

Basics to acoustics and natural acoustics

MUNDUS GmbH, Germany

The World of Sound

Sound and oscillation are always present. Some thing audible continuously occurs around us. We permanently listen. Ears have contrary to other organs no natural closing mechanism. It is neither equipped with a lid, nor muscles, or reflexes that could disconnect our acoustic sense from our surroundings. We are a species with sense of hearing from the beginnings of our life and its duration.

The world of hearing is full of indefinite diversity: It ranges from pneumatic hammers to Beethoven's 9th Symphony. We are frequently surrounded by an unnoticeable but vivid acoustic cosmos that perpetually recreates itself, while it expresses all the processes of evolution using sound, frequencies and oscillation.



Oscillation as a working Principle

„In the beginning, there was the word...“ - Genesis 1:1 The process of creation begins in all religions through transformation of the idea (spirit) into a form (matter) via oscillation. The material form obtains through “at-”tune”-ment” a precise meaning. The language of humankind, and the language of creation, or „...word of god“ is sound formed through syllables and thus carries the inherent potential to form matter.

„Sound” refers equally to the audio and material worlds. “Ton” has two meanings in German language. “Ton” as clay that is modelled, and “Ton” as sound that is modulated. The German translation of the bible states that god formed human beings from “Ton” meaning “clay”. Even the term „person“ leads to a correlation of Sound and humankind: (in Latin; per- = through, and -son comes from sonare = to sound).



Oscillation is an ancient Phenomenon of Life

All observable processes in nature can nowadays be depicted and understood as (mathematical) phenomena of oscillation. Any human body can feel and experience oscillation and sound. Sunlight and Music are obvious examples of oscillation that evoke reaction and movement.

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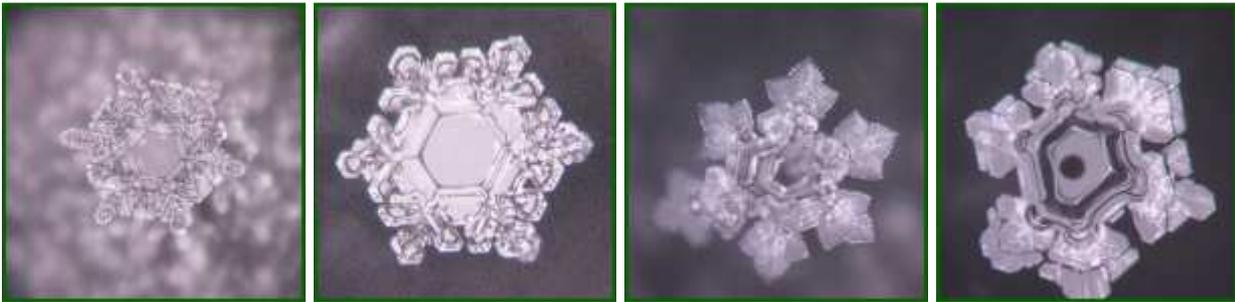
 humano Technik für ein neues Bewusstsein

NATURSCHALLWANDLER

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The better we understand how rhythm, pulse, oscillation, sound and vibration affect biological organisms, the more thoroughly we can harmonize, regulate and achieve balance within organisms to support natural healing processes.

Many scientists have been researching sound and oscillation and its effects on matter and organisms. Findings by significant innovators in the study of sound, such as Pythagoras, Ernst Friedrich, Chladni, Theodor Schwenk, Viktor Schaubergger, Alexander Lauterwasser, Joachim Ernst Behrendt and Masaru Emoto inspire and accompany our work.



Water crystal photography by Masaru Emoto made within the use of Naturschallwandler™

The inherent meaning of Rhythm and Melody

Rhythm is fundamentally significant within the process of composition and creation. It begins with breath- and cardiac rhythm, includes the rhythm of night and day, goes on with cycles of the moon, seasons and culminates in vast and repeating procedures that we can observe in Space. Everything is manifested via rhythmic cycles.

Rhythm is sonic geometry. “Geo”-”metry” means „measure of earth“. Every material appearance is structured according to defined and ordered patterns. Likewise within the design of NATURSCHALLWANDLER™ Rhythm is reproduced according to geometric fundamentals: Alongside harmonic relations (golden cut), is the inherent dynamic a crucial factor of efficiency. This is expressed within the interrelation of materials used and their installation. This relation in mathematical terms is described as the Euler's constant.



Acoustics in nature – what is natural sound?

A sound in nature, – the gentle trickle of a creek, a bird singing in the forest, or the strings of a fiddle being played – we hear clearly and precisely in our surrounding environment.

All sounds and noises of nature, as the sound of musical instruments and the human voice radiate according to physics as spherical sound fields. Starting from a single spot, all frequencies of a sound field simultaneously move toward all directions of space.

The singing of a small bird in the forest can be clearly heard over vast distances. Thereby the bird produces his singing with very little energy. Conventional speaker systems for outdoor areas or large indoor areas; – Although they use large amounts of energy, can hardly be heard within short distances. Humans can sense this effect at open-air concerts, airports and train stations. Apparently nature works differently.

Natural propagation of waves.

Everybody has observed what happens when we throw a stone into water: the resulting waves propagate circularly and homogeneously in all directions on the surface area of the water.

When two stones are simultaneously thrown into water, it is possible to observe how each wave develops freely. This despite their penetration of the other waves. Instead of superseding one another, the waves mutually move into the circles of respectively the other wave. Naturally oscillating waves do not cancel one another out, but penetrate one another in a harmonious manner.

Sound waves diffuse not only 2-dimensionally, but in form of three-dimensional spheres spreading into the entire surrounding area. This could be the song of a bird in a forest, rustling leaves in the wind, and the melody of a fiddle, a human voice.



Impulse point and emission surface – how sound evolves?

Within the production of sound in nature there is usually an emission centre and an emitting surface. Those are located apart from each other. Invariably there is one point, where the generation of sound occurs (Impulse Point), and one area or body that emits the sound into the environment (Emission Surface). Thereby the point of impulse is located spatially apart from the resonating body.



Examples include:

Bubbling of water:

water drop hits surface area = impulse point.

Water surface area = emission surface

Human voice :

vocal chords = impulse point.

Mouth and body = emission surface

Bell of a church:

hit with toggle = impulse point.

Metal body = emission surface

Violin

Bow stroke touches string = impulse point.

Body and strings = emission surface

Example: Sound emission of a violin

Graphics: Scheme: The production of sound, excitation point is not immediately emission surface area.

Left: The whole corpus of the violin is emission surface area

Right: At exactly the point where the bow stroke touches the strings of the violine the excitation point appears.



The strings of a violin cause the body to vibrate allowing sound waves to develop. The impulse point is where the bow meets the strings. The impulse generates sound waves that flow through the body of the violin. Within this process, dependent on the form of the body (emission area), some waves cancel each other out and others amplify certain frequencies. Some waves are resonant, others are dissonant with each other.

Naturally produced noises and sounds occurring and produced as described above, can be entirely processed by the human nervous system and cerebral activity. This is substantial for physical and spiritual health of a human being.

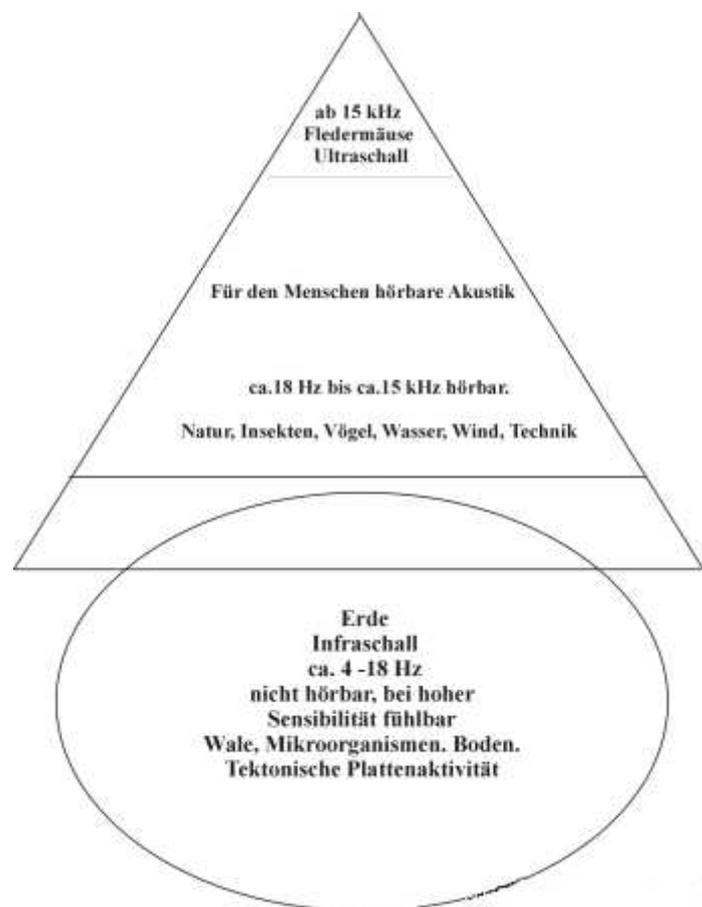
Loudspeakers - regardless of different qualities - work according to their design differently. Impulse point and emitting surface (membrane) are identical. It thus produces flat and one-directional sound waves, that are substantially stronger reflected by matter in a given space. Those directional sound waves cannot develop in a natural three-dimensional and spherical shape.

Hearing and brain

The ear transforms sound waves (conducted through air) into nerve impulses that are converted to audio information by the brain. The whole body simultaneously acts as the organ of resonance for acoustic occurrences and other oscillations from our environment. Bones are more sensitive to deeper frequencies („osseous-conductor“, especially oscillation of cranial bones), whereas skin (dermis) is more sensible to detect higher frequencies (dermis-conductor). The composition of functions of sensors for the absorption of sound in connection with accurate evaluation of sensory information in the brain is the definition of what we call sense of hearing.

A healthy sense of hearing with help of acoustic cognition by cerebral functions allows human beings to be capable of spatial orientation. In order to assess one's own location within three dimensional space and the dimension of time, the difference of distance in relation to other static or moving solid figures within the entire surrounding range of the environment must be geo-located by the sense of hearing and almost simultaneously evaluated and orderly arranged by our brain.

Self-produced oscillations and the oscillation evolving in our environment, presented in movements and stagnations, must be absorbed through our ears, directed by the central nervous system, and forwarded to synaptic activities performed within cerebral processes. Our brain calculates and estimates those inputs in form of oscillation. Both inner ears are connected to both cerebral hemispheres. Consequently our brain can compare acoustic signals coming from both our ears.

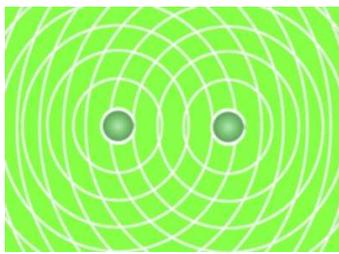


For our cerebral matter to perform accurate calculations necessary to process oscillations of sound, we must balance physical and acoustic characteristics that are detectable through the sense of hearing. If a hearing sense is disturbed, a definite mathematical picture of the acoustic environment cannot be established, which impairs orientation.

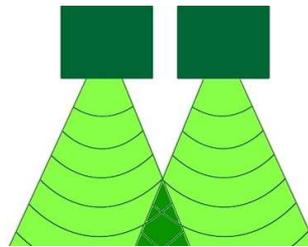
The Acoustic Hologram

Our spatial orientation is mostly steered by eyes and ears, while ears and eyes are responsible for different aspects of orientation: Eyes are directed to the front and service a detailed depiction of objects in 3-dimensional space while focussing and spatially distinguishing them. The field of vision amounts to 130 degrees. Since we cannot achieve a panoramic view with our eyes, they primarily direct orientation toward our front.

With ears however we are capable to sense 360 degrees surrounding us. Ears allow a complete spatial orientation toward all directions simultaneously! Nature has perfectly endowed us with a three-dimensional sense of hearing, with which we assess distances, areas, movements and perils.



undirected spherical
soundwaves



directed
Soundwaves

NATURSCHALLWANDLER™ speakers produce a complete and natural spatial sound. They project the spatial area of the original recording in facsimile with all dimensions of space and time into the real existing environment of the listener. We call this precise reflection to be an “Acoustic Hologram”. In order to produce and Acoustic Hologram, we need two sound sources that can radiate sound spherically into the area.

Placed into an “Acoustic Hologram” the listener can spatially detect occurrence of oscillation. “I hear to my right, to my left and above me...” Within the area almost the entire frequency spectrum is wholly preserved in facsimile. This includes polyphonic overtones that provide a fundamental contribution to the well-being of our body. The quality of production of NATURSCHALLWANDLER™ comes naturally produced to sound as closely as possible to the original source.



Regeneration of hearing with NATURSCHALLWANDLER™

With the help of NSW a unique opportunity to re-synchronise and balance the hearing sense and the brain exists. Explicit information is to be found on <http://mundus-hörregeneration.de> and within <http://www.naturschallwandler.com/aktuelles> (Seminars) carried out by MUNDUS GmbH.

Historical aspects of NATURSCHALLWANDLER™

Human beings have been producing sound and music since the beginning of ancient culture. Music, singing and sound have always been related to “cult”-ural acts and constantly provide social, religious and societal functions. Sound and oscillation were seen to offer the opportunity to connect to a “higher inner or outer” sphere. This could have been found in the impression of a voice within prayers or ritualized singing, or the production of music within rituals.

Within time human beings experience that sound is connected to spatial areas and their geometry.

Extraordinary architects of ancient Greece understood how to integrate an eminent disbursement of sound within their structure, as is to be seen in the designs of the amphitheatres, where the audience of thousands was without technical efforts able to clearly understand the performers in the centre from every seat. Through this design many people were able to collectively experience and be integrated into the same sound field. This could be realized through precise observation and implementation of natural phenomena in relation to intellectual awareness.

The theatre of Epidaurus dating back into the 3rd century provides an ideal example. The most noticeable and impressive structure of this ancient Greek city is built into a hillside. The amphitheatre features a most excellent acoustic space. Even from the last rows in the 14,000 seat grand stand, can every word spoken on stage be explicitly understood.



When Charles Cros invented the Paleophon in 1877 it was, according to existing sciences, the first time that it was made possible to reproduce recorded sounds. That was one hundred years ago and now it is a sensation belonging to our daily life.

The Telefunken Company in 1930 has developed a crucial contribution through the application of reflective bodies in the direction of natural propagation of sound occurrences with the so called Fungal-speaker. Through this technology sound was able to be heard over wider distances with lower power emissions that could have not imagined in earlier times.

In England in 1980 another principal of sound propagation has been developed – a geometrical form placed into two oppositely arranged speakers. Those speakers face equally apart from each other in a geometrically specially designed “double-conus”. This configuration allowed for the first time an emission of sound from one central point. The emission of a naturally spherical sound wave was thus practically implemented for the first time.

Following that, other developers from different countries questioned how sound according to the natural principles of physics could be reproduced.

German engineers of the have also been working on this technology.

Mundus GmbH is working with this Technology since 2005 with the initial aim to develop the opportunity of penetrating matter with sound to regenerate waters and soils. Soon we achieved more clarity of the enormous effect of sounds on any kind of biological organism. In case of human beings, this happens especially in the area of improving hearing impairment.

Technological Innovations by MUNDUS GmbH

In 2008 MUNDUS GmbH was finishing the new design of a Sound system named NSW-SUNRAY. In 2009 the development of a bandstand- and live System named NSW-ETERNITA followed. Technologies of crucial importance integrated by MUNDUS into the NSW-Systems are:

Crystal-Technology

to synchronize and harmonize audio crossovers, improved linear-phases, clear geo-locationing of musical events and improved impulse response.

Variomembran

Attenuates resonance of the bass bin independently of the given volume. It provides a clear, dry and impulse equivalent bass at all volumes.

3-stage Bassreflexrohrsystem (engl. Bassreflexpipesystem)

Provides technically accurate reproduction of sub-frequencies, that allow an extended spectrum of frequencies (Alphorn-Prinzip).

Gold

Positioning of pure gold at definite points for greater oscillation-information and purity.

Sacred Geometry

Ratios, assembly and distances, measurements and proportions of constructing parts are based on physical constants.

Natural Materials

The use of wood as basic material is from top priority. NATURSCHALLWANDLER are high quality instruments built from wood.

The utilization of natural materials is of the utmost importance not only from ecological and sustainability aspects from, but also for the positive effects on our wellbeing: By no means are other materials considered less important! i.e. for our insulation we use high quality organic (Demeter) sheep wool.



Development of Therapeutic Approach

Already in early stages of our development, we engaged intensively in researching therapeutic effects through NSW. Increasing possibilities of improvements, especially while curing hearing deficiencies, have been indicated.

We willingly pass on any insights – to one part in form of free basic seminars and to other parts through specialized trainings with our partners.



*"When we listen to music, soul calculates."
J.S. Bach*

MUNDUS



humane Technik für
ein neues Bewusstsein

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