



# The organ, a Medieval Synthesizer-King Kong-instrument

Inaugurated in 2019, the Klais organ in Sankt Petri church in Malmö is one of the most complex machines of acoustic sound production and one of the most modern organs in the world! Not only can one control all the 7356 pipes combined from the new organ as well as the Marcussen gallery organ (1951) and Walcker altar organ (1914) from the monumental 6 keyboards and pedal console, but also bells, drums and other sound effects.

Text by LINDWALL SUPMAH

So what does all this mean?

REV. << (ca 2300 years)

With one foot in tradition and the other one in experimentation and innovation, playing the organ is a perfect synthesis! Most people associate it with church music, and probably know Bach's famous Toccata in d-minor from some horror movie, but the instrument goes back way further than the church and has a fascinating history both before and after!

The Greek inventor Ctesibius is credited for having built the first organ during the 3rd century BC in Alexandria. Already the very few known facts about him make him seem even more sympathetic! His first career was to be a barber, and out of need he invented a counterweight-adjustable mirror. He also made such considerable improvements to the Clepsydra (water clock) that it remained the most accurate clock until Huygens pendulum clock in 1656. His Hydraulis (water organ) probably had 6 or 7 notes operated by drawbars, and a bellow blowing the wind operated by water pressure. Fun Fact: Ctesibius' wife is considered to be the first organ player in history!

In our time when culture and knowledge isn't always as highly valued by politicians as one would like them to be, it is important to consider that this complex instrument sprung out of science and arts, as it was invented in Alexandria, where Ctesibius later was appointed head of the museum which included the library!

The organ became very popular in Greece, and later in Rome, where it was played in arenas during gladiator games as well as in

brothels for background music...

The first pipe organ to enter the "West" was a gift from Constantine V of Constantinople to Pepin the Short, King of the Franks, in 757. According to legend, Pepin's son Charlemagne saw the potential of the instrument for being loud and pertinent enough to accompany the terrible singing of the church's choir, and requested a similar organ for his chapel in Aachen in 812. Hence beginning its establishment in Western European church music.

In constant mutation and enlargement, the organ established the modern format of two or more keyboards and a pedal keyboard in the 1400s, and most of the inventions that had been brought to it afterwards have been concentrated on the sound. To function, the organ always needed one or more assistants to pump the wind into the bellows, and this didn't change until the beginning of the 20th century when motor powered blowers appeared. Fearless organ builders worked together with visionary people like J.S. Bach, César Franck, Jean Guillou throughout the centuries to develop new sonorities and techniques, sometimes even leading them into bankruptcy. But many of the best inventions came out of people who were ready to risk everything to get them done!

F.FWR >> (Now!)

So where does that leave us today?

One of the biggest challenges since the industrial revolution is that specialized craft and manual labour has become increasingly expensive. Since every organ is commissioned and built to fit a specific space and design, everything is handmade from scratch. But



The left screen displays a detailed musical score interface. It is organized into several sections: **HARMONICS** (top), **CHOR** (middle), and **PIANO** (bottom). Each section contains a list of musical parts with their respective staves and time signatures. The interface is blue-themed with white text and includes a sidebar with navigation icons.

The organ console is a multi-tiered structure with five keyboards. It features a central display area with a glass cover. The console is supported by two yellow pillars. The front panel includes various controls, including a row of buttons labeled A, B, C, D, E, and a set of numbered buttons (1-10). There are also volume and mute controls on the left and right sides.

The right screen displays a musical score interface similar to the left one. It includes sections for **EFFECTS**, **CHOR**, and **CHAMADES**. The interface is blue-themed and includes a sidebar with navigation icons. The bottom of the screen shows a control panel with buttons for **copy**, **insert**, **paste**, and **delete**, along with a set of numbered buttons (1-10) and a display showing **divi cmb next** and **new layer**.

modern technology and materials also give us new possibilities. One of the most thrilling ideas today is to incorporate new technologies such as MIDI for remote playing, or sequencers to program otherwise unplayable music. But the rapid decay in technology also makes this difficult. There are organs in perfect playable condition that are many centuries old, but a computer or a phone has a lifespan of a few years at best.

Collaborating with organ builders is fascinating! Over the years I have been a consultant for a number of organ projects, striving to envision new instruments that will inspire composers and musicians to explore new ideas. Sankt Petri church in the Southern Swedish city Malmö is very special. Until recently it contained the famous Genarps organ from 1571, now in Malmö Museum, which is one of the oldest still playable organs in the world. For the construction of a new instrument, suitable for research and contemporary music and sound, organist Carl-Adam Landström put together a team led by Hans-Ola Ericsson where I and Mauro Lanza joined as consultants for the musical concept. Technical experts joined forces with SINUA who developed the complex console from where the organ is manipulated.

Any sound you hear, is a complex mixture of frequencies. As an example, a clarinet only has very few audible overtones, which make it sound very smooth and mellow. On the other hand, the sound of breaking glass has many highly pitched and inharmonic overtones, which make the sound harsh and painful. The organ functions by additive synthesis. Simply put; you add higher frequencies to your basic sounding flute in order to change the tone color, aka timbre. When pressing a

single key on the organ one activates sometimes between 25 to 30 pipes, but when it reaches the ear, it sounds like one tone.

A huge problem in the development of contemporary Western music is that it is built on a system of 12 notes that were defined by Pythagoras 2500 years ago. 12 NOTES!! Imagine going to art school and be given 12 colors and not be allowed to use anything in between! One can only dream about what could have happened, if composers in Western history would have been given ALL the frequencies to work with.

If you can control a large number of harmonic overtones, you could theoretically recreate any sound. One of my dreams has been to achieve this in an organ. After all, this is what the instrument has always been about, but in a more limited perspective due to the lack of computer technologies. Mauro Lanza helped to carry out the very complex mathematical calculations to achieve an almost unlimited number of overtones. The result is a special never-seen-before Harmonics Division of the organ that contains overtones to pick from, like a box of spices in the kitchen! With the help of the control system of the organ from SINUA, long sequences of frequencies can be programmed to be played from pressing a single key. This way, extremely complex sounds can be “synthesized” acoustically by rapidly changing the tone color while one key is pressed down.

The impressive console has been stripped from the traditional stop knobs, and have

been replaced by two giant touch screens. The programming of the organ is close to how smartphones are manipulated. Swipe, click, select, double-click, etc.

The thing that pleases me the most is that we have created a tool that we don't know the limits of! The door is open, and it is now up to everyone's imagination to go in the creational direction that they want. I cannot wait to see what the artistic output will be when innovative people will get the chance to work with it!output will be when innovative people will get the chance to work with it!

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Phill Niblock - Music for Organ  
Hi! Who are you? (w Susana Santos Silva & Torbjörn Zetterberg)  
Lost & Found (solo composition for the Roland TB-303)  
all recorded for Matière Mémoire  
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