Johann Andreas Silbermann Organ - 1761

Katholische Pfarrkirche St. Bartholomäus

Arlesheim, near Basel.

By Blair Batty

Forward

I am a retired organbuilder. I've always had an interest in pipe organ scaling and voicing. Scaling are the measurements of the pipes, that give them the particular sound of a particular organ. Over the years, I have collected and studied the scales of dozens of organs. As it was for my personal use, and I am not an academic, I often failed to note where I got the measurements from.

As this data may be useful to others, I decided to share it. You must use it with caution, as some of it was written down years ago. I may no longer know the source, or how reliable it may be.

Bear in mind when studying the scales, this organ is pitched at approximately A=392 Hz *(a whole tone below modern concert pitch of A=440 Hz)*, characteristic of its time.

If you are new to scaling, I recommend: http://www.blairbatty.ca/tonal.html#scales

Do contact me, if you have any comments, corrections, sources or questions. I won't be offended.

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The Arlesheim Organ

The Silbermann Organ in the village church of St. Bartholomäus in Arlesheim, Switzerland, is one of the most important and beautiful Baroque organs in the world.

The Organ Builder was Johann Andreas Silbermann (1678–1734). Andreas was the older brother of the more famous Gottfried Silbermann. He worked primarily in Alsace (now France) and was known for his meticulous craftsmanship, elegant cases, and a sound that blends French elegance with German solidity.

The organ was originally built for the Abbey Church of Marmoutier (Alsace). However, after the French Revolution, the abbey was dissolved, and the organ was sold. In 1790/1791, the organ was purchased by the parish of Arlesheim, dismantled, transported, and expertly reassembled in its current location by the local carpenter Blasius Birsner. This move saved it from potential destruction.

It is a pure, unaltered example of the South German/French-Alsace Silbermann style. It has three manuals: Hauptwerk, Positiv, Echo as well as an independent pedal division. It has 34 stops and is pitched A=392 Hz (approximately a semitone below modern pitch) in the Meantone temperment.

Silbermann organs are renowned for their clear, singing principals, refined flutes, and slightly pungent reeds (like the "Chalumeau"). The sound is not overwhelmingly loud but is incredibly articulate and colorful, perfect for the music of J.S. Bach, François Couperin, and their contemporaries.

It is one of the best-preserved and least-altered Silbermann organs in existence. Most of its pipework, action, and wind system are original. The Arlesheim church has a superb, warm, and lively acoustic that perfectly complements the organ's sound. This organ represents a direct link to one of the greatest organ-building dynasties.

In summary: The Arlesheim Silbermann Organ is not just a museum piece; it is a living, breathing masterpiece of 18th-century craftsmanship. It offers a rare and authentic auditory window into the sound world of the High Baroque, preserved in a near-miraculous state. For organ aficionados, it is a pilgrimage site of the highest order.

Stoplist

Positif (C–c3)

8’	Bourdon	
4’	Prestant	
4’	Flûte	
2 2/3’	Nazard	
2’	Doublette	
1 3/5’	Tierce	
1 1/3’	Larigot	(M)
III	Fourniture	(M)
8’	Cromorne	(M)

Hauptwerk (C–e3)

16’	Bourdon	
8’	Montre	
8’	Bourdon	
4’	Prestant	
2 2/3’	Nazard	
2’	Doublette	
1 3/5’	Tierce	
1’	Sifflet 1	
III	Fourniture	(M)
II	Cymbale	(M)
V	Cornet	c25-c49
8’	Trompette	(M,W)
8’	Voix humaine	(M)
	RP-HW	

Récit/Echo (C–c3)*

8’	Bourdon	
4’	Prestant	
2 2/3’	Nazard	
2’	Doublette	(M)
1 3/5’	Tierce	(M)
8’	Basson/Trompette	(W,M)

Pedal (C–d1)

16’	Subbass	
8’	Octavbass	
5 1/3’	Quinte	(M)
4’	Prestant	(M)
III	Fourniture	(M)
16’	Bombarde	(M)
8’	Trompette	(M)
4’	Clairon	(M)
	HW-P	

Tremulant: Hauptwerk + Echo, Tremulant: Positif
Pipework original by Johann Andreas Silbermann, except:
M) Metzler 1962
W) Wegmann/Alsace 1840

Description of Measurements

If you are not familiar with scaling measurements, I recommend you checkout my book of Scaling. It is available for free download from my website http://www.blairbatty.ca/tonal.html#scales. I typically measure every "c" and "f#" pipe, to understand how the dimensions of the pipes change, throughout the compass, from bass to treble.

Diameter: This is the inside diameter of the pipe, measured in millimeters.

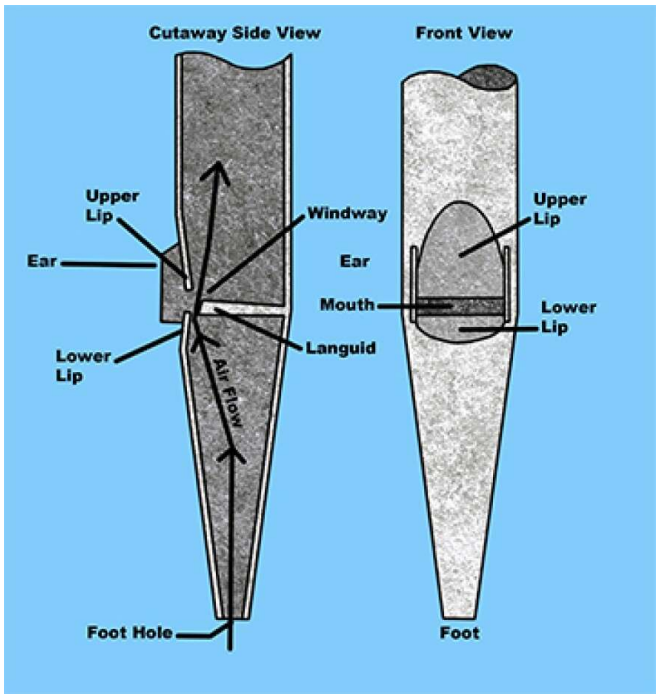
Mouthwidth: width of the mouth in millimeters.

Cutup: is distance between the upper and lower lips, in millimeters.

Windway: is the width of the slit of the windway, in millimeters.

Toehole: Is the diameter of the wind hole in the bottom of the foot, in millimeters.

Foot WP: Is the windpressure inside the foot of the pipe, measured in Pascal. Ten Pascal = ~1 millimeter watercolumn.



Calculations

Not everything was measured. Some of the numbers written down here were calculated from the measurements.

Topfer NM: The diameter, mouthwidth and cutup measurements were converted to Topfer Normmeasure and graphed. Mouth NM presumes ¼ mouth as normal, cutup presumes ¼ cutup as normal.

Mouthwidth and cutups: are commonly described as fractions *(e.g. ¼ mouthwidth, ¼ cutup)*. So, these fractions were also calculated.

What do the Numbers Tell Us?

Some people, like I, enjoy measuring the various dimensions of the pipes in an organ, and generating various charts and graphs of that data. We do that to discover how the original designer and voicer scaled and manipulated the pipes, to arrive at the sound they wanted.

In very simplistic terms, scaling and voicing can be described in this way:

- Diameter determines the loudness of the fundamental of the pipe.
- Cutup fine-tunes the harmonic content.
- Toehole/mouthwidth/windway fine-tunes the loudness.

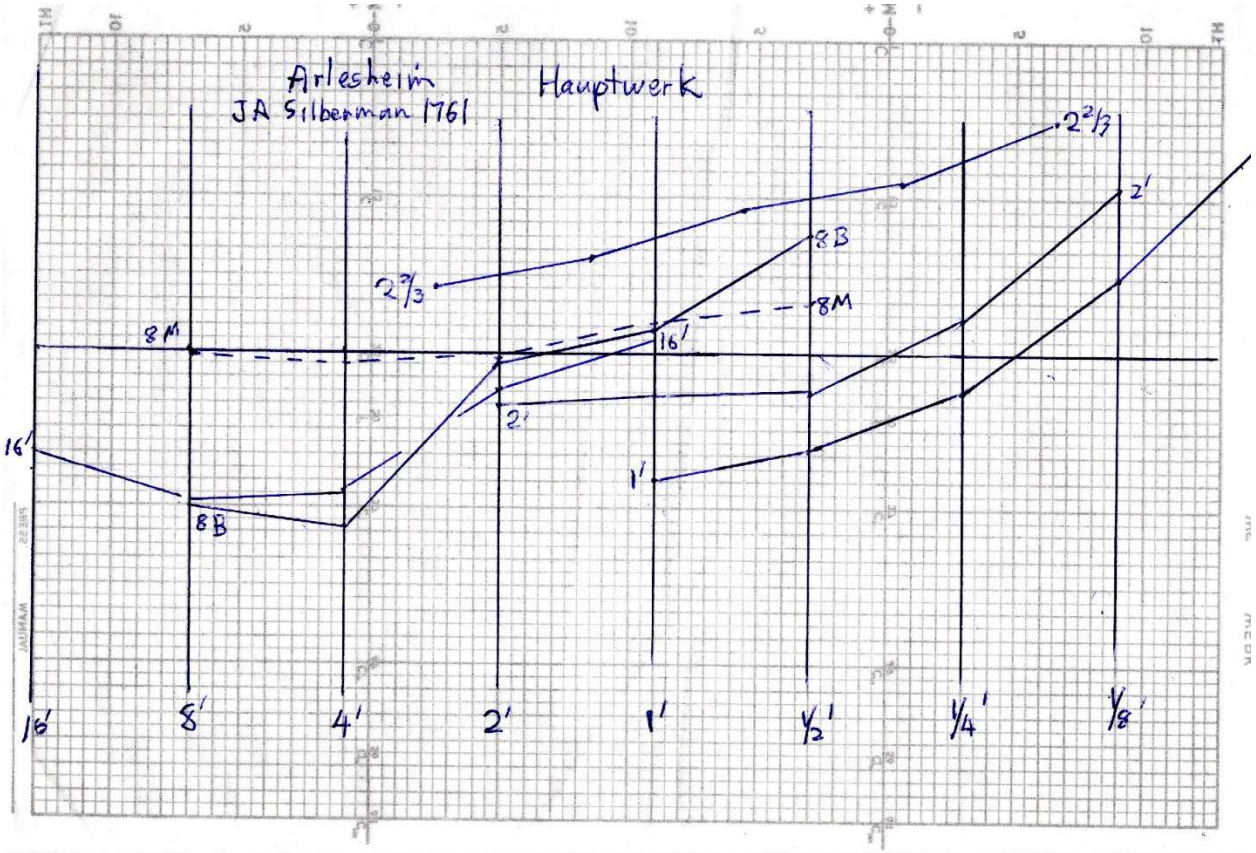
Of course, it's not that simple. For example, you can increase the scale of the pipe, which would increase the loudness of the fundamental *(and will also make the tone brighter)*. Then by reducing the toehole size which reduces the wind and loudness, and by using a lower cutup to reduce the brightness you can approximate the original pipes sound. But it is not identical, change has consequence.

Hauptwerk

Hauptwerk (C–e3)

16’	Bourdon	
8’	Montre	
8’	Bourdon	
4’	Prestant	
2 2/3’	Nazard	
2’	Doublette	
1 3/5’	Tierce	
1’	Sifflet 1	
III	Fourniture	(M)
II	Cymbale	(M)
V	Cornet	c25-c49
8’	Trompette	(M,W)
8’	Voix humaine	(M)

Pipework original by Johann Andreas Silbermann, except:
M) Metzler 1962
W) Wegmann/Alsace 1840



A. B. Batty

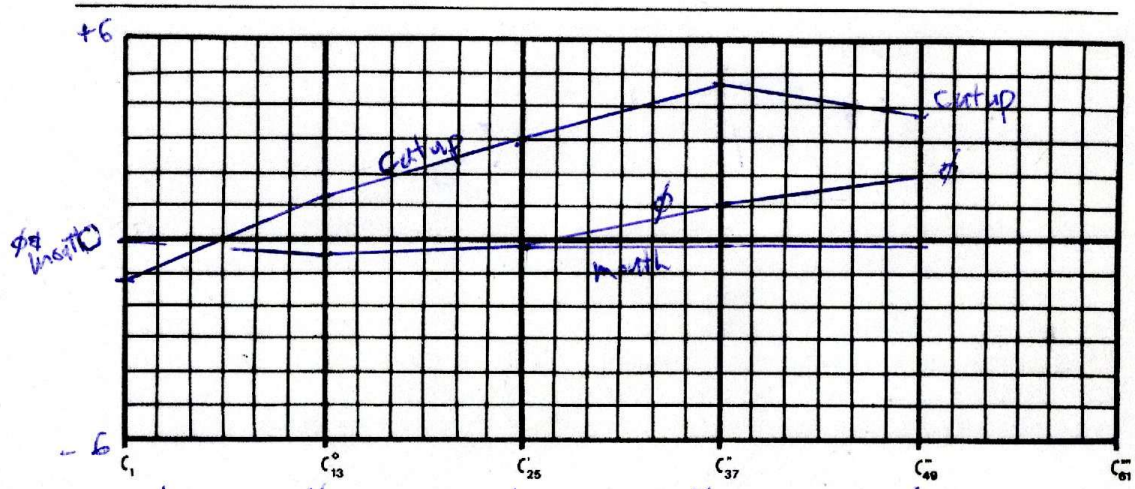
Stop: Montre 8' Div.: HW

Windpressure: Pitch:

Builder: J A Silbermann Date: 1761

Church: Adelsheim

Description of site & organ:



Mouthwidth:	1/4		1/4		1/4		1/4·2		1/4·4	
Cutup:	1/4·2		1/3·8		1/3·5		1/3·3		1/3·4	

ACTUAL MEASURE

	C'		F#		C		f#		c1		f#1		c#		f#11		c#1V
depth	155				91				55·2				34·2				21·2	
mouth	123				71·5				43·5				25·8				15·2	
cutup	29				19				12·3				7·9				4·5	

Collector Material:

A. B. Batty

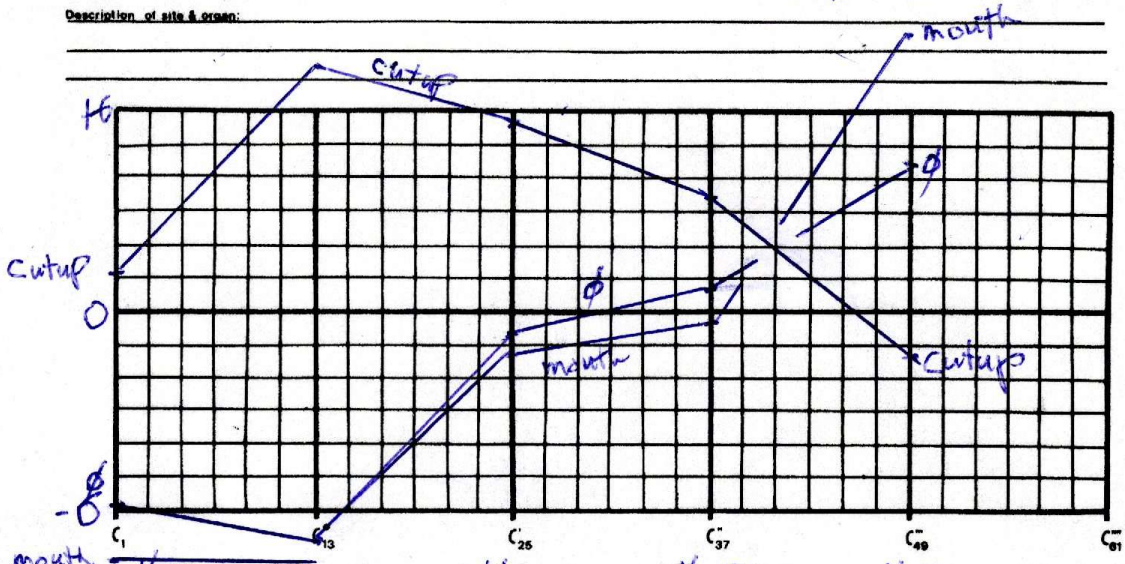
Stop: Bourdon 8 Div.: HW

Builder: JA Silbermann Date: 1761

Windpressure: Pitch:

Church: Arlesheim

Description of site & organ:



Mouthwidth:	1/4.3		1/4.2		1/4.1		1/4.2		1/3.3		
Cutup:	1/2.8		1/2.1		1/3		1/3.4		1/6.2		

ACTUAL MEASURE

wood → metal

	C	F#	C	f#	c'	f#'	c''	f#''	c'''	f#'''	c''''
theo ϕ	120.9		69.5								
depth	129		73		53		33.6		23.6		
mouth	89		52		41		25.3		22.4		
cutup	32		25		13.8		7.4		3.6		
Chimney ϕ					125		10		8.1		
length					90		65		65		

Collector: Material:

A. B. Batty

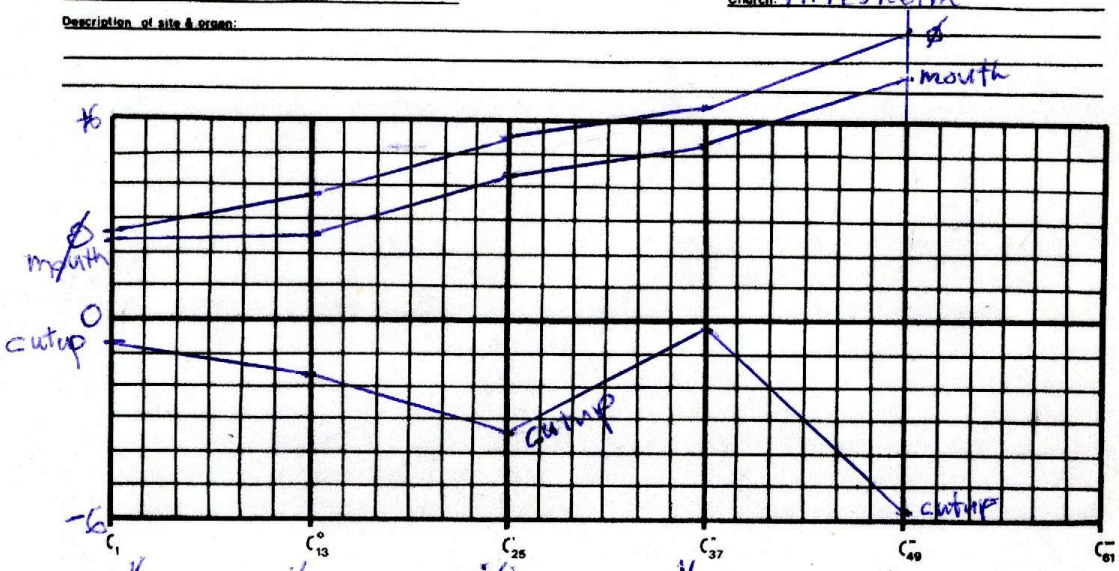
Stop: Nazard 2 2/3 Div.: HW

Builder: J A Silberman Date: 1761

Windpressure: Pitch:

Church: Arlesheim

Description of site & organ:



	C_1	C°_{13}	C_{25}	C^{-}_{37}	C^{--}_{49}	C^{---}_{61}
Mouthwidth:	1/4.1	1/4.2	1/4.2	1/4.2	1/4.3	
Cutup:	1/4.6	1/4.8	1/5.6	1/5.1	1/7.1	

ACTUAL MEASURE

	C'	F#	C	f#	c1	f#1	c11	f#11	c111	f#111	c1V
ø	76.5		47.5		30.4		18.8		12.6		
mouth	59		35.5		22.8		14.2		9.2		
cutup	12.9		7.4		4.1		2.5		1.3		

Collector Material:

A. B. Batty

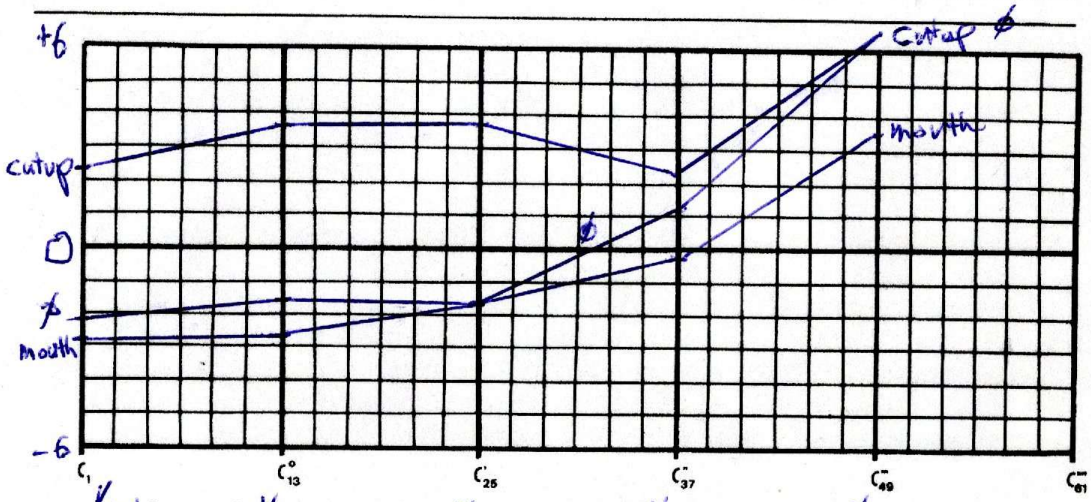
Stop: Doub 2' Div.: HW

Windpressure: Pitch:

Description of site & organ:

Builder: J.A. Silbermann Date: 1761

Church: Arlesheim



Mouthwidth:	1/4.1		1/4.2		1/4		1/4.3		1/4.6	
Cutup:	1/3.2		1/3		1/3.2		1/3.6		1/3.5	

ACTUAL MEASURE

	C'		F#		C		f#		c1		f#1		c11		f#11		c111
dia.	50				30.5				18				12.2				9.2
mouth	38.2				22.7				16.2				9				6.3
cutup	12				7.5				4.5				2.5				1.8

Collector , Material:

A. B. Batty

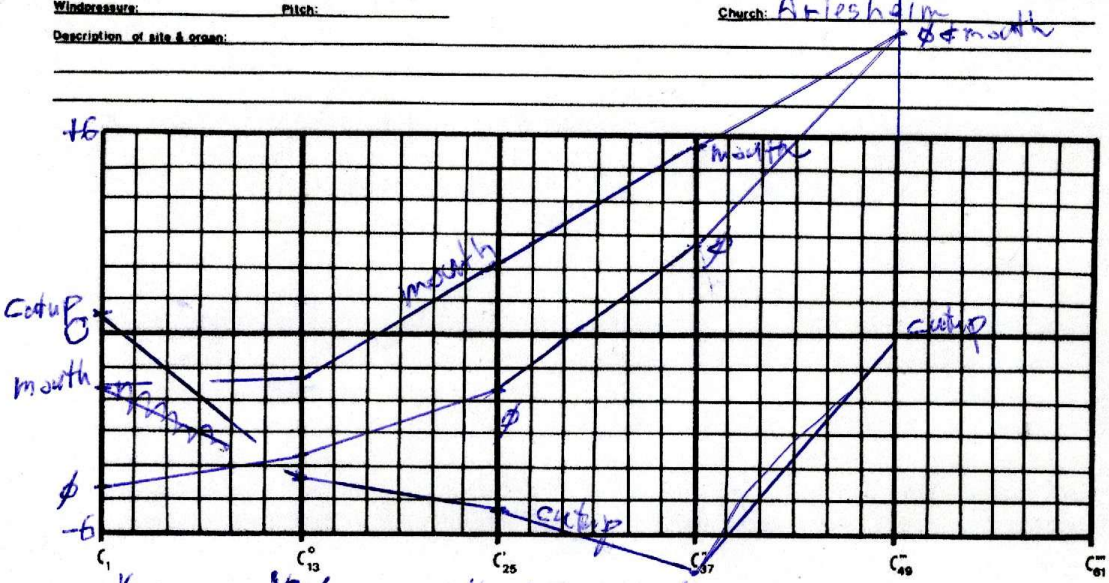
Stop: Sifflöte 1' Div.: HW

Windpressure: Pitch:

Description of site & organ:

Builder: JA Silbermann Date: 1761

Church: Arlesheim

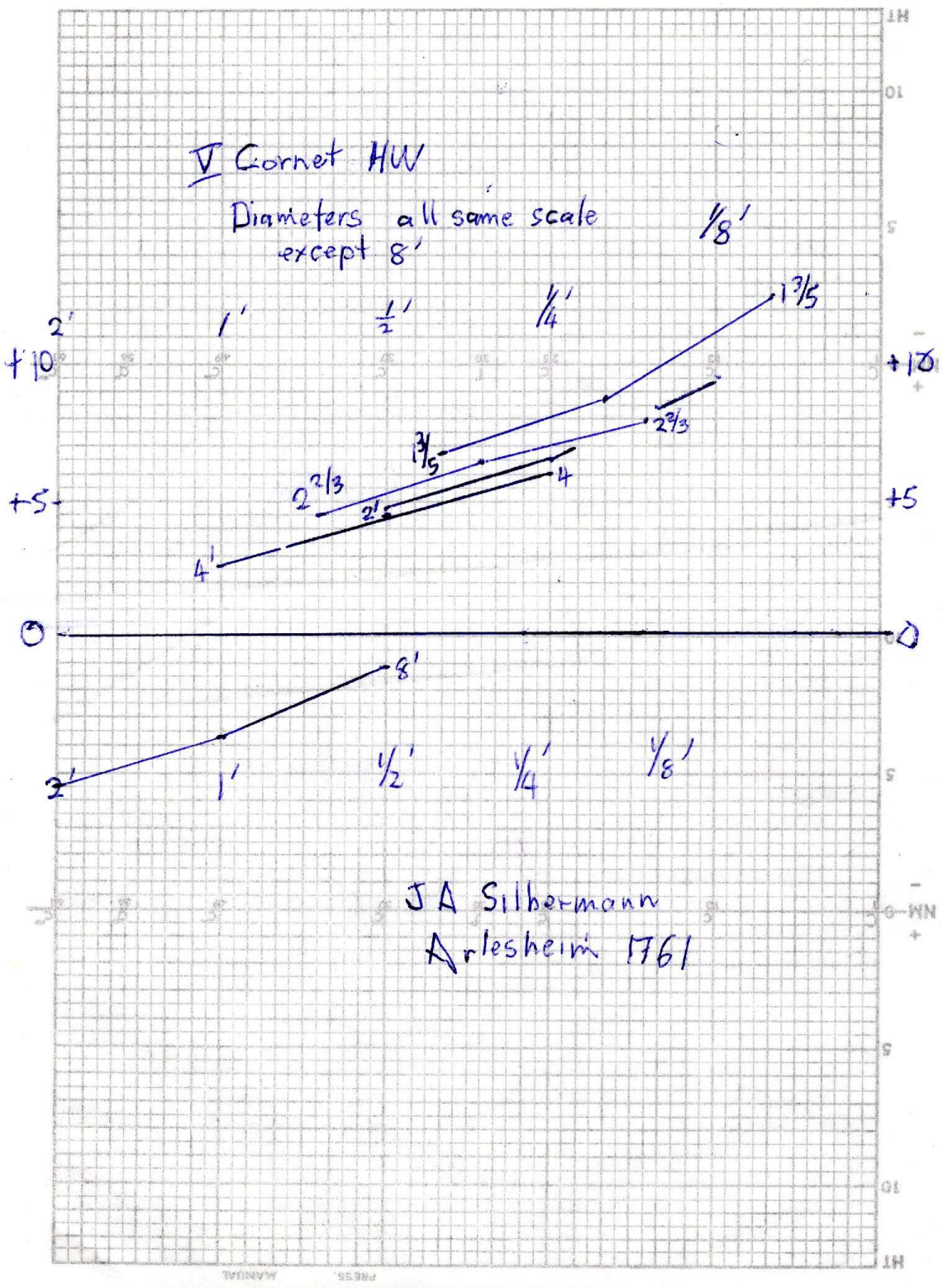


Mouthwidth:	1/3.5		1/3.6		1/3.4		1/3.6		1/4		
Cutup:	1/3.6		1/4.6		1/5.6		1/6.9		1/6.1		

ACTUAL MEASURE

	C'	F#	C	f#	c1	f#1	c2	f#2	c3	f#3	c4
depth	26.4		16.5		10.8		7.8		6.2		
mouth	24		14.4		10		6.9		4.9		
cutup	6.6		3.1		1.8		1		0.8		

Collector: Material:


V Cornet HW
Diameters all same scale except 8'
2'
1'
1/2'
1/4'
1/8'
+10
+5
0
1 3/5
2 2/3
2'
4'
4
8'
1'
1/2'
1/4'
1/8'
JA Silbermann
Arlesheim 1761

A. B. Batty

Stop: V Cornet 8' Div.: HW

Windpressure: Pitch:

Builder: Date:

Church:

Description of site & organ:

	C	F#	c	f#	c1	f#1	c11	f#11	c111	f#111	c1V
Mouthwidth:					1/4.2		1/4.1		1/4.2		
Cutup:					1/2.6		1/2.9		1/4.5		
ACTUAL MEASURE				∅	42.9		27.8		18.5		
				lab	32.2		21.1		14		
				cutup	12.2		7.4		3.1		

Collector Material:

A. B. Batty

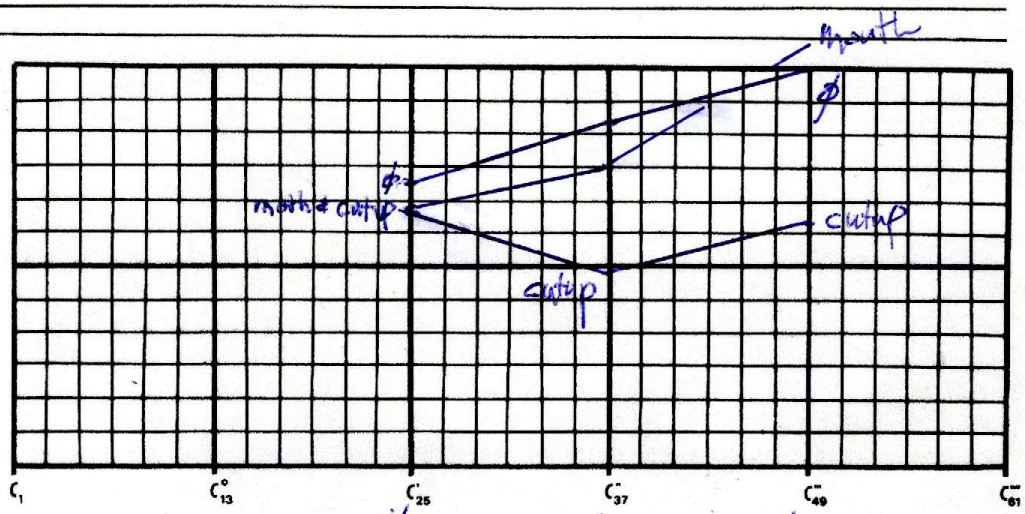
Stop: V Cornet II Div.: HW

Windpressure: Pitch:

Builder: Date:

Church:

Description of site & organ:



Mouthwidth:				¼-1			¼-2			¼-9	
Cutup:				¼			¼+6			⅕-1	

ACTUAL MEASURE

	C'	F#	C	f#	c1	f#1	c2	f#2	c3	f#3	c4
ø					3*6-4		23.3		15		
mouth					27.8		17.4		12.2		
cutup					6.9		3.8		2.4		

Collector Material:

A. B. Batty

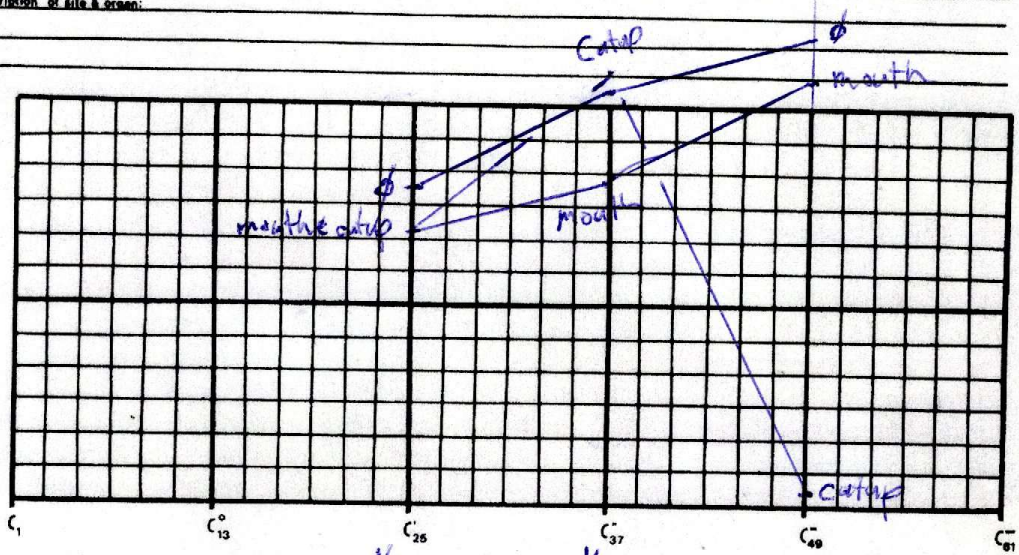
Stop: V Cornet 2 3/3 Div.: HW

Windpressure: Pitch:

Description of site & organ:

Builder: Date:

Church:



Mouthwidth:				1/4·2		1/4·5		1/4·3			
Cutup:				1/4		1/3.5		1/6·9			

ACTUAL MEASURE

	C'	F#	C	f'	c1	f#'	c''	f#''	c'''	f#'''	c''''
~~theoretical~~											
~~depth/ dia~~				ϕ	28		18.7		12.2		
~~width~~				mouth	20.7		13.2		9		
~~mouth width~~				cutup	5.2		3.8		1.3		
~~Cutup~~											
~~windway~~											
~~toe ϕ~~											
~~toe X~~											
~~foot Da~~											
~~footwp %~~											
~~dB 3pf~~											
~~I sing~~											
~~metal thick~~											
~~body length~~											
~~Language~~											

Collector Material:

A. B. Batty

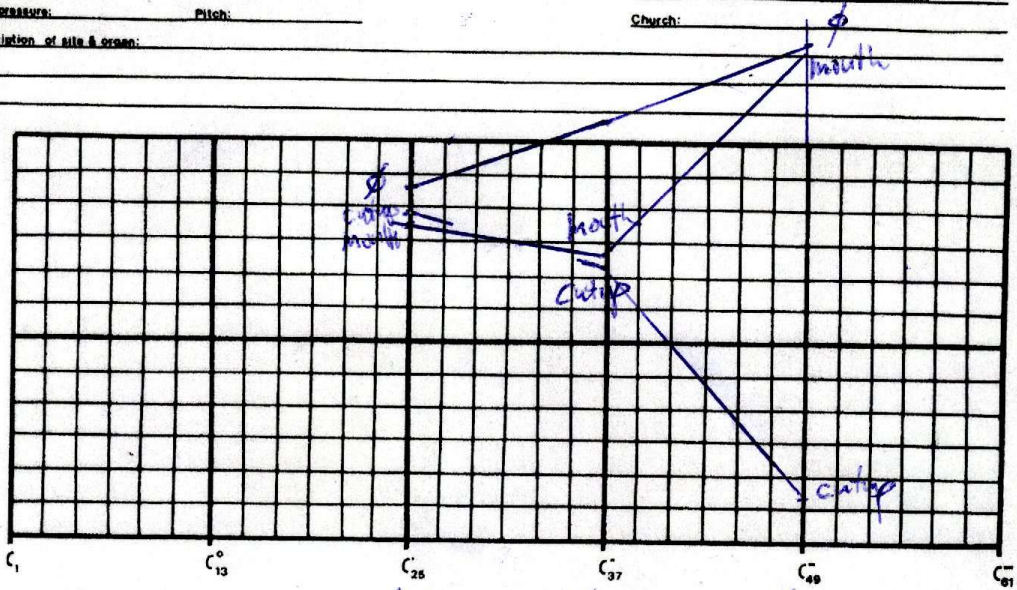
Stop: V Cornet 2' Qty.: HW

Windpressure: Pitch:

Description of site & organ:

Builder: Date:

Church:



Mouthwidth:				1/1.2		1/4.7		1/4.1				
Cutup:				1/3.9		1/4		1/7.3				

ACTUAL MEASURE

	C'	F#	C	f'	c1	f#'	c''	f#''	c'''	f#'''	c''''
theoretical ϕ				ϕ	23.7		15.4		10.4		
depth/dia				mouth	17.6		10.2		8		
width				cutup	4.5		2.5		1.1		
mouth width											
cutup											
windchest											
toe ϕ											
toe X											
foot Pa											
foot up %											
dB 3pf											
I sing											
metal thick											
body length											
Language											

Collector Material:

A. B. Batty

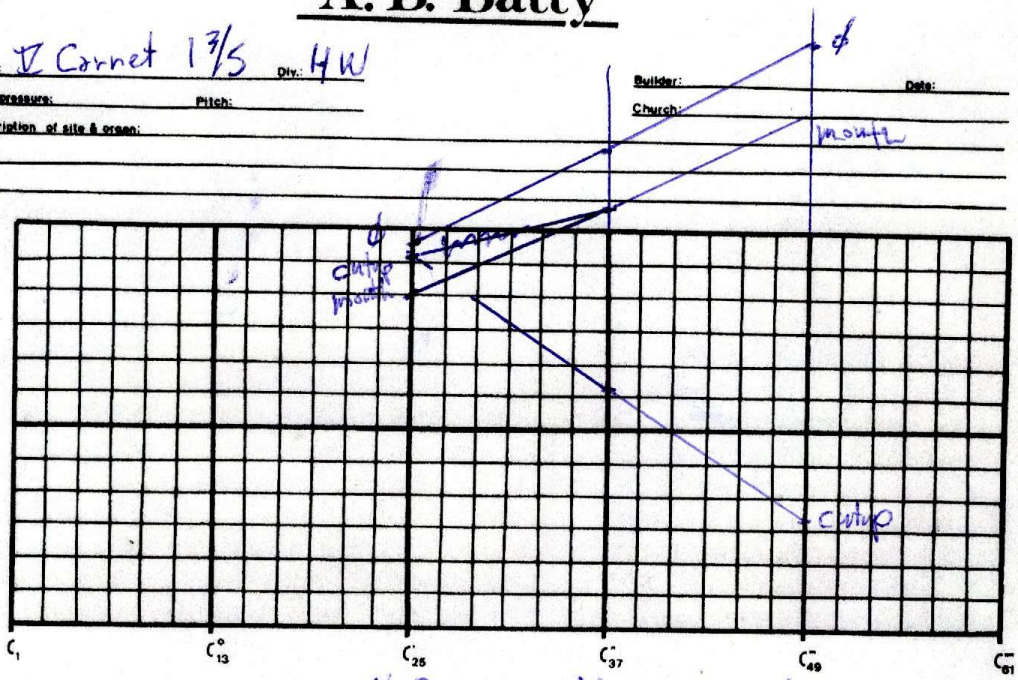
Stop: V Cornet 1 3/5 Div.: 4W

Windpressure: Pitch:

Description of site & organ:

Builder: Date:

Church:



Mouthwidth:				1/4.3		1/4.4		1/4.4		
Cutup:				1/3.8		1/5.1		1/7		

ACTUAL MEASURE

	C'	F#	C	f'	c1	f#'	c''	f#''	c'''	f#'''	c''''
.throat ø											
depth/dec				ø	20.9		14.3		~~10.8~~	9.09	
width				mouth	15.3		10.2		7		
mouthwidth				cutup	4		2		1		
cutup											
windway											
toe ø											
toe X											
foot Pa											
footup ø/o											
dB											
I sing											
metal thick											
body length											
Language											

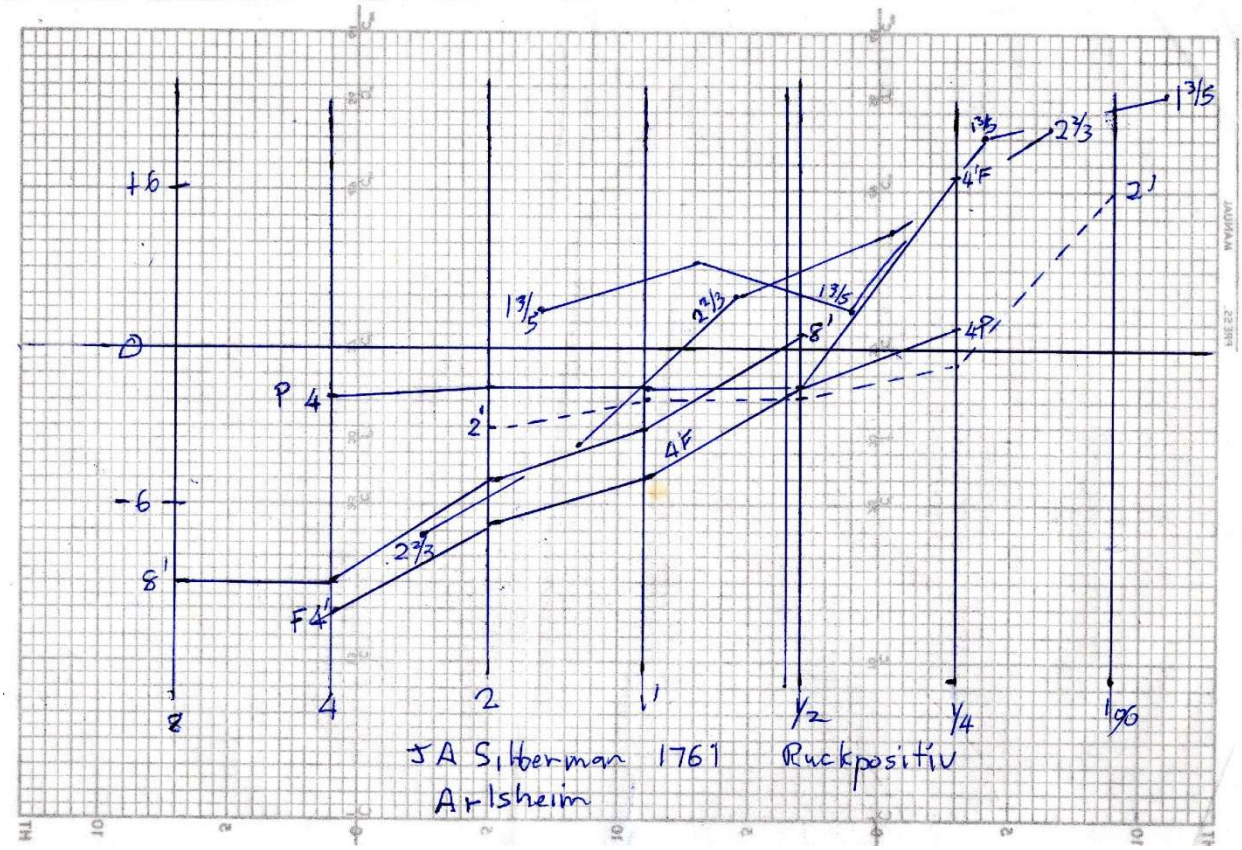
Collector Material:

Ruckpositiv

Positif (C–c3)

8’	Bourdon	
4’	Prestant	
4’	Flûte	
2 2/3’	Nazard	
2’	Doublette	
1 3/5’	Tierce	
1 1/3’	Larigot	(M)
III	Fourniture	(M)
8’	Cromorne	(M)

Pipework original by Johann Andreas Silbermann, except:
M) Metzler 1962
W) Wegmann/Alsace 1840

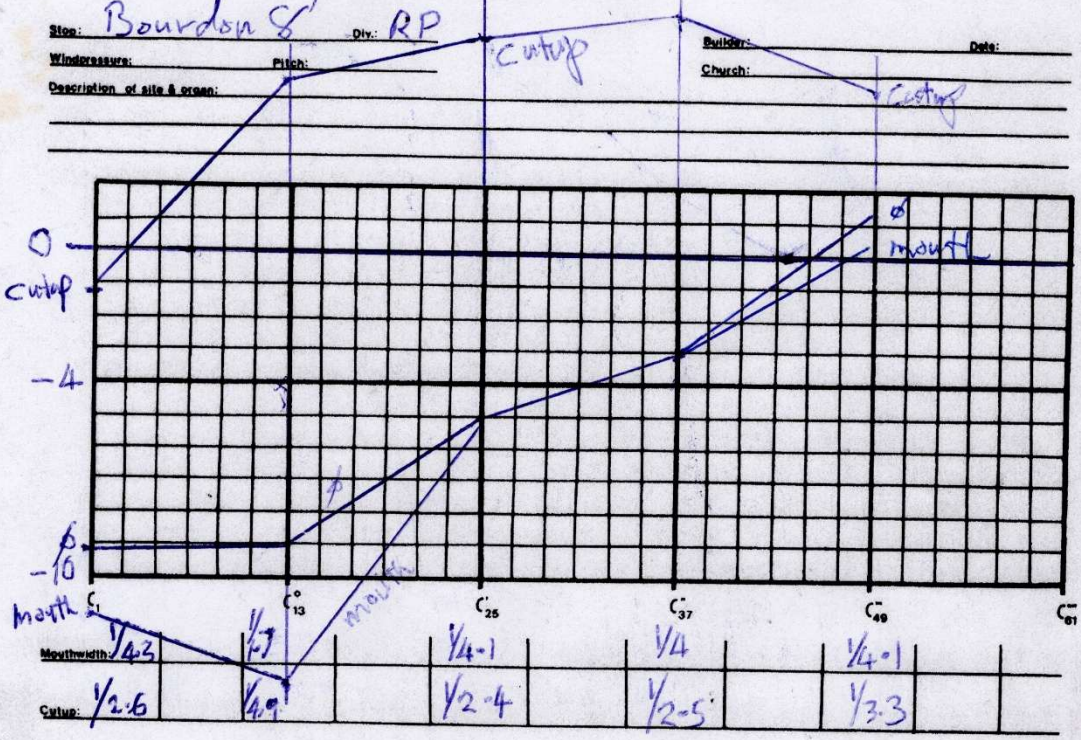


A. B. Batty

Stop: Bourdon 8' Div.: RP

Windpressure: Pitch: cutup Builder: Date:

Description of site & organ: Church: cutup



	C1	C13	C25	C37	C49
Mouthwidth:	1/4.3	1/4.7	1/4-1	1/4	1/4-1
Cutup:	1/2.6	1/4.9	1/2-4	1/2-5	1/3.3

ACTUAL MEASURE	C'	F#	C	f#	c1	f#1	c2	f#2	c3	f#3	c4
theoretical											
depth/ dia	105		63								
width					44.4		28.6		20.6		
mouth width	76		40		34.4		22.2		15.7		
cutup	29		23.2		14.6		9		4.8		
windway											
toe ø											
			chimney ø		13		9.5		8		
toe X				length	101		79		65		
foot Pa											
foot up %											
dB 3pf											
I sing											
metal thick											
body length											
Language											

Collector: Material:

A. B. Batty

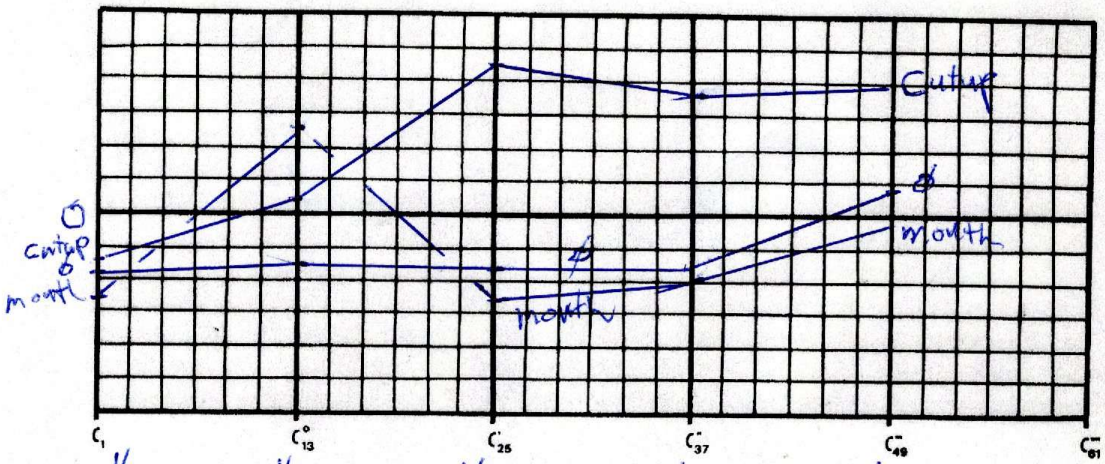
Stop: Principal 4 Div.: RP

Windpressure: Pitch:

Description of site & organ:

Builder: Date:

Church:



Mouthwidth:	1/4.1		1/3.3		1/4.2		1/4.1		1/4.2	
Cutup:	1/3.8		1/4.4		1/2.9		1/3.1		1/3.3	

ACTUAL MEASURE	C	F#	C	f#	c'	f#'	c''	f#''	c'''	f#'''	c''''
+heated/#											
depth/ da	85		61.2		30.4		18.1		12		
width			48.5				14		9		
mouthwidth	65		~~34~~		23		~~4.5~~		~~1~~		
cutup	17		11		7.8		4.5		2.7		
windway											
toe d											
toe X											
foot Pa											
footup %											
d/3 3pf											
I sing											
metal thick											
body length											
Language											

Collector: Material:

A. B. Batty

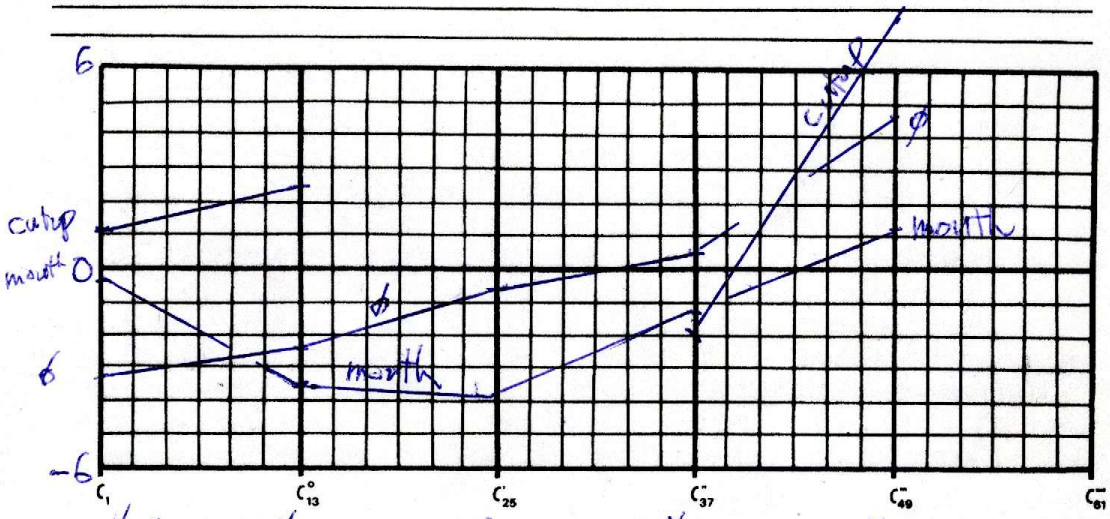
Stop: Flute 4' Div.: SW

Windpressure: Pitch:

Description of site & organ:

Builder: JA Silbermann Date: 1761

Church: Altesheim



Mouthwidth:	1/3.5		1/4.2		1/4.6		1/4.3		1/4.7	
Cutup:	1/3.7		1/3.1				1/4.1		1/3	

wood ← → metal

ACTUAL MEASURE	C'	A#	C	f'	c1	f#'	c''	f#''	c'''	f#'''	c''''
throat	80.1										
depth	71		49.8		31.8		19.8		14.2		
mouth	71		37.4		21.6		14.5		9.5		
cutup	19		12		—		3.5		3.2		

Collector: Material:

A. B. Batty

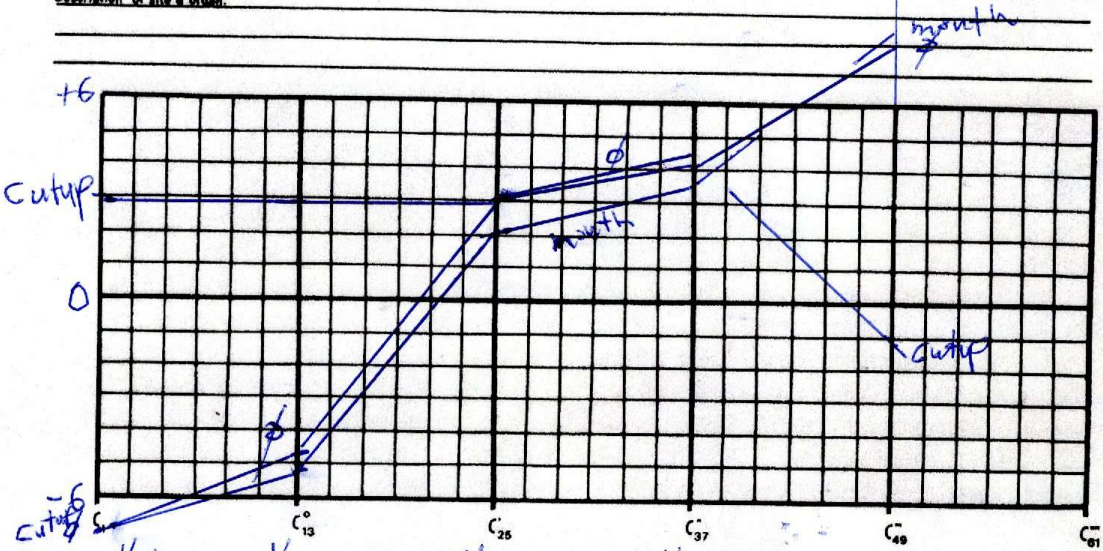
Stop: Nazard 2 2/3 Div.: RP

Windpressure: Pitch:

Description of site & organ:

Builder: Date:

Church:



	C	C13	C25	C37	C49
Mouthwidth:	1/4.1	1/4.1	1/4.2	1/4.2	1/3.9
Cutup:	1/2.6	1/2.8	1/3.8	1/3.8	1/6.1

ACTUAL MEASURE

roh: f|. taper

	C	F#	C	c1	f#1	c11	f#11	c111	f#111	c1V
theoretical										
depth/ dia	50.6		33	27.8		17.2		12		
width			25.5	20.7		13		9.7		
mouth width	39.2		9							
cutup	15.2		9	5.4		3.4		1.6		
windway										
toe ∅		Rohr ∅	10.6							
		length	58							
toe X										
foot Pa										
foot up %										
dB 3pf										
I sing										
metal thick										
body length										
Language										

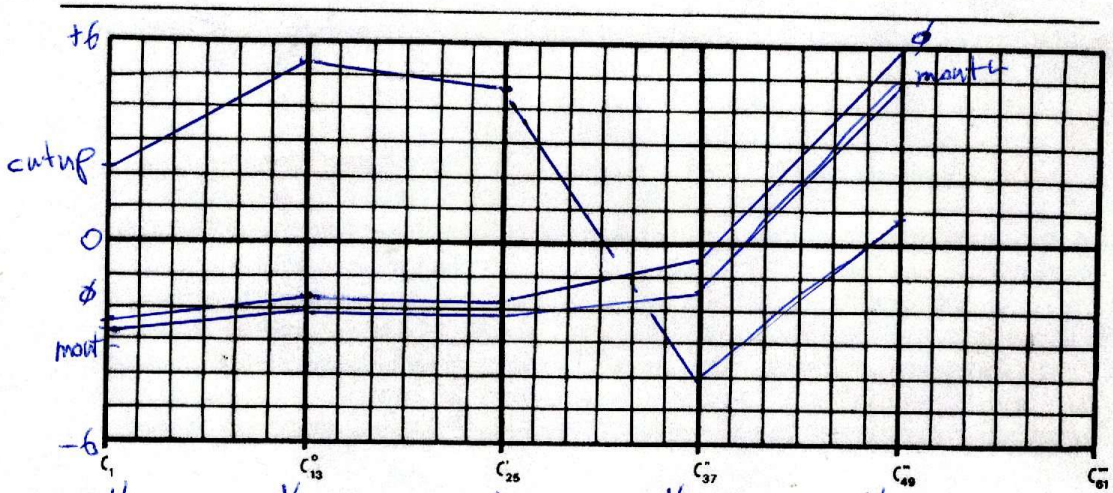
Collector Material:

A. B. Batty

Stop: Doublette 2' Div.: RP

Windpressure: Pitch: Builder: Date:

Description of site & organ: Church:



Mouthwidth	1/4.1	1/4.1	1/4	1/3.9	1/3.8
Cutup	1/3.2	1/2.9	1/3	1/5.1	1/5.3

ACTUAL MEASURE

	C'	F#	C	F#	c1	f#1	c11	f#11	c111	f#111	c1V
theoretical											
depth/dia	49.8		30.5		18		12		8.9		
width											
mouthwidth	38.5		23.5		14		9.7		7.4		
cutup	11.9		8.1		4.7		1.9		1.4		
windway											
toe ø											
toe X											
foot Pa											
footup %											
dB 3pf											
I sing											
metal thick											
body length											
Language											

Collector Material:

A. B. Batty

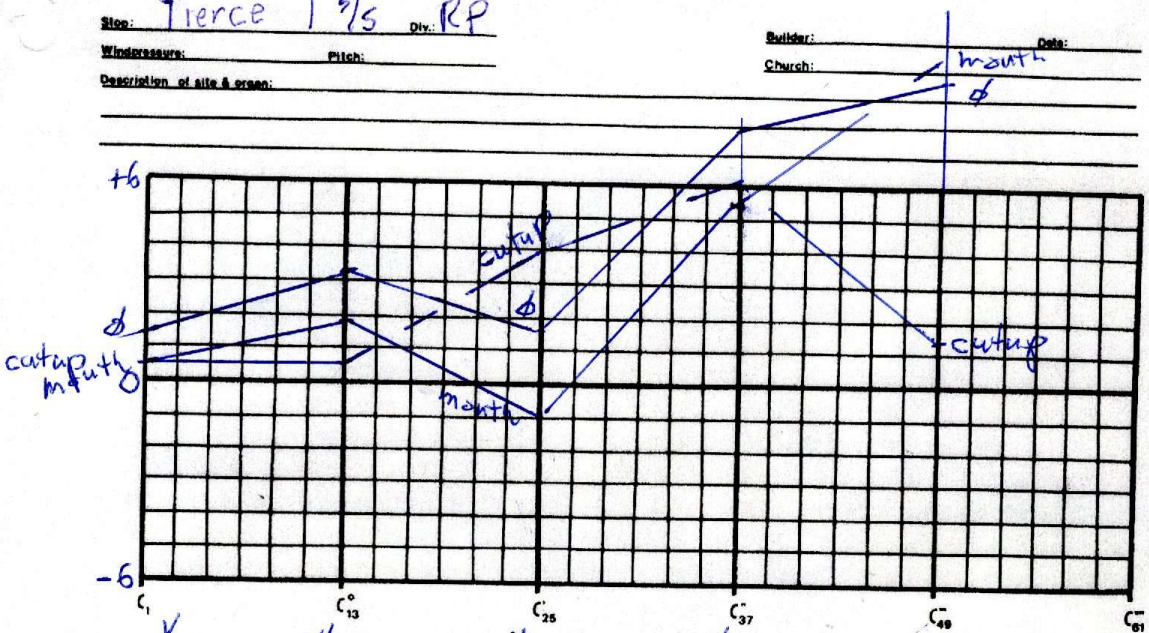
Stop: Tierce 1 3/5 Div.: RP

Windpressure: Pitch:

Description of site & organ:

Builder: Date:

Church:

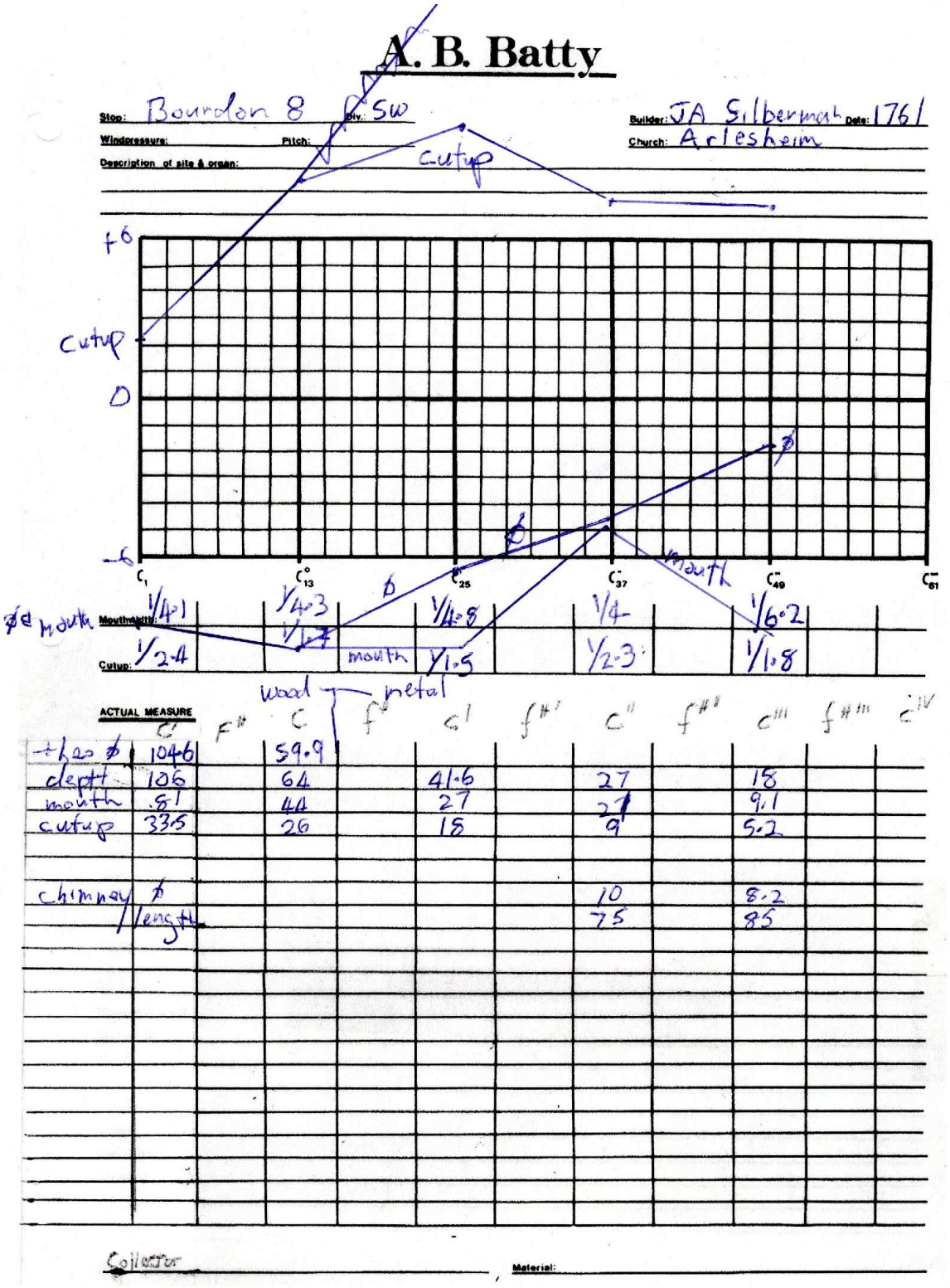


Mouthwidth:	1/4	1/4.2	1/4.5	1/4.4	1/3.8	
Cutup:	1/4	1/4.3	1/3.2	1/3.9	1/6	

ACTUAL MEASURE	C	F#	c	f#	c1	f#1	c2	f#2	c3	f#3	c4
throat ø											
depth/ dia	49.4	~~37.5~~	31.6		17.6		13.8		8.8		
width					12.3						
mouth width	38	~~29.5~~	23.5				9.8		7.2		
cutup	9.5	~~7.5~~	5.5		3.8		2.5		1.2		
windway											
toe ø											
toe X											
foot Pa											
footup %											
dB 3pf											
I sing											
metal thick											
body length											
Language											

Collector: Material:

Recit


A. B. Batty
Stop: Bourdon 8 Div.: SW
Windpressure: Pitch:
Description of site & organ:
Builder: JA Silbermann Date: 1761
Church: Arlesheim
cutup
+6
cutup
0
-6
C1
C13
C25
C37
C49
C61
mouth
Mouthwidth: 1/4.1 1/4.3 1/4.8 1/4 1/6.2
Cutup: 1/2.4 1/2.7 mouth 1/1.5 1/2.3 1/1.8
wood
metal
ACTUAL MEASURE
C F# C f' c' f#' c'' f#'' c''' f#''' c''''
+/-2o ϕ 1046 59.9
depth 106 64 41.6 27 18
mouth .81 44 27 27 9.1
cutup 335 26 15 9 5.2
chimney ϕ 10 8.2
length 75 85
Collector
Material:

A. B. Batty

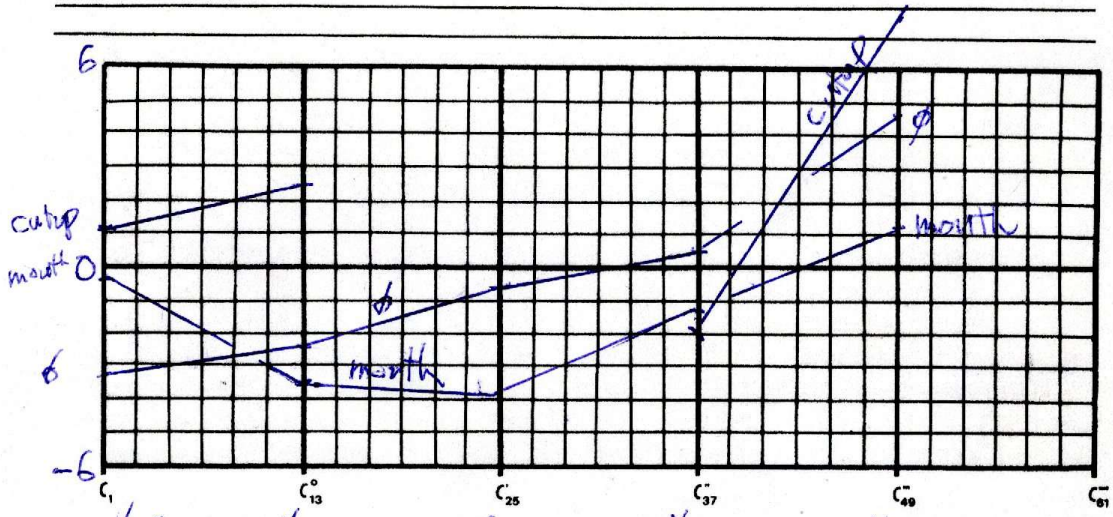
Stop: Flute 4' Div.: SW

Windpressure: Pitch:

Description of site & organ:

Builder: JA Silbermann Date: 1761

Church: Altesheim



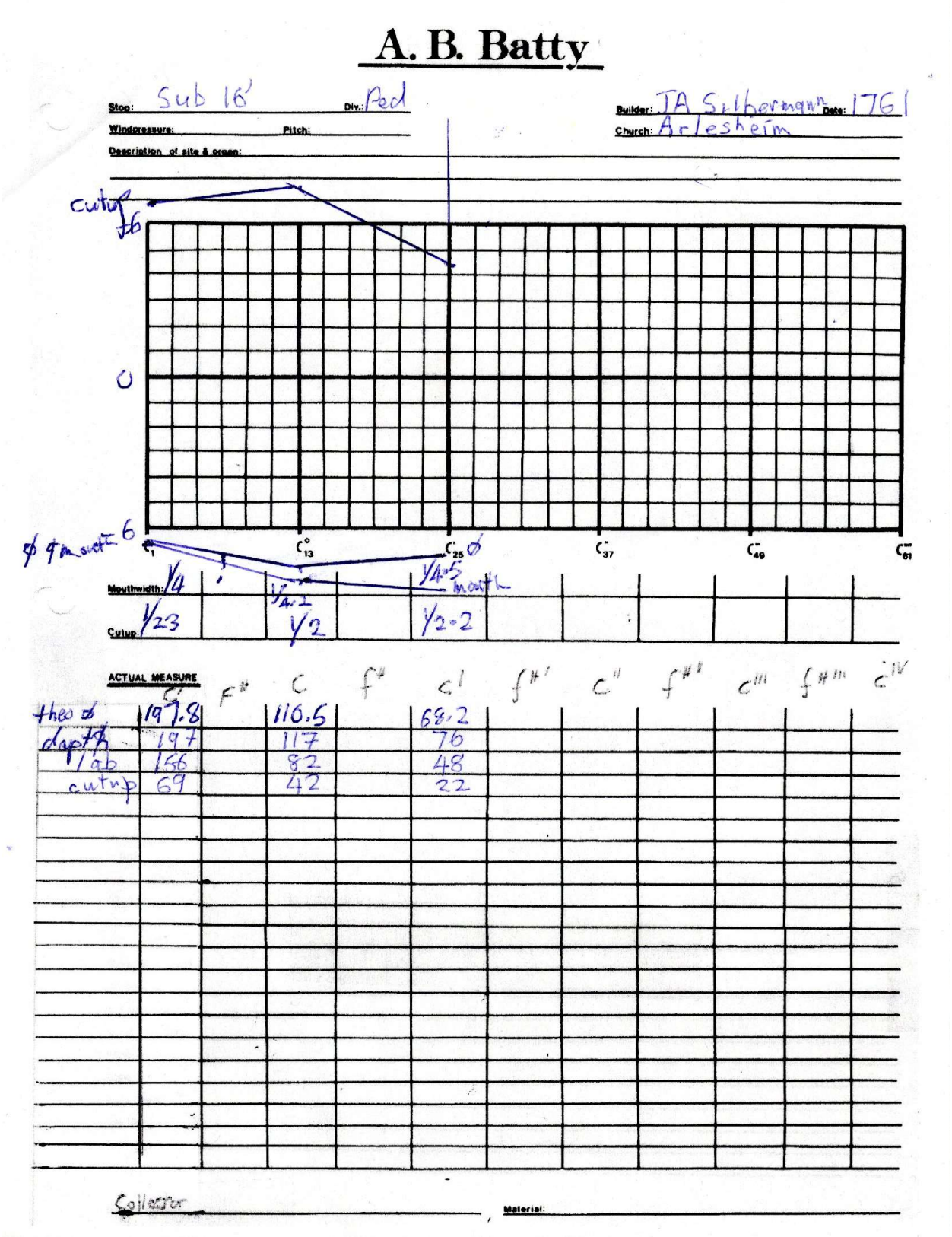
	C		c		c1		c2		c3		c4
Mouthwidth:	1/3.5		1/4.2		1/4.6		1/4.3		1/4.7		
Cutup:	1/3.7		1/3.1				1/4.1		1/3		

wood ← → metal

ACTUAL MEASURE	C	A#	c	f#	c1	f#1	c2	f#2	c3	f#3	c4
theor	80.1										
depth	71		49.8		31.8		19.8		14.2		
mouth	71		37.4		21.6		14.5		9.5		
cutup	19		12		—		3.5		3.2		

Collector: Material:

Pedal


A. B. Batty
Stop: Sub 16'
Div.: Ped
Windpressure:
Pitch:
Description of site & organ:
Builder: JA Silbermann
Date: 1761
Church: Arlesheim
cutup
#6
0
ϕ 4m scale 6
C1
C13
C25
C37
C49
C61
Mouthwidth: 1/4
1/4.2
1/4.5 mouth
Cutup: 1/23
1/2
1/2.2
ACTUAL MEASURE
C
F#
c
f#
c1
f#1
c#
f#11
c111
f#111
c1V
theo ϕ 197.8 116.5 68.2
depth 197 117 76
lab 166 82 48
cutup 69 42 22
Collector
Material:

A. B. Batty

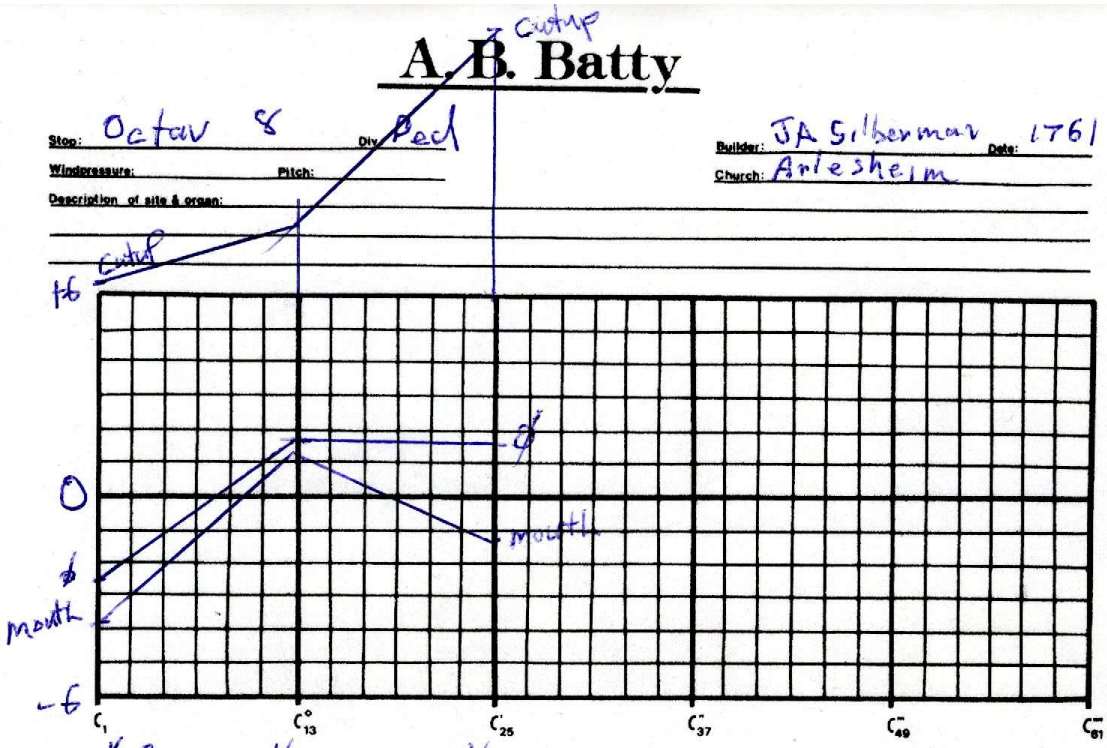
Stop: Octav 8 Div Ped

Windpressure: Pitch:

Description of site & organ:

Builder: JA Silbermann Date: 1761

Church: Arlesheim



Mouthwidth:	1/4·2	1/4·1	1/4·5
Cutup:	1/2·6	1/3	1/2·2

ACTUAL MEASURE

	C'	F#	C	f#	c'	f#'	c''	f#''	c'''	f#'''	c''''
theo ø	38·8		99·5		59·1						
depth	147		101		67						
mouth	103		77		41						
cutup	40		26		19						

Collector , Material: