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The World is Loud: A History of Noise

April 2023 / 432 pages; Copyright © 2023 by Rowohlt Verlag GmbH, Hamburg

English sample of some extracts translation by Brian Poole

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Geohistory and Prehistory

The Birth of Noise

What was before the Big Bang? The question is nonsense, if you believe Albert Einstein. In his opinion, the Big Bang marked the beginning of not only space, light, and matter, but also time. Logically, there was no “before.” I’m trying – unsuccessfully – to imagine it anyway. There is an insurmountable boundary between me and the answer. If the universe originated from an unimaginably dense tiny point of mass, who or what created it? But, of course, there was no “who” or “what” either. And where did this mass come from? Space and matter had not yet been created. My head’s already spinning. At the very least, I’m sure it all started from that mysterious moment. Space, time, matter, light, and sound. But wrong again! The world still had to wait for the boom, the sounds, and the noise.

The Big Bang – A Big Misunderstanding

Our entire being, even time and space, began with a bang, with the Big Bang. Modern astronomy is based on the theory of the Belgian priest and astrophysicist Georges Lemaître (1894–1966), which he developed on the basis of Albert Einstein’s (1879–1955) theory of relativity. But it was not until 1949 that the British astronomer Fred Hoyle coined the phrase “big bang” in a famous BBC radio programme. Hoyle actually intended to ridicule the theory, which was still controversial at the time.

The bang was not a bang at all, because the physical prerequisites for cosmic noise were not yet available. They had yet to be created by the Big Bang, which today’s astrophysicists date to a point in time around 13.8 billion years ago.

Sound occurs through the propagation of pressure or sound waves when the elementary building blocks of gases, liquids, or solid bodies are made to vibrate.

Since all the early elements, in addition to time and space, did not come into being until after the Big Bang, according to the prevailing opinion, it is impossible for the Big Bang to be associated with noise. As unusual as it sounds, everything was dead silent at that moment. The Big Bang was inaudible because there was still no space in which the bang could have spread. On the other hand, its physical echo is still measurable today. As so-called background radiation, it inexorably permeates the vastness of space. In 2006, the US scientists John C. Mather and George F. Smoot received the Nobel Prize in Physics for their research into the phenomenon.

Cosmic noise is younger than time and space, but not substantially. Astrophysicists discovered that, 380,000 years after the Big Bang, a deep, mysterious sound appeared in the infinite universe. So deep that it is only measurable, but inaudible to any living being. A tiny fraction of 1 Hz – the primordial hum of the world. For science, the acoustics of the universe is still a young field of research. Thanks to the rapid development of radio telescopes over the last 20 years, all acoustic phenomena known from the earliest age of the universe can be more easily explored. There's even a simple reason why we can measure them at all today: In ever-expanding space, they took an incredibly long time to get here. The US physicist John G. Cramer (born in 1934), a professor emeritus from Seattle, succeeded in making the propagation of space, time, and matter following the Big Bang audible. In the early 2000s, he summarized the first captured signals of the Big Bang echo from almost 400,000 years ago in a sound signal of 100 seconds in length. Cramer described the sound as “that of a large jet plane in the middle of the night 30 meters above a house.”¹

But you don't need a million-dollar radio or space telescope like those used by modern astrophysicists to listen to the Big Bang. An old FM or AM radio would also do the trick. In the static between two stations, an echo of the Big Bang background noise can be heard. Albeit only a very weak one. Astrophysicists have calculated that one percent of the buzz is an echo of the Big Bang almost 14 billion years ago.

The spread of galaxies and the birth of the stars and planets of our solar system was initially a rather silent affair – despite the tremendous energies and atomic primordial forces. Sound cannot propagate in space because there is nothing there to carry it. In a perfect vacuum, everything's as quiet as a mouse. It's almost unimaginable: The gigantic explosions and mergers in the formation of stars and planets took place absolutely silently. And the hiss of the laser beam from a Star Destroyer of the Star Wars saga would also be a silent affair. Whereas the Death Star explodes in the cinema with a low-frequency bass and a huge crash, in reality it would be breathtakingly quiet. But that would hardly fascinate the moviegoer, so the terrestrial racket of Hollywood's sound factories has to be added.

¹ John G. Cramer, “BOOMERanG and the Sound of the Big Bang,” in: *Analog Science Fiction & Fact Magazine*, Alternate View Column AV-104, Washington, 2001.

The Universe Learns to Hear

It wasn't until the formation of the earth 4.58 billion years ago that things got really loud. 'Outgassing' created a primordial atmosphere. Scientists now believe that the earth's fledgling gas envelope consisted of hydrogen, helium, methane, and a few other gases. A highly toxic mixture by today's standards that would have destroyed any life immediately. But this first atmosphere made something hitherto unheard of possible: It really made a racket. Finally, the sound could spread unhindered. Volcanic eruptions, earthquakes, meteorite impacts, and other cosmic catastrophes created an acoustically diabolical din that is hard to imagine today. Noise was born.

The transformation of our planet from a red-hot celestial body to a blue one was also accompanied by loud sounds. 3.8 billion years ago, in the Archean, as geologists call the earliest eon of geological history, another sound was added: the sound of water and the seas. Researchers have calculated that it rained continuously on Earth for around 40,000 years. This could not be compared with today's precipitation, even with a heavy downpour; the biblical flood itself was a mere steady rainfall in contrast to these masses of water. The earth cooled; the seas formed.

Meteorites and asteroids – two terms for the same phenomenon – hit the blue celestial body frequently, as the young atmosphere still poorly protected the globe. The earth remained noisy due to volcanism and earthquakes. But there was still no one to hear it. Life as we know it did not yet exist. Probably the first living beings were the simplest bacteria, for whom the toxic gas mixture of the earth's early years proved an elixir. Our present atmosphere, consisting of 78 percent nitrogen, 21 percent oxygen, and some noble gases, would have killed this first life instantly. In 2017, Canadian researchers announced that they had come across traces of primordial microbes in the north of the country that are about 3.77 billion years old.

The formation of oxygen about a billion years later, generated by early bacteria, heralded the end of these earliest life forms. But it also paved the way for life that, many millions of years later, could do what we now call hearing.

[pp.48-51]

Humankind's First Major Construction Site:

What Ancient Egypt Sounded Like

Today is the big day. I hear my father feeding the animals at dawn. The birds are chirping, the wind rustling softly in the two palm trees in front of the hut, a dog barking in the distance. And like every other year, the water has turned green – as always when the sun is at its highest. It gurgles and splashes in the small ditches because the water of the Nile rises and comes closer. And yet this time everything is different. For the first time, I'm allowed to go to the big house with my father when he leaves. The house has been there for as long as I can remember. I can see it on the opposing bank, almost finished, a brightly shimmering rock hewn by human hands. Today I will see it up close for the first time. Everywhere in the village they set off. Father and I also board the boat that takes us to the other side. After mooring, we approach the construction site in the morning coolness. A strange sound is ringing in my ears: a humming and roaring of thousands of voices and strange noises. The clanging of the copper chisels, the loud barking of the foremen, the grinding crash and crunch of a large wooden sled – accompanied by the groans of the 50 men who pull the sledge up the ramp. Next to the dispensary, men sit on the floor, clamorously sharpening the copper chisels, which dull so quickly. And then there is the incessant hammering that penetrates from the quarry to here, where the strongest men break the stones off from the rock.

When the pyramid of Khufu (Cheops) neared completion around 2600 BC, several thousand construction workers were working simultaneously on the first major construction site in world history. Probably mostly free workers, as evidenced by graves found in the early 2000s, they took advantage of the seasonal Nile flood, during which work in the fields was impossible. The Greek historian Herodotus (c. 490–430 BC) estimated that 100,000 workers were needed to build the Pyramid of

Cheops. Modern researchers put the figure between 8,000 and 300,000 people.

But no matter how many there were, for the young men who came to Giza from all parts of the Old Kingdom, it would have been an incredible sight. Moreover, the background noise of the pyramid construction was also likely impressive, intimidating, and unique for the contemporaries: the hammering of the bronze tools and the clamorous tool-grinders, who probably already worked in shifts and still couldn't keep up with sharpening the chisels. The screams of the foremen, the shouts of thousands of workers, and the deafening rumble of the stone sledges. The Egyptians were already familiar with the wheel yet still didn't use it to transport loads. So heavy sleds were lugged over the sand, accompanied by the grunting and groaning of those dragging the load. Drills were noisily hammered out of hard rock such as granite on site. And for smoothing, men sanded the capstones with hard Nile boulders or sandstone itself, which yielded a particularly smooth surface.

Not only the work of the craftsmen would have caused noise. Thousands of people had to be provided with food and water, and housed at night: porters, stonemasons, carpenters, painters, cooks, doctors, and civil servants. Egypt was the high-tech capital of early history. Its engineers, architects, and officials organised the incessant supply of building materials from across the Nile, from distant trade routes, and even from the far-off Red Sea. Rumbling, knocking, booming, and bustling could be heard along these supply routes even at night.

The human ear was already the subject of medical treatment in ancient Egypt. This is documented in extant papyri from the town of Crocodilopolis, southwest of Cairo. In 1976, an Egyptologist deciphered the fragments. Amongst the ear complaints, the early medical manual noted ringing in the ears, stabbing pain, and a disease of the earwax gland, but also deafness and hearing loss. And there was also an antidote: To eliminate the ear disorder, the patient should be given a mixture of salt and tree sap.²

Religion gave rise to the first mass events in the country on the Nile. Festivals and processions in honour of the gods were as much a part of the Egyptians' annual routine as the Opet festival was to the flood of the Nile. On the forecourts of the temples, in the ports, and along the Nile, thousands gathered to celebrate the jubilee of the ruler or the arrival of gods. They were true mega-events, even by today's standards. Herodotus reports that 700,000 people gathered at a festival in the Egyptian city of Bubastis in the Nile Delta. "The Egyptians have a lot of public festivals a year, not just one. The one that they take the most trouble about is held in honour of Artemis in the city of Bubastis [...]. When the time comes for the pilgrimage to Bubastis, great crowds of people, men and women together, pack themselves onto barges and sail off. Some of the women have castanets, with which they make a great clacking, and some of the men have flutes, which they play throughout the voyage, while the rest of the men and women sing and clap their

² E. A. E. Reymond, *A Medical Book from Crocodilopolis*, Wien 1976.

hands.”³

In 1600 BC, previously unknown sounds conquered the realm of the pharaohs – the trampling and neighing of horses. They were brought there by the Hyksos people, a Semitic dynasty from the East that ruled the country on the Nile for about 100 years. Horses remained a symbol of the elite and of prosperity and were used almost exclusively by the rulers. For Ramses II (c. 1303–1213 BC), the sounds of the horse stables were a familiar part of his court during the incredible 90 years of his life. Several reliefs depict the legendary pharaoh rattling into battle on a horse-drawn chariot. Ancient Egyptian noise probably didn’t have the significance we attach to it today. It was probably a fascination that, coupled with the sight of the miracles, intoxicated people rather than worried them. And yet a legend reminds us that, even in the land of the pharaohs, noise could be nerve-wracking. When King Seqenenre had to share the rule of the country with the Hyksos around 1550 BC, he clashed with its leader. The Hyksos prince urged the Pharaoh to remove the hippos from the waters of Thebes, as they disturbed his sleep: “It is Apophis who sends you the following message: Make sure that you remove the hippos from the canal, which is located in the east of the southern capital (Thebes)! For they do not allow sleep to come to him by day and by night. For the noise they make fills his ears!”⁴

There’s no record of how the dispute ended. It’s probably a legend. However, it cannot be ruled out that, soon afterwards, there were clashes between the Egyptians and the Hyksos, who were seen as an occupying power. If legend is to be believed, the dispute over neighbourly quarrels resulted in what is probably the most terrifying form of loud noises: the noise of war.

[pp.125-129]

Intonation of the Enlightenment: The Heralding of a New Era

As the Middle Ages came to an end, a storm loomed over the horizon; at first only as a faint breeze, it developed into a roaring hurricane of noise over the next few centuries. The continent gradually freed itself from the shackles of the religious and social restrictions of the Middle Ages. Progressive mechanization, the triumph of manufactories as forerunners of modern factories, the augmentation in road traffic, and the population growth ensured that cities in particular became centres of early modern noise.

³ Herodotus, *The Histories* (Translation by Tom Holland), 2013, Book II, 59–60.

⁴ Höber-Kamel, G., “Von den Hyksos zum Neuen Reich,” in: *Kemet*, Volume 2, Berlin 2003.

The modern conception of noise as a burden of everyday life became increasingly important in the early modern period. More and more people suffered from the unwanted noises of their neighbours and from the noise of the streets and factories, but also from the elevating sound of leisure and idleness on Sundays and holidays. A growing number of intellectuals, civil servants, artists, and writers were not only bothered by the street noise; they also felt restricted in their living environment, sometimes as if their lives were threatened.

A special role in the noise of the city was played by street vendors, wandering musicians, and traveling craftsmen such as scissor grinders. While they were already to be found almost everywhere in the Middle Ages, especially on market days, from 1600 onwards their screams became part of everyday acoustic life and a noisy burden on residents and passers-by, especially in the metropolises. The cries of the street vendors had certain identifying features to signal what goods they were offering. Fishmongers cried out differently than wine and herb merchants; the hawkers of fruit and vegetables used different pitches than those selling textiles or household goods.

And the noisier the cities, the louder the street vendors became. In the early modern period, merchants screamed deafeningly to drown out the noise of passing carriages. London, in particular, was filled with the shouts with which the goods were advertised. From the middle of the 18th century, many citizens of the British Isles were increasingly annoyed by these screaming vendors. The Irish writer Jonathan Swift (1667–1745), author of *Gulliver's Travels*, complained in a letter to his friend Esther Johnson in 1712 about the cabbage sellers on Dublin's streets: "I am so very sleepy in the morning that my man wakens me above ten times [...]. Here is a restless dog, crying cabbages and savoys, plagues me every morning about this time; he is now at it. I wish his largest cabbage were sticking in his throat."⁵

For better or worse, beggars and cripples had to compete with this volume of noise in order to be noticed at all. "The common beggars, dressed in rags that don't cover half their nakedness, follow anyone who gives alms to one of their fold with the utmost impetuosity and entreaties and supplications, using expressions and tones that would affect anyone but the hearts of reckless Frenchmen," wrote the German composer Johann Friedrich Reichardt (1752–1814), known for having set Goethe's poem of the *Erlkönig* to music.⁶ Yet although, according to his own statements, Reichardt had regularly given alms to beggars, he lost his composure when screaming vendors intruded into the field he worked in. After visiting the Paris Opera in 1802, he wrote the frustration out of his soul: "Between the acts, the mongers of lemonade, orangeade, ice cream, and fruit (...), and others who offer textbooks, evening papers,

⁵ Swift, *Journal to Stella*, Volume II, London, 1948, p. 581.

⁶ Johann Friedrich Reichardt, *Vertraute Briefe aus Paris geschrieben in den Jahren 1802 und 1803*, Erster Theil, Hamburg, 1804, p. 253

journals and spectacles, (...) drive one to despair. This is all the more disgusting on days like this, when the theatre is so full.” The hawkers didn’t even let up after the performance, and, with their crackling, they made the heart, so blissfully filled with music, burst with anger. “Immediately after the last tragic word,” the street vendors in the foyer would again “scream irrepressibly,” tearing apart “the ears and the feelings of pensive spectators.”⁷

The street musicians, jugglers, and organ grinders formed their own group. Many came from the poorest areas of Europe, such as Spain or southern Italy. They often moved to the cities with their entire family to play for alms. In the Middle Ages, they were still a welcome change in everyday life, but in the early modern period they increasingly became a plague. Complaints about the noise of undesirable music were more often mixed with social issues. The bourgeoisie felt more and more oppressed by the itinerant proletariat and defended itself to an extent that is hardly imaginable by today’s standards. The street performers fought back in their own way – with even more music, sometimes with deliberate noise, to take revenge for their persecution and rejection. Especially during the 19th century, the anger of the bourgeoisie over the close presence of people of lower status and foreign origin was growing. Racist resentment, the dread of social decline, and the fear of crime increasingly overlapped with the fight against noise.

In the early modern period, fairs were crescendos of noise and places for completely new experiences because they attracted numerous strangers – jugglers, showmen, comedians, travelling prestidigitators and magicians, and countless traders. Above all, artists, fire-breathers, and tightrope walkers were cheered on and frenetically applauded at performances in which hundreds of people watched silently, spellbound, and cheered deafeningly when the feat was achieved. Tooth pullers, quacks, and charlatans offered their services, while travelling merchants peddled magic ointments and remedies: herbal tinctures, sea onions, pepper root, greasy ointments, and the famous theriac: a preparation made from honey, opium, angelica, and up to 300 other ingredients that were said to alleviate almost all ailments. And for the first time in their lives many city dwellers saw and heard lions, bears, monkeys, parrots, camels, porcupines, ostriches, and dark-skinned abductees from exotic lands at such markets. Travelling theatres with ensembles of up to 40 actors appeared, presenting dwarfs, deformed people, or magical tricks to the astonished crowd, and performing their plays for hours on end to the thunderous applause of the bystanders. All in all, a noisy microcosm of crude entertainment, surpassed only by Shrovetide and Carnival.

The end of the Middle Ages brought about an upheaval that is rare in history. Continuities were ruptured, certainties devastated, yet at the same time new horizons opened up. The Reformation shattered the old order and weakened the rule of the

⁷ Ibid.

Catholic Church. The 'Thirty Years' War laid waste to large parts of the continent and left Europe divided into old and new beliefs for centuries. Knowledge exploded with printing and the Enlightenment; Islam was pushed back. Galileo, Kepler, da Vinci, and Newton changed the image of the world and laid the foundations that revolutionised technology and science.

The steam engine, mechanics, and technical inventions brought the first industries, and the era of machine noise finally began. With its higher energy density, anthracite (hard coal) replaced charcoal, which was becoming increasingly scarce. Everything became dirtier, faster, more efficient, more hectic – but also louder. In short, the noise factors brought themselves into position. The new manufactories crammed people into streamlined working environments. Holistic work was replaced by the division of labour, specialization, monotony, and the first indications of work-related stress – often associated with dirt, stench, and noise for the men, women, and children working there.

Columbus opened the door to a new world – but also to the worldwide spread of the noise of modernity. It was the beginning of European expansion and the epoch of discoveries. The world began to move, trading offices connected countries and continents, and Europe began to exploit the earth. With transatlantic slavery, European countries committed the greatest crime of the millennium, one that tore millions of people away from the tranquillity of their world.

At the same time, the Enlightenment spread the ideas of freedom and equality that shook the centuries-old estate system. Voltaire, Rousseau, Hume, and Kant called into question the previous world view. The French Revolution swept away royalty and nobility, creating the continent's first true nation. Intellectuals and Enlightenment thinkers became the first noise-plagued people of the era. Leaflets and newspapers developed into mass media, and the post horn announced something new, important, yet also spectacular. Simultaneously, the traditional world rebelled forcefully against such innovations. Witch trials were reminiscent of the Middle Ages, and the Counter-Reformation struck back with all its might.

A new era had begun.

[pp.148-156]

The Noise Exchange: The Pandemonium Columbus Brought to America

The sailor Rodrigo de Triana (ca. 1469–1525), a Jew from Seville, was the first to see the new continent of America, according to a report in the logbook of Christopher Columbus. With loud shouts, he is said to have informed the crew from aboard the *Pinta* about the sighting of land on the night of 12 October 1492, at 2 o'clock in the morning. He had seen light on the horizon. The *Pinta* then gave acoustic signals to the other ships. It was an island in the Bahamas; which one, exactly, is still a controversial question among scholars today.

In addition to the printing press and the Reformation, the rediscovery of America by Columbus in 1492 was the third event that fundamentally changed the world. The age of discoveries from the 15th to the 18th century showed people how large, diverse, and rich the earth was. Just five years after Columbus landed in America, Vasco da Gama found the sea route to India. The Portuguese Pedro Álvares Cabral was the first European to see Brazil in 1500, and Ferdinand Magellan circumnavigated the globe between 1519 and 1522 – a epoch-making adventure that he paid for with his life. Jacques Cartier, James Cook, and Alexander von Humboldt followed in the ensuing centuries. Everyone was overwhelmed by the wonders of nature, the sight of foreign regions, and their novel smells. They also found that the world out there sounded very different than it did in old Europe.

Sounds and languages never heard before now reached the ears of conquerors and settlers. At the same time, the indigenous people heard noises for the first time that frightened them, and not only because of their unusual volume. In both worlds, the old and the new, an acoustic transformation of the soundscapes began, the speed of which exceeded anything previously experienced. The first unknown sounds that the conquerors brought with them were still delicate, quiet, harmless, and seductive. After landing in what is now North Carolina in 1524, the Italian Giovanni da Verrazano (1485–1528) reported how he met friendly Native Americans there. The indigenous people were particularly fascinated by the sound of small brass bells, which the sailors presented to them along with other trinkets. “We saw a lot of people on the beach, making various signs of friendship and waving for us to come ashore. (...) We ordered one of our young sailors to swim ashore, bearing with him all sorts of trumpery such as bells, mirrors, and other gifts. When he was 4 fathoms away from the natives, he threw these things to them.”⁸

⁸ Giovanni da Verrazano, “Verrazano’s Voyage, 1524,” in: *Old South Leaflets*, No. 17, 1896, p. 4.

At the time, no one suspected that the delicate sound of bells would become a noisy inferno for the indigenous people. The rediscovery of America by Europeans set in motion a cultural exchange that has been known as the “Columbian Exchange” since the 1970s.⁹ The transfer of flora, fauna, precious metals, goods, people, technologies, culture, ideas, and ultimately diseases exposed the New World in particular to changes that completely reshaped the continent within a very short period. America also had an impact on the Old World, albeit to a much lesser extent. The biological, technological, and cultural transfers have been extensively studied over the past 50 years. But the effects of the exchange on the respective soundscapes have yet to be conclusively investigated.

There was also a noise exchange of languages, natural sounds, animal sounds, machine noise, gunfire, and transport sounds. With their horses, muskets, crossbows, and cannons, around 300 soldiers in clanking armour marched through the jungles of Central America in 1519, when the Spanish conquistador Hernán Cortés (1485–1547) set out to conquer Mexico. The banging of the muzzle-loaders, the thunder of the cannons, but also the clanking of the iron armour initially frightened the indigenous inhabitants and quickly made them realize how threatening these conquerors were to them. But European firearms were also fascinating, and they swiftly became an object of desire. They remained mysterious at first – not only because of their loud bang, but above all because of the invisible projectile that could kill from a great distance. New sounds also had an effect upon the conquerors. For Cortés’s men, the sounds of the Central American jungle – the tweeting, hooting, growling, and grunting of the animals – must have been simultaneously impressive and threatening, and not just at night.

When the conquistador later advanced on Tenochtitlán (now Mexico City), the Aztec emperor Moctezuma II (ca. 1465–1520) must have suspected that violence, death, and a turning point would ensue. Just days previously, Cortés had already fought fierce battles with another tribe. Especially the noise of the Spanish muskets, but also the smell of gunpowder, had engendered fear and terror among the locals. Aztec envoys described to the emperor what was going on: “A great clamor arose when they marched, their iron shirts, their iron swords, their iron helmets, and all their weapons clanking loudly like rattles. Some were dressed from head to toe in glistening iron. These shiny iron men terrified everyone who saw them.”¹⁰

The European conquerors did not come to a peaceful continent. The Inca, Maya, and Aztecs had been involved in armed conflicts for centuries and had cruelly subjugated other peoples; nevertheless, they were at the mercy of the power and noise of cannons and muskets. Moreover, the conquerors did not encounter

⁹ Alfred W. Crosby, *The Columbian Exchange: Biological and cultural consequences of 1492*, Westport, 1972.

¹⁰ Wolfgang Behringer (ed.), *Lust an der Geschichte: Amerika – Die Entdeckung und Entstehung einer neuen Welt*, Munich, 1992, p. 155.

primeval forests and rural idylls everywhere. Although many peoples still lived as hunters and nomads, especially in southern North America and in Central and South America, the continent was already filled with noisy urbanity. From 1000 AD onwards, the Anasazi built cities out of stone, housing several thousand inhabitants. Researchers assume that up to 40,000 people could have lived in the stone buildings of Mesa Verde (Colorado). By comparison, at the time Cologne's population was only about half that size. The houses in Mesa Verde were then the tallest buildings in North America, surpassed only by the skyscrapers in Chicago at the end of the 19th century. The sound sphere of the metropolises was correspondingly urban. Hustling and bustling markets, brisk trade, and lively traffic between the towns and villages formed the soundscape.

Even beyond war and conquest, the sound of America changed, as it later did on other continents. The sound of everyday life evolved fundamentally due to the imported animals, technology, and ways of life from the Old World. Colonists brought mooing cattle, grunting pigs, bleating goats, baaing sheep, and even the buzzing of the Western honey bee to America. In addition to bells, the clatter of the mill wheel or the rumble of carts and carriages resounded. The rattle of the iron saw and breaking glass were hitherto unknown noises. Musical instruments such as the piano, violin, and trombone echoed through the jungles of Central America.

Of particular importance to the Native Americans was the horse, which had become extinct in America 10,000 years ago for reasons that are still unclear. Horses, with their neighing and snorting, their trampling and whinnying, were the first animals of the Old World that the inhabitants of Central America saw and heard during the conquests in the years after 1500. The horse became the most important import, especially for the indigenous people in the vast prairies of North America. It changed the way of life of many tribes there – from the earlier sedentary to a nomadic life hunting on horseback for bison and other animals. In the course of the attempted Christianization in the centuries that followed, however, the Europeans forced the Indians to settle down again – one of the many catastrophes experienced by Indian cultures. The natural sounds of forest, steppe, and prairie were replaced by urban soundscapes, the indigenous personal freedom and independent culture replaced by new sedentarism, which often ended in impoverishment and the addictive behaviour of the Indian population in reservations, especially in the 20th century.

America inadvertently became an experimental laboratory for environmental acoustics. Changes in the sound sphere that would otherwise take centuries or more took place here within years or decades. Shortly after the introduction of the horse in America, the first animals escaped into the wild and became feral. The galloping herds of mustangs in the prairies of North America were a direct consequence of European colonization. On the other hand, the conquerors managed to silence other sounds of the vast plains. The roar of the huge herds of bison disappeared forever

in the 19th century. While an estimated 30 million of these beasts lived in North America until around 1850, the population was almost extinct by 1890. Today, there are only about 30,000 bison left – a mere 0.1 percent of their original number. As one European described the natural spectacle before the start of the mass hunt: “You could see buffalo all the way to the horizon and hear a rumbling thunder like that of a sea surf.”¹¹ In just four decades, fur traders, trophy collectors, and recreational hunters shot millions of the animals – sometimes, just for fun, from the windows of the first railroads, whose routes increasingly crossed the prairies and opened up the country.

The acoustic transfer also worked in the other direction, yet without the tremendous transformations that the New World was experiencing. Primarily, unknown animal sounds penetrated Europe. The screaming, croaking, and, later, the acquired speech of colourful parrots fascinated many Europeans, who were likewise enraptured by the distinctive ‘wheeking’ of guinea pigs. Also impressive was the intense cry of the blue peacock, which came to Europe from India and quickly adorned European ruling courts, followed later by the aviaries and parks of the bourgeoisie. The piercing call of the turkey did not penetrate Europe until after the animal was brought from America to the Old World. Last but not least, the music and chants of the abducted black population of Africa, which led to blues and jazz, and later to rock & roll, pop, and heavy metal.

The already sparsely populated continent was wide open to the colonists after successful conquest. The lawyer Franz Daniel Pastorius (ca. 1651–1720) was one of the first Germans to emigrate to Pennsylvania in 1683, and he later wrote a book about it. He was in close contact with the founder of Pennsylvania, William Penn (1644–1718), and he also described the state’s rich nature and its soundscape. “The shady shrubs and bushes are filled with birds in all places, their rare colours and many voices spread the praise of their creator far and wide. Otherwise, there is an abundance of wild geese, ducks, calicunes, partridges, wild pigeons, water-snipes, and the like.”¹² The first mills began making a racket in Pennsylvania shortly after the arrival of the new settlers. The fires in brick kilns crackled away at various locations in a race to erect the first buildings made of stone. Cloth makers rattled their looms, and, as early as 1690, hundreds of settlers came together for the first markets in Germantown. Otherwise, it was quiet and peaceful in the region. “No hostile shouting, neither drum nor musket sound” that would have disturbed the peace.¹³

Pastorius described the indigenous population and their customs in an unusually respectful and affectionate manner for the times: “They indulge in sincere

¹¹ Jadranka Kusar, “Die Jagd: Bisonjagd und Native Americans,” in: *Fluter*, Nr. 72, Bonn, 2019, p. 29.

¹² Franz Daniel Pastorius, *Umständliche geographische Beschreibung der zuallerletztf erfundenen Provinz Pensilvaniae*, Frankfurt/Leipzig, 1700, p. 20.

¹³ *Ibid.*, p. 54.

talkativeness, scrupulously keep their promises, and they neither deceive nor insult anyone [...]. They are otherwise serious and of few words, and are astonished when they perceive such superfluous chatter among Christians along with other frivolous behaviours. Each man has his own wife, and they detest whoring, kissing, and lying.”¹⁴ Pastorius has scarcely anything flattering to say about his own countrymen; there is a lot of “bickering and shouting,” “fighting” and “drunkenness” among them. The new citizens, he thought, should follow the example of the indigenous people. Pastorius remained one of the few admonishing and human voices of his time.

Cultural phonetic images were exchanged and merged. The songs of the African people mixed with the musical traditions of the Spaniards, English, and Portuguese, and these in turn influenced the culture of the remaining indigenous people. And in America, young Africans, millions of whom had been abducted by Europeans in the slave trade, encountered new worlds of sound: blacksmiths hammering horseshoes; the first threshing machines that knocked grains out of their shells with a loud thumping; the rumbling carriages of the landowners; and the ticking and hourly striking of the earliest grandfather clocks, which startled young house slaves in the households of rich slave owners.

Beyond the greed for gold or the desire to leave their homeland, Europeans were drawn to the New World by the wonders of nature they could see and hear there. Explorers and adventurers were far more likely to hear the tremendous roar and thunder of the waterfalls than to see these stupendous cataracts. The French missionary Louis Hennepin (1626–1705) was probably the first European to see Niagara Falls. In the winter of 1678, he noted that “these waters foam and boil in a fearful manner. They thunder continually, and when the wind blows in a southerly direction, the noise which they make is heard for from more than fifteen leagues.”¹⁵

The French explorer and officer Henri de Tonti (ca. 1649–1704) arrived only weeks later. On an expedition to the Great Lakes, his team saw the falls on 1 February 1679. He was impressed by the sight as well as by the roar and thunder of the cascading water: “It throws off vapours which may be seen at a distance of sixteen leagues [48 miles], and it may be heard at the same distance when it is calm.”¹⁶ The Finnish-Swedish explorer and botanist Pehr Kalm (1716–1779) was also overwhelmed when he reached Niagara Falls on 13 August 1750. He described the gigantic booming and thundering of the falls in a letter to Benjamin Franklin, whom he had met two years previously in Pennsylvania: “Sometimes, ’tis said, the Fall makes a much greater noise than at other times; and this is look’d upon as a certain

¹⁴ Ibid, p. 28, 29.

¹⁵ Louis Hennepin, *Description de la Louisiane*, Paris, 1688, pp. 29–30; translation in Charles Mason Dow, *Anthology and Bibliography of Niagara Falls*, Volume 1, Albany, 1921, p. 23.

¹⁶ “Memoir on La Salle’s Discoveries, by Tonti [Henri de Tonti], 1678-1690,” reprinted in Dow, *Anthology*, Volume 1, p. 30.

mark of approaching bad weather, or rain; the Indians here hold it always for a sure sign.”¹⁷

Kalm’s description went around the world and made Niagara Falls renowned globally. Franklin had the letter published in the *Pennsylvania Gazette*, which he co-edited; the famous *Gentleman’s Magazine* in London – the first magazine in history to have the term “magazine” in its title – reprinted the story in January 1751. Copper engravings conveyed a picture of the roaring waterfalls, republications in France, Germany, and the Netherlands followed. The myth of Niagara was born.

Within four centuries, humans had almost completely eliminated the natural soundscape of pre-Columbian America from the forests, steppes, prairies, and tropical jungles. And with the megacities of the New World, humans created metropolises that are now among the noisiest places on Earth.

[pp.401-404]

How dangerous is noise today?

In 1993, the World Health Organization (WHO) declared that persistent noise was a serious threat to health. Since then, more research has been carried out into the expected consequences of noise for human health. Anti-noise weeks, noise registers, limit values, and noise protection measures have thus come to dominate the debate about noise. 170 million people in the EU say they live in areas where they are significantly disturbed by noise during the day. Between five and 15 percent of all EU citizens complain of serious sleep disorders.¹⁸ Within a few years, the number of people in Germany who take sleeping pills or sedatives has more than doubled. In 2018, 710,000 people aged 14 and over took tablets daily or almost daily, but by 2021 this figure had risen to 1.55 million. The Consumption and Media Analysis forum (Verbrauchs- und Medienanalyse or VuMA) surveyed more than 20,000 people.¹⁹

Noise disturbs human sleep even at low volumes. Even noises from 25 to 30 dB (such as clearly audible whispers) impair one’s restfulness. And from 60 to 70 dB, a

¹⁷ Peter (Pehr) Kalm, letter to Benjamin Franklin dated 2 September 1750, reprinted in: Charles Mason Dow, *Anthology and Bibliography of Niagara Falls*, Volume 1, Albany, 1921, p. 57.

¹⁸ Mike Goldsmith, *Discord: The Story of Noise*, Oxford, 2012, p. 234.

¹⁹ <https://de.statista.com/statistik/daten/studie/181205/umfrage/haeufigkeit-verwendung-von-beruhigungsmitteln-schlafmitteln/>, accessed on 3 November 2022.

volume that can be heard in the interior of an apartment located on a busy street, doctors fear health consequences. Stress, nervousness, heart and circulatory diseases, stomach ulcers, depression, decline in learning ability, and speech and language disorders in children can result. The economic consequences are also becoming increasingly important: medical expenses, occupational disability, as well as the depreciation in the value of apartments and land. Many people suffer from tinnitus and hearing loss at an early age. In addition to loud events, this is also due to the unlimited availability of digital music and powerful headphones. Hearing aids are more prevalent than ever before. One in two Germans over the age of 65 wears such a hearing aid, which is now small and inconspicuous.

Science has only recently proven that noise can be even more dangerous. The University Hospital of Erlangen investigated the extent to which noise impairs the function of human kidneys. According to their scientists, the mental stress caused by noise leads to a heightened activity of the renal nerves, which results in reduced blood flow through the kidneys. Between 2012 and 2017, the EU's QUIET programme researched the effects of noise on human health and came to new conclusions. According to this study, one in three EU citizens today live in an area in which the limit of 55 dB, which has been set by the WHO as harmful to health, is exceeded. Before 2012, research was mainly looking for a link between traffic noise and cardiovascular disease, the head of the project, Danish molecular biologist Mette Sørensen, explained. However, she suspects that constant noise can also trigger diabetes and cancer – mainly because of the stress and disturbed sleep. The study compared the health data and noise exposure of 57,000 elderly people and 100,000 children. According to the study, the risk of certain chronic diseases grows the more people are exposed to noise. For example, a 10 dB augmentation in traffic noise increased the risk of diabetes by 11 percent. Noise from roads and railways likewise increased the risk of developing a certain type of breast cancer and distal colorectal cancer.²⁰

2020 was a special year. For the first time in the history of noise, it became quieter almost everywhere, at least temporarily. The Corona pandemic forced the world to rest. On all continents, the residents of airports could sit in their gardens and listen to the delicate sounds of songbirds, because the large birds had to stay on the ground. On many roads and highways around the globe, rush hour was cancelled because people were working from home. There were hardly any people in the city centres because the shops were closed. In the red-light districts, and in pubs and clubs of the cities, it remained dark – and therefore very quiet.

However, the sudden calming caused by the pandemic did not automatically provide peace and quiet. It caused other noises to emerge that would otherwise be

²⁰ "Health consequences of noise exposure from road traffic," <https://cordis.europa.eu/project/id/281760>, accessed on 30 October 2022.

masked by everyday noise. In April 2021, for example, the Saxony State Environment Agency reported that people's noise environment had changed. While previously traffic noise or the nuisance caused by music and parties in the evening were the focus of citizens' complaints, in the age of home office, other noises suddenly appeared disturbing. For example, there was more construction noise because many people invested in houses and apartments. Suddenly, low, humming frequencies, such as those made by high-voltage equipment, wind turbines or heat pumps, were annoying. Noise is layered: Very loud noises mask the medium sounds; the medium sounds mask the supposedly quiet ones. From this point of view, it is never quiet.

The quiet during the Corona epidemic didn't last long. The world picked up speed again in 2022 and became almost as loud as before. In addition, the noise of war filled Europe for the first time in decades – with still uncertain consequences. No one knows exactly how the noise of the world will develop. But there are conjectures. The farewell to the internal combustion engine, which many countries of the world have already initiated, will almost certainly provide a little more tranquillity. However, this will not significantly calm the world as a whole. After all, noise is also life, and the number of people in the world continues to rise. In September 2022, a UN report announced that, by 15 November 2022, more than eight billion people would inhabit the globe.²¹ More people make more noise.

But there is hope for all those who are plagued by noise, at least for future generations. Since 2015, the growth of the world's population has slowed significantly. As the United Nations announced in 2021, the number of people is growing by just over one percent annually. This population growth is thus only half the size it was 50 years ago. A particularly large number of people were born between 1960 and 1970. At that time, the annual growth was twice as high as it is today. The reason for the decline is that the women of the world are having fewer children because, despite all the disasters and famines, people are increasingly better off. Or to put it another way: People in developing or emerging countries today need fewer children in order to be economically secure. According to conservative estimates, the peak of growth could be reached in 2100, when ten billion people – all potential noisemakers – could populate the world. Some researchers assume that growth will then level off or that the population will even decline again.

Only in the distant future will man-made noise no longer be an issue, namely, when there are no more people. It is still unclear precisely when this will happen. But happen it will. And then only the sound of nature – whatever that is – will be heard.

²¹ Marco Evers, "Willkommen, lieber achtmilliardster Mensch!" in: *Der Spiegel* 39 / 2022.