# The Oldest Organ in Christendom

FoMRHIQ 35, April 1984, Comm.534
[with further details, added 2005]

While I was in Jerusalem three weeks ago I had the privilege, through the kindness of the Curator, Father Michel Piccirillo, of examining in some detail the collection of organ pipes in the Studium Biblicum Franciscanum Museum in the Convent of the Flagellation in the Via Dolorosa in the Old City of Jerusalem. What follows is the most preliminary of reports; it will take a considerable time to make sense of the measurements and for Bathja Bayer, who first showed me the pipes, to write the historical part of the full-scale article that we are planning. The main reason for producing even a preliminary report at this stage is that, according to Father Piccirillo, I am 'the hundred-and-first person to take measurements of the pipes' and yet, to my (and his) knowledge, this will be the first time that they have been reported in the organological literature. Previous publication has been in such sources as the Revue Biblique and, most recently, B. Bagatti, *Gli Antichi Edifici Sacri di Betlemme,* Jerusalem, 1952.

Briefly, then, the pipes were discovered while digging for construction work in 1906 in Bethlehem, along with some bells (a couple of bells had been found previously in 1863). There has always been a tradition that the bells, at least, of the Basilica of the Nativity in Bethlehem had been buried after their use had been prohibited in the 15th century, and there is little doubt that the same had happened to the pipes, if no more, of the organ. Similarly, there is little doubt that both pipes and bells date back to the Latin Kingdom, probably (but this is where Dr. Bayer is hoping to find more concrete information) early in the 12th century. If this is so, then these pipes are, by several centuries, the oldest that we have except for the very small pipes (portative organ size) of the Roman organ from Aquincum.

There are, visible in the Museum, just under 220 pipes. According to the early reports 251 were found, and so far I am not clear whether there were other bits in addition that were too broken to be worth keeping, or whether what was thrown away came out of the 251. Certainly there is no trace of anything but pipes – no woodwork or other metal work has survived, nor so far can any report be found that might indicate whether any such were dug up at the same time. The pipes are displayed in the Museum in an inverted V, as in illustrations of the central part of late mediæval organs (eg Arnault's drawing, in my *World of Medieval & Renaissance Musical Instruments* pl.50, and in many other books), in five ranks, so close together that only the first rank is accessible. There are 49 pipes in the first (front) rank, 42 in each of the second, third and fourth, and 43 in the fifth. In addition there are some broken pipes in a cupboard underneath the display and at least one pipe, and perhaps more, lying between the ranks on the boards that hold them in position (hence the vague figure 'just under 220' above).

Of the pipes in the front rank, the shortest speaking length (lip to top) is 16.8 cm and the longest is 58.8 cm (the longest pipe in the second rank is two or three centimetres longer; the central pipes in the further ranks may be longer, but because one cannot get at the mouths, nor see exactly even how high the board on which they are mounted is, one cannot be sure of this). It is possible that we have an organ with 2-foot C as the lowest note. Also, of course, there is no way of telling whether we have all the organ pipes or whether there is still another hoard to be found under the ground.

What we can say without any doubt is:

1) that all the pipes, irrespective of their length, are of about the same diameter ('about' because none is in new condition; all are somewhat battered and dented), between 28 and 29mm; there is no scaling at all.

2) Also that all the pipes were made, presumably by rolling the metal on a mandrel, with an overlap which now shows no signs of solder, which is reminiscent of the Aquincum pipes save that here the overlap is 3-5 mm deep (probably much the same proportionately to the circumference as those at Aquincum; the pipes there are not much more than pencil thickness).
3) That the pipes were made in one piece, unlike those at Aquincum, which were jointed at the mouth (ie with foot and body made in two separate pieces).
4) That the mouths are rectangular, or nearly so – some are a fraction higher at one side than at the other (again unlike Aquincum, where the lips are curved so that the cut-up or mouth looks like a D resting on its straight side).
5) That the metal, in the vast majority of cases is either copper or a copper alloy; that is to say, all the high spots, where the green oxide corrosion has been rubbed off in cleaning, and in one case where the whole pipe appears to have been chemically cleaned, are copper-coloured. I say 'in the vast majority of cases' because there are half a dozen pipes whose metal is white; one was accessible, and it weighed only about half as much as a copper pipe of similar size.

I have been back home so short a time that I've not yet had time to look up any table of metals to compare the specific gravities of copper (or bronze) and, for example, tin. The pipe that appeared to have been chemically cleaned showed scraping marks, apparently original and quite deep, almost like a wood grain. Metal thickness varied quite considerably, from about 0.45 mm to 0.9 mm (much fuller detail will follow in due course).

All these facts confirm a hypothesis on the date. Certainly what we have here is far older than Arnault's treatise, for instance. What I now have to do is to tabulate and make sense of the pipe lengths (I have a suspicion that we may have something that would correspond to the description of the tenth-century Winchester organ; there are groups of pipes of either the same length or very nearly the same length) and go through all the early organ building treatises to see just what information in them can be linked to what we have, and then write the thing up properly. Meanwhile, at least you know that it exists and where it can be seen (the Museum is open weekdays from 9.00 am to 11.30) and, if you are really pushed for information, that I have some. I will let you know, of course, when a proper publication appears; it is not likely to be here, partly because it should be in a journal of record, which we don't purport to be, and partly because it ought to be somewhere where organ people will see it, since it is they whom it most closely concerns.

Added in 2005: Little further work was done and there was no further publication, but I had been permitted to bring home a segment of broken pipe and that I had analysed here in Oxford. The report says:

| %Iron | %Nickel | %Copper | %Zinc | %Arsenic | %Lead | %Silver | %Tin | %Antimony |
|---|---|---|---|---|---|---|---|---|
| <0.1 | <0.1 | 95.6 | 0.3 | <0.1 | 1.2 | 0.2 | 2.3 | 0.3 |

"The organ pipe is a typical bronze (copper-tin, with traces of lead), and the dating of such things is virtually impossible." He added that there did seem to be traces of solder in the overlap.

I had promised to return the fragment and did so, apparently to the surprise of the Curator (who I think had forgotten all about it!). I am rather sorry I did because it might have been possible nowadays to have had a more detailed analysis, with perhaps a date.

My measurements of the mouths were:
width: about 23 mm.

height of cut-up: 10 mm for most; a few were about 8 mm, and a few slightly over 10 mm.

As far as could be seen, down to the plank which held the feet, the pipes appeared to be cylindrical; there seemed to be no contraction or conicity in the boot.

As noted above, only the front row was accessible for measuring. The following table gives the lengths, from lip to top. The left-hand figure in each column is the number in the row, from left to right; the right-hand figure is the length in cm. I have grouped them here in order of length, not of position in the row, because that seems to me to be more significant, and grouped in batches of similar length. As far as could be judged by eye, the other rows were similar, though each rank was higher than the one in front, and of course each may have started from a different height (ie their planks may have been set as steps).

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 16.8 | 6 | 21.3 | 3 | 23 | 16 | 24.8 | 30 | 38.9 |
| 2 | 17.5 | 45 | 21.4 | 10 | 23.2 | 18 | 24.8 | 21 | 39.0 |
| 49 | 17.8 | 8 | 21.5 | 13 | 23.2 | 37 | 24.8 | 19 | 39.1 |
| | | 9 | 21.5 | 44 | 23.2 | 36 | 24.8 | 22 | 39.2 |
| 7 | 20 | 46 | 21.6 | 43 | 23.2 | 35 | 24.8 | | |
| 48 | 20.3 | 11 | 21.8 | 14 | 23.3 | | | 28 | 44.0 |
| 47 | 20.4 | 12 | 21.8 | 42 | 23.3 | 31 | 32.1 | 26 | 44.2 |
| 5 | 20.4 | | | 15 | 23.4 | 17 | 32.2 | 27 | 44.2 |
| 4 | 20.6 | | | 41 | 23.4 | 20 | 32.3 | 23 | 44.4 |
| | | | | 40 | 23.4 | 33 | 32.3 | 24 | 44.4 |
| | | | | 39 | 23.5 | 34 | c.32.4 | | |
| | | | | 38 | 23.6 | 19 | 32.4 | 25 | 58.8 |
| | | | | | | 32 | 34.4 | | |

So here we have nine different pitches, with some wide gaps between them, and I presume that the other ranks fill those gaps with other pitches.

It does seem to me very clear that we have something like Winchester, where blocks of pipes stood to each key. Thus some of our 23 cm pipes would have been unisons, some fifths, some octaves, etc of whichever key they stood to. And it also seems clear that there was a built-in tremolo.

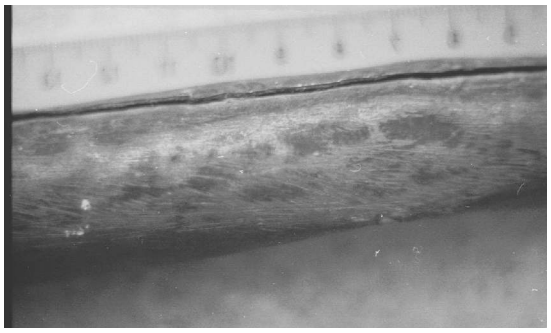
However, since we know nothing of the original source of these pipes (Bathja Bayer came up with no evidence, and my late wife who ploughed through many pilgrim reports in the Bodleian Library, found no reference at all to any organ), we may have here only a very small quantity of the original number of pipes, and we may also have the remains of half a dozen organs rather than of one. And if so my statement in the preceding paragraph may be totally wrong!

When I asked if it might be possible to measure all the pipes, which would have meant dismantling the display, Fr. Piccirillo was horrified at the idea – they had only recently gone to great trouble to arrange them in a visually pleasing array, and no way would they consider disturbing it. So I could only measure a few accessible top diameters in the other ranks, which were the same as the rest, and they were all clearly made in the same way. None of the mouths in the other ranks were accessible because they were behind the front-row pipes.

One last thought: the apparent graining in the one clean pipe might perhaps have been due to casting bronze sheet on a wooden base, just as the London South Bank concrete shows the wood-graining of the shuttering against which it was cast.

Organ as displayed

Row of mouths



Pipe seam

Languid