

Pipings 101: Some Basics about Opus 17

Fig Life Journal, August 2007 – Joel Martinson

We have now entered a new and exciting phase of our organ project, as construction has begun on the pipework for Opus 17 at the shop of Richards, Fowkes & Co. in Ooltewah, Tennessee. Following several months of design work by Ralph Richards, the firm's two pipemakers began making the various metal and constructing pipes for our instrument, their 17th organ, in April.

The mechanical-action pipe organ was the most complicated human invention until the steam powered-locomotive was built in the early 1800s. Because of this, a number of different disciplines in the arts and sciences are involved in the construction, including engineering, physics, metallurgy, drafting, geometry, wood-working and acoustics. Because of its complexity, organ-building has its own language consisting of terminology which is unfamiliar to most people. The purpose of this article is to introduce the readers to some of the basic concepts, especially regarding the various pipes of the organ.

To begin, here are some of the specifications our new instrument, with organ terms in bold letters:

- Ralph Richards is designing every detail of the organ, and Bruce Fowkes will **voice** the pipework (make it speak properly in the church) once the organ is installed at Transfiguration.
- Opus 17 will have 4 **divisions**, each of which is an organ in itself.
- It will be played by three **manuals** (keyboards) and one **pedalboard**.
- It will have 47 **stops** (or sets of pipes) when fully completed, and be the firm's 2nd largest organ to date. The vestry contracted for 46 stops, but during the design process, Ralph and Bruce believed that the organ should eventually have a smaller 4' reed stop on the Positive, so the firm is "**preparing**" for it at no cost to us by building space on the **windchest** and providing a **stopknob** at the **keydesk** for it. We will purchase the 58 pipes for it when we are able.

Some basic properties of organ pipes are:

- The length of a pipe determines its **pitch**. Length is measured in **feet**, with a pipe playing the lowest C of the organ (two octaves below Middle C on the piano) being 8 feet (8') in length. Thus, a 16' pipe plays an octave below that, and a 32' stop plays two octaves lower. Cutting the **body** (the pipe above its mouth) in half raises its pitch by an octave, therefore a 4' stop sounds an octave higher than an 8' stop, and a 2' stop sounds two octaves higher.
- The width of a flue pipe determines its type of **tone**: **principal** (medium), **flute** (wide) or **string** (narrow).
- The relation of width to length of a pipe determines its **scale**. This term is different from the musical term "scale," meaning a set of pitches. For example, the scales of the pipes on our current organ are very narrow, since it was intended for a smaller room (chapel), and reflects the style of the time which preferred clarity in thinner, brighter sounds ("neo-baroque"). Our new organ will have fairly large-scaled principals and flutes, giving it very warm, rich, round, singing sounds. (See the photo of the 8' Spitzflöte pipes under construction in the shop.)

There are two main types of pipes in the organ that produce their sound by different means: **flues** and **reeds**. Though either type of pipe can be made of wood or metal, the material used does not make a dramatic difference in its character. **Flue pipes** produce sound by air passing between a windway, setting in motion the column of air in the **body** of the pipe above (see drawing 1). This is similar to blowing over the top of a soda bottle or better yet, like playing a recorder. **Reed pipes** produce sound in a similar manner to a clarinet, in that a reed (in organs, a thin metal strip also called a **tongue**) vibrates against a fixed surface when air is introduced into the bottom (**foot**) of the pipe. The reed alone produces a buzzy sound (like a kazoo!), but it is topped with a variety of **resonators** which deepens the tone and gives the various type of reed pipes their character (see drawing 2).

There are three kinds of **flue** (as in a chimney – a square or round open column) pipes: **principals**, **flutes**, and **strings**. The **principals** are the most important part of the organ, providing the “foundation” for the rest of the instrument, making the most basic and unique organ tone, which is used to accompany hymn singing. Unlike our current organ, Opus 17 will have fully-developed **choruses** (sets of similar pipes at various pitch levels) on each division. The Great (main) division will have 16’, 8’, 4’, 3’, 2’ principals as well as a **compound stop** of five **ranks** of pipes called a **Mixture**. The Positive will have 8’, 4’ and 2’ principals and two compound stops: a Scharff (high mixture) of 5 ranks and a 2 rank **Sesquialtera** which provides the top of the “**cornet**” combination. The Swell will have a principal at 4’ and a mixture, and the Pedal division will have 16’, 8’, 4’, and its own 5-rank mixture. Seventeen of the 47 stops will be from the principal family.

Our new organ will have a great variety of **flute** pipes in all shapes and sizes. Some will be open at the top, some will be fully-closed with stoppers making them sound an octave lower than an open pipe of the same length (since the air travels twice as long – up and back). Others will have little chimneys or tapered tops (see the photo of the workers making the 8’ Spitzflöte). There will also be one compound stop on the Great, a Cornet V (the Roman numeral indicates the number of ranks - five), which will be used to solo out stronger melodic lines. There are sixteen flute stops on the organ.

The Swell division of the organ will be **enclosed** behind **swell shades**, allowing the organist to control how much sound gets out of the case into the room. Unlike our current organ, the shades will be hidden from view. This organ will have two **string** stops: a Salicional and a Celeste at 8’ pitch. These stops can be pulled together to create an undulating sound, since the Celeste will be tuned slightly sharper than the Salicional. The Salicional can also be used with an 8’ flute to provide a principal-like combination (“foundation”) for this division.

The remaining 12 stops on the organ are **reeds**, varying in size from the from the Pedal’s 32’ Posaune (German for “trombone”) to the little Vox Humana 8’ on the Positive. We will have 5 trumpets, another trombone at 16’ pitch, plus a bassoon (in German, “Fagott”) at 16’, a Dulcian and Oboe at 8’, and the Schalmei 4’, the “extra” stop, which will brighten up the reed choruses.

The Great will have 12 stops; the Postive – 13; the Swell – 12; and the Pedal – 10. The total organ will have 47 stops, 68 ranks, and by my total, 3,824 pipes.

Please see the display of pipes in the Gathering Space for additional information, including an up-to-date stoplist. One of the next issues of *Pipings* will deal with common questions about our organ

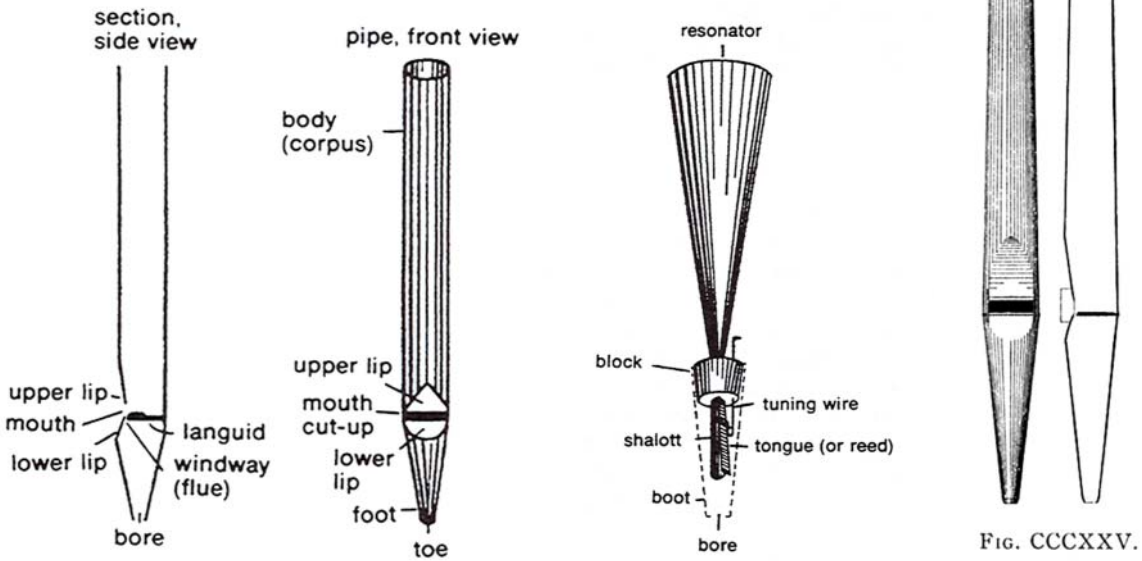


FIG. CCCXXV.