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## *The Electric Revolution*

The Electric Revolution extended many of the themes of the Industrial Revolution and added some new effects of its own. Owing to the increased transmission speed of electricity, the flat-line effect was extended to give the pitched tone, thus harmonizing the world on center frequencies of 25 and 40, then 50 and 60 cycles per second. Other extensions of trends already noted were the multiplication of sound producers and their imperialistic outswEEP by means of amplification.

Two new techniques were introduced: the discovery of packaging and storing techniques for sound and the splitting of sounds from their original contexts—which I call schizophonia. The benefits of the electroacoustic transmission and reproduction of sound are well enough celebrated, but they should not obscure the fact that precisely at the time hi-fi was being engineered, the world soundscape was slipping into an all-time lo-fi condition.

A good many of the fundamental discoveries of the Electric Revolution had already been made by 1850: the electric cell, the storage cell, the dynamo, the electric arc light. The detailed application of these inventions occupied the remainder of the nineteenth century. It was during this period that the electric power station, the telephone, the radio telegraph, the phonograph and the moving picture came into existence. At first their commercial applications were limited. It was not until the improvement of the dynamo by Werner Siemens (1856) and the alternator by Nikola Tesla (1887) that electrical power could become the generating force for the practical development of the discoveries.

One of the first products of the Electric Revolution, Morse's telegraph (1838), unintentionally dramatized the contradiction between discrete and contoured sound which, as I have said, separates slow from fast-paced

societies. Morse used the long line of the telegraph wire to transmit messages broken in binary code, which still relied on digital adroitness, thus maintaining in the telegrapher's trained finger a skill that related him to the pianist and the scribe. Because the finger cannot be wiggled fast enough to produce the fused contour of sound, the telegraph ticks and stutters in the same way as its two contemporary inventions, Thurber's typewriter and Gatling's machine gun. As increased mobility and speed in communication continued to be desired, it was inevitable that, together with the act of letter-scratching, the telegraph should give way to the telephone.

The three most revolutionary sound mechanisms of the Electric Revolution were the telephone, the phonograph and the radio. With the telephone and the radio, sound was no longer tied to its original point in space; with the phonograph it was released from its original point in time. The dazzling removal of these restrictions has given modern man an exciting new power which modern technology has continually sought to render more effective.

The soundscape researcher is concerned with changes in perception and behavior. Let us, for instance, point up a couple of observable changes effected by the telephone, the first of the new instruments to be extensively marketed.

The telephone extended intimate listening across wide distances. As it is basically unnatural to be intimate at a distance, it has taken some time for humans to accustom themselves to the idea. Today North Americans raise their voices only on transcontinental or transoceanic calls; Europeans, however, still raise their voices to talk to the next town, and Asians shout at the telephone when talking to someone in the next street.

The capacity of the telephone to interrupt thought is more important, for it has undoubtedly contributed a good share to the abbreviation of written prose and the choppy speech of modern times. For instance, when Schopenhauer writes at the beginning of *The World as Will and Idea* that he wishes us to consider his entire book as one thought, we realize that he is about to make severe demands on himself and his readers. The real depreciation of concentration began after the advent of the telephone. Had Schopenhauer written his book in my office, he would have completed the first sentence and the telephone would have rung. Two thoughts.

The telephone had already been dreamed of when Moses and Zo-roaster conversed with God, and the radio as an instrument for the transmission of divine messages was well imagined before that. The phonograph, too, has a long history in the imagination of man, for to catch and preserve the tissue of living sound was an ancient ambition. In Babylonian mythology there are hints of a specially constructed room in one of the ziggurats where whispers stayed forever. There is a similar room (still in existence) in the Ali Qapu in Isfahan, though in its present derelict state it is difficult to know how it was supposed to have worked. Presumably its highly polished walls and floor gave sounds an abnormal reverberation

time. In an ancient Chinese legend a king has a secret black box into which he speaks his orders, then sends them around his kingdom for his subjects to carry out, which I gloss to mean that there is *authority* in the magic of captured sound. With the invention of the telephone by Bell in 1876 and the phonograph by Charles Cros and Thomas Edison in 1877 the era of schizophonia was introduced.

*Schizophonia* The Greek prefix *schizo* means split, separated; and *phone* is Greek for voice. *Schizophonia* refers to the split between an original sound and its electroacoustical transmission or reproduction. It is another twentieth-century development.

Originally all sounds were originals. They occurred at one time in one place only. Sounds were then indissolubly tied to the mechanisms that produced them. The human voice traveled only as far as one could shout. Every sound was uncounterfeitable, unique. Sounds bore resemblances to one another, such as the phonemes which go to make up the repetition of a word, but they were not identical. Tests have shown that it is physically impossible for nature's most rational and calculating being to reproduce a single phoneme in his own name twice in exactly the same manner.

Since the invention of electroacoustical equipment for the transmission and storage of sound, any sound, no matter how tiny, can be blown up and shot around the world, or packaged on tape or record for the generations of the future. We have split the sound from the maker of the sound. Sounds have been torn from their natural sockets and given an amplified and independent existence. Vocal sound, for instance, is no longer tied to a hole in the head but is free to issue from anywhere in the landscape. In the same instant it may issue from millions of holes in millions of public and private places around the world, or it may be stored to be reproduced at a later date, perhaps eventually hundreds of years after it was originally uttered. A record or tape collection may contain items from widely diverse cultures and historical periods in what would seem, to a person from any century but our own, a meaningless and surrealistic juxtaposition.

The desire to dislocate sounds in time and space had been evident for some time in the history of Western music, so that the recent technological developments were merely the consequences of aspirations that had already been effectively imagined. The secret *quomodo omnis generis instrumentorum Musica in remotissima spacia propagari possit* (whereby all forms of instrumental music could be transmitted to remote places) was a special preoccupation of the musician-inventor Athanasius Kircher, who discussed the matter in detail in his *Phonurgia Nova* of 1673. In the practical sphere, the introduction of dynamics, echo effects, the splitting of resources, the separation of soloist from the ensemble and the incorporation of instruments with specific referential qualities (horn, anvil, bells, etc.)

were all attempts to create virtual spaces which were larger or different from natural room acoustics; just as the search for exotic folk music and the breaking forward and backward to find new or renew old musical resources represents a desire to transcend the present tense.

When, following the Second World War, the tape recorder made incisions into recorded material possible, any sound object could be cut out and inserted into any new context desired. Most recently, the quadraphonic sound system has made possible a 360-degree soundscape of moving and stationary sound events which allows any sound environment to be simulated in time and space. This provides for the complete portability of acoustic space. Any sonic environment can now become any other sonic environment.

We know that the territorial expansion of post-industrial sounds complemented the imperialistic ambitions of the Western nations. The loudspeaker was also invented by an imperialist, for it responded to the desire to dominate others with one's own sound. As the cry broadcasts distress, the loudspeaker communicates anxiety. "We should not have conquered Germany without . . . the loudspeaker," wrote Hitler in 1938.

I coined the term schizophonia in *The New Soundscape* intending it to be a nervous word. Related to schizophrenia, I wanted it to convey the same sense of aberration and drama. Indeed, the overkill of hi-fi gadgetry not only contributes generously to the lo-fi problem, but it creates a synthetic soundscape in which natural sounds are becoming increasingly unnatural while machine-made substitutes are providing the operative signals directing modern life.

*Radio: Extended Acoustic Space*     A character in one of Jorge Luis Borges's stories dreads mirrors because they multiply men. The same might be said of radios. By 1969, Americans were listening to 268,000,000 radios, that is, about one per citizen. Modern life has been ventriloquized. The domination of modern life by the radio did not take place unnoticed; but whereas opposition to the Industrial Revolution had come from the working classes, who feared the loss of their jobs, the principal opponents of the radio and the phonograph were the intellectuals. Emily Carr, who wrote and painted in the British Columbia wilderness, hated the radio when she first heard it in 1936.

When I go to houses where they are turned on full blast I feel as if I'd go mad. Inexplicable torment all over. I thought I ought to get used to them and one was put in my house on trial this morning. I feel as if bees had swarmed in my nervous system. Nerves all jangling. Such a feeling of angry resentment at that horrid metallic voice. After a second I have to clap it off. Can't stand it. Maybe it's my imperfect hearing? It's one of the wonders of the age, simply marvelous. I know that but I *hate* it.