

Soundcarrier

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Introduction

Music is carried by airwaves vibrating at around 50 to 20,000 cycles per second (the full range of hearing in a healthy adult). During the eighteenth and nineteenth centuries, scientists discovered how to detect traces of these vibrations, and in 1877 two inventions contrived the means to transmit these waves electrically (the telephone, invented by Alexander Graham Bell) and mechanically (the phonograph, invented by Thomas Edison). The two technologies are significantly different. The telephone is a simultaneous form, like radio, in which the sound waves are transient. In the phonograph, the sound waves were given durable form by the cylinder, which constituted the soundcarrier proper (later replaced by the disc, or record). Since the record needed a machine for it to be played on, it was thus a linked commodity, like the camera and film, and this linkage helped to determine the pattern of its exploitation. The record was both durable and a commodity of an entirely novel type: it turned the performance of music, which was previously as ephemeral as speech and involved the presence of the musician, into a disembodied material object that could be bought and sold. This factor would completely change the political economy of the music business.

Mechanical Technologies

The record was the first of several types of soundcarrier that would revolutionize the form and reach of music in the course of the twentieth century, but at first its effects were muted. A vivid demonstration of scientific magic, it nevertheless suffered from severe technical limitations - namely, a very limited frequency range and high levels of noise and distortion. For the telephone, such limitations were less serious, for it was found that the human brain needs remarkably little information to understand speech, and the narrower the bandwidth, the easier the design of the equipment. Vocal and instrumental music were more problematic. Thus, while the telephone experienced slow but steady growth, the early phonograph was little more than a novelty, the stuff of entertainment arcades and 'educational' lectures.

Moreover, as long as the soundcarrier took the form of a cylinder, the invention that promised repeatable recording but not its replication was able to capture the imagination but not to satisfy the demand it aroused. The problem with the cylinder was that every recording was in effect an original: there was no means of mass production. At best, it was possible to produce a few recordings at a

time or to copy them on a pantograph. Only the disc, patented in 1887 by Emil Berliner, made mass production possible, and thus enabled musicians, as Berliner himself put it, 'to derive an income from the royalties on the sale of their phonautograms' (quoted in Gelatt 1977, 38). Musicians quickly began to experience recording as a new and contradictory form of exploitation, in which other people were always making more from records than they were, although the rewards to be gained with success often outstripped all other sources of musical moneymaking. At the same time, the disc produced a separation of functions through which the figure of the consumer was constituted, since henceforth the cumbersome and more costly disc-cutting apparatus needed for recording was restricted to professional usage, and machines sold to the record buyer were capable only of playback.

The aesthetic effects of the mechanical soundcarrier, which now began to manifest themselves, were several and cumulative, and can hardly be considered apart, as if they were mere byproducts or epiphenomena. They were present from the outset and took multiple forms that conditioned the evolving political economy of the record industry, along with modes of both listening and music-making. In the first place, there was the physical separation of listening and performing, which had various implications. On the one hand, the performance became disembodied, transportable and vendible; this was to alter ways of listening by taking music into new settings, placing it in new surroundings. Indeed, the record, by carrying music into a whole range of new spaces, took it not only beyond the reach of the individual musician, but also beyond the sphere of printed music. This had an explosive effect on popular musics, as singers and players could now be imitated by those who could never hear them in person, and who often had no formal musical training to boot. The result was the rapid development of new styles through imitation and emulation, in which the soundcarrier displayed a double character, promoting both the song and the singer, both the music and the way it was put across. At the same time, musicians were able for the first time to hear themselves as others heard them. This, in the case of classical traditions, would change the nature of interpretation, which, as the musicologist Richard Taruskin has charted, became progressively less subjective and more analytical (Taruskin 1988).

In both cases, mechanical reproduction had effects on what Roland Barthes (1977), reviving a medieval term, called *musica practica*: the everyday practice of music, as opposed to its theory; music by ear rather than by the book, the practice through which it is transmitted from generation to generation, and which every generation modifies according to its own needs.

Moreover, from the earliest days, the record had a multiplier effect with a dynamic spatial and geographical character. From the moment it achieved success, the record industry, like cinema, was international. A recording could be made anywhere, not only in the place where it was to be manufactured and sold. For example, Italian immigrants in the United States provided a market for

records of operatic excerpts recorded in Italy, where opera was a popular art form. This market grew sufficiently large and influential that a record of Enrico Caruso singing 'Vesti la Giubba,' issued by the Victor company in 1907, became the first disc to sell a million copies.

Recordings of operatic excerpts by the leading singers of the day helped to establish the phonograph's credentials as a respectable form of diversion, although classical music already represented only a fraction of the market - according to an advertisement by the Victor Talking Machine Company in 1905, popular artists outsold opera singers by three to one or more, but there was 'good advertising in Grand Opera' (quoted in Gelatt 1977, 30). A double pattern of recording - records for the home market and for export to immigrant communities - meant that, from the very beginning, an enormous range of musics was recorded. By 1900, the catalog of the London-based Gramophone Company already offered 5,000 titles, including recordings in English, Scottish, Irish, Welsh, French, German, Italian, Spanish, Viennese, Hungarian, Russian, Persian, Hindi, Sikh, Urdu, Arabic and Hebrew, and the company had factories making discs in Britain, France, Spain and Austria; it also had plants in Riga, Latvia, serving the Russian market, and in Calcutta, serving the Far East. As a portable mechanical novelty, the phonograph penetrated communities all over the world in advance of electricity. In India, where there were no music publishers but a huge potential market, the Gramophone Company engaged musicians to train suitable singers and to set poems to music for them, thereby generating a supply of 2,000-3,000 new songs every year. The result was not only to secure the company a near-monopoly, but also to create a musical genre that would enter the cinema with the emergence of the Indian film musical in the 1940s.

Electronic Technologies

When electrical recording was introduced in 1925, as a result of research into telephony and the development of radio technology, not only did phonographs with electric motors, amplifiers and loudspeakers bring a huge improvement in quality, but amplification took recorded music into public spaces previously denied to the weak sound of the horn, thus extending its domain and producing new ways of using it. The cinema applied amplification to its own form of soundcarrier, the optical soundtrack. Meanwhile, records were played down telephone lines to be amplified as Muzak in factories, restaurants, hotels, salons and swimming pools. At the same time, the record developed a symbiotic relationship with radio. Radio learned to use records to fill up airtime, while the record industry used radio as an aural showcase. Both roles were facilitated by the appearance in the 1930s of the disc jockey, who would subsequently redefine the character of the record as a cultural object for new generations. The record industry thus lost its independent character, becoming incorporated into a much larger cultural industry, which after the middle of the century became increasingly transnational.

In the mid-twentieth century, postwar reconstruction brought renewed vigor to the market. First came the introduction of two new formats, both using smaller grooves known as 'microgrooves': the long-playing record (LP, revolving at 33 1/3 rpm) for classical music and albums; and the 7" (18 cm) 45 rpm record, which came in two forms - extended play (EP) for classical music and the so-called 'single' for pop music. The single had the same duration as the 78. It therefore preserved the restricted, established form of the commercially successful pop song, rather than developing it in line with the potential for longer recording and playback times made possible by the new format of the soundcarrier (which began only in the late 1960s). When electric recording had been introduced in the mid-1920s, the new equipment had been backward-compatible - the new machines had been able to play the old format. This time, the solution was to incorporate the old format alongside the new, to allow the market a period of transition, and the standard domestic gramophone was equipped to play 78s, 45s and LPs of all sizes. Later, when stereophonic sound was introduced in 1958, there was again backward-compatibility with existing microgroove records, which could be played on the new equipment. But this was not the case with the introduction of the compact disc (CD) in 1977, which was a completely new format.

Aesthetic Effects - I

Initially, the range of forms that the record could carry was restricted by the technical constraints of early recording systems, including the brief duration and limited tonal range of the record. While the extended works of classical music were chopped up into sections without regard to their musical logic, popular musical forms like dance music were truncated so that they could be squeezed into the three minutes that constituted one side of a 78 rpm record. This forced the music to become more concise, terse and economic, often to the detriment of musical content and quality. Thus, as the market expanded and demand increased, music publishers in the major centers of the music business organized the supply of new songs as a production line, with a consequent standardization of form that the philosopher Theodor W. Adorno (1967) would describe as 'always new and always the same' (126). Adorno infamously failed to distinguish between Tin Pan Alley and jazz as a musical art form, where the improvisational nature of the music prevented the publishers from exercising control. Here, creative musicians, including blues singers, often turned the need for discipline to good account, and the disc spurred the development of many new musical genres to fit the format. Moreover, the record played a key role in the international dissemination of jazz beyond the United States, and in the creation of a new musical idiom that became the lingua franca of a popular music which was disseminated on every continent of the globe.

At the same time, while the record industry constructed early paradigms of a new kind of international company with global ambitions, culturally speaking the record only accelerated an age-old characteristic of music. Since music is portable and travels easily, musical cultures were rarely isolated, and for

centuries every wave of migration and conquest had had the effect of producing musical cross-fertilization. Mechanical reproduction intensified this process by opening up musics everywhere to new foreign musical influences. Because the industry was based on the commercial aspect of the record and was controlled by advanced industrial capital, the principal effect was the beginning of the Westernization of non-Western musics. Nonetheless, musical influences traversed the world in different directions. By the late 1920s, when Russian musicians were playing jazz in Moscow, recordings of popular music were being made in Southeast Asia that incorporated the Hawaiian guitar. In the 1930s, Eastern European Jewish immigrants to Palestine were composing Argentinean tangos in Hebrew with Hasidic-inflected melodies. In the 1940s and 1950s, records of Caribbean music began to find their way to Africa by means of black intellectuals meeting at universities in England and France, sowing the seeds for new styles of African urban music such as Congo-Latin.

Tape Technologies

The 1930s saw developments in an alternative recording technology, employing a different soundcarrier in the form of the magnetic tape recording, a method pioneered in 1898 by the Danish inventor Valdemar Poulsen using wire as the soundcarrier. Originally held back by the lack of amplification, the development of magnetic recording was taken up again in the 1930s, when the BBC tried out machines using a polished metal strip as the soundcarrier (soon discontinued because it was deemed too dangerous), and a plastic-based tape was developed in Nazi Germany under conditions of military secrecy. The latter development was appropriated by US entrepreneurs in the late 1940s when they acquired the patents as part of the spoils of war. Within a few years, magnetic tape completely took over the recording process not only in the record industry and radio broadcasting, but also in film production, and it was soon being sold to the affluent consumer for amateur use. Then, in 1963, serious competition was brought into the popular consumer market with the introduction of the audio cassette, which married tape to the battery-powered transistor radio introduced in the 1950s. Miniaturization and the compact cassette not only gave tape a new cheapness and portability, but, because it reunited the functions of recording and playback, also allowed ease of duplication at the edge of the market and outside it, thus contributing to the growth of new forms and styles before they were recognized by the major record companies. The technology was also applied to the television signal, and the first professional videotape recorders appeared in the mid-1950s, although it was almost 20 years before improvements in video recording technology led to the introduction of domestic videotape machines using a similar format to that of the audio cassette, and rather longer before the equipment became genuinely portable.

The soundcarrier had now taken on multiple forms. On the one hand, it was divided into those dedicated to sound alone, and those that incorporated the soundcarrier into an audiovisual medium. On the other hand, it was divided into formats that only carried and reproduced the sound, and those that also

captured and recorded it. The original cylinder phonograph did both. Disc technology separated these functions, marketing the former to the consumer and restricting the latter to professional usage. Tape reunited what the disc system had separated - the functions of recording and playback - thus handing over to the consumer the means of production of recordings, even though the quality did not originally match professional standards. Nevertheless, it promoted recording by amateurs both in the reactive form of copying records and taping from the radio, and in the proactive form of making music and recording it. Rock groups started making demo tapes - amateur recordings intended to attract the attention of talent-spotters. Often, a recording would be made on a high-quality reel-to-reel machine and then distributed on cassette.

Above all, the cassette accelerated and extended the reach of recorded music. In Western countries, it intensified a market that had already penetrated virtually every social class, especially among youth; in the underdeveloped world, it spread through the shantytowns of cities like Lima or Johannesburg, and reached the most isolated villages in the Andes or the Sahara. Everywhere, it created local markets just large enough to sustain minority tastes and new trends by musicians marginal to the international music industry, and often served as a means of disseminating musics suppressed for political reasons. The phenomenon was repeated the world over, in Nigeria and Indonesia, Israel and India, Turkey and China, which all had their own forms of 'cassette music' (see Manuel 1993).

From the point of view of consumption, a proliferation of technically different types of soundcarrier competed for the consumer's attention. On the supply side, however, at the level of production, there was both diversification and convergence. The various media used different forms of soundcarrier (although the content was readily transferable between them), and they dealt in the same double contents, the song and the singer, which they traded among themselves. Here, the soundcarrier was incidental, a technical detail. On the other hand, the ease and cheapness with which the recording could be copied also increased the practice of piracy, which was destined to grow with further technological advances.

Digital Technologies

The record companies fought back against piracy in the same way as they had combated competition from alternative entertainments: they introduced another new format. The CD, like practically all new record formats before it, used the classical market to establish itself and then took over the popular market. Not everyone agreed on the superiority of the new soundcarrier; some insisted that the sound of the new digital form of recording was colder than that of the existing analog systems. But the economics were decisive. While the consumer continued to pay high prices for a soundcarrier that was at the cutting edge of technology, the costs of production rapidly fell, and the producer's profit margins went up - conditions that encouraged diversity and the exploitation of

the archives left behind by previous formats.

By the 1980s, the diversification of musical voices promoted by the proliferation of the soundcarrier was reflected in a reversal of flow from advanced to underdeveloped countries, with the rise of the trend known as 'world music.' At the same time, new musical forms like rap spread like wildfire around the world from their individual points of origin. Meanwhile, as the soundcarrier took on digital form, which made it even easier to transfer from one format to another, the physical nature of the carrier ceased to govern the manner in which the music reached the listener, and convergence also meant that music was increasingly able to escape constraints resulting from either technical boundaries or claims of ownership - thus returning to something like the condition of music before the advent of mechanical reproduction, when a good song circulated freely.

A new stage arrived in the 1990s, with advances in computer technology and the growth of the Internet, which affected both the creation and the distribution of music. Back in the 1950s and 1960s, computers and other devices had been used by the pioneers of electronic music, who stored the results on magnetic tape. When keyboard synthesizers first appeared on the market in the late 1960s, they represented a new performing instrument - while samplers and sequencers, with their own built-in storage devices, became studio gizmos. When all these were interfaced with the computer through a protocol called MIDI (musical instrument digital interface), introduced in 1982, the computer started to become a new means of musical creation, a tool of composition not as notes on paper but in sound - a trend that took off when hard disc storage grew large enough for the computer to become a soundcarrier in its own right.

Since the sound signal was now recorded not as an analog waveform but as a digital data stream, it also became capable of streaming over the Internet and being stored on other new types of memory-storage devices produced by the computer industry. The most radical effect of this new technological revolution took shape in the late 1990s through a computer program called MP3, which packaged sound files for dissemination over the Web. Using MP3, millions of people were able to download free music, much of which had been pirated, generally causing the record companies great anxiety on account of falling sales. The result was that the record companies took action against Napster, the company that promoted MP3 on the Web, and it was forced to close down operations in 2001. However, at this time, it seemed unlikely - given the unruly character of the Internet, the resourcefulness of computer programmers and the avidity of the audience - that the free dissemination of music on the Web could be halted.

Aesthetic Effects - II

The aesthetic effects of the mechanical soundcarrier began with the divorce between the location of performance and the site of listening. The reception of

music changed radically in the process, often by releasing music from traditional constraints. As a result, musical culture underwent changes and shifts both positive and negative. Classical traditions acquired a larger audience than ever before, but the record congealed performance, the listener was deprived of the physical presence of the performer, and music came to be experienced as an interchangeable series of physical objects rather than a living experience. In popular musics, the huge expansion of the record market promoted, on the one hand, a formulaic production line for new material and, on the other, new forms and styles of performance with varying degrees of authenticity and originality. Often, these were correlated with subcultural social movements, especially with the growth of teenage and youth culture which developed out of postwar reconstruction in the 1950s, a process that intensified the age-old links between musical taste and social identity.

All along, the reception of the record has been mediated by the construction of the figure of the consumer as record collector, as adumbrated in the magazines and reviews that have grown up to promote the record industry. However, while music has been divided into different compartments for the purposes of market management - literally so in the topology of the record store - at home listeners are liable to take over by mixing up the records they listen to, often in blithe disregard for both social expectations and the received hierarchy of taste.

There has been an alteration in modes of listening. On the one hand, records (like radio) induce a new passivity in listeners by relegating music to the background, placing it in situations where it is only half-heard (as, similarly, wallpaper is chosen and then ignored). On the other hand, the record can intensify receptivity, by allowing listeners to match music to mood or simply to listen to it undistracted in the most intimate setting. Indeed, the gamut of social space is reconfigured by means of sound reproduction, from the home to the shopping mall, by way of the jukebox in the café or bar, the cassette player in the automobile and the ghetto blaster on the street. Also, the Walkman allows listeners to wander around freely within their own bubble of music. The results of this ubiquity raise questions about control over the sound environment - from specific noise that precipitates domestic arguments and disputes between neighbors (even the murder of persistent noise-makers) to a general increase in noise that has deleterious effects on psychological and physical health. But the soundcarrier also lends itself to the creative uses of the imagination in the most unexpected ways. The machine designed to record and reproduce can be made to manipulate the sound, especially in conjunction with ancillary equipment. The tape recorder thus became an inventive tool in the creation of esoteric electronic music in the 1950s, and commercial popular music not long afterward. As mixing, multitracking and remixing became primary techniques, a new technical form of musicality began to emerge, often associated with the creative input of the record producer, who thereby acquired special cultural status. This tendency for the soundcarrier to behave in certain conditions like a musical instrument goes further than the general law whereby technological

inventions typically lead to uses that could not previously have been imagined. Thus, even the record player, which only replays old LPs, can be used as an instrument, in the form of record scratching, in which records are manipulated on turntables by being jiggled backward and forward under the pickup to produce not a reproduction of the music, but a series of more or less rhythmic noises. A transgression of intended purpose, not to mention musical norms, nothing symbolizes better than the art of the record scratcher the paradoxical double character of the soundcarrier in its evolution from mechanical novelty to major determinant of the shape of musical culture at the beginning of the twenty-first century.

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