

## Arranging in the Carl Frei 20-Note Scale\*

Wally Venable

### The Carl Frei 20-er Scale

There are several “20-note organ scales.” Most modern crank organs, including German 20er organs, and English (including John Smith) 20er organs use the Frei scale, probably devised by organ builder Carl Frei, over 70 years ago, although it may have been based on an earlier Bruder scale.

Like any organ scale, the Carl Frei scale establishes intervals between notes, not specific notes. **Figure 1** shows the notes which are available to the arranger if we make the lowest note in the scale a G. This version of the scale shows the limitations more clearly to most people. The only “black key” available to us is F Sharp. Unfortunately, a great deal of the music composed since 1900 contains additional “accidental notes,” or black keys, so the arranger faces challenges in producing a pleasing rendition of many popular melodies.

In actual practice, some organs, including the Whitmann organs, the Weinerwald (Vienna Woods), Alan Pell electronic card organs, and some Raffin reed organs are tuned with G as the lowest note, while most other German 20-er organs and the John Smith organs are tuned with F as the lowest note. During the arranging process this is of no importance, but it often does require us to do transpositions when we prepare the final MIDI file or sometimes a roll.

Several different MIDI versions of the Carl Frei scale are in use. I have found the following lowest notes are in use for “standard 20 note organ” MIDI files by various organ builders, arrangers, and distributors: MIDI #41, 43, 48, 53, 55 and 62.

Regardless of where the scale starts, the same intervals between notes are used.

### Beginning an Arrangement

Most arrangers work in MIDI today. For small organs the final MIDI file may be played directly on some organs, printed as a roll or book with MIDIBoek and manually punched, or sent by email to Mel Wright who will mail a roll back to you in about a week. I do all three, depending on the organ. A few people also computer punch directly from the MIDI file with a MIDSter punch built from the Bob Essex plans.

The first step in creating an arrangement is to enter the source notes into a MIDI file. That is assuming you are not starting with someone else's MIDI arrangement. I often scan sheet music to produce a source file.<sup>1</sup> If you can play piano, you might play your arrangement into a computer with a MIDI keyboard. It can also be entered note-by-note on the computer keys.

Once you have the preliminary MIDI file it is generally useful to shorten all notes to about

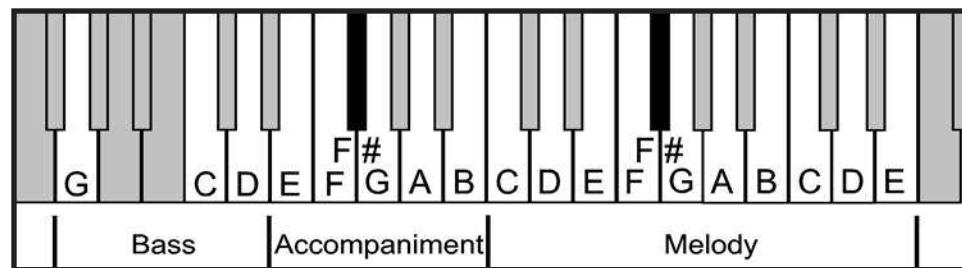


Figure 1. The Carl Frei 20-note scale, using G as the lowest note.

90% of their “sheet music” length since mechanical organ music uses short notes. More on that follows at the end of this discussion.

I began my arranging with the low Bass F as MIDI number 53, which was in a MIDIBoek gamma file for Raffin 20 organs. As a result, Generally I first transpose my source file into the key of Bb or F. When describing the 20-er scale based on F, Bb and Eb are often written as A# and D#. If you choose to work with the low bass note being G, you will probably find it most convenient to transpose your initial file into the key of C or G.

Actual editing is done with the Windows program PowerTracks Pro, but other programs such as Cakewalk will work as well. From beginning to end I use MIDIBoek as an analytical tool.<sup>2</sup>

I have prepared MIDIBoek “gamma files” for the 26, and 31-note scales which display the Bass, Accompaniment, and Melody notes in different colors. For 20-note organs the difference between bass and accompaniment lines is insignificant, and the lower accompaniment notes can usefully extend the bass line. For John Smith organs, and most others with no stops, there is no particular reason to separate the melody line, either. If arrangements will be played on the larger 20er organs with multiple stops, then the melody should be kept within the top 11 notes.

You can download a number of my personal Gamma Files from [www.Wallace-Venable.name/mechanical-music](http://www.Wallace-Venable.name/mechanical-music)

#### **Tip #1**—Use classic computer practices

- First SAVE your working copy with a new name
- SAVE frequently, and use name changes so you can back-track
- Learn how to use your UNDO command

**Tip #2**—Keep parts separate as long as possible. I usually edit the Bass line first, then Accompaniment, then Melody, and merge the tracks at the end. Sometimes I create a set of duplicate lines and then delete notes from one copy to create a melody track and from the other copy to create an accompaniment track. As you do this it may be helpful to use different voices (patches) for the different lines or to selectively mute lines from the source file so that you can clearly hear the line on which you are working.

In the tips below I suggest a number of file and note-by-note transpositions which I have found useful in dealing with notes which are not in the Frei scale. The first note listed is the

one in an F based scale, while the one in parentheses is the one for a G based scale.

**Tip #3**—Try transposing the entire piece to Bb (C) and examine it in

\* COAA Arranger’s Seminar Summary—Presented at 2012 Lake Winnie Rally

MIDIBoek. Also try transposition to F (G) and examine in MIDIBoek. Start work with the one resulting in fewest errors in the melody line. It will probably be useful to start Bass edits with a +12 semitone transposition.

**Tip #4**—A note which is not found in the scale can generally be replaced by another note within the same chord. This is usually noticeable if the note is within the melody line, but frequently not heard if it is in the bass or accompaniment lines.

**Figure 2** shows some of the alternatives which are available if you are working in the key of F or Bb, as I usually do.

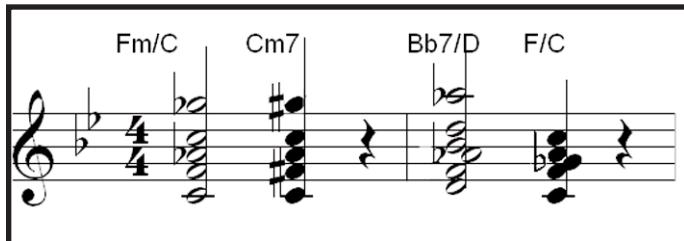


Figure 2. Extended chords in the key of F.

Try shifting B's to D's (C# to F) and listen to results note by note. In some cases a single mass shift accomplished in two or three key strokes will work for all notes. If that results in "bad notes," individually shift those which sound "OK."

Try shifting remaining B's to Bb's and listen to results note by note.

**Tip #5**—As noted above, not all occurrences of a note will shift inoffensively to the same note. Listen to results note by note

#### Tip #6

Other shifts to consider:

- G# to A or
- C# to C or
- F# to F

#### Articulation

"Articulation" is a term used to describe how notes follow one another.

**The Ringling Bros. Grand Entry March**  
Solo B<sub>b</sub> Cornet      ALBERT C. SWEET.

Figure 3. the first four bars of the Solo Cornet part for the *Ringling Bros. Grand Entry March*.

This illustration (**Figure 3**) shows three representations of the first four bars of the Solo Cornet part for the *Ringling Bros. Grand Entry March*.

In Figure 3 the first section shows how the first four bars of the Solo Cornet part for the *Ringling Bros. Grand Entry March* appear in the sheet music. In bars one and four the musician plays the same note three times in a row, but with different note lengths.

The second section shows how these notes appear in a piano roll window of a MIDI editor. Notice how the notes butt up against each other. If this MIDI file is played using a Piano patch, or, voice, the louder sound made as the piano hammers hit the strings, and the damping as the fingers are lifted between notes if the sustain peddle is off, create the distinction between the three notes. A cornet player would create this distinction by cutting off the wind momentarily with the tongue, a string player would use bowing to achieve a similar effect. Organ pipes have to be shut off between notes, otherwise a sustained note results.

The third section of Figure 3 shows how note length must be adjusted in the MIDI file for use with an organ. This is essential for the repeated notes, but the classic "band organ" sound requires that we treat almost all notes in a similar fashion. That is why I mentioned shortening all notes at the beginning of the arrangement process. I generally try to keep the notes in the melody somewhat longer than in the other two sections.

Electric organ magnets (valves) are very fast. A MIDI controlled organ will start and stop notes with almost the same timing as you will hear when previewing the tune during arranging on a computer. Adjustment of articulation is generally pretty straight forward when preparing MIDI output, but it may be more complicated if your MIDI files will be used to punch rolls or books

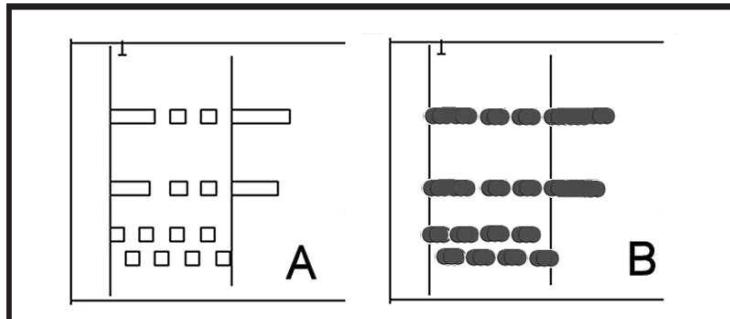


Figure 4. Different interpretations which printing or punching software may make from the same MIDI file.

**Figure 4** shows how different printing or punching software algorithms might make the same MIDI file sound quite differently.

Section A shows "slots" printed on a template using MIDIBoek. Each slot begins at the start of the note and ends where the note is to have been stopped. The slots are cut or punched inside the lines, filling them as completely as possible. With this pattern, all notes start a little bit late (half a hole diameter) and end the same amount early, but we get a full hole diameter of "shut off."

Section B shows what would happen if a computer punching algorithm caused a slot to begin with the first hole centered on the start of the note and the last hole centered on the end of

the note. In this case there is no “shut off.” The small holes used in Wurlitzer rolls lessen the problem, while the big holes used in John Smith rolls make it worse.

#### Finishing Your Arrangement

**Tip #7**—Make sure you thoroughly understand the output format you will be using. In the case of MIDI arrangements, this means knowing what MIDI Numbers are coded into the electronics of the target instrument. The most recent versions of the popular J-Omega boards can be easily modified, but all tunes for the organ must be based on the same assumptions.

**Tip #8**—Check “articulation” against the correct algorithm.

**Tip #9**—Reduce most chords to no more than five notes, particularly if sustained.

#### References:

1. “Scanning Sheet Music to Produce MIDI Files,” *Carousel Organ*, Issue 50, January, 2012
2. “MIDIBoek as an Analytical Tool,” *Carousel Organ*, Issue 49, October,/. 2011

Wally Venable focuses his mechanical music interests on crank organs, including a Smith Senior 20 and an expanded scale OSI 20er with percussion, and on arranging.

#### In memory of . . . Dick Nash

Richard “Dick” Nash of Warwick, NY passed on April 30th, 2013. Dick was 86 and was married to Maria Nash for 62 years. He served both in WWII and the Korean war as a Pharmacist Mate.

Many COAA members remember Dick bringing large European organs (Bruder and Dutch street organ) that eventually passed in to other’s collections. Dick, we will miss that smiling face.

Ron Bopp



#### FOR SALE

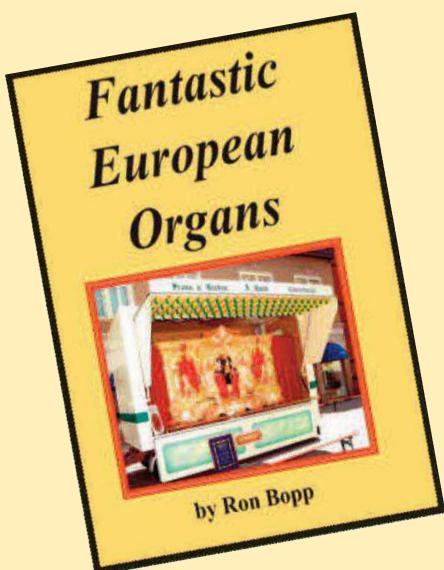
- A. Wurlitzer Type 4 in 1 valve unit; Foundry pattern (wood); 1 unit made up; 1 original unit; 1 blank, all aluminum; all for \$200.00
- B. 3 Wurlitzer wood trombones: \$300.00
- C. Wurlitzer unit valve blocks; plastic type; 31 all tested for \$186.00
- D. Artizian Rolls; 10 rolls; all 57-61 note: \$500.00

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