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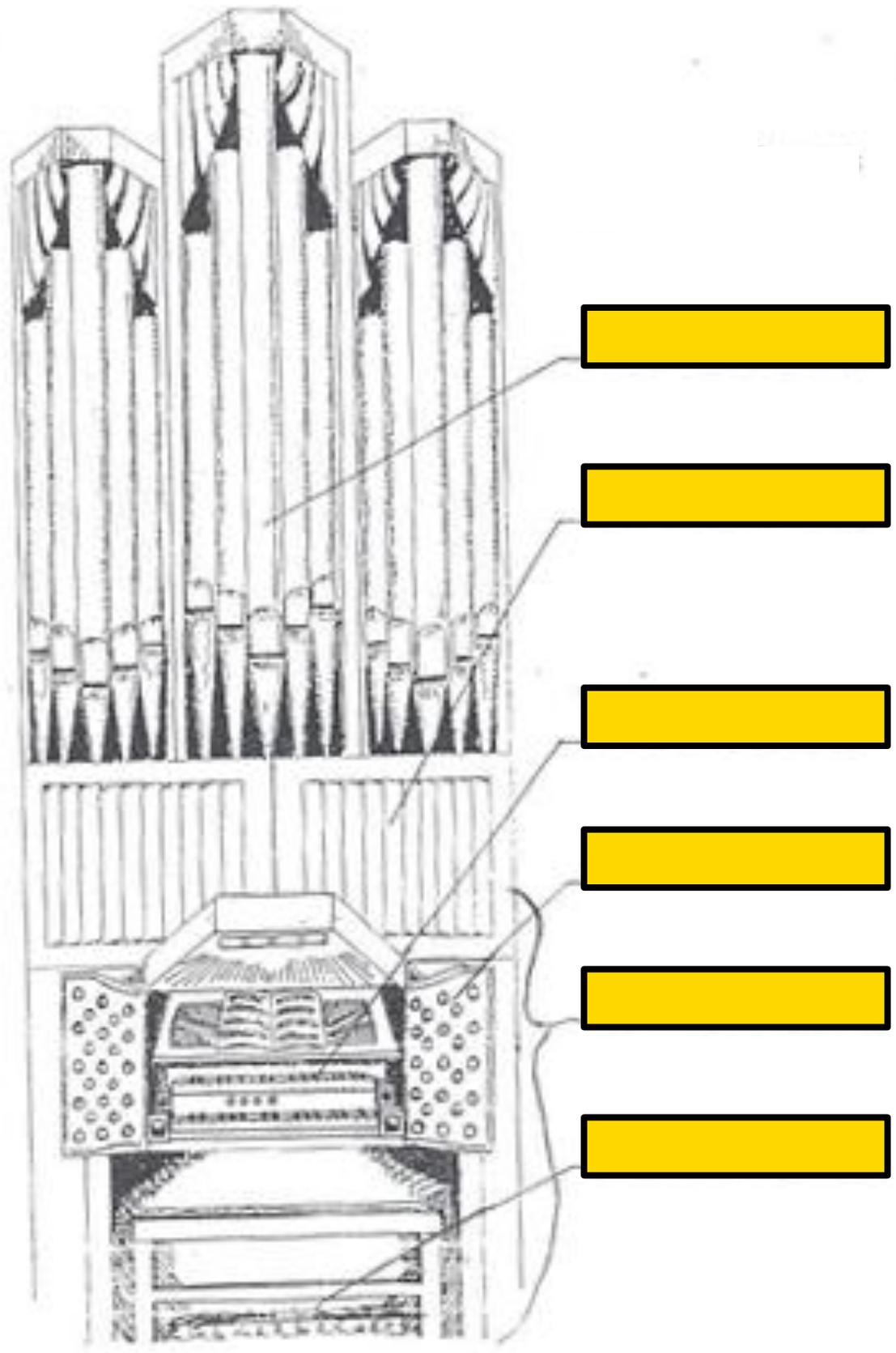
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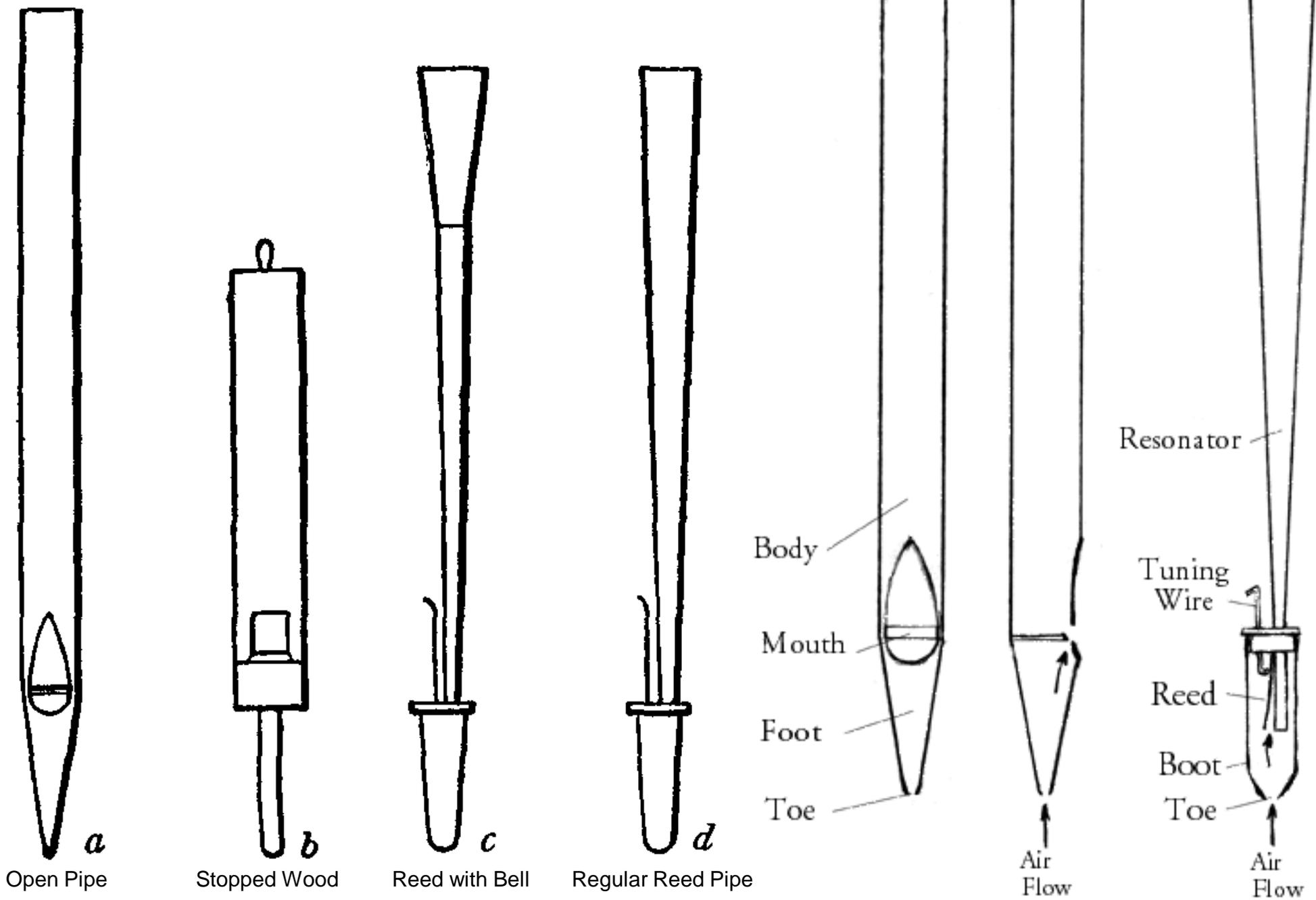
Use the word list to name the parts of the organ. (Answers are given below.)



- Word list
- draw knobs
 - pipes
 - pedals
 - shutters
 - manuals
 - console



Top to bottom: pipes, shutters, manuals, draw knobs, console, pedals.



Organ pipes, of course, all have to be made a bit like "fancy whistles," so they can stand on the wind chest to get their wind and make their sound. But their different shapes make the different tone colors for various stops.



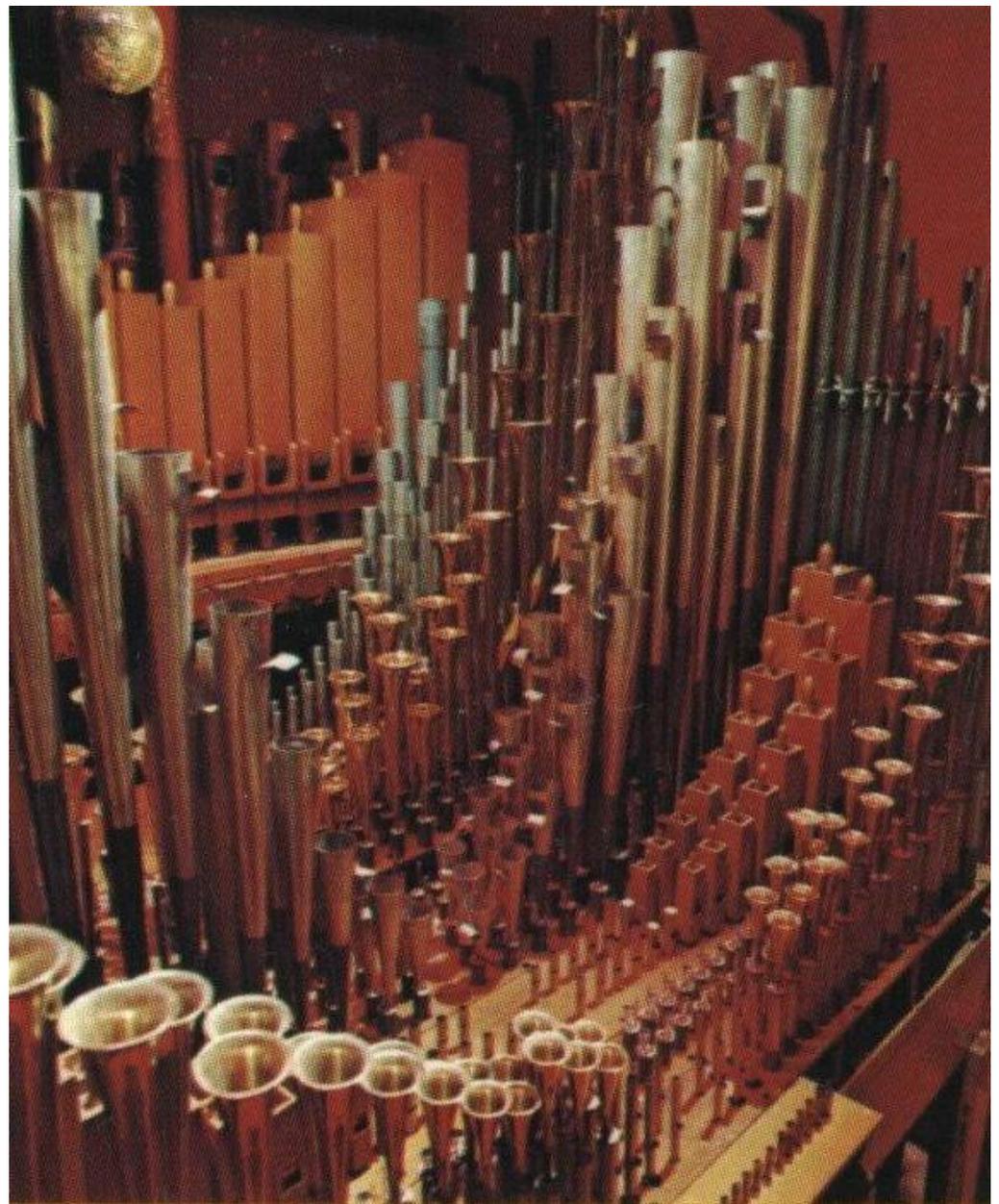


Open Pipes, Reed Pipes, Stopped Woods, Open Metal, Stopped Metal

Why do some organ pipes sound like flutes, strings, or brass? It's because the pipes themselves are made in different shapes. You know that the various wind instruments of the orchestra sound different from each other. They look different and their tone colors, or individual sounds, comes down to the fact that they are made in different shapes. Above are 5 different types of pipes pictured above. The cylindrical Open Pipes make basic organ tones (*diapasons*). Reed Pipes make sounds like oboes or trumpets. The Stopped Wood pipes make sounds like recorders. The narrow, Open Metal Pipes, slightly tapered, imitate string sounds. The last picture shows Stopped Metal Pipes that sound like flutes.

[Click here for a quiz on the kinds of pipes.](#)



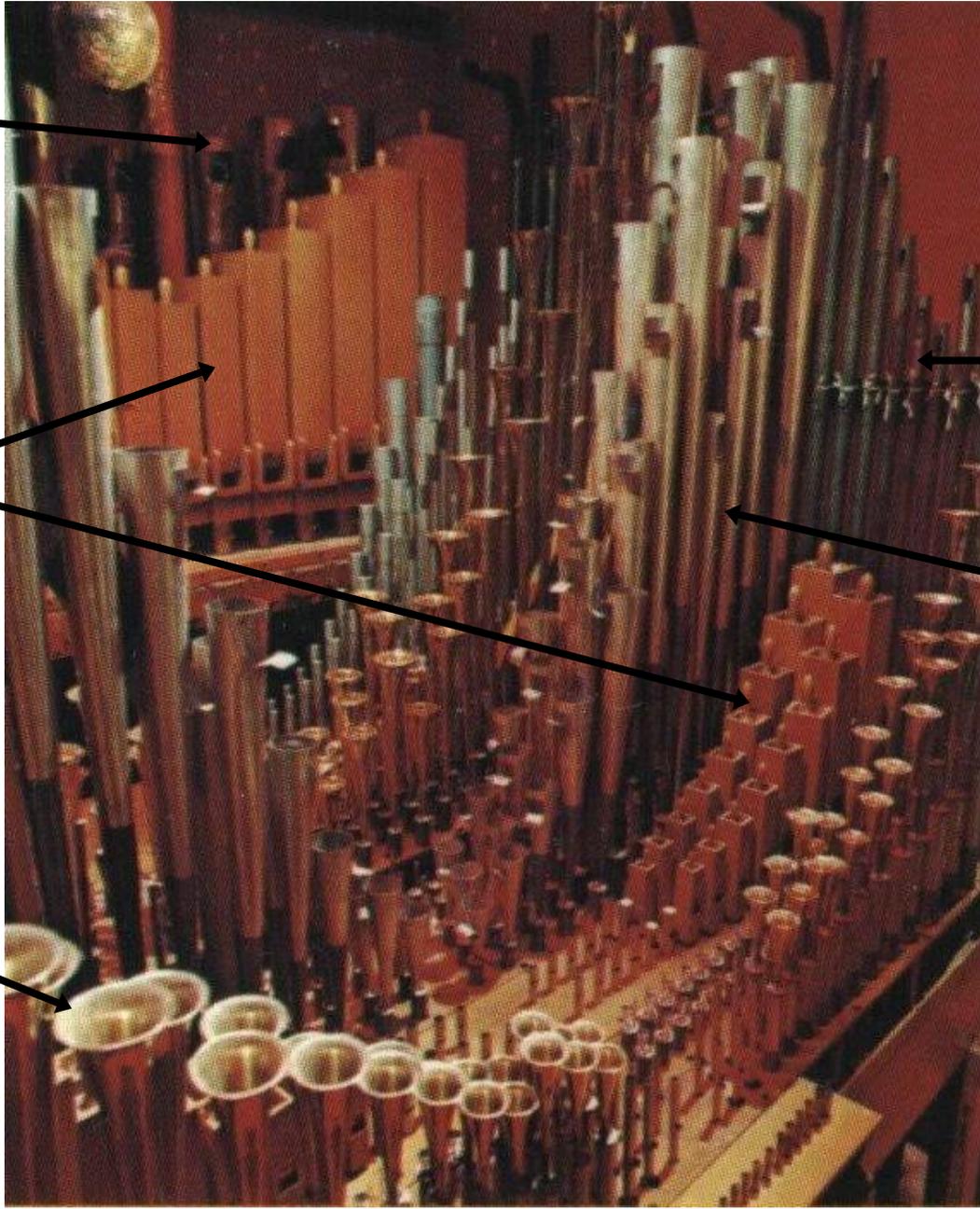


Organ pipes are made of metal or wood. The smallest can be less than 6 inches long; the largest can be 32 feet long. Wind is blown through them to make the pipes sound. For each specific sound, pipes are set up in a row, called a rank (like a rank of trumpets.) Soldiers and band members also line up in what we call ranks. The size of an organ can be indicated by its number of ranks. Click on the link below to see an interactive, 360-degree aerial view of a pipe organ chamber.

<http://www.360cities.net/image/massey-organ-pipe-chamber-view-2-usa#-132.86,57.67,70.0>



Use the word box to label the different types of pipes.
(Answers are given in text below.)



Word List

Stopped Woods
Reed Pipes
Reed with Bells
Open Pipes
String Pipes



Clockwise from caption's pointer: string pipes (thin & narrow), reed pipes (see boots at bottom of pipes), reeds with bells, stopped woods, and (most likely) open pipes.



Sometimes pipes are contained in a chamber behind a screen or “grillwork,” and are not seen from the room. Above on the left, we see the screen, with the chamber door open at the side. Then on the right above, we see a view inside the chamber, showing the pipes within. When this chamber door is closed, sound can come only through the screen.



At other times, organ pipes are set up in within woodwork called an “organ case,” and this case helps to reflect the sound outward. (Sometimes these cases can be very fancy.) In the picture to the left, we see a two-manual organ built in the kind of chambers that make up an organ case. The three pipe divisions are easily seen from the room -- and the sound is often better when the pipes are in the room itself.

The three pipe divisions correspond to the manual and pedal keyboards -- Great, Swell, and Pedal – each in its own section of the case, as within a chamber. Pipes at the front of these kinds of chambers are said to be “*en façade*,” French for “on the face.” (*Façade* is also sometimes used to indicate the “face” of a building.)

The Great division is at the upper left, singing out on top of everything. (Notice the wood pipes at the sides.) Below we see the Swell division, behind the pipe shades. On the right are pipes of the Pedal division, the largest pipes in the organ, which sound the lowest bass notes.

[To the right of the organ console, under the Pedal pipes, there is a bookcase for organ music – not part of the organ itself, but something the organist is just lucky to have!]





The Swell division's pipes are always contained in a chamber (or a box) called a "swell box." (Choir divisions are often enclosed in swell boxes as well, though Great divisions are seldom enclosed at all, at least one side to the room almost always being open.) In the picture above, we're in the organ chamber, looking from the unenclosed division in front (perhaps the Great), toward the swell shutters. Behind the shutters we can see some of the pipes that are enclosed in the swell box.

These shutters (or "shades," like Venetian blinds) open and close on the chamber to let out more or less sound, making the sound louder or softer. (If the shades are closed, opening them makes the sound get louder, or "swell up.")

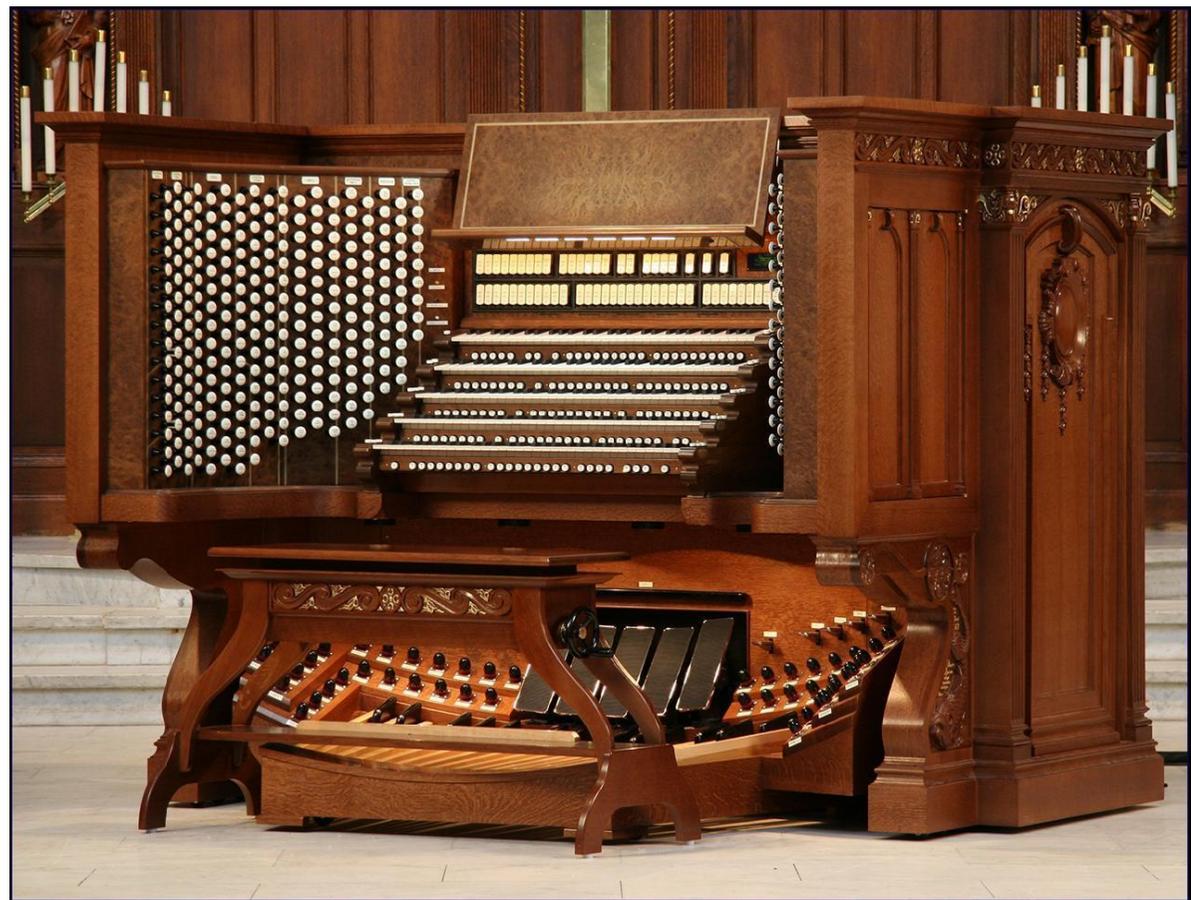


The organ blower pumps air into the main reservoir, and from there it goes into the wind chests under the pipes. This is where the pipes get air in order to sound. Older organs were pumped by men or women pumping bellows that fed air to the reservoir; but today, electric motors run the organ blower.





The organ console is a control center for the pipe organ. The parts of the console are the manual and pedal keyboards, the controls that turn on the various sounds, a bench to sit on, and a music rack to hold the music. Various other parts are also labeled on the console at the left. (Can you point out the same ones on the console below?)





The unison pitch, the same pitch as the piano, is made by a pipe 8 feet long at the bottom of the organ keyboard. An octave lower is 16 feet, and an octave below that is 32 (very low indeed, usually the biggest pipes of any large organ).

A pipe an octave above the 8-foot unison is 4 feet long, and above that are stops at 2 feet, 1 foot, and even 1/2 foot. The organ "builds" its big sounds by adding these stops together, changing the overall tone by reinforcing harmonic "partials" of the fundamental note played

(For a detailed explanation of this acoustic principal, click on the following link: <http://www.sfu.ca/sonic-studio/handbook/Harmonic.html>. The illustration on the musical staff can be particularly helpful.)





Organs can have 1 to 4, or more keyboards. The "manual" is a keyboard for the hands, and 2 or 3 manuals are standard. An organ of 4 manuals or more would be a large organ.

In English wording, the bottom manual keyboard is usually called the **Choir**. It controls stops of the Choir division (some usable to accompany a choir).

The next manual up is the **Great**, which controls the organ's main and loudest ("greatest") division.

The third one up is usually the **Swell**. This is where the "Swell shoe" comes in, allowing the whole division to get louder and softer, whatever stops are playing.





All but the very smallest instruments also have a pedal keyboard for the feet to play. The feet usually sound the bass, the lowest musical line, but they can play higher pitches too. Pedal keyboards are played with the organist's toes and heels.

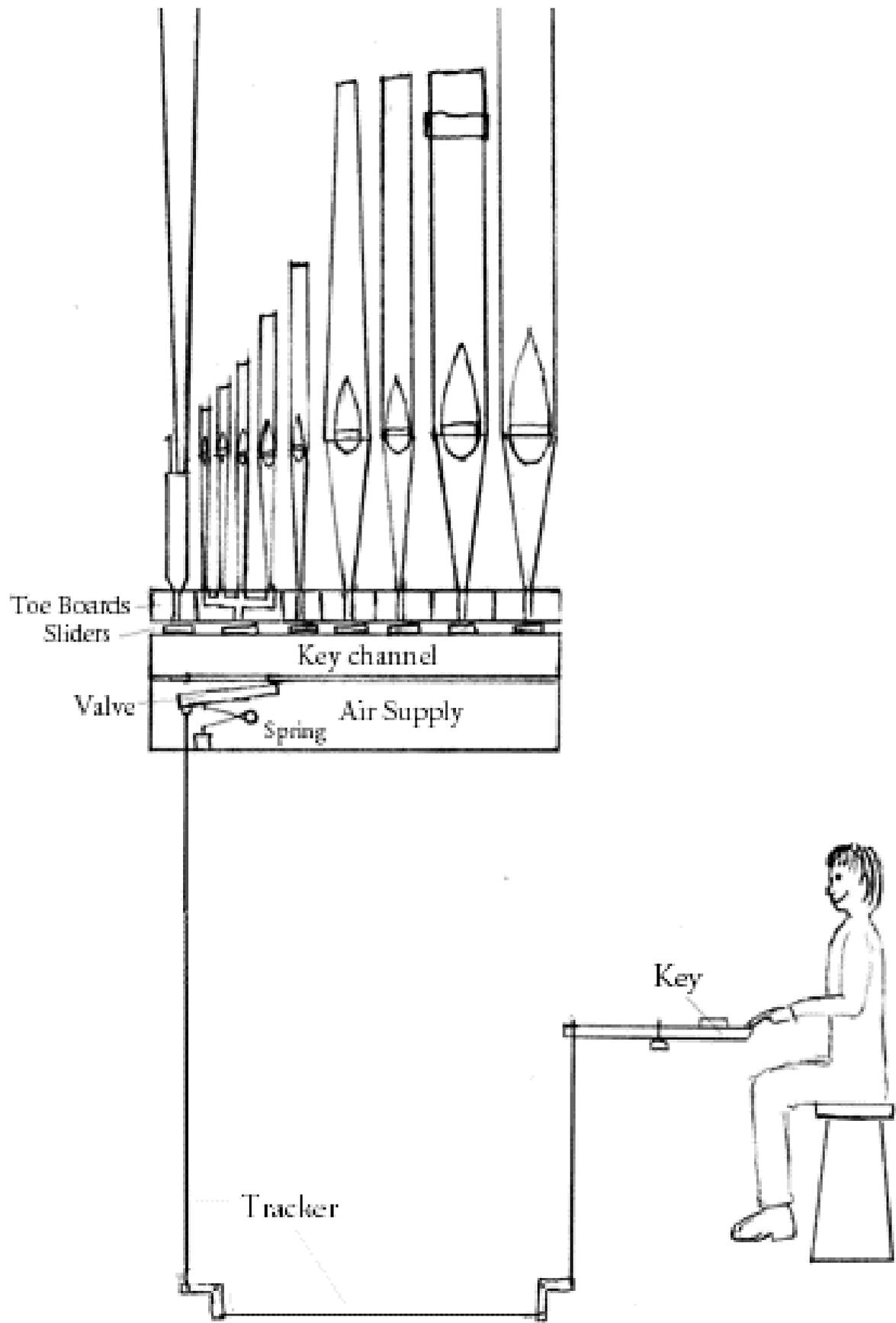


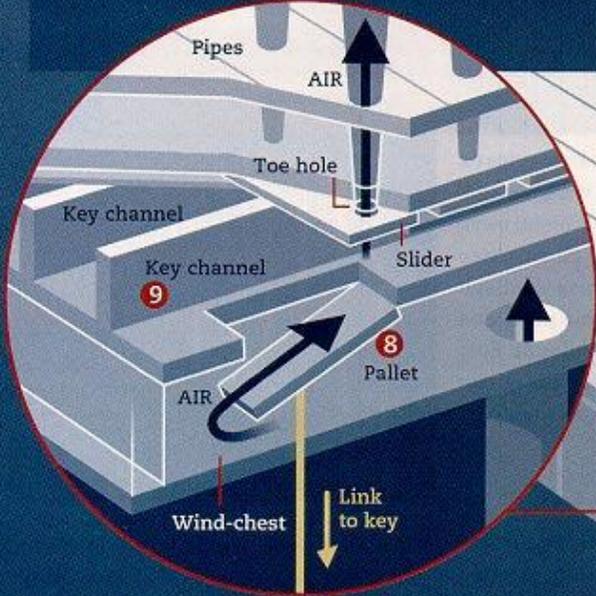
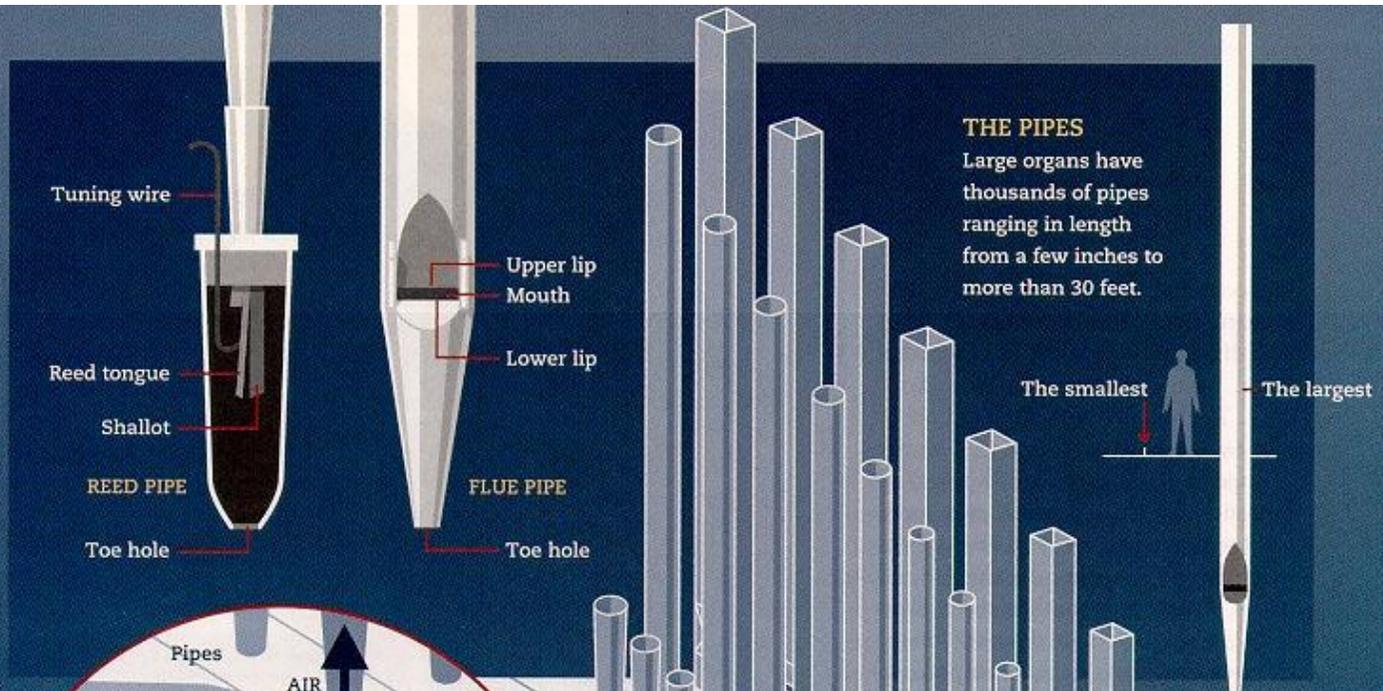
On many organs, the feet can also use special pedals which are a bit like the accelerator pedal on an automobile. These are called "shoes" because the player's whole shoe is used to control them, and they make parts of the organ louder or softer.

The Swell pedal (one of the "shoes") opens and closes the shutters on the Swell division, which increases and decreases the volume of the sound coming from the division. If the Choir division is inside in a shaded chamber, it also has its own shoe-sized pedal, in order to do the same thing.

The crescendo pedal (yet another of the "shoes") increases and decreases the volume of the organ by adding or subtracting stops. More stops are added to increase the volume, and stops are withdrawn to decrease the volume.

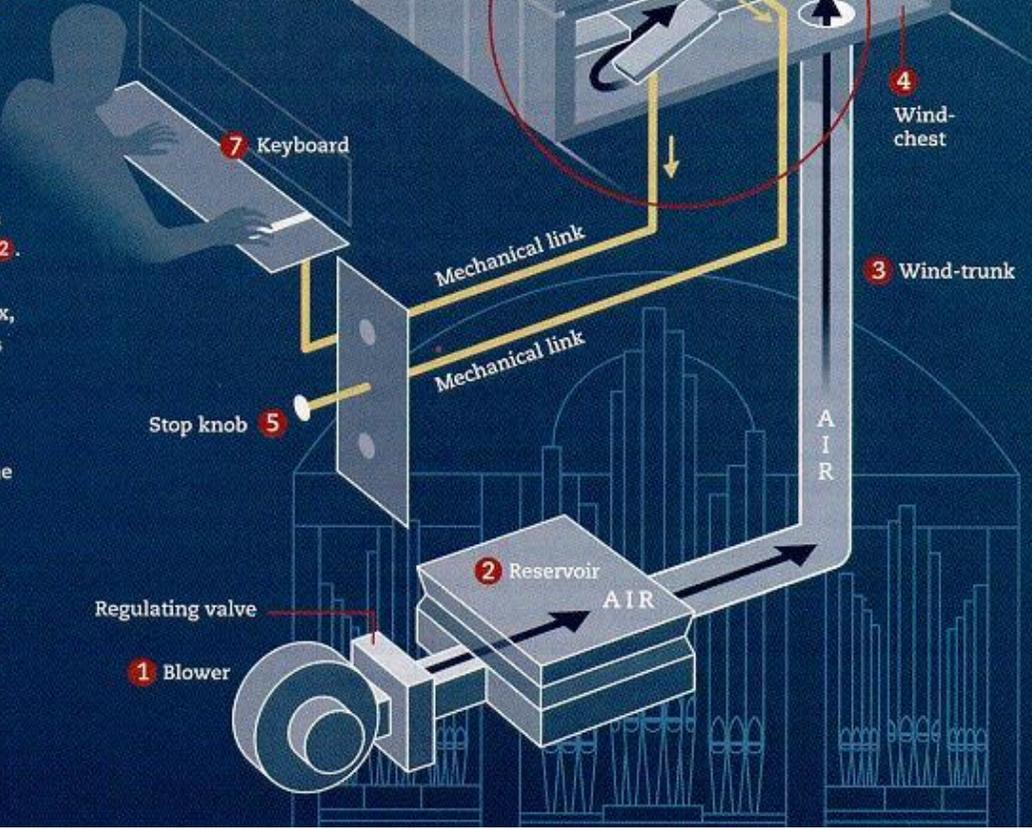
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HOW A MECHANICAL PIPE ORGAN WORKS

A blower **1** pushes air through a regulating valve into a reservoir **2**. From there the air travels up the wind-trunk **3** into an airtight box, the wind-chest **4**. A row of pipes is controlled by a stop knob **5**. As the knob is pulled out, a wooden slat called a slider **6** is moved, and holes in the slider line up with the pipes. Now these pipes can be played. When the organist depresses a key **7**, a pallet **8** opens, and air enters a key channel **9**. All the pipes on that channel (whose stops have been opened) will sound.





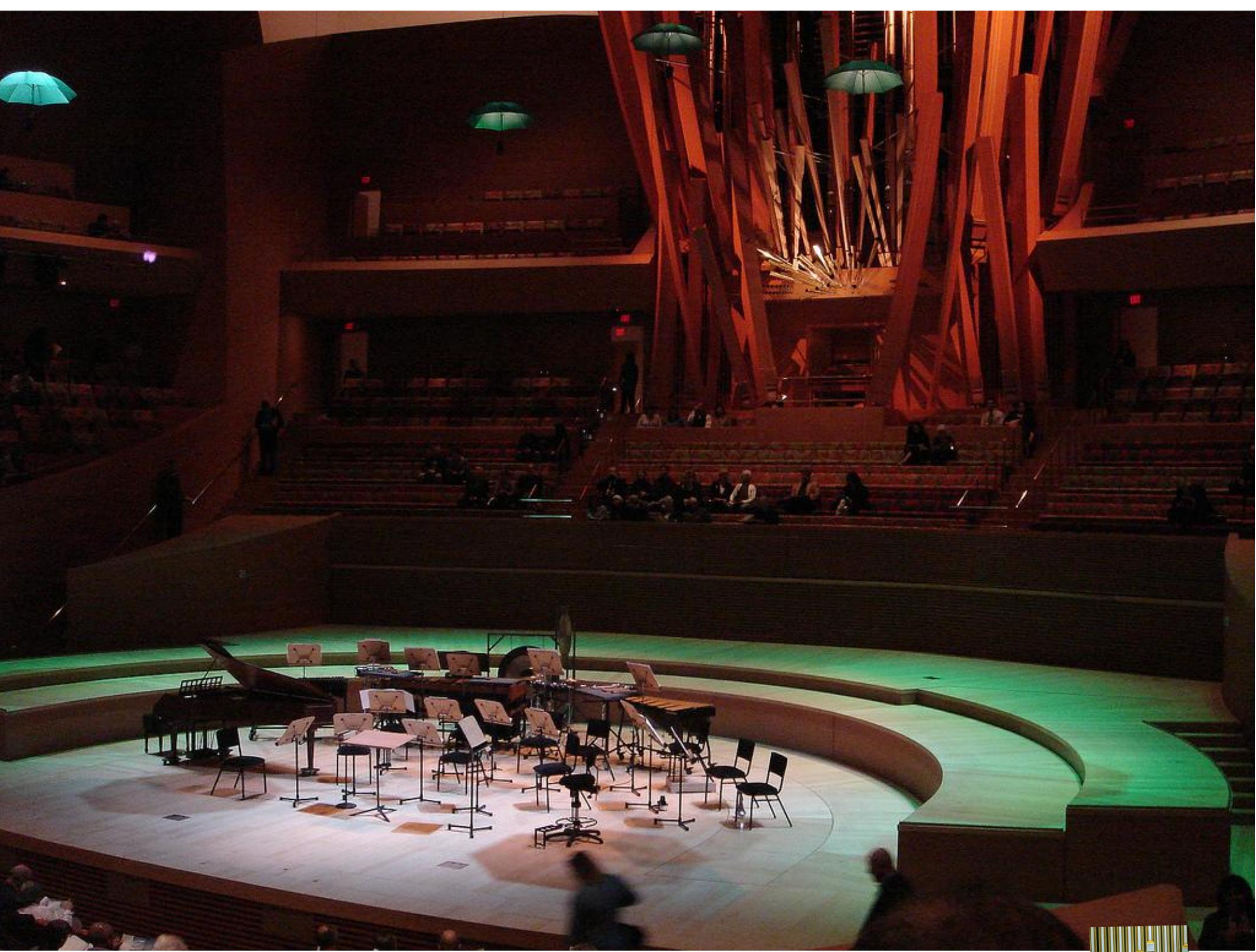
The organist can change the stop controls by hand, or an assistant can help make stop changes. For a century or more, organs have also had controls under the manual keys and above the pedal keys to help the player change stop combinations quickly. Under the manuals, the buttons are called "**Pistons**," and above the pedals, the larger buttons are called "**Toe Studs**."

Toe Studs



A whole set of stops (a division of stops) plays on each keyboard, and keyboards can also be "**coupled**" so they play together as one.





Gallery of organ pictures, sound clips and links to other Pipe Organ sites.

http://pipedreams.publicradio.org/articles/how_a_pipe_organ_works/howapipeorganworks.shtml

Anatomy of a Pipe Organ

<http://www.physics.smu.edu/olness/www/SHARED/1320/JamesEmery.pdf>

Video- Discovering Music- The Pipe Organ with Michael Conrady

http://www.youtube.com/watch?v=3sCz1R5ttpk&feature=player_embedded#!

Video- How my Pipe Organ Works

<http://www.youtube.com/watch?v=d5baNcglA8o&feature=related>

