not automatically correspond with how the average individual evaluates particular noise problems. There are over ten times as many publications on aircraft noise than on the noise of neighbors, but the inconveniences caused by the people next door are higher on the list of nuisances reported by the people interviewed.

Such findings make clear why *public* problems should be distinguished from *private* ones. In his study on the culture of public problems, Joseph Gusfield claimed that not all problems "necessarily become public ones" in the sense that they "become matters of conflict or controversy in the arenas of public action" (Gusfield 1981: 5). As an example, he refers to people's disappointment in friendships. Even if feelings of disappointment may be very painful on an individual level, so far no public agency has been set up to solve this problem. Perceptions of these sorts of problems can change in the long run, however. Teasing individual kids at school has probably been a problem ever since schools have been around. Only recently, however, have Dutch schools been made formally responsible for the problem after the assistant secretary of education issued a regulation forcing schools to take action against it. In Gusfield's terminology, the Dutch assistant secretary is now one of the "owners" of the *public* problem of teasing, whereas the school is charged with solving it. The discrepancies in the hierarchy of noise problems—between the level of attention for them in the press and the ways in which people experience them—is an intriguing indication of how the character of problems changes when problems are transformed from private into public ones, or when they change from one public arena to another.

Public problems of noise are currently "owned" by hundreds of organizations, institutions, and industries created with the purpose of abating, regulating, or studying noise. Almost every country in Western Europe has at least one nationally operating noise abatement organization. These are, for example, the Ligue Française contre le Bruit (French Anti-Noise League), the Nederlandse Stichting Geluidshinder (Dutch Noise Nuisance Foundation), the British Noise Abatement Society, and the Deutscher Arbeitsring für Lärmbekämpfung (German Working Group for Noise Abatement). Most of these agencies were founded between the late 1950s and 1970s, but many had forerunners that date

back to the first decades of the twentieth century. Present-day European organizations are usually members of the Association Internationale Contre le Bruit (International Association Against Noise), established in 1959 (Lehmann 1964: 11). Outside Europe, noise abatement organizations are found in many countries including the United States, Canada, Israel, and Argentina. And often cities and even neighborhoods have their own antinoise groups, such as those found in Berlin, Washington, and New York (including the Bronx), to mention just a few examples.

In addition to agencies that address different kinds of noise problems, there are many that focus on particular types of sound. The most common ones are those that fight the noise produced by a specific airport.[2] Others, such as Pipedown International in the United Kingdom, deal with background music. Violently sounding acronyms are quite common. BAM is the acronym of the Dutch lobbying group against Muzak; BLAST, located in Santa Barbara, California, stands for Ban Leafblowers and Save our Town, and HORN (Mt. Tabor, New Jersey) for Halt Outrageous Railroad Noise.[3] And there has been an annual World Noise Awareness Day since 1996. At this and other occasions, organizations like the League for the Hard of Hearing frequently ask national governments and international bodies to take public action against noise. Indeed, countless governmental committees, ministerial departments, national health councils, and standardization organizations have entered the realm of regulating noise, defining the noise problem and distributing responsibilities on their own account. So have their international counterparts, including the European Union and the World Health Organization. These agencies seek expert advice from scholarly organizations for acoustics, noise control engineering, and audiology, or from countless acoustic consultants.[4]

This overwhelming and still expanding network of initiatives for noise abatement and control makes clear that noise is on the minds and in the hands of many. Almost nowhere, however, has the problem of noise been removed from the public agenda. This may explain the noisy names of some of the pressure groups. What has gone wrong? Why is noise an enduring if not a permanent public problem?

The Putative Difficulties of Dealing with Noise

Today, the difficulty of tackling the public problem of noise is most commonly attributed to three causes: the economic prerogative of growth that conflicts with a quiet lifestyle, the subjectivity of hearing, and the intrinsic character of Western culture. In the first line of reasoning, noise involves a hard to solve problem because it results from a fundamental conflict between economic progress, population growth, and increasing mobility on the one hand, and concerns of public health and the environment on the other. As the journalists Peter Müller and Marcus von Schmude noted in the German weekly *Die Zeit,* there is much ado about noise-induced health problems, yet the millions of people "who complain about traffic noise take the car nonetheless (2001: 9)." One Dutch journalist portrayed these millions as victims. Their decent lives, she stressed, have been subordinated to the interests of the "supreme" transport industry, "the God of the twentieth century" (Pessers 1997). The basic opposition is the same: the public's well-being is being exchanged for mobility.

In 1996, the European *Green Paper on Future Noise Policy* made a similar claim in less accusatory prose and more detail. It stated that since 1970 "the noise from individual cars has been reduced by 85% . . . and the noise from lorries by 90%. . . . However data covering the past 15 years do not show significant improvements in exposure to environmental noise. . . . The growth and spread of traffic in space and time and the development of leisure activities and tourism have partly offset the technological improvements." [5] According to Egon Dietz, a staff member of the Dutch National Data Agency, the Dutch government spent 2.8 billion guilders on noise abatement between 1979 and 1993. During the same period, however, the percentage of citizens who complained about noise hardly decreased at all. The growing population, rising population density, increasing mobility, and the widespread possession of audio sets, Dietz stresses, have all contributed to the complexity of the noise problem (Dietz 1995: 20).

The second type of argument provides reasons for the enduring trouble of noise by referring to the characteristics of hearing. As the noise historian Hillel Schwartz has shown, the baseline to "the litany of twentieth-century antinoise

polemics is the claim that human hearing is constant, involuntary, and nearly impossible to shut off" (2003: 487). These features explain, at least to many people writing about noise, the difficulty of dealing with noise problems. Our sense of hearing needs to function constantly because it provides us with crucial information. "It is easy to imagine how dangerous a completely silent car would be," an architect proclaimed in 1967. "What, in fact, we are combating is not so much noise as such . . . as its dual character. We are trying to abolish noises that are harmful to human beings, but not to get rid of all noises, since this would deprive man of a vital source of information" (Stramentov 1967: 8).

What's more, the perception of sound is now considered to be highly subjective. Psychologists argue that whether individuals are annoyed by a specific sound is not only dependent on the characteristics of that sound, such as its loudness, frequency, or periodicity; equally relevant are one's physiological sound sensitivity and compulsivity, as well as the social context and perceived control (Hell et al. 1993: 247). Dietz believes that this subjectivity of sound perception accounts for the persistency of discontent (1995: 21). Or as *Die Zeit* journalists put it, "Noise separates beergarden-friends from tranquility-lovers, techno-fans from visitors of chamber music concerts, churchgoers from late risers. . . . And that's why noise abatement is hard" (Müller and Von Schmude 2001: 9). The social scientist Ronald de Jong considers the challenge most problematic for governments. For how can government authorities handle noise nuisance if, as noise experts claim, this annoyance varies "over time rather quickly, under the influence of mood, motivation, [and] situation?" "They can hardly be expected to change standards every five years or so, or to use different standards for different areas" (de Jong 1990: 107–108).

The third case for the persistency of the noise problem—Western culture's fear of silence and its visual character—seems to be the most all encompassing. As the musicologist Bruce MacLeod remarked, "our society seems to be deathly afraid of silence, even though we rarely experience silence in even an approximately pure form." And it is this general fear of silence that explains the omnipresence of background music (MacLeod 1979: 28). The well known example of British BBC accountants who had brand new double-glazed win-

dows, noiseless air-conditioning and silent personal computers installed in their offices is illustrative. Although all the changes were effective in abating noise, the BBC employees felt uncomfortable. They reported feeling lonely and of being afraid that everyone was listening in on their phone calls. This made the BBC decide to buy an expensive noise machine to drive out the silence by producing a continuous and unintelligible hum (Lawaaimachine 1999).

Like MacLeod, the Dutch philosopher Ton Lemaire explains these kinds of responses from a general fear of silence. People are used to surroundings "in which all sounds get produced by humans or by human means and machines" (Lemaire 1995: 107). The right to silence is therefore extremely difficult to protect. Unlike realizing smoke-free spaces, the recognition of the right to quietude would require a basic change in social structure. In our society, driven as it is "by utility, action and the wish to control," listening is considered to be "too passive" (Lemaire 1995: 108). Or, as a journalist puts it on the opinion page of the *Independent:* "Unfortunately, our culture has linked loudness with enjoyment" (Bronzaft 2002: 3).

A variation on the character-of-culture-theme is the supposition that our culture is a visual one, whereas in the past hearing had a higher status. "The ancient Greeks," as Raymond Murray Schafer, initiator of the World Soundscape Project, claims, "were much better listeners than today's architects and acoustical engineers" (Schafer 1994: 13). To his indignation, even the acousticians illustrate their work with slides and charts rather than with sounds. "Yet it is precisely these people who are placed in charge of planning the acoustic changes of the modern world" (Schafer 1994/1977: 128). Our culture, Schafer's colleague Barry Truax recapitulates, tends "to trade its ears for its eyes" (Truax 1978: v).

Schafer finds hope for a better future in Marshall McLuhan's 1962 analysis of a receding print culture: "As our age translates itself back into the oral and auditory modes because of the electronic pressure of simultaneity, we become sharply aware of the uncritical acceptance of visual metaphors and models by many past centuries" (McLuhan, quoted by Schafer 1994/1977: 128). For Schafer, the implications of McLuhan's view are that "as we increase our dependence on acoustic signals, we become out of sheer necessity more conscious of our

general sonic environment" (Schafer 1994: 115). Schafer believes that Western culture originally relied on the "inward" drawing ear and views the subsequent rise in the primacy of the "outward" looking eye as a step backward (Schafer 1967: 2). Yet, he continues to believe that our culture may return to giving the ear primacy in the near future, and, if so, the quest for quietude has a far better chance of being successful.

In *The Audible Past,* Jonathan Sterne intelligently comments on this story line, which he calls the "audiovisual litany." In this litany, which predominates in the literature on the senses, hearing is treated as the better sense since it is the "inner" one. While seeing creates distance, focuses on the superficial, and calls on the intellect, hearing surrounds us with sounds, penetrates deep into the heart of the matter, and is inclined to the affective. The religious overtones of this view are obvious, with the eye (the dead letter) in the role of the fallen angel and the ear (the living spirit) as our future paradise. Yet why would the ear be a better sense than the eye? And why should the history of the senses be "a zero-sum game, where the dominance of one sense by necessity leads to the decline of another sense" (Sterne 2003: 16)? The cultural geographer Paul Rodaway views the issue similarly. The new auditory mode is not "a revival of something long since lost, but rather yet another redefinition of the role of the sense of hearing . . . in geographical and social experience" (Rodaway 1994: 114). And as contemporary ethnographers have stressed, today's audio technologies help many people in the auditory control and aestheticization of a meaningful everyday life (DeNora 2000; Bull 2000; Bull and Back 2003).

The idea that our visual culture has atrophied the ear and keeps us from careful listening is still around, however. In some versions, the dominance of seeing and the way it separates subject and object even leads to an aggressiveness that "feeds" noise (Berendt 1985: 17). The key to this line of argument is that we will keep making noise as long as the visual realm continues to prevail in our culture.

Most of these arguments rightly point out various issues that, taken together, make noise problems hard to tackle. Many will only agree that most people in Western societies want economic growth and mobility, that our sense

of hearing will always be subjective to some degree, and that silence indeed refers to the absence of life. Many of these arguments, however, also have a decidedly historical and contextual dimension to them, and their validity has changed over time and from place to place. If today, economic growth and increasing mobility, and hence more noise, are seen as belonging to one and the same process, a century ago, the Austrian ethnologist Michael Haberlandt consciously differentiated between the sounds of work and of mobility. He could tolerate "the resonance of work," such as the "song of the hammer, the shriek of the saw, the beat and clatter of the workshop, the stamping of machines," remarking that "we live on that money, don't we?" Yet he lamented the "deafening, enraging noise of the alley," which he described as "a mix of the rattle of carriages, of ringing and whistling, of the barking of dogs and the ding dong of bells with a hundred indescribable overtones that submerge in the uproar" (Haberlandt 1900: 178). Similarly, how hearing is understood to be subjective has changed over time, as have its connotations. Therefore, we should historicize the explanatory force of this subjectivity of hearing. Moreover, the claim that our visual culture is exclusively accountable for noise overlooks the fact that in the early twentieth century, railroad stations were portrayed as having become less noisy *after* the introduction of visual signals that replaced aural ones. Even the argument focusing on the Western fear of silence has its problems. For if we explain noise from a dislike of silence, tautology is just around the corner.

In referring to the ways that noise problems have been defined in the past, such as Haberlandt's lament, I offer a prelude to what will be taken up in subsequent chapters. For the moment, however, I want to show the benefits of using an historical approach for understanding the persistence of public problems about noise by comparing it with the history of stench. This will be the topic of the next section.

Noise Compared to Stench

In *Village Bells: Sound and Meaning in the Nineteenth-century French Countryside,* the historian Alain Corbin notes that in the nineteenth century, "hostility to

noise . . . was much less discernible than the anxiety aroused by unpleasant odors (1999/1994: 299)." How that came about is the topic of his other famous book, *The Foul and the Fragrant: Odor and the French Social Imagination* (1986/1982).

The years between 1750 and 1880, Corbin argues, were crucial in the deodorization of Western Europe in general, and of France in particular. Intriguingly, those decisive years in the creation of hygiene predated the scientific contributions of Pasteur on bacteria as the cause of disease. From the mid-eighteenth century onward, Corbin claims, the stench of excrement, mud, and cadavers increasingly created panic. This happened first among the social elite, after which it gradually spread to broader segments of the population. Before that time, most people had considered stench as an inevitable aspect of life, a nuisance that was part and parcel of slaughterers', skinners', and tanners' work. Bodily odor was even a sign of vitality and sexual strength. Yet, in the second half of the eighteenth century, medical experts increasingly stressed that stench could do enormous harm to people's health through its miasmas, the infectious substances of the exhalations of body and soil. Smell thus came to be defined as both the symptom *and* the cause of infectious disease and epidemics, the harbinger of death and decay. Also new was a concerted effort by physicians and hygienists to systematize the study of odor. They started to collect airs and gasses, identify their composition and effects, and use their noses to point out the dangers of the offensive smell of rot and decay.

Their work signified a collective refinement in the sensitivity to smell and a growing intolerance to stench. Although they certainly played an important part in the distribution of ideas, hygienists and physicians merely translated the sensitivity of their contemporaries into research. The elite lived in constant metaphysical fear, continuously alert to the processes of dissolution within the body. It was no coincidence that stench came to be associated with the depths of hell. Danger was everywhere, but particularly in the humid holes of the soil, the steam of mud and moors, in the killing stench and fume of city cesspools, and in the repugnant smell of slaughterhouses. Moreover, odor came to be invested with social imagery that made the nose an instrument of social politics.

Subtle changes in policies, Corbin stressed, show how the sense of smell increasingly played a role in the refinement of societal boundaries and practices.

At first, remedies against dangerous smell focused on ways to de-poison the air, and to create flavors and perfumes that restored the balance of good and bad airs. Experts proclaimed that strong, bestial odors such as musk and amber were best suited for the abatement of persistent stench. As soon as the idea that filth obstructed the pores had been accepted and the first steps of maintaining bodily hygiene had been taken, however, the attitude of the elite toward musk and amber changed. The use of strong perfumes increasingly incurred the suspicion of a lack of hygiene. The growing sensitivity to bodily odors made both lighter, flowerlike perfumes and the cultivation of one's sensitivity to smell more popular. The social elite were also increasingly astonished by the tolerance of the common man for stench. The more sensitive one's nose, the more refined one's nature—a refinement, the elite noted, that workers did not possess.

Similarly, the attitude toward the masses shifted. Initially, a general distrust of the emanations of crowds existed, particularly of those packed up in closed spaces, such as in hospitals, prisons, barracks, ships, churches, and theaters. Since humidity was considered dangerous and movement purifying, numerous ventilation systems for crowded spaces were invented, which was further stimulated by a refinement of the analysis of air that showed a decrease of oxygen in closed spaces with lots of people. In the course of the nineteenth century, however, not a dislike of the fumes of undifferentiated masses, but a dislike of the smell of the poor began to predominate. Pauperism and stench were seen as one and the same issue. The elite distinguished itself from the rest of the population on the basis of smell, which underlined the danger of contagion and justified the need to discipline and subject the lower classes. Therefore, after the citizenry had deodorized its own bodies and houses, the semiprivatization of toilets (located on the porches of tenements) and the inspection of the public's houses to eradicate smell grew increasingly important. Thus the focus of attention shifted from the biological to the social and from public to private space.

In addition to ventilation, paving, drainage, and creating space between people, there were significant strategies for reducing smell. Rules were introduced for the clearing and cleaning of cesspools, streets were repaved and broadened, and waterworks, latrines, and the regular changing of clothing in hospitals became common. Within private space, filth had to be covered up with lime,

chimneys became mandatory, and bathing gradually developed into a routine. The introduction of substances such as chlorinated water and zinc chloride and swan-necked containers was of enormous help. Within a context of increasing utilitarianism, the possibilities of using human excrement as fertilizer and animal remains for salt ammoniac were increasingly recognized, albeit with different effects. For example, in France the use of human excrement as fertilizer initially held up the planning of sewage systems, whereas the collection of carcasses contributed to the deodorizing of public space.

In the early nineteenth century, the idea that smell caused disease influenced even the nuisance regulation of industries. Damp emanations produced by the rot of collected animal and vegetable materials were considered to be unhealthy and inconvenient in terms of the law. Yet chemical effluences were not seen as dangerous. Therefore, the process of industrial deodorizing proceeded slowly (Corbin 1995/1991: 156).

We can infer from this history of stench that, first, the identification of smell as a cause of disease, and thus a public health threat, contributed significantly to the kinds of interventions chosen and solutions found for stemming stench. Hygienists played a significant role in this process. Second, it is important to note that the stress on differences in sensitivity to smell contributed to, instead of hampered, the abatement of smell. This occurred because smell became the sign of social difference and hierarchies that, together with the idea that smell caused contagion, legitimized interventions, such as home checks and instructions on hygiene, in the lives of lower class people.

As Andrew Aisenberg has shown, the legitimization of the intervention in private spaces in Paris was based on Pasteur's scientific theories from the late nineteenth century onward. The prevention of disease became increasingly associated with the disinfection of the home, the isolation of diseased patients, and tracing the persons with whom they had had contact in order to find a contagion's source. Since respect for the integrity and autonomy of the family would endanger society, the danger embodied in the contagion's source, "made the acceptance of social duties, articulated and presented by a regulatory authority, an integral part of what it means to be an individual in urban space" (Aisenberg

1999: 173). If in the late nineteenth century, then, the conflict between liberty and social order was legally resolved by the scientific notion of contagion, at the century's start the mere reference to the miasmatic smell of the poor as a threat to social order had been sufficient grounds for intervening.

Third, it is remarkable that considerations of economic gain hampered as well as stimulated the abatement of smell. The use of excrement as fertilizer hindered the installment of sewage systems in France. But as soon as animal remains were understood to be a source for the production of new and useful substances, people stopped allowing them to rot and stink.

Many of Corbin's observations about the social meaning of smell are equally applicable to noise, as this book will amply demonstrate. Just as with stench, noise was also considered to threaten the social order. If stench became symbolically associated with the depths of hell, noise became characterized as infernal din. Social elites not only considered the lower classes to be insensitive to smell and bestial odors, but also portrayed them as being indifferent to noise (Schafer 1994/1977: 223). However, the public problem of noise has been resolved less thoroughly than the public problem of smell. This calls for a rephrasing of my questions. For one thing, why have we not become so afraid of or touchy about sound as we have become about smell, the putative health menace number one between 1750 and 1880? Why did the social hierarchy of sound prove less helpful in the abatement of noise than the social hierarchy of odor had been in the case of stench? And which developments undermined the association of silence and economic gain strongly enough to be a mainstay in the fight against noise?

Ways of Understanding the History of Noise

Having used the comparison between stench and noise to gain a better understanding of the significance of the *definition* of such public problems—their putative causes, consequences, solutions—I will return to the work of Joseph Gusfield. His work is one of my sources of inspiration for how to examine the history of public problems of noise. Drawing on the introduction of social

constructionism in the theory of social problems in the early 1970s, Joseph Gusfield developed a framework for studying the culture and structure of public problems (Gusfield 1981: 4; Miller and Holstein 1993). The distinction between their cognitive and moral dimensions was crucial to Gusfield's understanding of public problems. "The cognitive side consists in beliefs about the facticity of the situation and events comprising the problem—our theories and empirical beliefs about poverty, mental disorder, alcoholism, and so forth. The moral side is that which enables the situation to be viewed as painful, ignoble, immoral. It is what makes alteration or eradication desirable or continuation valuable. . . . Without both a cognitive belief in alterability and a moral judgement of its character, a phenomenon is not at issue, not a problem" (Gusfield 1981: 9–10).

Equally important are the notions of *ownership, political responsibility,* and *causal responsibility. Owners* are those groups or institutions defining the problem, whereas those in charge of actually solving the problem by intervening are the ones with *political responsibility.* In contrast, *causal responsibility* is about the explanation of phenomena, such as saying that the source of impure air is the automobile. Yet the interesting thing is that the structure of public problems is often "an arena of conflict in which a set of groups and institutions . . . compete and struggle over ownership and disownership, the acceptance of causal theories, and the fixation of responsibility" (Gusfield 1981: 15).

Gusfield's motivation for writing his book was to show how the many professionals involved in trying to solve the "drinking-driving problem" were locked into a specific definition of that problem. This definition comprised the following: "Alcohol leads to impaired driving and increases the risk of accident, injury, and death. Since drinking coupled with driving 'causes' auto accidents, solutions lie in strategies which diminish either drinking or driving after drinking" (Gusfield 1981: 7). The key to this problem definition was the idea that alcohol and car safety are first and foremost the problem of individual motorists, more specifically, the problem of "the conflict between self-control and self-indulgence" (Gusfield 1981: 173). "Two things struck me as especially significant by their absence: the lack of involvement of alcohol beverage distributors—bartenders, sellers, manufacturers—and the inability or unwillingness of people to

see the problem of drinking-driving as a problem of transportation" (Gusfield 1981: 7). Several alternative definitions had been proposed in the course of time. One of these defined safety as a problem related to the construction of the car, for which the car industry had responsibility. Yet such a conception failed to become predominant in the episode that Gusfield brought to the fore, which he relates to the high status of individualism within American culture.

Gusfield's focus as a sociologist was on the culture and structure of public problems per se. The historical dimension of his research had to underpin his method of irony by which he meant "to hold up that which is taken for granted, familiar, and commonplace as something strange and problematic" (Gusfield 1981: 191). "To find alternative ways of seeing phenomena," he added, "is to imagine that things can be otherwise" (Gusfield 1981: 193). And since he could partly find such alternative ways of seeing in the past, historical research was an important entry into the study of public problems. In this book, however, the historical dimension has an additional use. Following the sequence of public problems of noise and their changing structures over time allows me to show how strategies for the solutions of noise—such as individualizing, objectifying, and materializing noise—were transferred from the definition of one type of noise problem to another. At times this created situations in which the people abating noise tried to characterize and win the ensuing war with the former war's weapons. Similarly vital to this book is the branch of public problems theory that studies the moment of *discourse coalitions* in the emergence of public problems (Hajer 1995). How did social movements that defined noise problems involve other social groups in their strife for tranquility?

Studying the contribution of law and science to the *staging* and *drama* of public problems is also highly significant for answering this book's key questions. Gusfield analyzed juridical documents and public presentations, even scientific ones, "as performances—as materials which dramatize the drinking-driving phenomenon as both a cognitive and a moral matter" (Gusfield 1981: 18). State laws, for instance, "hold the individual and not the auto industry or the road or the locality 'responsible' for accidents." Such laws are based on deterrence, the idea that "the individual motorist can be led to more diligence in driving

through the fear of police apprehension and legal punishment" (Gusfield 1981: 45). The ways in which scientific information on drinking and driving was gathered, and how these facts were presented and classified have been crucial to Gusfield's project as well. Similarly, the delineation of responsibility for acoustic privacy in law is paramount to the understanding of the history of noise. And so are the processes leading to the rise of the decibel in the measurement of noise, and the significance of these measurements to the definition and dramatization of noise.

Thus, this book aims to follow the changing order of public problems of noise over time and give a special ear for the contribution of science and law to the drama and definitions of these problems. This means that in addition to public problems theory, the field of Science and Technology Studies (STS) is indispensable to this study. STS contributes to my analysis in many distinct ways, but studies of *standardization* will appear in this book more than once. For example, what did the prevailing definitions of noise problems mean with respect to the character, acceptability, and employability of the standardized units and technological tools of noise measurement? What did these units entail in the interventions in noise problems? And what does the investment in standards as techniques of trust, coordination, and control say about the role of *experts* in the technological culture of the twentieth century?

What makes this study different from much of the current work in STS is not merely the connection it creates between STS and public problems theory, but also its aim to acknowledge the general public's acceptance of *technological determinism,* the idea that technology develops autonomously and simply takes society by surprise (Smith and Marx 1994). To do justice to their acceptance of technological determinism, this book will analyze the effects of situations in which, at least to the general public, new sounds seemed to fall out of the sky—in a rather literal sense in the case of aircraft. In doing so, this study can fully harvest the fruits from the social and radical constructivist studies that stress the co-evolution of science, technology, and culture (Bijker, Hughes, and Pinch 1987; Latour 1987), while taking the consequences of belief in technological determinism seriously.

The third field of considerable input is the history, anthropology, cultural geography, and philosophy of the senses. The better studies from these disciplines help me to reckon with the historicity "of the modalities of attention, thresholds of perception, significance of noises, and configuration of the tolerable and the intolerable." Again, this quotation comes from the work of Corbin. Corbin contrasted his approach to that of Guy Thuillier who attempted to "to compile a catalogue and measure the relative intensity of the noises which might reach the ear of a villager in the Nivernais in the middle of the nineteenth century" (1995: 183). Indeed, while Thuillier considered the history of noises to be part of the history of mentalities, what he ended up doing was summing up the variety of sounds that were audible to villagers. These included the laments of death's harbinger, as well as the sounds of forges, steam machines, and telephones (Thuillier 1977: 231–234). Corbin certainly valued this type of work. "It aids immersion in the village of the past; it encourages the adoption of a comprehensive viewpoint; it helps to reduce the risk of anachronism." Yet it wrongly implied the idea that "the habitus of the Nivernais villager of the nineteenth century did not condition his hearing, and so his listening" (Corbin 1995/1991: 183).

Such a critique also partially applies to the work of Raymond Murray Schafer, the Canadian composer, environmental spokesman, and author of *The Soundscape: Our Sonic Environment and the Tuning of the World*—the book that resulted from the World Soundscape Project. This project started in the late 1960s and involved both education and research. Schafer's first interest was in noise pollution. He soon relabeled this as soundscape design, however, because it had a more positive tone and was more popular among students than noise abatement (Schafer 1969; Schafer 1999; Järviluoma 1994). In Schafer's view, several routes could lead to a more pleasurable *soundscape,* or sonic environment. The first was mapping historical and recent changes in the world's soundscape. The second was promoting "ear cleaning" workshops and "soundwalks" to enhance the public's listening capabilities (Schafer 1967). The third was employing environmental sound recordings as samples for new music compositions. In the 1990s, Schafer started presenting his ideas for acoustic design in public spaces. One proposal was to organize the aural information at railway stations and airports in such a

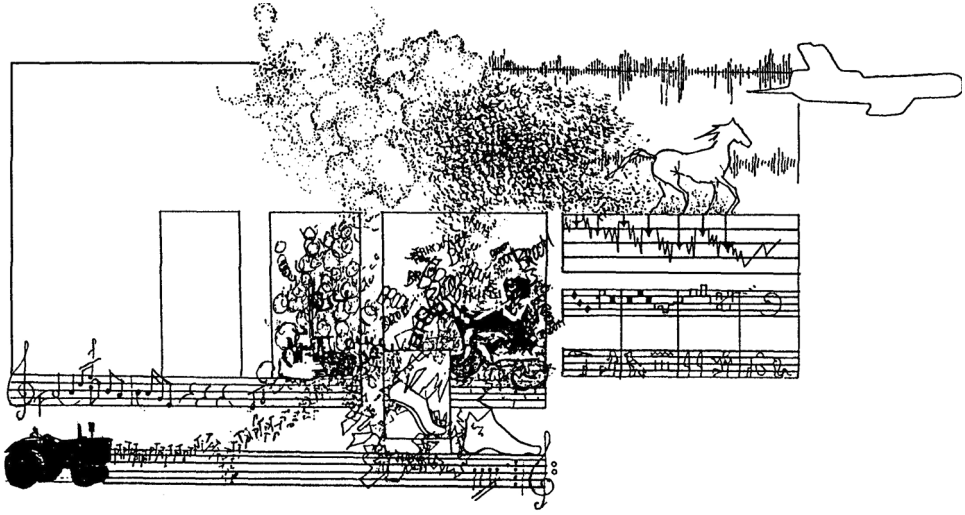

Figure 1.1 Logo of the World Forum of Acoustic Ecology. This logo was derived from an art work by Liliane Karnouk, originally created in 1978 for a poster announcing the radio program *Soundwalking,* produced by sound artist Hildegard Westerkamp for Vancouver Co-operative Radio. Courtesy Liliane Karnouk.

way that different kinds of information had distinct sonic motifs, an approach that is analogous to what occurs in nature, where, for example, each species of bird has it own sound (Schafer 1993: 24). The proposal expressed Schafer's ecological approach of sound. A similar passion for the acoustic richness of public spaces and consumer products, rather than for mere quantitative noise control, can be found in the World Forum for Acoustic Ecology,[6] an offshoot of the World Soundscape Project. (Figure 1.1.)

The larger part of Schafer and his colleagues' work, however, was concerned with documenting changes in soundscapes by archiving and describing sounds through sound recording journeys and sound diaries (Schafer 1977a, 1977b; Truax 1996). Schafer designed parameters like the "soundmark," a unique "community sound," which included sounds such as the slam-and-slick of doors in the Paris Metro and "keynote sounds." Keynote sounds were sounds "heard

by a particular society continuously or frequently enough to form a background against which other sounds are perceived," such as the sound of geysers on Iceland or the murmur of electric equipment in modern dwellings (Schafer 1994/1977: 274, 272). In addition, Schafer developed an extensive sound notation system, including the physical characteristics of sound (such as duration, frequency, and dynamics) as well as referential aspects (meaning, purpose, and function). All of this helped him to document a shift from a preindustrial "hi-fi" sonic environment, in which signals are clearly audible, to an industrial "lo-fi" soundscape, in which individual sounds are masked and overcrowded. One of Schafer's colleagues, Barry Truax, developed an even more distinctly ecological perspective by pleading for the preservation of sonic "variety" (Truax 1984: 97).

Although Schafer definitely sought to understand the rise of the lo-fi soundscape, which he attributed to the power of industrialists, his project and its aftermath remained descriptive rather than explanatory.[7] His conclusions even suffer from the same kind of fallacy that Corbin identified in Thuillier's work. To Schafer, the character of the sonic environment is what changes, not the ways in which people listen to it. Such an approach, however, makes it hard to understand why new mechanical sounds, as I will show in later chapters, often seemed to be perceived "unmasked," as if these sounds arose in a hi-fi surrounding instead of in the lo-fi sonic environment that Schafer assumes exists in industrial society. I prefer Emily Thompson's definition of the soundscape, as published in her widely and rightly praised study, *The Soundscape of Modernity.* In Thompson's view, the soundscape is "simultaneously a physical environment and a way of perceiving that environment; it is both a world and a culture constructed to make sense of that world." Her physical environment, moreover, does not only encompass sounds, "but also the material objects that create, and sometimes destroy, those sounds" (Thompson 2002: 1). What's more, Thompson's approach reduces the downsides of the "visual analogies" of Schafer's notion of soundscapes, a shortcoming for which both Paul Rodaway and Joy Parr have criticized him (Parr 2001: 736). Such visual analogies may lead one to construe a static image and to forget about the "dynamic" aspects of the auditory experience (Rodaway 1994: 86–87).

This is not to say that the work of Schafer and other soundscape theorists is not informative or inspiring. On the contrary, their documentation of soundscapes is phenomenologically rich and their critical program evocative. Yet this book is a study of shifting public problems of noise. And to study these changes, I need to be thoroughly historical. This means that the physical characteristics of sound are not sufficient to understand why particular sounds came to be defined as noises or why private problems of noise became public ones. These questions require acknowledging transformations in the ways people listen to sounds and their cultural meanings. Being thoroughly historical also requires putting the three most common explanations for the persistence of noise—economic growth, the subjectivity of hearing, and the sensory priorities of our culture—in parentheses. The historiography of stench shows us that economic gain and solving sensory problems can go together in certain contexts and that the notion of sensory subjectivity may help instead of hamper in tackling such problems. Moreover, critical studies of the senses stress that a visual culture is not by implication less attentive to sound. Yet unlike stench, noise never acquired a robust enough status of societal danger to make deeply encroaching and lasting interventions appear to be legitimate. This provides the first clue to understanding why today's columnists only dare to discuss noise with a touch of irony. What has contributed to this situation? And what needs to be done to understand the persistence of public problems of noise?

Listening to Technology through the Ears of the Past

Since this book's focus is on the decades immediately following the efforts to raise issues of noise actuated by new kinds of mechanical sound—industrial, traffic, audio, and aircraft sound—it does not fully cover a century of noise abatement policies. Instead, it aims to scrutinize the most fervent episodes of public debate and action so as to understand what's behind the persistence of noise as a public problem. These episodes succeeded each other roughly between 1875 and 1975. By 1875 most European countries had nuisance laws that would influence the definition of future noise problems. And by 1975 most European

countries had designed or introduced encompassing laws on noise nuisance or environmental legislation in which noise was included.

Nor does the book cover all of Western culture in each chapter. The scope of primary sources concerning music, medicine, and acoustics spans North America and Western Europe. Throughout most of the twentieth century, these worlds, notably the journals and meetings that constitute their inner circles, were highly international. With respect to other relevant sources, such as pamphlets, essays, and newspaper articles on noise, the archives and journals of national noise abatement societies and the archives of national research institutes, governmental committees, and national policy documents, my main concern has been with Western Europe, notably the United Kingdom and Germany, as the first two European countries with noise abatement societies, and the Netherlands. In addition, I consulted this subject's most significant primary sources from the United States. In the mid-1970s, the Dutch government considered the United States, the United Kingdom, and Germany as the countries "furthest ahead" in the legislation on noise abatement.[8] Yet even in these countries, the public debate about noise all but died down. This contrast makes these countries particularly relevant for studying the persistence of public problems of noise.

Because the various national noise abatement societies were very eager to report about antinoise activities elsewhere, while governmental committees usually turned to other countries for information before deciding what to do, their documents provide a wealth of information about the other Western countries. Still, subsequent chapters will foreground some countries more than others, and this is in part motivated by the fever of discussion, by how developments in one country triggered changes elsewhere, or by the extent to which a particular type of noise, as in the case of neighborly noise, requires extensive local detail.

At first sight, one might expect this study to be accompanied by a compact disc with historical recordings or contemporary recordings of historical artifacts. This, it seems to me, would not be very helpful. Listening to a recording of museum steam machines might give you the impression that these machines were not very "loud" at all, forgetting that steam machines may not have been as well oiled when originally in use as when in use in a museum decades later.

Hearing the cracks and noises of a phonograph recording may initially enlighten their historical status as "mechanical" instruments. Yet, the very same sounds complicate our understanding of the "tone tests" of the early twentieth century in which audiences were unable to hear the difference between performers and records playing (Thompson 1995; Siefert 1995; and Sterne 2003)—something that is hard to believe today. When presenting papers on the history of traffic noise, I have often confronted my audience with a recording of the actual sound of an automobile horn from the 1930s. Even if my act always managed to make the audience laugh because the recording sounded like a dog with a cough, it failed to contribute to its grasp of why honking was such a dominant public problem in 1930s. Thus, if we take seriously the historicity of perception, as well as of public problems, recordings are a far less informative or a much more complex source than one might think (Smith 2003a, 2004).

Our challenge, then, is to historicize the sensory experience of sound, and to listen to the sounds of technology through the ears of those people who complained about these sounds. Subsequently, we have to understand how the complainants were able to dramatize these sounds in such a way that they could be packaged into noise problems to be discussed in the public arena. What repertoires for the dramatization of sound could the complainants draw from?