

From The Builder

by John Brombaugh, 1997

Discussions about building a special organ for Duke University's Memorial Chapel began some 12 years ago. Since the room is relatively small, the milder sound of the early Italian organ was considered a most suitable complement to the large Flentrop and Æolian organs in the main part of the Chapel. Meantone tuning, customary for organs before the 18th century, would also offer a wider scope of unusual musical opportunities. To avoid diminishing even further the limited seating space, the new organ would be placed in a "swallow's nest" loft made by the organbuilder to match the organ case. A contract was signed in the spring of 1991, actual construction began in the Brombaugh shop in the summer of 1995, and the organ was installed in the Memorial Chapel during the summer of 1997. The result is a new organ — consisting of 21 ranks, 23 stops, and some 960 pipes — that may very well be the only modern example of its type in the Western Hemisphere.

The early Renaissance organs in southern Europe seldom made the aggressive sounds that became common later in France and Germany. These organs were remarkably simple compared to their northern cousins, but (especially in Tuscany) they made a wonderful, sweet sound. Instruments in Italy seldom had more than one manual keyboard, and the limited pedals, if present at all, assisted only in playing occasional bass notes.

Nonetheless, these bass pipes could be quite large, as one can still see in the 24' front pipes of the Epistle organ in the Basilica of San Petronio in Bologna. This remarkable instrument, made in 1475 by the renowned Tuscan builder Lorenzo da Prato, has only about a thousand pipes, but the sound carries softly throughout the immense church. One of the very few remaining organs from the 15th century, it underwent a minor renovation in 1532 to accommodate retuning in meantone temperament. The San Petronio organ — as well as similar ones by Domenico di Lorenzo in Lucca and Florence, and by Giovanni Piffero in Siena — was the primary inspiration for the Principal chorus and two flute stops (4' and 2 2/3') on the main (Great) division of the Memorial Chapel organ. The Italian pipes are modeled specifically after still extant examples from 1480, 1551, and 1612.

The Italian Principal chorus, referred to as the ripieno, comprises several sets of narrow cylindrical metal pipes, of which the visible front pipes are the largest. The lowest rank of facade pipes (Principale 8') extends from two octaves below middle c to two octaves above it. Additional stops in the ripieno sound either an octave or a fifth higher in successively higher registers and can be added separately in various combinations. The smallest pipe of the highest rank, producing a pitch sounding four octaves above middle c, is only 1 1/2" long, approaching the upper limit of normal human hearing. Consequently, the usual Italian practice was to "break back" the highest pitches to an octave below, to avoid pipes that would be too small for practical use. The Memorial Chapel organ includes a tiratutti pedal to engage the entire Principal chorus at once, a device that appeared on some Italian instruments by the turn of the 18th century.

In addition to the Principal chorus and the flutes in the main division, another stop called a Cornettina (seen in later Venetian organs) has been included. Containing a tierce, or third-sounding rank, it can be used for solo melodies in the manner of similar treble stops found in contemporary French, Germanic, and Iberian organs.

The Great also has two non-Italian flute stops (16' and 8') and a German Trumpet 8' to expand the organ's versatility when playing literature of other national schools. The Trumpet is divisible between bass and treble, following a common historic convention in some instruments. The division is found historically at various points near the middle of the keyboard, but most commonly between b and c' or between c' and c# (the latter a consistent feature in Iberian organs). The Memorial Chapel organ features a lever that will allow the organist to select either dividing point.

To make the organ still more flexible for playing a variety of non-Italian music, a second manual division (in the style of a small north German Brustwerk) adds four more stops. Of special interest is the Querpfeiff 2', inspired by an unusual overblowing flute stop with a similar name in the Schnitger organ of the Jakobikirche in Hamburg.

The Brustwerk manual has the conventional bass "short octave" format that was customary in keyboard instruments throughout Europe before the 18th century. That is, the keys that would appear to be E, F#, and G# in the lowest octave

actually play C, D, and E respectively. The Great keyboard is similar, except the apparent F# and G# keys in the bottom octave are “split” to make those pitches available as well the D and E (an arrangement referred to as a “broken octave”). The keys on both manuals reflect the shorter dimensions found in early instruments.

The Pedal keyboard, however, has a different layout, assuming a format often used by the renowned 17th-century north German builder Arp Schnitger. This keyboard includes F# and G# in the bass octave but (like the manuals) not C# and D#. The Pedal plays three of the Great stops by transmission but has no pipes of its own.

The tuning system used in the Memorial Chapel organ is meantone, the accepted standard for keyboard instruments in Europe during the 16th and 17th centuries. The most distinctive feature of 1/4-comma meantone temperament is that the eight usable major thirds are tuned absolutely pure, that is, without the audible “beats” that characterize all intervals (except the octave) in modern equal temperament. For long-established acoustical reasons, every practical tuning system involves a certain quid pro quo; in this case, tuning some pure intervals creates other unusable intervals, thus permitting only a limited constellation of keys (corresponding to those commonly used in the repertoire at the time).

To allow composers and keyboard players to venture beyond the usual limitations of meantone tuning, a few historic organs had more than 12 notes per octave, extending the range of tolerable keys. This transient system usually required double (split) keys for Eb and G# so that one could also play the enharmonic notes D# and Ab. To ameliorate this rather curious (and at times awkward) keyboard design for the player, we developed an unusual (but not unprecedented) mechanical system for the Memorial Chapel organ so that one can switch between the enharmonic pitches Eb and D# or G# and Ab on all keyboards by means of two levers.

The organ case and loft for the Memorial Chapel instrument follow basic Renaissance architectural styles. The upper case, containing the pipes of the main division, is based on ancient Italian cases like the one in the Church of San Bernardino in Verona, as well as others found in some Tuscan churches. The layout of the front pipes follows a conventional pattern seen, for example, in the organ at Santa Maria della Scala in Siena. The facade pipes are made of an alloy that is over 98% tin, and the pipe mouths are gilded with 23-carat gold leaf.

Within the case, all the pipes rest on windchests. Although most historic Italian organ builders used an unusual construction known as a “spring chest,” the more conventional European type, the “slider chest,” was occasionally found in Italy as well. The Memorial Chapel organ employs slider chests, but the stops operating the Italian registers (located on the left side of the keydesk) are fashioned after the ancient spring chest levers.

The wind system includes one large wedge bellows and a small electric blower (the latter a minor concession to modernity). The wind pressure is only 47 mm, considerably lower than was common for northern European organs. The simple tremulant (after Schnitger) is adjustable in its intensity. Components of the wind system, as well as the largest bass pipes, are placed in a chamber behind the organ case, accessible by means of a spiral staircase not visible to the audience or congregation.

About the Builder

One of the world’s most distinguished active organ builders, John Brombaugh holds degrees in electrical engineering from the University of Cincinnati and Cornell University. His intended career as an engineer took a different turn when he chose to work as an apprentice for the American organ builders Fritz Noack and Charles Fisk between 1964 and 1967, followed by a brief period in Hamburg assisting the German builder Rudolf von Beckerath.

Brombaugh established his own firm in Middletown, Ohio, in 1968, moving to Eugene, Oregon in 1977. Early in his career, he specialized in organs patterned after 17th-century north German prototypes, later broadening his expertise to include larger, more eclectic instruments, but always adhering to the time-honored classical principles of organ construction. Brombaugh organs are located throughout the United States and abroad, among them the meantone instruments at Oberlin College, Southern College, and the Haga Church in Gothenburg, Sweden.