12-1973

The Pipe Organ: An Honors Special Study

Mary DeArmond
Ouachita Baptist University

HAMMER ORGAN, MARKET CHURCH, HANNOVER, GERMANY

HAUPTWERK

16'	Quintadena
8'	Principal
8'	Rohrflöte
4'	Oktav
4'	Nachthorn
2⅔'	Quinte
2'	Oktav
2'	Hohlflöte
VI-VIII	Mixtur
IV	Scharff
16'	Trompete
8'	Trompete

BRUSTWERK

8'	Gedackt
4'	Gedacktflöte
2'	Principal
II	Terzian
III	Zimbel
8'	Krummhorn
	Tremulant

OBERWERK

8'	Principal
8'	Koppelflöte
4'	Violflöte
4'	Blockflöte
2⅔'	Nasat
2'	Nachthorn
1⅓'	Quinte
1⅗'	Terz
1'	Sifflöte
III	Rauschflöte
IV-VI	Mixtur
III	Terzzimbel
8'	Trompete
4'	Holzregal
	Tremulant

PEDAL

16'	Principal
16'	Subbass
8'	Oktav
8'	Gedacktpommer
4'	Metallflöte
2'	Nachthorn
III	Hintersatz
VI	Mixtur
32'	Kontrafagott
16'	Posaune
16'	Dulzian
8'	Trompete
4'	Trompete
2'	Kornett

RÜCKPOSITIV

8'	Gedackt
8'	Quintadena
4'	Principal
4'	Rohrflöte
2'	Oktav
2'	Gemshorn
1⅓'	Quinte
II	Sesquialtera
V-VI	Scharff
16'	Bärpfeife
8'	Schalmei

COUPLERS

Rückpositiv — Hauptwerk
Brustwerk — Hauptwerk

Mechanical key and stop actions.

THE PIPE ORGAN

An Honors Special Study

Mary DeArmond

Ouachita Baptist University

December 17, 1973

Mrs. Frances Scott, Adviser

CONTENTS

This is the information I used in teaching Park and Goldstein elementary schools in Hot Springs on November 29 and November 30 at Park Place Baptist Church and St. Lukes Episcopal Church.

THE PIPE ORGAN

Largest and most complex of musical instruments, the pipe organ is fundamentally a wind instrument. The average modern grand organ consists not of one organ but of three or more, arranged so that the player can operate them all at once. Each of these organs has its own set of pipes and its own keyboard. The keyboards, called manuals, have a stairlike arrangement but overlap into the playing unit, called the console, and a special pedal keyboard operated by the player's feet is placed on the floor underneath the manuals. Each organ in the instrument serves a particular purpose and has its own name; the great, swell, choir and pedal organs are the most common. The great

Three manual draw knob console. Recessed rectangular panel case.

organ is generally the largest and contains the fundamental pipes of the instrument. The choir organ is like the great organ but smaller and softer and may contain some solo effect effects. The outstanding characteristic of the small organ is its function of supplying solo and imitative colors to the ensemble, while the pedal organ provides pipes of low pitch to strengthen the bass parts. The pipes of some of these organs, notably the swell and choir, may be enclosed in semisoundproof boxes which can be opened or closed by means of louvers at the player's will to produce variations in the volume of sound.

In modern organs, wind is supplied to the pipes by a power driven fan connected to large metal tubes which carry the wind to oblong airtight boxes called wind chests. In the

A section of the wind chest department.

top of the wind chest is a series of holes, each filled with a valve, which can be opened or closed by means of a small electromagnet inside the chest; the feet of each organ pipe rests in such a hole and when the valve is open, receives the impulse of air from the chest and sends it to the sound-producing portion of the pipe. The electromagnet is activated by the player pressing down a key.

In an organ, the pipes are organized by ranks, that is, full sets of pipes of the same type covering all notes from the lowest to the highest. Apart from the tone quality, ranks are also distinguished by the pitch level at which their pipes sound. That is to say, a rank in which the pipes all sound at normal pitch (with respect to the keyboard) is said to be an 8' pitch, so called because the length of a pipe sounding the C two octaves below middle C is about eight feet. Let us assume an organist playing one note, middle C. When the 8' rank is used, middle C will sound. But there would also be another rank of the same kind of pipes at 4' pitch sounding an octave higher, and the organist could, if he wished, employ both ranks at the same time, so that pressing the key midde C would produce two notes, middle C and the C an octave above it. A rank at 2' pitch would produce the C two octaves above middle C while one at 16' pitch would sound the C an octave lower than middle C. Thus, by merely playing middle C, the organist, by allowing additional registers at 4', 2', and 16' pitch to sound, could produce four C's, each in a different

octave.

Also to be mentioned are two kinds of stops that are never used by themselves, but only in conjunction with others, mutation and mixture stops. The mutation stop is the simpler of the two, since it sounds the fifth or twelfth above the fundamental note. The mixture stop on the other hand, is "compound" in that it doesn't present a continuous scale from the bottom to the top of its range, but rather shifts its relation to the fundamental note; the first twelfth of its range is two octaves above the fundamental, the next octave is a twelfth higher, the third octave is one octave higher, and the last octave is in unison.. These stops are employed to strengthen the partial tones and thus provide an enrichment of tone color. When one takes into account this aspect of the various pitch levels and adds to it the various different kinds of pipe, along with the possibility of ranks of open and stopped pipes, it is easy to appreciate the countless combinations that are possible on this instrument.

A rank, then, is a set of pipes of the same kind. A stop, strictly speaking, is the lever or control by which the organist causes a certain rank to sound or not to sound; but the term "stop" is loosely used to mean the same as register or rank. Originally, particular manuals controlled certain registers, but most later organs are made so that all registers are available from any one manual.

The number of types of pipes used to produce the various

tonal affects is very large. Most of these pipes are made of tin, lead, copper, and antimony, or mixtures of two or more of these, but in some cases wood is used. The pipes range from

A view of a portion of the metal pipe shop.

A section of the wood pipe shop.

Rolling up a sheet of newly cast pipe metal.

thirty-two feet to less than an inch in length and their diameters vary according to their pitch and timbre. Organ pipes fall into two classifications according to method of tone production and into four according to tone color. In a flue pipe, tone is produced by the forcing of air across an opening known as the mouth, while the tone of a reed pipe is produced by a small, vibrating brass reed fixed in the foot of the pipe.

One of the flue voicing rooms. Pipes are shown in the process of preparation and voicing.

The four tonal classifications are as follows: diapason tone, the characteristic organ color; flute tone, smoother and softer than diapason tone and approximately resembling the orchestral flute; string tone, sharper and thinner than either flute or diapason tone; and reed tone, metallic and imitative of various orchestral wind instruments. Some organs, particularly those used in the theater also contain percussion attachments such as

chimes and drums.

The origins of the organ are lost in antiquity, but it is reasonably surmised that the panpipe, a type of syrinx, is its remote ancestor. The invention of the hydraulis, or water organ, is attributed to an Alexandrian engineer, Ctesibius, who flourished between 246 and 221 B.C. The hydraulis was a powerful instrument, with wind pressure supplied by a water compressor, while the various pipes were made to sound by the manipulation of slide valves. It was used by the Greeks and Romans at festivals and games, and during the rites of the mystery cults. The tone was bombastic and piercing and could be heard for great distances. During the early Christian centuries, bellows replaced the old water compressors, and the size and number of pipes was greatly increased.

The organ was used in churches in Spain as early as the middle of the fifth century, and since it was still an instrument of almost overpowering sound, was reserved mostly for high festivals. By the eleventh century, large organs were in general use all over Europe, an unusually large one for the time being the organ built in 980 in the monastery at Winchester in England. Keys gradually replaced the awkward slides, the pitch and tonal ranges were enlarged, and in the fourteenth century pedals were invented. During this same period, a miniature portable organ, the portative, and a small stationery organ, the positive, were used extensively.

The "golden age" of organ building and organ music began

around 1600 and continued well into the eighteenth century. The organ of this period was distinguished for great brilliance and variety of tone, and its extreme clarity provided a perfect medium for the performance of contrapuntal music. Almost all of the truly great organ composers wrote for this "baroque organ," which enjoyed a popularity greater than the organs of any other period before or since. The nineteeth century romantic movement, with its emphasis on expressive orchestral sound, brought with it a general deterioration in organ building and in organ music; however, builders attempted to create a one-man orchestra and the attempt resulted only in a poor imitation. In addition to the vast number of tonal effects introduced in the nineteenth and twentieth centuries, great advances in mechanical construction were made. The tendancy toward increasingly bigger instruments culminated in the huge, 33,113-pipe Atlantic City Auditorium organ, equipped with two consoles, one having seven keyboards. Early in the present century, however, organists and builders began a movement toward simplification.

Studio Teaching Organ, University of Michigan, Ann Arbor, Michigan

A view of the erecting room. The instrument shown is assembled for final testing before shipment to the site of installation.

RICKLINGEN CASTLE

RICKLINGEN
GERMANY

PETER-PAULS CHURCH

HERMANNSBURG
GERMANY

BIBLIOGRAPHY

"The Organ," Comptons Encyclopedia, Chicago, F. E. Compton Co., 1970.

Kirby, F. E., A Short History of Keyboard Music, New York, The Free Press, 1966.

Grout, Donald Jay, A History of Western Music, New York, W. W. Norton & Co., 1973.