

## Verbal Description of Organ Principal 8' Sound

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### Introduction

Organ builders communicate at least in two different situations using verbal description of the sound. The first situation is like communication when music experts (listeners) assess the sound. The second one is connected with their profession; they are accustomed to express the pipe sound during voicing process. In this situation they are using specific words connected to scaling and voicing.

Some specific voicer expressions used for the description of transient as well as steady state can be found in [1]. Common description of sound timbre independent of sound source was also studied [2]; the focus on verbal description of violin sound is in [3]. One of the tasks of the EU CRAFT project (see Acknowledgement) was to collect and classify the verbal description of organ sound and to search for its spectral correlates. The first two aims are discussed here.

### Method

The sound recordings of twelve pipe organs from four European countries (six Baroque, two Romantic and four contemporary) measured *in situ* – list of instruments see in [4] – were subjectively evaluated. Individual sound signals were manipulated to decrease the influence of transients on the perception (uniform fade in and fade out). Two listening tests with sounds of tones C2, C3, C4, C5 and C6 of Principal 8' were provided.

During the first test (dissimilarity in timbre in all pairs of eleven/twelve sounds for each tone) [4] also the spontaneously expressed verbal attributes describing the main sound contrast in each judged pair of organ sounds were collected. Twelve listeners (nine organ players, three organ builders) took part in this test.

In the second listening test only the most contrasting pairs in timbre were selected and judged by the group of eight organ builders. The listeners ranked spontaneously expressed verbal attributes into four prescribed categories according to their meaning describing pipe *scaling*, pipe *voicing*, prominent or insufficient *partials*, and *timbre*.

Common frequency vocabularies from both tests together with the vocabularies of expressions used in individual pitches and category vocabularies were created.

### Results

The attributes were collected predominantly in German language. The attributes from dissimilarity test of all pairs with the absolute frequency at least ten are shown in Table 1. The attributes with interestingly changed number of use in individual tones shows Figure 1. The attributes collected in listening of contrasting pairs were selected into Table 2.

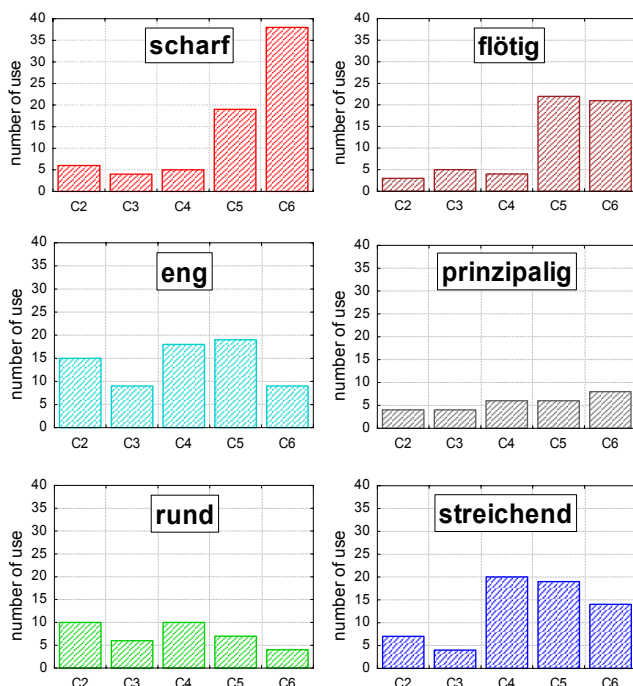
**Table 1:** The number of use of attributes for all Principal 8' tones and for individual tones C2 - C6. The attributes with overall absolute frequency at least 10 were selected.

verbal attribute	number of use (absolute frequency)					
	all	C2	C3	C4	C5	C6
scharf	72	6	4	5	19	38
eng	70	15	9	18	19	9
streichend	64	7	4	20	19	14
weich	63	15	9	8	19	12
obertönig	58	12	13	8	16	9
flötig	55	3	5	4	22	21
weit	42	8	12	14	2	6
rund	37	10	6	10	7	4
rauschig	29	6	4	12	6	1
prinzipalig	28	4	4	6	6	8
normal	26	5	2	10	9	0
hohl	21	1	5	12	3	0
schwach	20	9	3	0	8	0
hart	19	2	3	3	7	4
stark	19	7	3	0	7	2
blasig	19	14	0	2	2	1
kräftig	17	8	5	1	3	0
direkt	15	3	2	4	5	1
hell	14	0	2	7	1	4
kernig	13	3	4	4	1	1
u	12	0	6	4	1	1
dumpf	12	3	8	0	1	0
zungenartig	11	0	1	5	0	5
grundtönig	11	8	1	0	2	0
o	11	1	4	5	1	0
hässlich	10	5	0	0	4	1
oktavstark	10	4	3	2	1	0
gambig	10	5	2	2	1	0

**Table 2:** The number of use of attributes from contrasting pairs test in prescribed categories: **Scaling**, **Voicing**, **Partials**, **Timbre**. The most frequently used attributes and attributes with ambiguous rating were selected.

verbal attribute	all	S	V	P	T
Mensur eng	71	71			
obertönig	42			42	
rauschig	35		9	9	17
hell	33				33
laut	32		2		30
Lautstärke	27				27
Oktave	27			27	
streichend	27		9		18
Mensur weit	26	26			
stark	26		4		22
weich	26		2		24
unruhig	25		4	12	9
quintig	23			21	2
rund	23				23
Aufschnitt niedrig	18		17		1
bläst	18			15	3

verbal attribute	all	S	V	P	T
flötig	15	2			13
Mensur normal	14	14			
dunkel	11			1	10
gut	11		8	2	1
ö	11				11
Aufschnitt hoch	10		10		
Mensur mittel	10	10			
ä	9			1	8
grundtönig	9			9	
prinzipalig	9	2			7
singend	7			1	6
u	7				7
Winddruck höher	7		7		
gerausch	6		4	1	1
Kernspalte weit	6		6		
kräftig	6				6
wenig Teiltöne	6			6	
zu viel Wind	6		6		
blasend	5			1	4
dumpf	5				5
mittle Teiltönen	5			5	
nebengerausch	5		4	1	
o	5				5
klar	4				4
schwacher	4				4
ü	4			1	3
viele Teiltöne	4			4	
direkte Ansprache	3		3		
instabil	3		1	1	1
scharf	2				2
Terz	2			2	



**Figure 1:** The number of use of attributes in individual tones from dissimilarity pair test. Some "timbral" attributes (left column) and "basic stop categories" (right column).

## Discussion and conclusions

There are two kinds of interesting phenomena concerning classification of verbal attributes:

### 1. Prescribed (and expected) classification:

#### a) **Scaling** with the word *Mensur* ...

b) **Voicing** with the words *Aufschnitt...*, *Kernspalte*, but also *Wind...*, *Ansprache*.

c) **Partials** with the words *grundton...*, *teilton...*, *obertönig*, *Oktave*, *quintig*, *Terz*.

d) **Timbre** with usual words like *dumpf*, *dunkel*, *hell*, *klar*, *rund*, *scharf*, *singend*, *weich*, but also vowels (a, ä, e, o, ö, u, ü) and partially also others (see later description).

### 2. Mixed classification (probable need of own classes):

a) **Stop type** (flötig, prinzipalig, salicionalig, streichend) classified predominantly to Timbre and partially to Scaling or Voicing.

b) **Loudness**, like *laut*, *stark*, *schwacher* classified predominantly to Timbre and partially to Voicing.

c) **Noise or Stability** described by words *bläst*, *gerausch*, *instabil*, *rauschig*, *unruhig*, classified into three classes Voicing, Partials and Timbre.

It is important task to collect both types of verbal attributes: common sound description and reflection of organ pipe scaling and voicing. Their proper understanding can improve the quality of communication among organ builders, but has also great importance for organ builders to help them better understand customer wishes regarding organ sound.

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