



2nd floor – HEARING

We hear 24 hours a day. Even when we sleep, our hearing is switched to reception. A device that ensured survival from an evolutionary biological point of view. At night, the eyes could hardly see anything, so the ears took over the warning of sneaking enemies. This is why we wake up when the alarm clock rings.

Our ears are well designed for warning: The ear can perceive ten octaves and about 400,000 different tones. And with built-in "filters", we can still understand our conversation partner from the babble of voices even at loud parties.

And since we have two ears, we can also determine the direction of the sounds. We recognise a difference of a thousandth of a second with which a sound reaches our two ears. This allows us to determine the direction of sound sources with an accuracy of about one third of a degree around us.

But animals are also superior to us in the sense of hearing. Animals can perceive softer sounds, hear infrasound below our perception limit of 20 hertz or even ultrasound up to 200,000 hertz.

With our ears we can hear very precisely. We find noise sources such as cars more quickly by hearing than with our eyes...

OWL

Hold your head in the owl mask so that the small holes are at your ears. With the owl's big ears, you can hear sounds coming from the direction in front of the owl. And you can also hear soft sounds from this direction very well

Owls hunt very successfully with this hearing technique, even at night.

DANIEL FIR TREE

The Daniel fir, the thickest fir in the Black Forest, stands in the Grafenhausen community area.

The fir has been standing near the Hüsli for 300 to 400 years. The fir has survived many storms and tempests during this time, even though other silver firs around it have already been uprooted. With its 43-metre height, it towers over many neighbouring trees. At the base, the Daniel fir is 1.71 metres thick, or measured differently: It has a circumference of 5.30 metres. 7 kindergarten children are needed to span the fir tree. How many arm lengths do you need to span the Daniele fir?

The Daniel fir in Grafenhausen is the thickest fir in the Black Forest. It is 43 metres tall and has a circumference of 5.30 metres. It was planted more than 300 years ago. You can google the graph idea for it: Children grasping around the tree.

RESONANCE TUBES

Listen to resonance!

Put your ear to a tube. The sound you hear is the tube's resonance to ambient noise. Because of the different lengths of the pipes, you hear a different low humming sound in each pipe. Like organ pipes, which are also different lengths and thicknesses, the resonance frequency is different. Each tube therefore has its own tone to which it is "tuned" and which it "amplifies". The longer a tube is, the lower the tone you hear



THE ALEMANNIC SCHOOL OF VIOLIN MAKING IN GRAFENHAUSEN.

According to current research, Grafenhausen can be considered the birthplace of Alemannic violin making. The researcher Olga Adelman has compiled some facts about this. Kurt Hodapp from Waldshut has considerably expanded her research and the state of knowledge about the Alemannic school in the Black Forest.

Adam Kirner, of whom it is not known exactly where he came from, was named violin maker in a sales deed as early as 1626 (28). He taught Joseph Meyer, his stepson from Geroldshofstetten near Grafenhausen, how to make violins. He was very talented and spread the art of violin making. One of his pupils, Johann Konrad Stoppel, went as far as Vienna as a violin maker.

The Grafenhausen violin "Joseph Meyer In Gerold / Hoffstötten Bey Braffen / hausen 1670". This is written on a violin that is in the State Institute for Music Research in Berlin. This proves that a cradle of Alemannic violin making was located in

Geroldshofstetten near Grafenhausen (view from the window, right above the spa gardens). A plot of land in Brandhaldenweg is still called Gigeacker (violin field) by locals today. The oversized violin in the exhibition is based on the design of Joseph Meyer's violin..

The beginning of Alemannic violin making was in Grafenhausen. Alemannic violins are a special kind of violin. In Berlin there is a violin from Grafenhausen that was made almost 450 years ago.



CHLADNI SHEETS (VIOLIN)

Paint a pattern with tones

Stroke the edge of the sheet with the violin bow. When you produce a loud audible sound, the grains of sand on the sheet form a symmetrical pattern. With different tones, the pattern also becomes different.

When you make a sound on a sheet of metal, the sheet vibrates. It vibrates differently in different parts of the sheet. The grains of sand collect in places where there is little vibration.

Hold the violin bow vertically and carefully stroke the edge of the metal plate.

Do not 'saw' - do not hit!!!



WATER SOUND BOWL

Make it rain with sounds

When you stroke the handles of the bowl with moistened palms and light pressure, a soft sound is produced. If you manage to keep this sound even, the water surface will ripple. If you make the right sound, drops form that splash up to 30cm high.

The ripples created by the vibrations of the bowl transfer to the water and form a wave pattern. When these waves overlap, they become so high that drops splash out of the bowl.



SPEED OF SOUND

Sound travels in the air at about 340 metres per second (this depends on air pressure and temperature). There is 50 metres of tube between the two cups. If you speak into one, you can hear yourself in the other cup about one and a half tenths of a second later.

You can hear yourself like an echo.



HANS MÜLLER FROM BULGENBACH

Comes from Bulgenbach, today a part of Grafenhausen, and was probably a 'lansquenet' in his younger years who went to war as a mercenary for Emperor Maximilian. When the peasants in the region rose up in 1524 due to the oppression, servitude and violence of the authorities, he was probably elected captain because of his military experience. In three months, he managed to gather a 'bunch' of rebellious peasants of about 3,500 men. With his peasants fighting for freedom, he marched through the southern Black Forest and soon had the monastery of St. Blasien in his hands.

The northern foothills of Lake Constance were also in turmoil. The number of peasant insurgents grew to 12,000 men as a result of the amalgamation of three bands. Because of his rhetorical talent and Hans Müller's organisational skills, he was appointed their spokesman and supreme captain. Politically, the insurgent peasants presented a programme of twelve articles in which they demanded far-reaching rights. From the Allgäu to Freiburg, many towns and villages were besieged, occupied or destroyed. Freiburg was also taken, and the city council was forced to join the peasants' union in your treaty. In the following siege of Radolfzell, the peasants were defeated by an Austrian army in several smaller battles. Hans Müller was able to flee as far as Hohentwiel and hide from his pursuers there. However, he fell into the hands of Ulrich von Habsberg, a captain in Austrian service. On 12 August 1525, the 'supreme captain on the Black Forest' was executed standing on the sword in Laufenburg.

In the Bulgenbach district of Grafenhausen, a memorial stone stands on the site of Hans Müller's burnt-down house. The historical Hans Müller group maintains the memory in various activities and events around the time of the Peasants' War.

Hans Müller was a leader in the peasant wars around 1524. He and his peasants wanted more rights. He led up to 12.000 men. But he lost the battles. He was caught on the run and beheaded.



HANS-MÜLLER-DRUM

Can you kick the ball off the stick with the Landsknecht drum?

Hit the back of the drumhead with the flat of your hand.

The table tennis ball is not blown down by the sound of the drum but by the swirl of air coming out of the hole in the drumhead.



GONG

Sounds tickle your stomach

Stand behind the gong. The distance between your belly and the gong should be about 5 cm. Now have someone else lightly strike the gong.

What do you feel?

When you strike the gong in quick succession, the sound becomes louder and more intense.

