

In the Refuge of a Cave

for solo performer and live processing
(version for brass instrument)



Pictured: Ape Cave, near Mount St. Helens, WA. Jeffhollett / CC BY-SA (<https://creativecommons.org/licenses/by-sa/4.0>)

Nicholas Denton Protsack



Original Score.

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Program Notes:

Before there were bunkers, fortresses, or strongholds, there were caves. Since long before the dawn of recorded history, caves have held a universal significance as a source of refuge—a safe haven from the elements, predators, and natural disasters. Inversely, however, caves have widely been known to inspire a sense of apprehension and foreboding as well—potentially harbouring in the darkness the very dangers from which they are meant to offer protection.

Writing these program notes in late July of 2020, I can't help but compare the duality of caves to the tremendous changes that have taken place during the last six months. The Pandemic has forced just about everyone to reinvent their lives in order to preserve their safety and security. Whether metaphorically or analogously, we have all retreated to our caves in one way or another. For example, while many of us have achieved refuge through social distancing and sheltering-in-place, doing so has forced us to face the existential darkness of isolation and confinement.

In the Refuge of a Cave (2020) is my perspective on these themes as a composer and musician. What musical artists could once rely upon—concert spaces, audiences, even the ability to perform onstage together—has disappeared or drastically transformed in mere days. Now, one's own insights, abilities, and resources are the only certainties in their musical endeavors. When writing *In the Refuge of a Cave*, I imagined these restrictions as a literal cave surrounding the musical artist. What could a musician do to create music if they were isolated within a cave? How could one find artistic fulfillment in such a lonely and remote place? The only natural answer is that a musician would need to make do with the sonic resources and tools that the space granted them. The musician would utilize the reverberations and echoes generated by the cave's walls; in doing so, they would stumble upon a way to play music with another—a past version of themselves—an echo.

In the Refuge of a Cave is dedicated to my many friends and colleagues who have found themselves forced to navigate a unique cave of their own in these challenging times. Thus, it is designed to be playable by any instrument or voice type, and no two performances will ever sound alike.

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Required Hardware/Software:

- Laptop or computer capable of running at least Ableton Live 10.
- Stereo speakers or monitors (more than two speakers can be used if desired).
- High-quality microphone or USB microphone.
- Audio interface (not required if USB microphone is used).
- Ableton Live 10 Suite (or any version capable of running Max for Live 8 or higher).
- "In the Refuge of a Cave.amxd" Max for Live patcher available at www.dentonprotsack.com.

Setup:

1. Download the patcher (and score) from www.dentonprotsack.com.
2. If not already installed, install Ableton Live 10 Suite (or another version capable of running Max for Live 8) (a free trial is available at www.ableton.com).
3. Move the patcher to the "Max Audio Effect" folder, found under "Ableton">"User Library">"Presets">"Audio Effects".
4. Connect the desired microphone or audio interface to the computer. Connect the desired monitor or

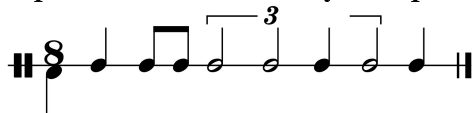
speaker system to the computer or audio interface. Ensure that the computer recognizes both external devices.

5. Create a new project in Ableton Live.
6. Create an "Audio" track, and set the "Audio From" to match the input of the desired microphone. Go to the "Master" track and set the "Master Out" to match the desired monitor or speaker system.
7. Ensure that the "Audio" track is selected and drag "In the Refuge of a Cave.amxd" patcher found under "Max for Live">"Max Audio Effect" into the "Drop Audio Effects Here" field.
8. If desired, drag a light reverb effect to the RIGHT of the patcher in a similar manner to the previous step.
9. Set the "Monitor" value to "In".

Notes for the Performer:

In the Refuge of a Cave is a work for a solo performer and live digital processing via a customized Max for Live patcher. The patcher works in tandem with a form of aleatoric notation, both of which are explained in detail below:

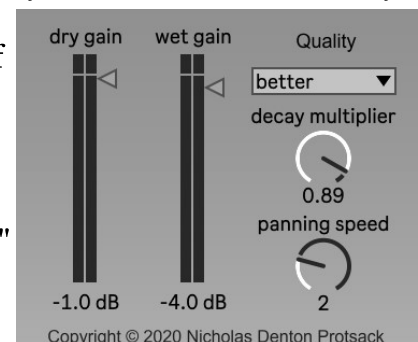
The patcher consists of an echo effect with original modifications that alter duration and pitch. Instead of repeating a given sound at regular intervals as a normal echo would, the patcher used in *In the Refuge of a Cave* creates a series of echoes, each with a unique duration and tuning modification applied to the original sound. The series repeats itself when completed, forming a regular cycle of pitch and rhythm that the performer can directly respond to; in fact, the piece is designed so that one repetition of the echo cycle equals one bar of music. The rhythm of the cycle is as follows:



The tuning modifications featured in the cycle are difficult to express with standard notation because they lie outside the tuning of 12 equal temperament. Instead, they have been expressed below in justly intoned ratios, in addition to cent values (in brackets):

3/4 (-498¢), **5/4** (+386¢), **11/8** (+551¢), **1/1** (+0¢), **7/8** (-231¢), **9/8** (204¢), **13/16** (-359¢), **17/16** (+105¢).

The patcher also has several fluid parameters that can be manipulated by the user as desired. "Dry Gain" controls the volume of the initial sound that enters the patcher (the default value is set to -1.0 dB). "Wet Gain" controls the volume of the sounds the patcher produces (the default value is set to -4.0 dB). "Quality" controls the fidelity of the sounds the patcher produces; a lower fidelity may reduce CPU load on slower computers. "Decay Multiplier" controls the rate at which the echo chain decays (the default value is 0.89—or 11% decay per echo). Lastly, "Panning Speed" controls the rate at which the echoes move spatially around the stereo channels. The values range from 1-5. A lower value causes the echoes to remain almost stationary, and a higher value causes the echoes to rapidly shift location (the default value is set to "2").



In the Refuge of a Cave uses a form of aleatoric notation, in which pitch and phrase structure are left up to the performer's discretion. A single line staff is used instead of the standard five lines, with notes written on and around the line. Thus, exact pitch is impossible to infer; instead, the performer must choose pitches at their own liberty while ensuring that they follow the basic contour of the music. Only

one pitch must remain consistent: the pitch that lies directly on the line of the staff. The performer must determine this pitch at the start of their performance, and base all their gestures around said pitch.

Phrase structure in *In the Refuge of a Cave* is given a similar aleatoric treatment. For starters, each bar of music is assigned a range of possible repetitions (denoted in a box to the right of the bar). The performer may opt to play the bar any number of times within the given range. Once the performer is finished playing a given bar, they must proceed *attacca* to an adjacent bar as indicated by the arrows (→) marked in the score. The performer may only proceed to a bar that is connected to their current bar by an arrow, and the direction of the arrow must be observed (no back-tracking is allowed). If a bar has multiple arrows leading away from it, the performer can choose a given path at their discretion.

Lastly, the form of the work is divided into 4 sections and a coda. The order in which these sections are played is also determined by the performer. This is achieved through boxed directions included in each section. The performer reaches the end of a section when they follow a marked arrow that leads to one of these boxes. Inside each box, there are directions that instruct the performer to proceed to one of two possible sections (for example, "Section 1" can lead to either "Section 2" or "Section 4"). While this choice is also up to the performer's discretion, every section must be explored before the performance can be concluded. When proceeding to a new section, the performer must begin at the bar with "START" or "ALTERNATE START", marked above it. Finally, the performance ends when the performer proceeds to the "Coda" section and finishes playing all the material written within.

Instructions for Brass Instrument Version:

General Instructions:

- The length of bends and glissandi notated in the score are only meant to serve as general guidelines for the performer, and need only be as long as the performer is able to feasibly execute on their instrument. Valved instruments should utilize half-valve playing to facilitate longer glissandi.
- The note that lies directly on the single line of the staff must be the lowest possible note that an alternate (or false) fingering can be executed on.
- Choices of pitch that lie outside the standard intonation of 12-ET are encouraged, and entirely up to the performer's discretion.

Techniques:

air - Blow air through the instrument without activating pitch. The timbre of the air should be altered to correspond with the register in which it is written (the higher the register, the faster/narrower the air stream). This can be achieved either by adjusting the quality of the air with embouchure, or (depending on the instrument) by utilizing fingerings that achieve the same effect. This technique is notated using an 'x'-shaped note head.

flz. air - Similar to "*air*", but simultaneously combined with flutter-tongue. To differentiate between the two techniques, tremolo bars have been added to the stems of the 'x'-shaped noteheads.

hum - Simultaneously hum and play a note, producing a multiphonic. The hummed note appears as a smaller notehead along with the given, standard note. The approximate register of the hummed note should be followed as well as reasonably possible by the performer.

slap tongue (abbreviated "*s.t.*") - Begin by blowing air through the instrument, then abruptly cut off the air flow by blocking the embouchure with the tongue. This produces an abrupt popping sound containing pitch. The pitch can be controlled to a certain extent with valves or slides, but the

amount differs depending on the instrument executing the technique. Thus, the performer should follow the melodic contour of the notated slap-tongue as best as feasibly possible. This technique is notated using a white, circular notehead with a dot in the middle.

half-valve - play a given fingering with at least one of the valves half depressed, so that the instrument becomes "stuck" halfway between two notes or registers. This technique can be combined with flutter tongue, producing a thick, distorted sound. The lower of the two notes is notated with a standard notehead, while the upper one is notated with a diamond notehead. If the performer is playing an instrument without valves, they may utilize a hummed multiphonic instead, or ignore the technique entirely if a multiphonic is unreasonably difficult to execute.

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Nicholas Denton Protsack
(composed May - July 2020)

SECTION I:
suggested duration: 45" - 1'30"

START
Moderately (one echo cycle/bar) ($\text{♩} = 83$)

flz. air *mp* (flz. air) *mp* ord. air *p* *pp* *p*

play 1-4x play 1x play 2-3x

(ord. air) *p* *mp* *pp* *mp* *pp*

precipitando *pp* *f* *sfz sfz*

6"-9"

Go to **SECTION II** or **SECTION IV**

SECTION II:
suggested duration: 1'15" - 2'30"

START

slap tongue *sfz* ord. *mp* Go to **SECTION III** or **CODA**

play 1-3x play 1x play 1x

(slap tongue) *mp* (ord.) *f* bend, ad lib. *f* *p*

alternate fingerings *p* *pp sempre*

play 2-3x play 1-3x

half-valve/flz. *mf* *sfz* *mf* *sfz* *mf* *sfz* sim. (s.t.)

Original Score.

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SECTION III:
suggested duration: 1'00" - 2'00"

START half-valve → ord.

play 1× *ppp* → play 1-2× *mp* arco

half-valve → ord. half-valve → ord. (s.t.)

play 2-3× *p* → *f* 3"-5"

play 3-5× *mp* → play 2× *p* < *mf* > *p* < *f* > *p* < *mf* > *f* *p* (s.t.)

morendo bend bend

play 1× *p* *mp* *pp* *p* *n*

Go to **SECTION IV** or **SECTION I**

SECTION IV:
suggested duration: 1'15" - 2'30"

START ord.

play 2-4× *n* *mf* *n*

ALTERNATE START gliss. (half-valve or slide)

play 2-4× *n* *mf* *n*

Go to **SECTION II** or **CODA**

play 1× ord. *n* *f*

play 1× (gliss.) *mp* *n* (hum) *n* *f*

play 1-3× (hum) *pp* *f* *pp* bend, ad lib.

CODA:

START (slap tongue)

play 2-3× *sfz* *sempre*

play 1× (s.t.) *p* (flz. air) *let echoes fade out*