

CHAPTER 3

“SOBBING, WHINING, RUMBLING”: LISTENING TO AUTOMOBILES AS SOCIAL PRACTICE

STEFAN KREBS

INTRODUCTION

ON a hot summer day in 1950, a Bavarian commercial traveler decides to bring his car to a nearby repair shop. When driving, he occasionally hears an inexplicable slapping noise, and he worries that this might be an audible indication of a technical problem. The mechanics at the garage search for the source of the noise. In particular they check the carburetor and the ignition, which often cause trouble, but they are unable to find the slightest malfunction. When the motorist returns that same afternoon to pick up his car, the mechanics ask him to describe the slapping sound in detail, as well as when and where it is most noticeable. He explains: “Every day I drive down a long, straight street lined with poplars, and there I always hear the slapping noise” (Anonymous 1950b, 353).¹ The mechanics burst out laughing because they immediately understood that the driver was merely hearing the regular echo of the car as the sound was being reflected by the trees.

This anecdote, together with three similar stories, appears in the August 1950 issue of the German trade journal *Krafthand*—a major periodical for car mechanics and dealers. All four accounts emphasize the superior knowledge car mechanics possess. If the opening anecdote suggests that even experienced drivers, such as commercial drivers, lack the necessary *techniques* to diagnose audible malfunctions, it also underscores the general importance of listening as a means of noticing technical problems and the general difficulties of locating a sound source and attributing meaning to it.

In sharp contrast to the “tree echo” episode from the 1950s, German motorists in the 1920s in fact appeared to possess the necessary listening skills to diagnose malfunctions. As I show in this chapter, they even questioned the sonic expertise of their car mechanics. So when did listening first become an exclusive domain of German car mechanics? Furthermore, why did drivers of the 1920s and their counterparts of the 1950s listen to their cars differently? To tackle these questions, this chapter describes the relevant listening practices and explains how and why they differ. I focus on what Kevin Borg calls technology’s middle ground, the “ambiguous space between production and consumption” (Borg 2007, 2–3) and explore the complex relationship between German auto mechanics and motorists during the interwar period and the first years after World War Two.

My first hypothesis is that the two actor groups (motorists and auto mechanics) gradually developed two different “modes” of listening:² “listening while driving” and “diagnostic listening.” To investigate the genealogy of these modes I conceptualize them as social practices in accordance with Pierre Bourdieu’s theory of practice. As a *technique du corps*, or technique of the body, listening is a practical sense (Bourdieu 1990, 66–79). Marcel Mauss (1936) describes techniques of the body as part of the habitus; they vary with educational method, decency, fashion, and prestige. Following Mauss, Bourdieu conceptualizes techniques of the body as “the *socially informed body*, with its tastes and distastes, its compulsions and repulsions, with, in a word, all its *senses*, that is to say, not only the traditional five senses . . . but also the sense of necessity and the sense of duty, the sense of direction and the sense of reality” (Bourdieu 1977, 124).³ For Bourdieu, agents incorporate into their habitus the social logic that constitutes the field. He posits a homologous relation between habitus and field (Bourdieu 1999, 138–46). Accordingly, I assume that listening to automobiles as a social practice is structured by the habitus of the actors and the field they act in.

In addition to Bourdieu’s theory of practice, I suggest using the notion of the *dispositive* to further investigate the genealogy of the listening practices. According to Michel Foucault, the *dispositive* is a heterogeneous ensemble “consisting of discourses, institutions, architectural forms, regulatory decisions, laws, administrative measures, scientific statements, philosophical, moral and philanthropic propositions—in short, the said as much as the unsaid” (Foucault 1978, 119–20). Within the *dispositive* discourses and institutionalized power structures affect nondiscursive practices (Jäger 2001). In my case study, I assume that the nondiscursive practice of listening to automobiles is shaped by the power structure between mechanics and automobilists.

This brings me to my second hypothesis: The formation of a particular German auto mechanic's dispositive in the 1930s altered the power structure in the field, giving rise to the differentiation of the two listening practices by excluding motorists from the realm of "diagnostic listening." In the first two sections I explore the listening *techniques* of motorists and mechanics in the 1920s. The next section describes the repair crisis at the end of that decade and the new legislation concerning the auto mechanics' trade in 1934. Subsequently, I focus on the automotive technology of that time. The final section discusses the differentiation of the two listening practices. I have analyzed different trade journals for automotive engineers, auto mechanics, and garage owners, as well as special-interest journals for automobilists. Particularly the periodicals of automobile clubs turned out to be rich historical sources as they contained hundreds of letters from car drivers, who described technical problems—often mentioning their listening practices. In addition, I considered contemporary handbooks for car owners, chauffeurs, and auto mechanics.

LISTENING TO AUTOMOBILES: THE DRIVER'S EXPERIENCE

My inquiry starts at the end of World War One, during which the private use of automobiles had virtually ground to a halt (Ruppel 1927, 10). At that time, members of the German automobile lobby, such as the Imperial Automobile Club (Kaiserlicher Automobil Club), anticipated a growing demand for private motorization in peacetime. They argued that the military use of cars and trucks had proven the usefulness and reliability of automobiles as a means of mass transportation (König 1919). The postwar car was imagined to be small, light, economical, and effortlessly drivable without the help of a mechanic (Ledertheil 1919).

Experts projected that the self-driving tradesman and other middle-class people would be the most likely future car owners. Rudolf Hessler, author of *Der Selbstfahrer* (The Self-Driver) (Hessler 1926, 7), presupposed a reasonable level of technological knowledge as common among these potential motorists. Handbooks and driving manuals were intellectually demanding, and the division between professional and popular automobile journals was not as sharp as today.⁴ Accordingly, there was a sense that the new categories of car owners were going to replace the chauffeur in his two roles as driver and mechanic (Borg 2007, 13–30). This continuum between chauffeurs and postwar motorists is visible in the specific concepts used in the literature of the time. A great number of instruction books equally addressed professional chauffeurs and self-driving automobilists (Parzer-Mühlbacher 1926; Hacker 1932; Martini 1938). In concepts and technical level, even specialized almanacs for chauffeurs did not differ considerably from more general instruction books (Martini 1922).

It seems worthwhile, then, first to examine the chauffeurs' practice in terms of their concerns with listening and automobile sound. Besides driving, their main duties included maintenance and repair work. Only major engine jobs that needed special equipment were to be left to repair shops (Martini 1922, 13). Chauffeurs needed a high level of technical knowledge and driving know-how (the latter was acquired exclusively through experience). In addition, chauffeurs had to have a good sense of hearing: "The ear should rigorously register the finest deviance of the engine sound" (König 1919, 12). While driving, the chauffeur had to listen carefully to the machine (Küster 1907, 10), and if he detected any dissonance, he had to look for its source and decide whether it required immediate repair (Martini 1922, 207). One could develop a fine sense of the engine's rhythm and timing only through experience, but theoretical understanding of automotive technology counted as a prerequisite for proper diagnosis (Küster 1907, 10). In summary, professional drivers had to learn to listen to automobiles through hands-on experience, and they had to acquire the appropriate technological knowledge. This *technique* of listening and the embodied cultural capital were requisite for success as a good chauffeur.

As already indicated, self-driving car owners would find similar advice in the contemporary sources of the day. In *Ohne Chauffeur* (Without Chauffeur), one of the earliest handbooks that appeared in as many as thirteen editions between 1904 and 1930, the motorist was urged to "listen to the desires of his engine" (Schmal 1912, 10). Other manuals stressed the importance of regularly listening to the sound of the engine (Hacker 1932, 62). Once the driver noticed any discord, he was to drive carefully and "open up his ears" (Hacker 1932, 83). Furthermore, drivers were instructed to avoid any unnecessary noise because only when the engine "runs as quietly as possible, any malfunctions that might arise can be noticed plainly and early" (Hessler 1926, 217). One even suspected that too much noise would harm the drivers' sense of hearing, thereby affecting their sensitivity to the "desires" of the machine (Hessler 1926, 203). In general, all motorists could train their ears:

With growing experience and habit even the beginner learns to focus his attention on other things, especially his own car, without being distracted from the road. It is primarily the rhythmic and silent run of the engine that requires his attention. The regular humming of the gearbox or chain drive indicates that everything is in best order. He will soon notice that every engine and every car has its own pace and that even the slightest technical problem alters this lovely rhythm. He will involuntarily listen to this pace very closely, thereby avoiding any greater malfunctions. A knock or rattle of the engine, a crunch of the chain, a rattle of a bolt will indicate the spot where the car needs maintenance, and he will do well to follow the slightest hint to repair malfunctions in time before they grow worse. (Küster 1919, 304)

As this quotation from the handbook *Das Automobil und seine Behandlung* (The automobile and its maintenance) suggests, motorists needed time to get to know their car and to develop the necessary listening skill to understand what the engine "said" to them. They had to learn to distinguish the familiar sounds of a

properly running vehicle from the deviant sounds that indicated problems, a practice Karin Bijsterveld calls “monitory listening” (Bijsterveld 2008, 77–78; 2009).

Such monitory listening techniques, which constitute the social practice I call “listening while driving,” are just one side of the coin. As mentioned earlier, automobilists were to undertake supplementary diagnoses of the malfunctions they noticed while driving. Here, too, listening played an essential role: “[N]oise is most important for the detection of technical fault” (Hessler 1926, 216). In comparison to the *technique* of monitory listening, the practice of “diagnostic listening” was much harder to achieve: “This skill, to make the correct diagnosis out of a knocking sound, requires tremendous experience and exact knowledge of the type of engine construction” (Hacker 1932, 83). Maintenance almanacs for motorists provided help, however; they offered a systematic overview of possible malfunctions, symptoms, and ways of repairing. Oskar Hacker’s manual (1932), for example, categorized malfunctions by the senses: seeing, hearing, smelling, and feeling. He needed no less than twenty-nine pages to list a wide array of audible failures, a systematic approach that was also adopted in journal articles. Other manuals ordered the maintenance section by components or combined the explanation of the engine’s function with potential malfunctions (Schmal 1912; Küster 1919). Implicitly, handbook authors began codifying car sounds by transforming their auditory experience into communicable signs and meanings, if only with limited success, as we will see later. Jens Lachmund has described similar problems that physicians encounter when listening to a patient’s body (Lachmund 1999, 420).

All of the authors emphasized the importance of technical knowledge and clear thinking: Motorists had to carry out a systematic inquiry to achieve their objective. As guidelines, the manuals contained tables, lists, and fault trees. They could be used to perform a differential diagnosis to narrow down the list to a single condition and provide a basis for a hypothesis of what was ailing the “patient” (Hacker 1932, 18). It is no coincidence that this resembles the physician’s routine: “As in the relation between a physician and his patient, the diagnosis itself is the most important thing to a driver” (Hessler 1926, 216).

Further, the motorist was advised to ask specific questions about the different symptoms, the components that might be “infected,” or the specific driving conditions under which the malfunction was most noticeable—just like a physician taking a patient’s medical history. “If the physician cannot make his diagnosis by the appearance of the patient, he will take his stethoscope and listen to the patient’s body. This is how you ought to proceed with your car engine as well” (Hessler 1926, 216). To listen at definite spots, the driver could use a screwdriver or a long metal pipe as a simple ear trumpet (Hacker 1932, 81; chapter 12). A driving manual of the German Association of Motorists (Allgemeiner Deutscher Automobil Club) stated that, with a stethoscope, a trained ear could indeed locate a single dry-running bearing (Dietl 1931, 324). Corresponding hearing devices, such as the Auto-Doktor, were advertised in motoring journals (Anonymous 1929a).

As mentioned earlier, handbook authors recognized automobilists as having the ability to make a range of significant distinctions between acoustic phenomena.

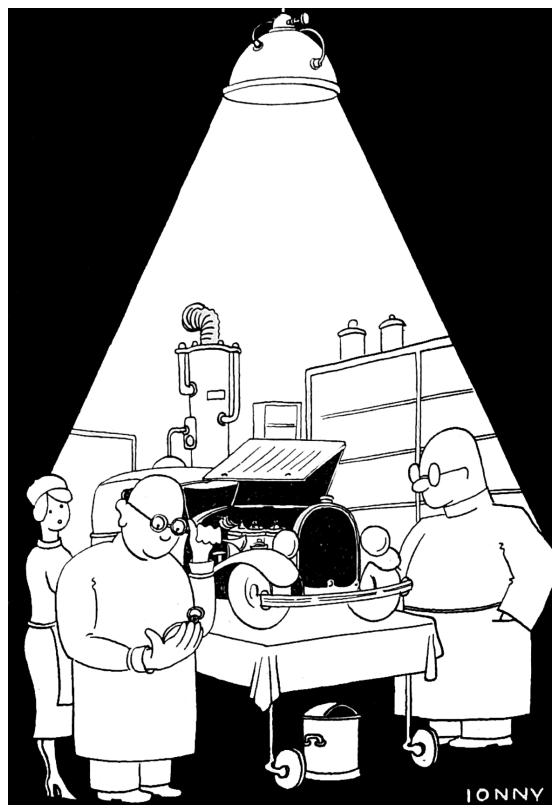


Figure 3.1 Cartoon of a car mechanic as a physician, from the *Briefkasten* section of the *Allgemeine Automobil-Zeitung* 33(42) (1932): 19 (Jonny).

Furthermore, they were seen as eager to acquire the expertise to repair their cars themselves. Nonetheless, why should they want to acquire the needed knowledge and experience, including the hard-to-learn technique of diagnostic listening? The magazines and handbooks of the time agreed on two intersecting aspects: First, self-repairing was simply cheaper and, if done in time, useful in avoiding more serious technical problems. Second, car owners were obliged to monitor their cars to avoid any accidents that might occur due to technical problems. Even if they employed a chauffeur, they were still legally obliged to monitor their car's condition, as well as the chauffeur's driving habits. Thus, employers needed the appropriate technical knowledge and experience to supervise their chauffeurs, in particular if they doubted their employees' trustworthiness (Anonymous 1926).

From 1928 onward, the *Allgemeine Automobil-Zeitung* carried a section called "letter box" (*Briefkasten*), which regularly addressed legal and technical problems. Until the outbreak of the Second World War, this journal received some fifteen thousand letters, a selection of which was published in each issue. Some reveal concerns about motorists' listening practices. In general, car owners followed the advice given in the driving manuals; they carefully monitored the running of their

machines—they “listened while driving.” Their descriptions were detailed accounts of the specific driving conditions under which a suspicious noise occurred. To illustrate their cars’ audible idiosyncrasies, drivers used a wide range of adjectives: Their cars were sobbing, whining, rumbling, as well as stuttering, hammering, knocking, singing, howling, growling, ticking, hissing, and droning (Briefkasten 1928c). The letter writers additionally referred to other common sounds to depict a specific noise, such as the chirps of a cricket (Briefkasten 1930). Other letters described the frequency and pitch of the noise (Briefkasten 1929a). In addition, they listed tests and repairs they had already carried out and claimed their own expertise by referring to their personal experience: “I have been a self-driver for twenty-two years now, and I know a lot about engine designs, but this time I am helpless,” one driver grumbled (Briefkasten 1928d).

Often the editors had difficulty making sense of the written accounts because motorists, despite the attempts to codify car sounds in handbooks and journals, shared no standardized vocabulary to describe their auditory experiences. A knocking, for example, could indicate different malfunctions: spontaneous ignitions as well as worn-out piston bearings. In difficult cases the editors gave general suggestions or described diagnostic strategies to narrow down the range of possible faults (Briefkasten 1929b). Sometimes the communication failed completely: A “hot noise,” as one reader wrote, made no sense (Briefkasten 1938). To stress their own expertise, the editors stated that experienced mechanics needed more than ten years to develop a “trained ear,” allowing them to trace any noise to its exact source (Briefkasten 1933). Despite this emphasis, the Briefkasten advisers always treated the readers as technically competent and believed them capable of major repairs such as cleaning the oil-carbon deposit in the combustion chamber (Briefkasten 1928a).

To summarize, motorists in the 1920s developed two intertwined listening practices. First, they monitored their cars and “listened while driving” to detect technical problems in time. Second, they acquired the technique of diagnostic listening. A 1926 manual suggested that the experienced driver and the efficient chauffeur could both be recognized by their diagnostic abilities (Parzer-Mühlbacher 1926, 353). Clearly, motorists were oriented toward the chauffeur’s techniques of listening, which, in the case of middle-class automobilists, was mediated and reflected in written instructions (Bourdieu 1990, 74). This explains some of the problems they encountered while making sense of what they had heard. However, it was a technological necessity for self-drivers to learn to recognize audible signs of malfunctions. Motorists embodied both listening practices as *techniques du corps*; they engraved these techniques into their habitus. Displaying these techniques became a means of social orientation: They considered car repair as matching their upper-middle-class social standing. Car repair became a bourgeois cultural technique: While car driving in Germany was still an exclusive and expensive occupation, the associated technical expertise was a distinctive sign and a sign of distinction (Wetterauer 2007, 155–66). Furthermore, motorists who acquired diagnostic capabilities could compensate for their distrust of chauffeurs and auto mechanics.

LISTENING TO AUTOMOBILES: THE MECHANIC'S EXPERIENCE

Despite great expectations after the war, mass motorization did not take off in Germany in the interwar period. The number of passenger cars rose from 60,876 in 1914 to 216,300 in 1925. At that same time, there were 17,726,507 passenger cars in the United States; 778,211 in the United Kingdom; and 573,397 in France (Ruppel 1927, 10, 15).⁵ Still, the car-repair business saw strong growth in Germany, with some 20,000 repair shops in business in 1929 (Reparatur-Werkstatt 1929, 1–2). This figure included a huge number of workshops run by blacksmiths, tinsmiths, and fitters, who repaired cars on the side, which is why Kevin Borg appropriately refers to this group of auto mechanics as ad-hoc mechanics (2007, 31–52).

In contrast to other trades in Germany, the auto mechanics failed to be legally regulated, and it was regarded as socially legitimate for chauffeurs, retired army drivers, or craftsmen from a wide range of trades to repair cars. The blurred boundaries of this field are reflected in journals such as *Auto-Technik*, which, in the first postwar decade, catered to car dealers, garage owners, mechanics, and automotive engineers. Renamed *Automobiltechnische Zeitschrift* in 1929, it became the landmark of the German automotive engineering profession. In 1928 a monothematic journal, *Die Reparatur-Werkstatt*, renamed *Krafthand* in 1930, was initiated to support the ad-hoc mechanics, as well as specialized auto mechanics, with news from the trade, articles on automotive technology, and repair tips.

Journals for German auto mechanics frequently ran articles on car-related sounds, noises, and listening. A special section in *Auto-Technik* titled “For the Repair Shop,” for example, gave advice on how to get rid of minor noises, such as the rattling of the brake linkage. More in-depth articles explained the technological background of new noiseless chain drives and engine knock (Ostwald 1921, 1922). In this context, authors discussed the knock resistance of antiknock fuels. They described engine knock as starting with occasional plinking and increasing up to loud and frequent detonations and claimed that, for the time being, in the absence of measuring devices, the best instrument to determine the antiknock quality of fuels remained a well-trained ear, mainly because of its great sensitivity to differences in frequency (Enoch 1928). Interestingly, this ties in with Marcel Mauss’s notion of the body as the first and most natural technical means (1936) and underscores the crucial significance of listening in the field of auto mechanics.

As with motorists, mechanics relied heavily on their own listening skills to diagnose technical malfunctions. The article “How to Diagnose Malfunctions of Passenger Cars” explained different noises, their technical sources, and ways to repair them (S. 1928). Another contribution distinguished a multitude of abnormal sounds. The author categorized noises emanating from the engine, the drive train, the body, and the chassis. He gave details on how to diagnose every sound, he described particular driving conditions typical for this sound, and he advised the

disassembly of certain components to rule out other possible sound sources. As one anonymous source put it: “For diagnosing engine sounds a very fine sense of hearing is required indeed, especially when the sounds are very faint and if several sounds from different sources have to be distinguished simultaneously, which is often the case” (Anonymous 1932, 81). The author elaborated that experience was essential for “diagnostic listening” and stated that a lack of practice could not be compensated for by using a hearing device: “Those who are unaccustomed to the use of a wooden rod or a stethoscope, which are both put against the engine from the outside, will easily be misled by the effect of resonance” (Anonymous 1932, 81).

Other authors were much more optimistic that hearing devices could assist the auto mechanic—especially when it was important to focus on definite spots. *Auto-Anzeiger*, a trade journal not distributed to ordinary motorists, presented a special stethoscope with two sensors: the Tektoskop and the Tektophon. This type of construction should enable the mechanic to examine two engine spots at once, thus allowing him to compare two sounds in great detail (Anonymous 1929b). Labeled “the ideal troubleshooter,” the Meccano-Stethoskop was described as a brilliant tool: With the help of the stethoscope one could “clearly observe the processes inside the engine” and save the time by not having to disassemble the engine when diagnosing problems (Anonymous 1930). The Meccano-Stethoskop provides another indication of the general importance of listening in the auto mechanics trade. The claim that it could help to speed up the diagnosis appealed

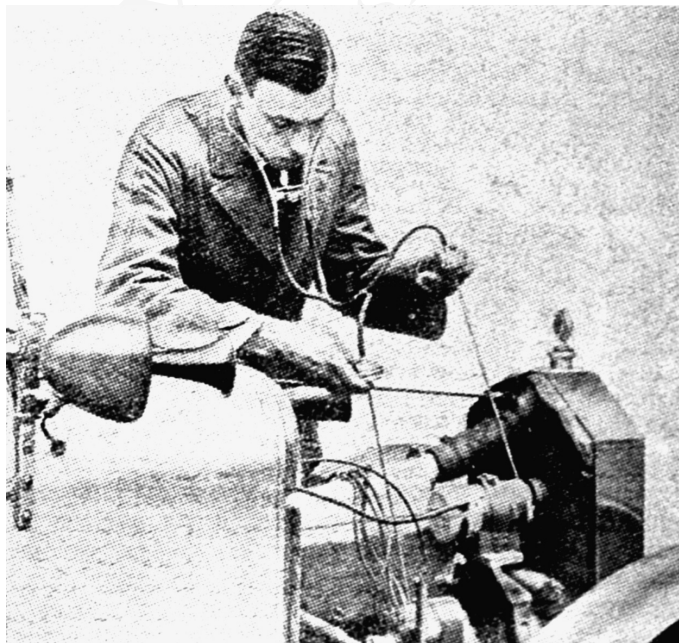


Figure 3.2 Photograph illustrating the use of a Tektoskop: Anon. “Wo entsteht das Geräusch?” *Auto-Anzeiger* 4(40) (1929b): 2–3.

to workshops, as customers expected a prompt and exact estimate. However, because of the difficulty of making a precise sound diagnosis, *Auto-Technik* warned the auto mechanics among its readership to give only nonbinding estimates (Walkenhorst 1926).

Auto-Technik's warning about making estimates indicates two crucial intersections of the practice of diagnostic listening: mapping and verbalization. The notion of *sound mapping* comes from the field of psychoacoustics. It refers to the linking of sounds to the information they represent (Fricke 2009, 55–56), and it is a useful metaphor for grasping the practice of diagnostic listening as the association of particular car sounds with specific malfunctions. The concept of mapping helps to explain why stethoscopes and other hearing devices alone were of little help, as it is not sufficient simply to amplify sounds; one must assign meaning to them as well. But how would auto mechanics be able to learn to map sounds? Was it largely a matter of theoretical knowledge? Or was bodily knowledge the key to diagnostic listening?

As in the case of motorists' listening practice, the literature they had available agreed on the precondition of theoretical knowledge and the status of practical experience (Anonymous 1928; O. Winkler 1928). Tables, lists, and fault trees were published to foster methodological investigation of audible defects (Fischer 1927). Regular sections in auto mechanics trade journals, such as "From the Workshop Practice" (*Auto-Technik*) and "Do You Already Know?" (*Die Reparatur-Werkstatt*), emphasized the significance of practical knowledge. Regardless of whether the articles had a more theoretical or practical orientation, however, both journals struggled to put the audible indications of different malfunctions into words even though such codification of car sounds was a prerequisite for the written transmission of the diagnostic listening skill (chapter 4). Engine knock is a good example to illustrate this. An article specifically devoted to the hammering and knocking of the engine described engine knock as a hammering sound, whereas only the audible malfunction of a piston bearing or rod was called knocking (Anonymous 1919). Another 1932 article distinguished no fewer than seven types of knocking, including "metallic knocking," "high knocking," "damped knocking," and a "muffled clang" (Anonymous 1932). Apparently, a standardized set of subtly nuanced terms to verbalize the audible characteristics of malfunctions was not available. Nonetheless, how should the mechanic in his everyday practice know exactly what this author's variously described knocking sounds referred to? Similarly, it was crucial to distinguish between these sounds, as the "metallic" one was just a nuisance, but the "high" one indicated a serious problem.

This raised the question of whether written advice on how to listen to malfunctions was of any use to auto mechanics. Despite his own work, Eugen Mayer-Sidd (1931b), a regular contributor to *Krafthand*, questioned the use of written repair accounts: "[I]t is exceptionally difficult to give someone else a detailed and graspable description of a technical work or method that enables him to do it himself later on." Especially with regard to malfunctions he was very pessimistic: "[I]t is even more difficult to describe a malfunction so comprehensibly that someone else,

without physical inspection, may give the appropriate advice with certainty on how to repair it” (Mayer-Sidd 1931b). The unachieved codification of car sounds and the general difficulties of giving written advice underscore the relevance of the tacit dimension of car repair knowledge (Polanyi 1958, 69–245). If written accounts largely failed to convey “diagnostic listening” skills, tacit knowledge could be passed on only through apprenticeship.

It is safe to argue that the motorists’ techniques of listening and the auto mechanics’ practice of diagnostic listening were in fact quite similar. This is perhaps hardly surprising because specialized auto mechanics shared their knowledge of their field with many inexperienced craftsmen from other trades, former chauffeurs, and other ad-hoc mechanics. Until the mid-1920s, they competed as more or less competent and legitimate rivals, and all of them might gain advanced expertise in diagnosing and repairing passenger cars. If theoretical knowledge generally served as a necessary basis, only through practical experience could one really develop diagnostic skills. All of these individuals recognized car sounds as an indispensable source of information on the engine’s condition and as a means of locating particular malfunctions. The ability to diagnose by listening had to be incorporated as an embodied technique, and the mechanics’ literature emphasized the considerable effort this took. Only a practically trained auto mechanic could diagnose a malfunction by listening to it, but even then partial disassembling was still regarded as advisable.

THE “REPAIR CHAOS” AND THE FORMATION OF THE AUTO MECHANICS DISPOSITIVE

In December 1926 the German Chambers of Industry and Commerce published an assessment of the situation in the field of auto mechanics. The study summarized a series of complaints about excessive prices for spare parts and repair work. In response, the car dealer association denied these shortcomings, but the discussion about cheap and reliable repairs did not die down (Anonymous 1926). Several letters published in the *Allgemeine Automobil-Zeitung* articulated the rising distrust and dissatisfaction among car owners (Briefkasten 1928a, 1928b).

In 1928 *Auto-Technik* published an editorial titled “The Great Repair Misery.” Apparently, its author considered it his duty to raise this delicate issue, and he even felt obliged to criticize parties that paid for ads in this same journal. He leveled criticism mainly at auto mechanics and their expertise and trustworthiness, including those employed by car dealers and manufacturers, as well as independent repair shops. During the warranty period, for example, the significance of audible technical problems was often played down if not altogether denied by the manufacturer’s

mechanics: “[T]hey try to persuade the customer that the abnormal sound, which indicates an upcoming problem, is of no significance—‘this does not mean anything,’ ‘this is just an imperfection’ ” (Loewe 1928, 11). In other cases motorists would bring in a car that obviously had an audible problem, but after the repair the difficulty continued. The author of the editorial interpreted this as a sign of the lack of the necessary expertise. In sum, he argued that the repair misery posed a serious threat to the whole automobile system because dissatisfied motorists might simply abandon their cars.

A corresponding editorial in the *Allgemeine Automobil-Zeitung* articulated “the outcry of the automobilist” and asked readers to propose a way out of the “repair chaos.” As evidence, the article mentioned the numerous complaints published in the journal’s “letter box.” Motorists, it claimed, preferred to carry out major repairs themselves because of their distrust of auto mechanics (Anonymous 1931b). Coming from the other end, advocates of the auto repair business saw the origin of the “repair chaos” in the unregulated access to the trade: “The blacksmith, the bicycle or sewing machine mechanic, the fitter, they all have to learn their trade for four years, but anybody who learned to handle a file and followed a six-week course is able to repair the complicated and valuable engine of a car flawlessly?!” (Testor 1931). To put things right, they proposed the establishment of an independent auto mechanics trade together with mandatory membership in a guild (Anonymous 1931a).

In this respect it is relevant to briefly discuss the overall German professional trade system. Importantly, the laws governing trade and industry in Germany had been amended in 1897 and 1908. From then on, the right to enter a trade was restricted. To practice a trade, a three- to four-year formal apprenticeship was required. The passing of a final exam, which earned one a journeyman’s certificate (Gesellenbrief), served as one’s entry ticket to a particular trade. After accumulating experience for three to five years, depending on regional customs, journeymen achieved the right to take a second exam to obtain a master craftsman’s certificate (Meisterbrief). Only with this second certificate did one have the right to train apprentices. Moreover, every workshop had to become a member of a trade guild. Because this was mandatory, the system led to a high degree of organization in the trades (Greinert 1994). The journeyman’s certificate was not only a form of institutionalized cultural capital that regulated and restricted access to one’s field; it also allowed German craftsmen to take up a position of trust, a kind of symbolic capital, which structured their social relationships with nonmembers in the field regardless of individual skills. German craftsmen thus cultivated a particular preindustrial mentality, a habitus grounded in a long and painstaking apprenticeship, whereby ultimately a sense of “master craftsman’s honor” and the ideology of “high-quality workmanship” served as guiding values (Holtwick 1999; Sennett 2008).

The craftsman’s position of trust was also part of the discussion in the auto mechanics’ community, sparked as it was by complaints about the “repair chaos.”

Thereby the “physician” played a major role. It was claimed that during their apprenticeship, future auto mechanics would develop—under the strict guidance of a master craftsman—a distinct sense of responsibility. Just like a physician, the mechanic would embody the necessary expertise, as well as commitment to good practice. The advocates of an independent trade of auto mechanics argued that limited repair courses, as offered in the United States (Borg 2007), were insufficient to instill this particular sense of responsibility (Schiff 1930).

The auto mechanics’ fight for an independent profession was further embedded in the political action of representatives of the trade organizations to defend their members’ social standing and economic position. They argued that the “high-quality workmanship” guaranteed by the craft trades was a public good that deserved special protection through strict regulation of the field. Andrew Abbott has described how such public claims of jurisdiction are often used to enforce the specific interests of a profession (Abbott 1988, 59–85). He has also emphasized the role of legal regulations, “which can confer formal control of work” (Abbott 1988, 59). Despite several initiatives, the craft trades failed to put through their program during the Weimar period, but the demands were taken up by the National Socialists. After they came to power, they enacted new legislation in 1934 that introduced obligatory guilds for all recognized trades. Furthermore, in 1935 an amendment abolished the right to practice a trade, establishing the master craftsman’s certificate (*grosser Befähigungsnachweis*) as a precondition for starting a workshop (H. Winkler 1972, 184–85; Saldern 1979). The first to profit from the new legislative framework were auto mechanics. This is hardly surprising as they maintained good relations with the National Socialist Motor Corps (NSKK). Furthermore, the discourse about the future of the auto mechanics trade meshed well with the National Socialists’ plans for mass motorization in Germany (Zeller 2007). Friedrich Stupp, member of the Nazi Party and NSKK-Obersturmführer, was elected first president of the Berlin auto mechanics guild in September 1933, and only a few years later 80 percent of the auto mechanics master craftsmen were members of the NSKK (Hochstetter 2005, 115–16).

In response to the *urgency* of the repair crisis, different groups of actors engaged in reorganizing the auto mechanics trade.⁶ This led to the formation of the car mechanics guild, a new corporate body with the symbolic power to approve car repair experts (Bourdieu 1989, 23). The newly established system of obligatory trade guilds, apprenticeships, and workshops led by master craftsmen can be understood as the formation of an auto mechanics *dispositif*—as the readjustment of power relations within the field of auto mechanics. The formation was determined by the structure of the German system of trades: its common set of legal restrictions, institutions, cultural values, social relations, and practices. The societal conditioning through the tradition of this system resolved the crisis of confidence between motorists and auto mechanics by guaranteeing the trustworthiness of the latter. Henceforth, auto mechanics received theoretical training in vocational schools, and they embodied the necessary techniques, as well as a distinct *habitus*, during their

four-year apprenticeship. The new cultural capital of the journeyman's certificate not only regulated access to the trade but also equipped auto mechanics with an unquestionable expertise: The truth value of that expertise was independent of the individual skills of a single mechanic as it was guaranteed by the "honor" of the craft professions. Foucault has described how the encounters between individual actors become structured by the power relation inscribed in the dispositive (1976, 120).

In comparison, in the United States the status of auto mechanics as trustworthy technical experts remained contested due to the unregulated access to the trade. As a possible solution, the auto mechanics sought to delegate diagnostic authority to instruments and measuring devices—but failed. Also, the introduction of a flat-rate system did not solve the problem of distrust because mechanics started to work hastily and thus did a shoddy job under the pressure of standardized work times (McIntyre 2000, 292). In contrast to their German counterparts, American auto mechanics have suffered an endless crisis of confidence (Borg 2007).

THE IDEAL OF THE SILENT CAR

Before describing the differentiation of listening practices attributable to the formation of the auto mechanics dispositive, I first consider two strands of discourse on the "silent car" that are closely connected to the contemporary automotive technology: noise as an audible sign of technological inefficiency and silence as a cultural expression of modernity and distinction.

After 1900, engineers showed increasing interest in reducing the noise of production equipment. As Karin Bijsterveld has shown, "noisy machinery" became an "indication of mechanical inefficiency" (Bijsterveld 2006, 328–29). This special discourse entered the automotive engineering community, too: Research on noiseless car components, especially noiseless sprocket chains, pertained to theoretical concerns, as well as the production process. Chain drives had the advantage of being quieter than spur wheels. Corresponding articles in trade journals described sprocket chains as efficient and modern (M. 1919).

Advertisements for "silent car components" in consumer magazines clearly show the circulation and significance of the special discourse beyond the field of engineering. Manufacturers informed automobilists that *Fichtel & Sachs* roller bearings "reduced fuel and lubricant consumption" and "guaranteed the silent run of the engine"—or that *ZF* gearwheels were the "wheels of choice for the silent gear box" (Fichtel & Sachs 1928; *ZF* 1930). Science journalist Walter Ostwald (1921, 11) commented on the "silent car" craze: "Noiselessness is more than a fashion. A noise always points to a waste of energy. Therefore, the longing for noiselessness, if fashionable, is at least a good and useful fashion."



Figure 3.3 Detail from advertisement for silent-running pistons: “Running smoothness matters!” *Allgemeine Automobil-Zeitung* 41(49) (1940): 839.

Furthermore, the advertising of car manufacturers promoted noiselessness as a distinguishing mark of modern and elegant passenger cars. The Citroën-Phaeton stood out with its “noiseless and flexible working engine” (Citroën 1928), Brennabor’s Juwel had an “inaudible engine full of adaptable power” (Brennabor 1929), and a positive feature of the Primus was its noiselessness, achieved by the “generous use of rubber for sound insulation” (Adler 1932). Articles offered advice to motorists and auto mechanics on how to get rid of squeaks and squawks (Ostwald 1923). These little noises were not just a nuisance but also an embarrassment to the car owner. An ad for suspension covers came with an illustration of a young driver whose car’s suspensions screeched so loudly that his spouse, as the accompanying poem clarified, preferred to take the train back home (Vogelsang 1937).

“Noiselessness was [not only] the mark of a good car” (K. 1927) but also a sign of good manners and distinction as contemporary antinoise advocates stressed (Bijsterveld 2008). Significantly, the propaganda of noise-abatement campaigns, class habitus, and engineering discourse converged in this set of values. Mechanical efficiency and social distinction urged car owners to listen to their cars even more carefully and to complain about each tiny noise. However, as we will see later, automobilists who insisted on the promised “silent run” of their machines were often denounced as “noise fanatics.” In the eyes of the mechanics these drivers took the advertisements far too seriously.

DIFFERENTIATION OF LISTENING PRACTICES

From 1934 onward, the expertise of German auto mechanics was basically guaranteed through their obligatory four-year apprenticeship. During this period the future mechanic worked in very close contact with a master craftsman or a journeyman to learn by observing and imitating. To ensure the quality of their bond, a master craftsman was not allowed to train more than two apprentices, while a journeyman could supervise only one apprentice. During the first six months, apprentices only lent a hand to their mentors, after which they continued with simple tasks like lubricating or checking the tire pressure. In the second year, they learned to diagnose uncomplicated malfunctions, but they were not allowed to carry out maintenance work themselves until the third year of their apprenticeship. In addition, apprentices had to learn a wide range of metalworking skills, such as filing, drilling, milling, turning, and welding. This set of manual skills emphasizes the status of *bodily knowledge* in the auto mechanics trade (Kümmer 1941; Zogbaum 1937).

Training manuals did not explicitly mention specific auto mechanics' skills, such as diagnostic listening. Apparently, such skills were considered part of the practical learning process—based on imitation of the master craftsman. Inherent in the notion of the apprenticeship system was the substitution of codified knowledge through the practical skills apprentices would pick up in their years of practice: They learned by doing. Douglas Harper has shown how car repair knowledge is informally passed on in this manner (1987, 24–31). It involves a practical repertoire of imitated actions rather than models, a process of acquisition Bourdieu calls *mimeticism*: “Bodily hexis speaks directly to motor function, in the form of a pattern of postures that is both individual and systematic, being bound up with a whole system of objects, and charged with special meanings and values” (Bourdieu 1990, 74). In a similar way, Harry Collins speaks of the “unconscious emulation” of uncognizable knowledge (Collins 2001, 72).

During the formative period of the auto mechanics dispositive, individuals questioned the position of car owners as knowledgeable amateur mechanics. Under the programmatic title “Hands Off,” in May 1933, the readers of the *Allgemeine Automobil-Zeitung* were urgently requested not to repair their cars themselves because they lacked the necessary abilities. Furthermore, drivers were instructed to ignore little noises that are just a nuisance. Only if they heard a “threatening noise” (Gefahrengeräusch) should they bring their car to a specialized repair shop (Anonymous 1933). Both articles supported the professionalization of the auto mechanics trade. As such they glorified the “high-quality workmanship” and devalued the knowledge of all nonexpert mechanics.

Concomitantly with the stabilization of the dispositive through the 1934 legislation, the new picture of the lay motorist became clearer. As one author put it,

“The rising spread of automobiles goes hand in hand with the diminishing number of knowledgeable motorists” (Rdl. 1936). One cause was seen in the technical level reached in the automotive industry, which made cars more and more reliable, but more important, it was assumed that most people were just “terribly clumsy” (Rdl. 1936). The shifting balance between motorists and auto mechanics can further be observed in the rhetorical shift from *reparieren* (repairing) to *basteln* (tinkering). This semantic turn excluded automobilists from the discourse on automobile repairs. Furthermore, it sustained the new boundary between expert mechanics and lay drivers along the line of technological knowledge (Franz 2005). Automobilists’ journals no longer published articles on how to acquire diagnostic skills or provided real repair instructions. Instead, they advised the automobile enthusiasts on how to tinker with their cars (Rdl. 1938).

On the other hand, letters that ended up in the *Briefkasten* section suggest that motorists changed their practices only gradually. In the latter part of the 1930s they still listened closely to their cars, sent in their self-diagnoses, and asked for advice on how to tackle the problems. However, in contrast to the situation several years before, when readers were advised to “listen in” themselves, they were now urged to consult expert mechanics. In addition, the automobile club journal published lists of reliable workshops and informed its readers that most of their trouble with mechanics could be traced back to the readers themselves: They were blamed for having unrealistic ideas about prices and repair times (Dill 1936). Another article argued that motorists should learn not to bother auto mechanics with their self-diagnoses: “If your car is more important to you than your rhetorical exercises, let the master craftsman do the job” (W. 1938).

In the late 1930s an interesting discussion arose about the right of motorists to observe the repair process inside the workshop. The *Allgemeine Automobil-Zeitung* argued that, in particular cases, such as the repair of a rare make, a driver could potentially provide help to the mechanic because of his own special knowledge of the car (Peter 1938). In a direct response, *Krafthand*, the trade’s official journal, dismissed this as an offensive intrusion into the mechanics’ backstage domain—and as a blunt articulation of distrust (Goffman 1959, 111–21). The journal advised its readers to follow a strict policy of trust: “The motorist who distrusts a workshop should look for another one. One does not go to a physician whom one does not trust, either” (Anonymous 1940). The car mechanics’ exclusive access to the actual workshop became part of the dispositive. The new official master craftsman’s handbook proposed a ground plan for garages that separated motorists and mechanics (Kümmer 1939, 250): The showroom and a special waiting room for customers served as the front domain, where the master craftsman met his clients, whereas the backstage of the workshop was for mechanics only. In this way the establishment of a trusting relationship between mechanics and motorists simultaneously gave rise to new barriers.

The discourse on lay motorists illustrates, moreover, how the trade used this discussion to demarcate its new boundaries. The cartoon series “Kunibald, the Smart Customer” portrayed the “dull” lay driver. Kunibald is a motorist who tries

to diagnose and repair his car on his own, and he often disregards his mechanic's advice, but in the end he always fails and must admit that he should have taken his car to the garage (Jonny 1937). Another fictional story describes a neurotic motorist who always does everything himself, but, like Kunibald, he finally ruins his car and needs the help of a professional mechanic (Windecker 1937). I suggest a reading of these narratives as stereotypes in which the emerging auto mechanic's habitus gradually became visible. They exemplified the "social viewpoint" of an average auto mechanic, and at the same time the "shop talk" structured future encounters between mechanics and motorists by suggesting the proper front-stage behavior (Goffman 1959, 175–76).

As mentioned earlier, the struggle for listening expertise culminated in complaints from mechanics about "noise fanatics": "As you know, there are so-called noise fanatics who can drive a busy master craftsman crazy with their accounts of, sometimes real and sometimes imagined, noises they heard" (Anonymous 1938). Another article elaborated: "He is often bothered by noises that exist only in his imagination. The fact that he is always sure where the noise comes from does not make him any more likeable because mostly he is wrong, thus leading the craftsman down the wrong road" (Anonymous 1939). With the topos of the "noise fanatic," auto mechanics reclaimed the practice of diagnostic listening as their exclusive domain: "When looking for a noise source, never ever let yourself be influenced by the customer" (Anonymous 1939). By denouncing them as overanxious and unknowing, mechanics deprived motorists of their listening expertise. This was not a matter of whether or not they actually lacked such expertise; rather, it followed from their newly gained status as nonexperts. As a result, the motorists' practice of diagnostic listening was reconfigured as illegitimate.

At the same time, the narrations about "noise fanatics" demonstrate why ordinary drivers, though expelled from the realm of diagnostic listening, should nevertheless listen to their cars. One article noted: "The expert's trained ear knows the sound of the engine; he distinguishes between healthy sounds and noises that indicate an upcoming problem. In contrast, the layman is often anxious about harmless noises. But it is still better for him to consult an expert in vain than to disregard noises until the engine has a serious problem" (Anonymous 1936). The latter type of driver was also called the "noise phlegmatic" (chapter 2). Another author explained: "He is not worried when his car rattles and squeaks at all ends and when the chassis together with the engine plays a free concert. . . . Because the noise phlegmatic has a tin ear, this symphony does not disturb him; he will not do anything until his heap breaks down. We find these people just as disagreeable" (Anonymous 1939). Following this rhetorical confrontation, motorists should on no account "listen to diagnose" malfunctions, but they should always "listen while driving" to recognize technical problems in time. In other words, the "sonic contradiction" urged automobilists to listen carefully but not to listen thoroughly.

The ban of private car use in Germany in February 1942 temporarily suspended the struggle between motorists and car mechanics—at a point where the latter had gained the upper hand. After the war, journals for automobilists, such as

ADAC Motorwelt, predecessor of the *Allgemeine Automobil-Zeitung*, and *Auto Revue*, revived some of their old features and columns. For example, the “travel box” section advised readers on their travel plans (Anonymous 1950a). Nevertheless, the technology-oriented *Briefkasten* section was not taken up again in the 1950s. Nor did these journals continue to publish detailed instructions on how to diagnose and repair malfunctions as they had done in the interwar period. Apparently they no longer recognized readers as interested and competent in these matters: Regardless of individual listening techniques, the motorists’ practice of diagnostic listening was apparently dismissed as irrelevant or inappropriate. On the other hand, trade journals for auto mechanics continued to publish articles on how to locate audible malfunctions. This underscored the role of listening as a diagnostic technique (Anonymous 1955). As indicated in the introduction, trade advocates also continued their polemics against ordinary motorists, but they were no longer the subject of editorials. Instead, these narrations were taken up in cartoons and small columns on “real” and instructive incidents. Thus, they became part of a folkloristic reassurance of the auto mechanics’ own exclusive expertise. The craft professions habitus barred motorists from car diagnostics and contested even their monitory listening skills—without denying them the latter practice.

CONCLUSION

As I argue in this chapter, listening to automobiles was a common technique among motorists and auto mechanics during the 1920s. At the end of the decade, however, the repair crisis posed a threat to the growth of the automobile system, and in response to this urgency different groups argued in favor of a rigid organization of the trade. This strategic movement led to the formation of an auto mechanics dispositive that altered the balance of power between motorists and auto mechanics. The new social logic devalued the knowledge of ordinary automobilists, which can be read as an adjustment to the new dispositive (Foucault 1978, 121). In the new situation, motorists listened while driving to recognize technical problems in time, and mechanics listened to thoroughly diagnose these malfunctions. The genealogy of listening practices shows that the claim for expertise in diagnostic listening was merely certified by the auto mechanics’ position of power (Foucault 1976, 120). So, rather than personal skills, their habitus decided on the truth value of their knowledge, and concomitantly the motorists’ habitus was altered by the submission to the *doxa* of the field, which limited their scope of action accordingly.

NOTES

¹ My translation. I have also translated all of the sources cited in this chapter that were not available in English.

- 2 For the distinction between different modes of listening (monitory listening, diagnostic listening, exploratory and synthetic listening), see Bijsterveld (2009).
- 3 Bourdieu uses the term *hexis* instead of *technique du corps*.
- 4 In the early postwar years, for example, the same articles appeared in periodicals for mechanical engineers and ordinary motorists (Ostwald 1921).
- 5 This amounted to 290 persons per car in Germany, 6 per car in the United States, 60 in the UK, and 71 in France.
- 6 For Foucault a societal crisis, *urgency*, is the trigger for the formation of a dispositive, see Foucault 1978, 120; Bührmann and Schneider 2008, 53, 61.

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