Skeleton measurement sheet

Location:	Quedlinburg							
Inv. N°:	-	(but no marks on bell)						
Measured:	Adrian Brown, Peter Van Heyghen							
Date:	27/06/2016							
Pitch @ a=440hz:								
Total length:	391							
Speaking length:	343.2							
Windway length:	47.8							
Material:	Cherry?						**External diameters**	
mark:	S						(east - west)	
							distance	
	FINGERHOLES						**from top**	**Ø**
	length		**diameter**		**direction**		17.8	29.7
	(from top)	(from bl)	east/w	north/s	⇧⇨⇩⇦		47.8	28.9
X	*171.1*	123.3	5.0	5.3			hole X	24.4
1	*181.8*	134	5.3	5.4			1	24.1
2	*207.1*	159.3	5.3	5.2			2	23.4
3	*232.3*	184.5	5.8	6.2			3	22.7
4	*260.8*	213	6.3	7.3			4	21.9
5	*285.6*	237.8	6.3	7.0			5	21.9
6	*311.8*	264	6.1	6.3			6	22.2
7 west (r hand player)	*334.6*	286.8	4.6	5.0			7	23.2
7 east	*333.8*	286	wax				368	28.5
							bottom	37.5
	Step:	irregular, but large			Window width:	11.6		
	Edge thickness:	paper thin			Cutup	4.30		
	Windway exit chamfers: up	indistinct						
					Ramp width north	12.8		
	down	0.8			south	14		
		circa. 45°						
	W/W entrance: width	12.5			Ramp length: west	19.8		
	height	1.8			east	19.9		
					middle	24.3		
	Beak cut away:	30						

NOTES:
Holes 4 and 5 have less pronounced overcutting and seem to have been irregularly enlarged.
Otherwise notes as tenor 1
Replacement block?

Quedlinburg 1 Alto S.xls, Bore from top

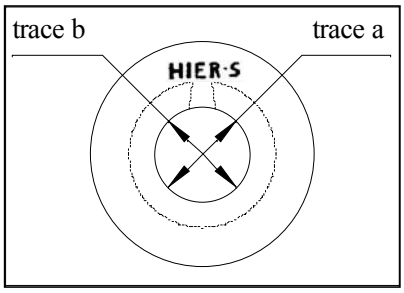
Length	Ø⇦⇨	Ø⇧⇩		Length	Ø⇦⇨	Ø⇧⇩		Length	Ø⇦⇨	Ø⇧⇩				
49.8	17.26245	16.56363		199.8	15.53379	15.68091		349.8	13.8419	13.87868				
54.8	16.89465	16.52685		204.8	15.42345	15.57057		354.8	13.73156	13.87868				
59.8	16.67397	16.52685		209.8	15.49701	15.64413		359.8	13.658	13.8419				
64.8	16.41651	16.52685		214.8	15.49701	15.64413		364.8	13.62122	13.80512				
69.8	16.23261	16.60041		219.8	15.53379	15.60735		369.8	13.58444	13.69478				
74.8	16.26939	16.60041		224.8	15.49701	15.60735		374.8	13.62122	13.658				
79.8	16.49007	16.56363		229.8	15.57057	15.57057		379.8	13.54766	13.62122				
84.8	16.52685	16.63719		234.8	15.49701	15.64413		384.8	13.58444	13.58444				
89.8	16.49007	16.63719		239.8	15.49701	15.57057		389.8	13.51088	13.4741				
94.8	16.34295	16.56363		244.8	14.76141	14.83497								
99.8	16.34295	16.49007		249.8	14.72463	14.76141								
104.8	16.30617	16.41651		254.8	14.68785	14.76141								
109.8	15.86481	16.04871		259.8	14.65107	14.72463								
114.8	15.79125	15.71769		264.8	14.65107	14.68785								
119.8	15.75447	15.64413		269.8	14.57751	14.61429								
124.8	15.68091	15.60735		274.8	14.50395	14.54073								
129.8	15.64413	15.57057		279.8	14.46717	14.54073								
134.8	15.57057	15.68091		284.8	14.61429	14.46717								
139.8	15.68091	15.71769		289.8	14.32005	14.39361								
144.8	15.57057	15.68091		294.8	14.28327	14.32005								
149.8	15.60735	15.79125		299.8	14.20971	14.32005								
154.8	15.68091	15.86481		304.8	14.17293	14.28327								
159.8	15.71769	15.90159		309.8	14.17293	14.28327								
164.8	15.82803	15.79125		314.8	14.09937	14.24649								
169.8	15.64413	15.90159		319.8	14.0258	14.17293								
174.8	15.57057	15.79125		324.8	13.95224	14.13615								
179.8	15.53379	16.04871		329.8	13.87868	14.06259								
184.8	15.53379	16.01193		334.8	13.8419	14.61429								
189.8	15.42345	15.86481		339.8	14.0258	13.91546								
194.8	15.49701	15.75447		344.8	13.95224	13.91546								

	I =	A			Temp.		
	Tuner set to	a'=440	Equal tempered		Humidity	!	
Note	Cents deflection from 0	Pressure mm H_2O	Fingering, where different	Note	Cents deflection from 0	Pressure mm H_2O	Fingering, where different
I	+20	12		VIII	-10	27	
II	-5	15		IX	-10	29	
III	-40	17		X	-40	33	
IV	+20	20		XI			
V	0	22		XII	-30	38	
VI	-5	24		XIII	-45	40	
VII	-40	26		XIV	Just about		
				XV	"		

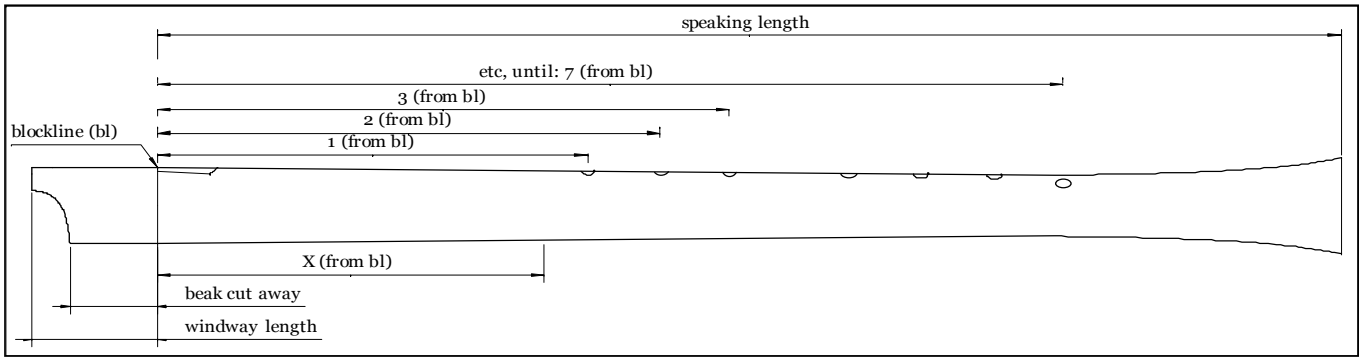
Very sharp I, otherwise fairly well in tune.
Just about 2 octaves, (with our standard dolcimelo fingerings!) probaby due as a consiquence of the sharp I
XIII works open, with very open thumb, but also with 4/567

KEY AND NOTES TO MEASUREMENT SHEETS

All attempts at measuring are necessarily subjective and the current survey was undertaken with some finite objectives: To undertake an inclusive study of ALL the recorders, using a skeleton format of the most important measurements and minimal intervention. The bores were measured from the bottom, using a strain gauge based digital internal caliper. This has the advantage that bores can be measured with the blocks in situ, thus preventing damage to this sensitive part. Normally, two traces were made, at approximately 90° from each other, avoiding the fingerholes where possible. Calculations were then made to give internal diameters from the top of the instruments, and allow bore traces to be plotted.



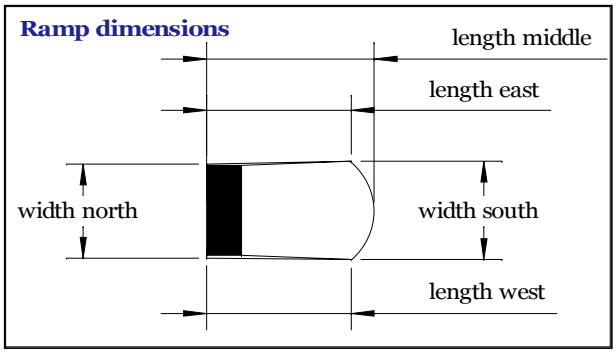
FIELD	TYPICAL VALUE	EXPLANATION
Location:		Town, collection or both, where the instrument is currently located
Inv. N°:		Inventory number of the instrument
Measured:		Name of measurer
Date:		Date of measurements, where known
Pitch @ a=440hz:		Pitch in terms of lowest note, all holes covered, relative to modern pitch (a=440hz). + or - indicates a quarter tone step, relative to modern pitch
Material:		Material from which the instrument is made
mark:		Mark or stamp visible on the instrument, branded or embossed by maker or owner

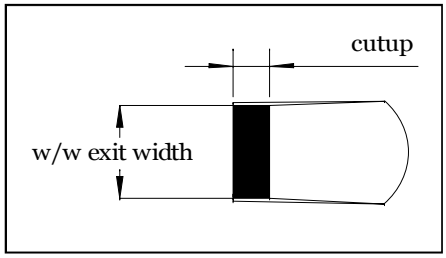


FINGERHOLES		Tone, or fingerholes of the instrument
length		
(from bl)		(See drawing above)
(from top)		Sum of length from blockline and windway length
diameter		
east/w		Fingerhole minimum diameter in an east to west direction
north/s		Fingerhole minimum diameter in a north to south direction
direction		
⇧⇨⇩⇦		Indicates if a fingerhole is bored obliquely, or undercut with an unusual bias, and in which direction
Step:		Difference between lower surface of edge (labium) and upper surface of windway ceiling. Typically, this measurment is a visual estimate, given that the blocks would not normally be removed
Edge thickness:		Thickness of edge (labium). Measured by impression made in fine gum and compared using feeler gauges
Windway exit chamfers: up	small, c. 0.6	Chamfer on upper surface of windway exit (on ceiling)
	flat	An estimate of its angle
down	2.0	Chamfer on lower surface of windway exit (on block)
	45°	An estimate of its angle

(These measurements have either been obtained by the same method as the edge thickness, or are a visual estimate)

W/W entrance: width		Width of windway entrance,
height		Height of windway entrance, distance between windway ceiling and block surface
External diameters (east - west)		Diameter of the instrument's exterior Measured at 90 degrees to the longitudinal plane of the fingerholes
distance from top		Distance from the north end of the instrument, at which measurement was taken. Note: On basses with fontanelles, the aproximate measurements of beads and fontanelle supports were also included.





Cap		Measurements relative to cap
Overall length	99	Total length of the cap
internal Ø	57.6	Approximate internal diameter of cap recess
depth	73	Maximum depth of cap recess
largest external Ø	74.7	Maximum diameter of caps external turning
hole Ø	11.8	Diameter of crook hole, where appropriate
blow hole		Width and height of blowing hole, where appropriate
ring width	21.6	Width of brass strengthening ring
Ø	64	Diameter of brass strengthening ring
Fontanelle		Measurements relative to fontanelle
Overall length	151	Total length of fontanelle
internal Ø south	69.5	Approximate internal diameter of lower end
internal Ø north	64.3	Approximate internal diameter of upper end
largest external Ø	81.2	Maximum exterior diameter, typically scored with a line though the middle of the roses
north ring width	22.5	Width of upper brass strengthening ring
Ø	71.7	Diameter of upper brass strengthening ring
south ring width	22.9	Width of lower brass strengthening ring
Ø	78.5	Diameter of lower brass strengthening ring
rose Ø	28	Diameter of the largest ring of hole arrangement. Typically holes are arranged in three rings, with an extra hole in the centre.
holes	3	Diameter of the rose holes

For the exterior of the instruments, measurements were taken at strategic points, relative to the functionality of the instruments. Some decorative details, particularly with regard to the bass instruments, were also recorded to allow a faithful reproduction to be made.
Concerning the voicing of the instruments, only the most basic details such as those concerning the window and ramp, windway width could be recorded with any surety. Many of the blocks are badly damaged, missing or replacements and it was felt that little would be gained by miniscule examination of these areas. From instruments with an undamaged labium or chamfers, estimates were made to give instrument makers an idea of the sort of degree of voicing these recorders might have originally had.
The recorders were mouth blown and measurements taken with a Korg tuner calibrated in equal temperament at a=440hz, Readings were taken as cents deflection from this two pitch standard. The pressure measurements were read in millimetres of water column, using an Appleby and Ireland pressure gauge with the range 0 to 100 mm/H2O.
Each instrument was blown to find the centre of the sound and the pressure and pitch recorded. Where fingerings other than the st
The following fingerings were tested.

Note	Fingering
I	1234567
II	0123456-
III	012345--
IV	01234-5-
V	0123----
VI	012-----
VII	01------
VIII	0-2-----
IX	--------
X	0/12345--
XI	Not recorded
XII	0/123----
XIII	0/12-----
XIV	Various
XV	Various

It was not deemed necessary to take readings for note XI due to different half holing of hole 6. All recorders were tried for Jambe de Fer and Ganassi fingerings and where this was successful, the fingerings were recorded.