

Sound Effects Player Example 04*

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Abstract

How to produce sound effects for live theatrical performances on a small budget, for example for a Community Theatre production.

Keywords: Sound Effects, Community Theatre.

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1 Purpose of Sound Effects

The purpose of sound effects is to assist in telling the story. That story is told mostly by the actors on the stage, augmented by the costumes, props and scenery. Just as the scenery should not draw the audience's attention away from the story, neither should the sound effects.

2 Why Use a Computer

Low-budget live musical theatre provides its non-professional singers with microphones so they can be heard over the orchestra by the audience. Even non-musicals generally need microphones for actors unless the theater is very small or has excellent acoustics. The audio mixer, speakers and amplifiers needed for sound reinforcement can also be used for sound effects.

In the simplest cases, adding a source of recorded sound, such as a CD player, with the sound effects as "songs" on the player, will be enough. This is adequate for background sounds, but the timing of a music player is not precise enough for a spot sound, such as a slap. In some cases these spot sounds can be made by the actors or a backstage person using objects, but for others, such as a gun shot, this is undesirable. In addition, background sounds are severely constrained: if an automobile must start its engine in response to a cue while the urban background sounds are playing, you need a second CD player.

Computers have become inexpensive enough in recent years that it is reasonable to consider using one in place of the CD players during a live performance. With suitable software, a computer can play both background and spot sounds, and mix them together as needed.

I will use an example to illustrate how to use the `sound_effects_player` component of the `show_control` project to produce the sounds needed for a live musical theatre production.

3 What You Will Need

To run the `sound_effects_player` you will need a computer running the Fedora distribution of GNU/Linux. The computer must also have a sound card so it can output sound. `Sound_effects_player` supports up to eight channels of sound, but two are usually enough for Community Theatre productions. If you need more, USB sound players are not very expensive.

To get the `sound_effects_player` software, download the source tarball from github. It is a component of the `show_control` project, at this URL: https://github.com/ShowControl/sound_effects_player. `Sound_effects_player` also requires `libtime`, another component of `show_control`. Details are in the `.spec` file. Alternatively, you can install the `sound_effects_player` from COPR under the name `johnsauter / sound_effects_player`.

Once you have the software installed you can look at the sample configuration, the documentation and the first three examples to learn about the mechanics of the

sound_effects_player and see how to make simple sounds. In this paper I will assume that you have looked at that information so I will concentrate on the high-level design of the sound effects for a live performance.

4 A Show with Complex Sound Effects

Let us suppose that you have been asked to provide the sound effects for a show with a challenging set of sound effects: Children of Eden by Stephen Schwartz and John Caird.

In addition to the usual pre-show music and environment sounds during each scene, there are also a variety of spot sounds that must be played when an on-stage action happens. In addition, the director has challenged you to provide sound from both the front and back of the audience, and has loaned you the speakers from his home theater to make this possible. This includes a subwoofer that will be useful for the thunder.

The XML files developed in this paper are included with the distribution of the sound_effects_player as example 4.

In order to make sounds come from behind the audience you have positioned two self-powered speakers on stands at the back of the theater along with the usual two at the front. The subwoofer is under the stage, concealed from the audience by a cloth drop from the front of the stage.

The music will be live but the actors are not professional singers, so we will use body microphones on the actors so they can be heard over the music. These microphones go through the audio mixer and their sound is sent equally to the two front speakers, so it seems to the audience that it is coming from the center of the stage.

The sound effects enter five channels of the audio mixer from the computer running sound_effects_player. In order to get five sound channels out of the computer you might need to use a USB sound device such as the M-Audio Fast Track Ultra 8R or the much newer StarTech 7.1 USB Audio Adapter Sound Card with SPDIF Digital Audio. You won't need a new sound output device, of course, if your computer can already drive a 5.1 surround sound system. The audio mixer routes the five sound channels from the computer directly to the five speakers. If you are using a 5.1 surround sound output from the computer, the Front Center channel will be unused.

We wish to provide an easy-to-use interface for the sound effects operator, so we will divide the show into discrete parts, and present him with only the controls he needs in each part. Theatre tradition divides shows into acts and scenes, but Children of Eden has no scene markers, so we we will make up our own based on changes in the depicted location. In addition, we also need some sounds before the first act.

I do not have permission from the owners of the copyright on Children of Eden to post the script here, so I will ask you to purchase a copy of the script from Music Theater International at this URL: <https://www.mtishows.com/children-of-eden> so you can follow along as I go through the script looking for places that sound effects can help to tell the story. When you are creating sound effects for your own show you will have a copy of your script as part of the right to produce the play. Be sure to talk to the director, in case he has some sound effects in mind.

4.1 Before the House Opens

You will want to test the sound system. Before the house opens is the best time to fix any cable failures or wiring errors. This needn't be complex: a single sound that identifies all five speakers in turn should be enough. I have used a track called "6-channel ID" which identifies all of the speakers in a 5.1 surround sound system. If your speaker wiring is correct you won't hear the front center speaker.

Here is the description of the sound in `Theater_sound.xml`:

```
<sound>
  <name>6-channel_ID</name>
  <wav_file_name>6_Channel_ID.wav</wav_file_name>
  <loop_from_time>8.0</loop_from_time>
  <loop_to_time>0.0</loop_to_time>
  <loop_limit>0</loop_limit>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
    <channel>
      <number>1</number>
      <speakers>
        <speaker>
          <name>front_right</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
    <channel>
      <number>2</number>
      <speakers>
        <speaker>
          <name>front_center</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
    <channel>
      <number>3</number>
      <speakers>
        <speaker>
```

```

        <name>LFE1</name>
        <volume_level>1.0</volume_level>
      </speaker>
    </speakers>
  </channel>
  <channel>
    <number>4</number>
    <speakers>
      <speaker>
        <name>rear_left</name>
        <volume_level>1.0</volume_level>
      </speaker>
    </speakers>
  </channel>
  <channel>
    <number>5</number>
    <speakers>
      <speaker>
        <name>rear_right</name>
        <volume_level>1.0</volume_level>
      </speaker>
    </speakers>
  </channel>
</channels>
</sound>

```

The 8-second sound repeats until the operator stops it. Each channel is sent to the speaker corresponding to the name heard on the channel.

To allow the sound effects operator to play the sound before the house opens we have the following in `Theater_sound_sequence.xml`:

```

<sequence_item>
  <name>offer_tests</name>
  <type>offer_sound</type>
  <next_to_start>6-channel-id</next_to_start>
  <cluster_number>0</cluster_number>
  <text_to_display>6-channel ID</text_to_display>
  <tag>tests</tag>
  <next>wait_for_house_to_open</next>
</sequence_item>

<sequence_item>
  <name>6-channel-id</name>
  <type>start_sound</type>
  <sound_name>6-channel_ID</sound_name>
  <cluster_number>0</cluster_number>
  <text_to_display>Naming six speakers; </text_to_display>

```

```

    <text_to_display>press "stop" to end.</text_to_display>
  <tag>tests</tag>
</sequence_item>

```

The first sequence item tells the sound effects operator that he can run the sound “6-channel ID” by pushing the Start button on cluster 0, and the second, which runs when he pushes that button, plays it. The sound runs until the sound effects operator presses Stop on cluster 0.

In order to get this to work we must have a starting point for the sequence, and a sequence item which causes the above to be executed. This is in `Example_04_sound_sequence.xml`:

```

<sequence_item>
  <name>start_of_sequence</name>
  <type>start_sequence</type>
  <next>offer_tests</next>
</sequence_item>

<sequence_item>
  <name>wait_for_house_to_open</name>
  <type>operator_wait</type>
  <text_to_display>Press Play</text_to_display>
  <text_to_display> when the house opens.</text_to_display>
  <next_play>stop_tests_1</next_play>
</sequence_item>

```

In the above, “start_of_sequence” is where the sequence starts. The next sequence item is “offer_tests” which is in `Theater_sound_sequence.xml` as shown above. “Offer_tests” then branches to “wait_for_house_to_open” which waits for the sound effects operator to press the Play button. During this wait, if the sound effects operator presses Start on cluster 0, the 6-channel-ID sound will play.

When the house opens the Sound Effects Operator presses the Play button, which stops the 6-channel-ID sound if it is playing and takes it off cluster 0 so he can no longer play it.

```

<sequence_item>
  <name>stop_tests_1</name>
  <type>stop_sound</type>
  <tag>tests</tag>
  <next>stop_tests_2</next>
</sequence_item>

<sequence_item>
  <name>stop_tests_2</name>
  <type>cease_offering_sound</type>
  <tag>tests</tag>
  <next>house_is_open</next>
</sequence_item>

```

4.2 House is Open

Play a medley of music from the play, perhaps recorded during rehearsal. To avoid copyright issues with this paper, I have used a nice public domain song in example 4. You won't have a copyright problem because as part of the right to produce your play you have the right to play its music for your audience.

Here is the definition of the sound from `Example_04_sounds.xml`:

```
<!--
    Play this music from house open to ready for announcements.
-->
<sound>
  <name>pre-show music</name>
  <wav_file_name>pre_show_music.wav</wav_file_name>
  <attack_duration_time>5.0</attack_duration_time>
  <designer_volume_level>1.0</designer_volume_level>
  <designer_pan>0.00</designer_pan>
  <default_volume_level>0.5</default_volume_level>
  <loop_from_time>386</loop_from_time>
  <loop_to_time>0</loop_to_time>
  <loop_limit>0</loop_limit>
  <release_duration_time>1.0</release_duration_time>
  <channels>
    <!-- Channel 0 to speakers front_left and rear_left,
         1 to front_right and rear_right.
         Rear speakers at low volume.
    -->
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
        <speaker>
          <name>rear_left</name>
          <volume_level>0.5</volume_level>
        </speaker>
      </speakers>
    </channel>
    <channel>
      <number>1</number>
      <speakers>
        <speaker>
          <name>front_right</name>
          <volume_level>1.0</volume_level>
        </speaker>
```

```

        <speaker>
          <name>rear_right</name>
          <volume_level>0.5</volume_level>
        </speaker>
      </speakers>
    </channel>
  </channels>
</sound>

```

Notice that it repeats until the sound effects operator stops it. The sound is mostly in the front speakers, but the rear speakers get half the volume. The sound effects operator can increase the volume level by up to a factor of 2.

Here are the sequence items which control the music, from file `Example_04_sound_sequence.xml`.

```

<!-- House is Open -->

<sequence_item>
  <name>house_is_open</name>
  <type>start_sound</type>
  <sound_name>pre-show music</sound_name>
  <cluster_number>15</cluster_number>
  <text_to_display>pre-show music</text_to_display>
  <tag>pre-show music</tag>
  <next_starts>wait_for_announcement</next_starts>
</sequence_item>

<sequence_item>
  <name>wait_for_announcement</name>
  <type>operator_wait</type>
  <text_to_display>Press Play when it is time for</text_to_display>
  <text_to_display> a safety announcement.</text_to_display>
  <next_play>house_quiet_1</next_play>
</sequence_item>

<sequence_item>
  <name>house_quiet_1</name>
  <type>stop_sound</type>
  <tag>pre-show music</tag>
  <next>offer_announcements</next>
</sequence_item>

```

The above sequence starts the sound, waits for the operator to push the Play button, then stops the sound if it is running.

4.3 Almost Ready for Curtain

Your theater will probably want to make a safety announcement. This might be done live by the management, but in case it isn't offer the sound effects operator a choice of announcements to play. I have included in example 4 the announcements used at the Souhegan High School in Amherst, NH, where I did the sound for the Amherst PTA production of Children of Eden in 2010. Here are the sounds, from Theater_sounds.xml:

```
<!--
    These announcements can be played before the first curtain
    or, in one case, before the second act.
-->

<sound>
  <name>Announcement Evening Long</name>
  <wav_file_name>announcements/01-Evening_Long.wav</wav_file_name>
  <start_time>1.95</start_time>
  <attack_duration_time>0.05</attack_duration_time>
</sound>

<sound>
  <name>Announcement Evening Short</name>
  <wav_file_name>announcements/02-Evening_Short.wav</wav_file_name>
  <start_time>2.00</start_time>
  <attack_duration_time>0.05</attack_duration_time>
</sound>

<sound>
  <name>Announcement Evening Long Humorous</name>
  <wav_file_name>announcements/03-Evening_Long_Humorous.wav</wav_file_name>
  <start_time>2.50</start_time>
  <attack_duration_time>0.05</attack_duration_time>
</sound>

<sound>
  <name>Announcement Afternoon Long</name>
  <wav_file_name>announcements/04-Afternoon_Long.wav</wav_file_name>
  <start_time>2.10</start_time>
  <attack_duration_time>0.05</attack_duration_time>
</sound>

<sound>
  <name>Announcement Afternoon Short</name>
  <wav_file_name>announcements/05-Afternoon_Short.wav</wav_file_name>
  <start_time>1.90</start_time>
  <attack_duration_time>0.05</attack_duration_time>
```

```

</sound>

<sound>
  <name>Announcement Afternoon Long Humorous</name>
  <wav_file_name>announcements/06-Afternoon_Long_Humorous.wav</wav_file_name>
  <start_time>1.80</start_time>
  <attack_duration_time>0.05</attack_duration_time>
</sound>

<sound>
  <name>Announcement Morning Short</name>
  <wav_file_name>announcements/07-Morning_Short.wav</wav_file_name>
  <start_time>1.85</start_time>
  <attack_duration_time>0.05</attack_duration_time>
</sound>

<sound>
  <name>Announcement Intermission Return</name>
  <wav_file_name>announcements/08-Intermission_Return.wav</wav_file_name>
  <start_time>1.95</start_time>
  <attack_duration_time>0.05</attack_duration_time>
</sound>

```

And here are the sequence items, from Example_04_sound_sequence.xml and Theater_sound_sequence.xml:

```

<sequence_item>
  <name>offer_announcements</name>
  <type>offer_sound</type>
  <next_to_start>announcement_evening_long</next_to_start>
  <text_to_display>Evening Long</text_to_display>
  <cluster_number>0</cluster_number>
  <tag>announcements</tag>
  <next>offer_announcement_2</next>
</sequence_item>

<sequence_item>
  <name>announcement_evening_long</name>
  <type>start_sound</type>
  <sound_name>Announcement Evening Long</sound_name>
  <cluster_number>0</cluster_number>
  <text_to_display>Evening Long</text_to_display>
  <tag>announcements</tag>
</sequence_item>

<sequence_item>
  <name>offer_announcement_2</name>

```

```

    <type>offer_sound</type>
    <next_to_start>announcement_evening_short</next_to_start>
    <text_to_display>Evening Short</text_to_display>
    <cluster_number>1</cluster_number>
    <tag>announcements</tag>
    <next>offer_announcement_3</next>
</sequence_item>

<sequence_item>
    <name>announcement_evening_short</name>
    <type>start_sound</type>
    <sound_name>Announcement Evening Short</sound_name>
    <cluster_number>1</cluster_number>
    <text_to_display>Evening Short</text_to_display>
    <tag>announcements</tag>
</sequence_item>

<sequence_item>
    <name>offer_announcement_3</name>
    <type>offer_sound</type>
    <next_to_start>announcement_evening_long_humorous</next_to_start>
    <text_to_display>Evening Long Humorous</text_to_display>
    <cluster_number>2</cluster_number>
    <tag>announcements</tag>
    <next>offer_announcement_4</next>
</sequence_item>

<sequence_item>
    <name>announcement_evening_long_humorous</name>
    <type>start_sound</type>
    <sound_name>Announcement Evening Long Humorous</sound_name>
    <cluster_number>2</cluster_number>
    <text_to_display>Evening Long Humorous</text_to_display>
    <tag>announcements</tag>
</sequence_item>

<sequence_item>
    <name>offer_announcement_4</name>
    <type>offer_sound</type>
    <next_to_start>announcement_afternoon_long</next_to_start>
    <text_to_display>Afternoon Long</text_to_display>
    <cluster_number>3</cluster_number>
    <tag>announcements</tag>
    <next>offer_announcement_5</next>
</sequence_item>

```

```

<sequence_item>
  <name>announcement_afternoon_long</name>
  <type>start_sound</type>
  <sound_name>Announcement Afternoon Long</sound_name>
  <cluster_number>3</cluster_number>
  <text_to_display>Afternoon Long</text_to_display>
  <tag>announcements</tag>
</sequence_item>

<sequence_item>
  <name>offer_announcement_5</name>
  <type>offer_sound</type>
  <next_to_start>announcement_afternoon_short</next_to_start>
  <text_to_display>Afternoon Short</text_to_display>
  <cluster_number>4</cluster_number>
  <tag>announcements</tag>
  <next>offer_announcement_6</next>
</sequence_item>

<sequence_item>
  <name>announcement_afternoon_short</name>
  <type>start_sound</type>
  <sound_name>Announcement Afternoon Short</sound_name>
  <cluster_number>4</cluster_number>
  <text_to_display>Afternoon Short</text_to_display>
  <tag>announcements</tag>
</sequence_item>

<sequence_item>
  <name>offer_announcement_6</name>
  <type>offer_sound</type>
  <next_to_start>announcement_afternoon_long_humorous</next_to_start>
  <text_to_display>Afternoon Long Humorous</text_to_display>
  <cluster_number>5</cluster_number>
  <tag>announcements</tag>
  <next>offer_announcement_7</next>
</sequence_item>

<sequence_item>
  <name>announcement_afternoon_long_humorous</name>
  <type>start_sound</type>
  <sound_name>Announcement Afternoon Long Humorous</sound_name>
  <cluster_number>5</cluster_number>
  <text_to_display>Afternoon Long Humorous</text_to_display>
  <tag>announcements</tag>
</sequence_item>

```

```

<sequence_item>
  <name>offer_announcement_7</name>
  <type>offer_sound</type>
  <next_to_start>announcement_morning_short</next_to_start>
  <text_to_display>Morning Short</text_to_display>
  <cluster_number>6</cluster_number>
  <tag>announcements</tag>
  <next>wait_for_curtain_1</next>
</sequence_item>

<sequence_item>
  <name>announcement_morning_short</name>
  <type>start_sound</type>
  <sound_name>Announcement Morning Short</sound_name>
  <cluster_number>6</cluster_number>
  <text_to_display>Morning Short</text_to_display>
  <tag>announcements</tag>
</sequence_item>

<!-- Almost Ready for Curtain -->

<sequence_item>
  <name>wait_for_curtain_1</name>
  <type>operator_wait</type>
  <text_to_display>Press Play when the curtain opens.</text_to_display>
  <next_play>wait_for_curtain_2</next_play>
</sequence_item>

<sequence_item>
  <name>wait_for_curtain_2</name>
  <type>stop_sound</type>
  <tag>announcements</tag>
  <next>wait_for_curtain_3</next>
</sequence_item>

<sequence_item>
  <name>wait_for_curtain_3</name>
  <type>cease_offering_sound</type>
  <tag>announcements</tag>
  <next>Act 01 Scene 01 Page 001</next>
</sequence_item>

```

There are announcements for Morning, Evening and Afternoon performances. The Afternoon and Evening versions have short, long and long humorous versions,

whereas Morning has only short. The sound effects operator will play the appropriate announcement. You should record a voice familiar to your audience making the announcements.

4.4 Act 01 Scene 01 Page 001: Creation

The play starts in the dark, before the Earth was created. It isn't at all clear what sounds would convey this to the audience, so we'll just have silence.

```
<!-- Page 001: Creation -->

<sequence_item>
  <name>Act 01 Scene 01 Page 001</name>
  <type>operator_wait</type>
  <text_to_display>Press Play when the </text_to_display>
  <text_to_display>Garden of Eden is created.</text_to_display>
  <next_play>Act 01 Scene 02 Page 007_1</next_play>
</sequence_item>
```

4.5 Act 01 Scene 02 Page 007: Garden of Eden

The Garden of Eden should sound like a garden full of mammals, birds, insects and reptiles for Adam to name. They should be very soft until page 15, when they present themselves to Adam. We want a sound different from the silence of the void, but not loud enough to distract the audience from the story.

Let's use the sound of a forest. It is mostly birds, but you can hear other noises in the bush.

```
<!--
  Play this forest sound while Adam and Eve
  are in the Garden of Eden.
-->

<sound>
  <name>Garden ambience</name>
  <wav_file_name>forest.wav</wav_file_name>
  <attack_duration_time>1.0</attack_duration_time>
  <designer_volume_level>0.125</designer_volume_level>
  <default_volume_level>0.5</default_volume_level>
  <release_duration_time>1.0</release_duration_time>
  <loop_from_time>333.0</loop_from_time>
  <loop_to_time>0.0</loop_to_time>
  <loop_limit>0</loop_limit>
  <channels>
    <!-- This is a quadrophonic sound. We send
      channel 0 to front left, 1 to front right,
      2 to rear left and 3 to rear right.
    -->
```

```

<channel>
  <number>0</number>
  <speakers>
    <speaker>
      <name>front_left</name>
      <volume_level>1.0</volume_level>
    </speaker>
  </speakers>
</channel>
<channel>
  <number>1</number>
  <speakers>
    <speaker>
      <name>front_right</name>
      <volume_level>1.0</volume_level>
    </speaker>
  </speakers>
</channel>
<channel>
  <number>2</number>
  <speakers>
    <speaker>
      <name>rear_left</name>
      <volume_level>1.0</volume_level>
    </speaker>
  </speakers>
</channel>
<channel>
  <number>3</number>
  <speakers>
    <speaker>
      <name>rear_right</name>
      <volume_level>1.0</volume_level>
    </speaker>
  </speakers>
</channel>
</channels>
</sound>

<!-- Page 007: Garden of Eden -->

<sequence_item>
  <name>Act 01 Scene 02 Page 007_1</name>
  <type>start_sound</type>
  <sound_name>Garden ambience</sound_name>
  <text_to_display>The Garden of Eden</text_to_display>

```

```

<cluster_number>15</cluster_number>
<tag>garden_ambience</tag>
<next_starts>Act 01 Scene 02 Page 007_2</next_starts>
</sequence_item>

```

4.5.1 Act 01 Scene 02 Page 015: Animals Appear

As the animals arrive their sounds become more noticable until Father starts to sing. The director will probably not want a sound effect for this, but you never know. Like the announcements, we will make this sound available to the sound effects operator, and if the director decides at the last minute that he doesn't like it, the operator can simply not push the Start button.

```

<!--
    Page 015: More animals start to arrive.
    Page 019: The animals dance about Adam and Eve.
-->
<sound>
    <name>Animal Medley</name>
    <wav_file_name>Steve_Devino/08-Animal_medley.wav</wav_file_name>
</sound>

<sequence_item>
    <name>Act 01 Scene 02 Page 007_2</name>
    <type>offer_sound</type>
    <next_to_start>Animal Medley_01</next_to_start>
    <cluster_number>0</cluster_number>
    <tag>animals</tag>
    <text_to_display>Animals</text_to_display>
    <next>Act 01 Scene 02 Page 007_3</next>
</sequence_item>

<sequence_item>
    <name>Animal Medley_01</name>
    <type>start_sound</type>
    <sound_name>Animal Medley</sound_name>
    <cluster_number>0</cluster_number>
    <text_to_display>Animals</text_to_display>
    <tag>animals</tag>
</sequence_item>

```

4.5.2 Act 01 Scene 02 Page 024: Tree of Knowledge

The tree is said to be near a waterfall, so we can add the sound of running water. However, it is later depicted as also being in the part of the garden where Adam and Eve live, so perhaps the running water isn't needed, or maybe it should always be

present. It is easier to eliminate a sound than to add one at the last minute, so we will have this sound available, and not use it if the director doesn't want it.

I created the water sound in example 4 by obtaining four stereo recordings of flowing water, and assigning them to each pair of speakers around the room: front, rear, left and right. Each speaker thus gets two channels. The four stereo recordings are of different lengths, so as they repeat the audience doesn't hear the same sound every few seconds.

```
<!--
  These four sounds together constitute running water.
  They are independent stereo recordings played in
  adjacent pairs of speakers.
-->
<sound>
  <name>Water_01</name>
  <wav_file_name>water/water1.wav</wav_file_name>
  <attack_duration_time>1.0</attack_duration_time>
  <designer_volume_level>0.05</designer_volume_level>
  <default_volume_level>0.3</default_volume_level>
  <release_duration_time>1.0</release_duration_time>
  <loop_from_time>59</loop_from_time>
  <loop_to_time>0</loop_to_time>
  <loop_limit>0</loop_limit>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
    <channel>
      <number>1</number>
      <speakers>
        <speaker>
          <name>front_right</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
  </channels>
</sound>
<sound>
  <name>Water_02</name>
```

```

<wav_file_name>water/water2.wav</wav_file_name>
<attack_duration_time>1.0</attack_duration_time>
<designer_volume_level>0.05</designer_volume_level>
<default_volume_level>0.3</default_volume_level>
<release_duration_time>1.0</release_duration_time>
<loop_from_time>24</loop_from_time>
<loop_to_time>0</loop_to_time>
<loop_limit>0</loop_limit>
<channels>
  <channel>
    <number>0</number>
    <speakers>
      <speaker>
        <name>front_right</name>
        <volume_level>1.0</volume_level>
      </speaker>
    </speakers>
  </channel>
  <channel>
    <number>1</number>
    <speakers>
      <speaker>
        <name>rear_left</name>
        <volume_level>1.0</volume_level>
      </speaker>
    </speakers>
  </channel>
</channels>
</sound>
<sound>
  <name>Water_03</name>
  <wav_file_name>water/water3.wav</wav_file_name>
  <attack_duration_time>1.0</attack_duration_time>
  <designer_volume_level>0.05</designer_volume_level>
  <default_volume_level>0.3</default_volume_level>
  <release_duration_time>1.0</release_duration_time>
  <loop_from_time>24.5</loop_from_time>
  <loop_to_time>0</loop_to_time>
  <loop_limit>0</loop_limit>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>rear_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
  </channels>
</sound>

```

```

        </speaker>
    </speakers>
</channel>
<channel>
    <number>1</number>
    <speakers>
        <speaker>
            <name>rear_right</name>
            <volume_level>1.0</volume_level>
        </speaker>
    </speakers>
</channel>
</channels>
</sound>
<sound>
    <name>Water_04</name>
    <wav_file_name>water/water4.wav</wav_file_name>
    <attack_duration_time>1.0</attack_duration_time>
    <designer_volume_level>0.05</designer_volume_level>
    <default_volume_level>0.3</default_volume_level>
    <release_duration_time>1.0</release_duration_time>
    <loop_from_time>28</loop_from_time>
    <loop_to_time>0</loop_to_time>
    <loop_limit>0</loop_limit>
    <channels>
        <channel>
            <number>0</number>
            <speakers>
                <speaker>
                    <name>front_left</name>
                    <volume_level>1.0</volume_level>
                </speaker>
            </speakers>
        </channel>
        <channel>
            <number>1</number>
            <speakers>
                <speaker>
                    <name>rear_left</name>
                    <volume_level>1.0</volume_level>
                </speaker>
            </speakers>
        </channel>
    </channels>
</sound>

```

In the sequence below, notice that the sound is offered on just one cluster, but pressing its Start button starts all four sounds. In addition, when any Stop button is pressed, all of the sounds are stopped.

```

<sequence_item>
  <name>Act 01 Scene 02 Page 007_3</name>
  <type>offer_sound</type>
  <next_to_start>Water_1</next_to_start>
  <tag>water</tag>
  <text_to_display>Water</text_to_display>
  <cluster_number>9</cluster_number>
  <next>Act 01 Scene 02 Page 007_4</next>
</sequence_item>

<sequence_item>
  <name>Water_1</name>
  <type>start_sound</type>
  <sound_name>Water_01</sound_name>
  <text_to_display>Water</text_to_display>
  <importance>1</importance>
  <cluster_number>9</cluster_number>
  <tag>water</tag>
  <next_starts>Water_2</next_starts>
  <next_termination>water_stop</next_termination>
</sequence_item>

<sequence_item>
  <name>Water_2</name>
  <type>start_sound</type>
  <sound_name>Water_02</sound_name>
  <text_to_display>Water</text_to_display>
  <importance>1</importance>
  <cluster_number>12</cluster_number>
  <tag>water</tag>
  <next_starts>Water_3</next_starts>
  <next_termination>water_stop</next_termination>
</sequence_item>

<sequence_item>
  <name>Water_3</name>
  <type>start_sound</type>
  <sound_name>Water_03</sound_name>
  <text_to_display>Water</text_to_display>
  <importance>1</importance>
  <cluster_number>13</cluster_number>
  <tag>water</tag>

```

```

    <next_starts>Water_4</next_starts>
    <next_termination>water_stop</next_termination>
</sequence_item>

<sequence_item>
  <name>Water_4</name>
  <type>start_sound</type>
  <sound_name>Water_04</sound_name>
  <text_to_display>Water</text_to_display>
  <importance>1</importance>
  <cluster_number>14</cluster_number>
  <tag>water</tag>
  <next_termination>water_stop</next_termination>
</sequence_item>

<sequence_item>
  <name>water_stop</name>
  <type>stop_sound</type>
  <tag>water</tag>
</sequence_item>

```

4.5.3 Act 01 Scene 02 Page 033a: Eve Bites the Apple

As Eve bites, make the sound of an apple being bitten into.

```

<!--
  Pages 033 and 040: Adam and Eve bite the apple.
-->

<sound>
  <name>Apple</name>
  <wav_file_name>apple.wav</wav_file_name>
</sound>

<sequence_item>
  <name>Act 01 Scene 02 Page 007_4</name>
  <type>offer_sound</type>
  <next_to_start>Apple_1</next_to_start>
  <tag>apple</tag>
  <text_to_display>Apple</text_to_display>
  <cluster_number>1</cluster_number>
  <next>Act 01 Scene 02 Page 007_5</next>
</sequence_item>

<sequence_item>
  <name>Apple_1</name>
  <type>start_sound</type>
  <sound_name>Apple</sound_name>

```

```

    <cluster_number>1</cluster_number>
    <importance>2</importance>
    <text_to_display>Apple</text_to_display>
  </sequence_item>

```

4.5.4 Act 01 Scene 02 Page 033b: Eve Departs

Eve walks off through the garden so we can end the sound of running water. Pressing any of the Stop buttons marked “Water” stops all of them, leaving one Start button active.

4.5.5 Act 01 Scene 02 Page 040: Adam Bites the Apple

Make the apple biting sound again.

4.5.6 Act 01 Scene 02 page 042: Thunder and Lightning

After Father says “forever will it burn!” there is a terrific crash of thunder as a bolt of lightning strikes the Tree of Knowledge. This should be loud. Use all four speakers to good effect starting with those at the front. I used Audacity to move the sound from front to rear. In addition, to enhance the bass I filtered a monophonic version of the sound to eliminate all frequencies over 100 Hz and fed that to the LFE1 speaker, under the stage.

```

<!--
    Page 042: The lightning strike and consequent thunder when
    Father destroys the tree.
-->
<sound>
  <name>lightning_crash</name>
  <wav_file_name>Weather/lightning_crash.wav</wav_file_name>
  <start_time>4.0</start_time>
  <release_duration_time>1</release_duration_time>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
    <channel>
      <number>1</number>
      <speakers>
        <speaker>

```

```

        <name>front_right</name>
        <volume_level>1.0</volume_level>
    </speaker>
</speakers>
</channel>
<channel>
    <number>2</number>
    <speakers>
        <speaker>
            <name>rear_left</name>
            <volume_level>1.0</volume_level>
        </speaker>
    </speakers>
</channel>
<channel>
    <number>3</number>
    <speakers>
        <speaker>
            <name>rear_right</name>
            <volume_level>1.0</volume_level>
        </speaker>
    </speakers>
</channel>
<channel>
    <number>4</number>
    <speakers>
        <speaker>
            <name>LFE1</name>
            <volume_level>1.0</volume_level>
        </speaker>
    </speakers>
</channel>
</channels>
</sound>

<sequence_item>
    <name>Act 01 Scene 02 Page 007_5</name>
    <type>offer_sound</type>
    <next_to_start>lightning_crash</next_to_start>
    <text_to_display>Father destroys tree</text_to_display>
    <cluster_number>2</cluster_number>
    <importance>2</importance>
    <tag>lightning_crash</tag>
    <next>wait_for_end_of_act_1_scene_2</next>
</sequence_item>

```

```

<sequence_item>
  <name>lightning_crash</name>
  <type>start_sound</type>
  <sound_name>lightning_crash</sound_name>
  <text_to_display>Father destroys tree</text_to_display>
  <cluster_number>2</cluster_number>
  <importance>2</importance>
</sequence_item>

```

That's all the sounds we will need in scene 2. When it is over stop them so we can use those same clusters for the sounds in scene 3. However, leave the water sound available because we will need it in the next scene.

```

<sequence_item>
  <name>wait_for_end_of_act_1_scene_2</name>
  <type>operator_wait</type>
  <text_to_display>Press Play when Adam and Eve</text_to_display>
  <text_to_display> leave the garden.</text_to_display>
  <next_play>end_act_01_scene_02_1</next_play>
</sequence_item>

```

<!-- Page 043: The Wasteland -->

```

<sequence_item>
  <name>end_act_01_scene_02_1</name>
  <type>stop_sound</type>
  <tag>garden_ambience</tag>
  <next>end_act_01_scene_02_2</next>
</sequence_item>

```

```

<sequence_item>
  <name>end_act_01_scene_02_2</name>
  <type>stop_sound</type>
  <tag>animals</tag>
  <next>end_act_01_scene_02_3</next>
</sequence_item>

```

```

<sequence_item>
  <name>end_act_01_scene_02_3</name>
  <type>cease_offering_sound</type>
  <tag>animals</tag>
  <next>end_act_01_scene_02_4</next>
</sequence_item>

```

```

<sequence_item>
  <name>end_act_01_scene_02_4</name>

```

```

    <type>cease_offering_sound</type>
    <tag>apple</tag>
    <next>end_act_01_scene_02_5</next>
</sequence_item>

<sequence_item>
    <name>end_act_01_scene_02_5</name>
    <type>cease_offering_sound</type>
    <tag>lightning_crash</tag>
    <next>Act 01 Scene 03 Page 043_1</next>
</sequence_item>

```

4.6 Act 01 Scene 03 Page 043: The Wasteland

We transition to a new scene, where the background sound is not of a garden but of a wasteland. There is a waterfall nearby, so we will continue to have the sound of running water available, as we did in the Garden of Eden.

```

<!-- background sound when in the wasteland. -->

<sound>
    <name>Wasteland ambience</name>
    <wav_file_name>Wasteland/Wasteland.wav</wav_file_name>
    <designer_volume_level>0.02</designer_volume_level>
    <attack_duration_time>1.0</attack_duration_time>
    <release_duration_time>1.0</release_duration_time>
    <loop_from_time>230</loop_from_time>
    <loop_to_time>1.0</loop_to_time>
    <loop_limit>0</loop_limit>
    <channels>
        <channel>
            <number>0</number>
            <speakers>
                <speaker>
                    <name>front_left</name>
                    <volume_level>1.0</volume_level>
                </speaker>
                <speaker>
                    <name>rear_left</name>
                    <volume_level>0.5</volume_level>
                </speaker>
            </speakers>
        </channel>
        <channel>
            <number>1</number>
            <speakers>

```

```

        <speaker>
            <name>front_right</name>
            <volume_level>1.0</volume_level>
        </speaker>
        <speaker>
            <name>rear_right</name>
            <volume_level>0.5</volume_level>
        </speaker>
    </speakers>
</channel>
</channels>
</sound>

<sequence_item>
    <name>Act 01 Scene 03 Page 043_1</name>
    <type>start_sound</type>
    <sound_name>Wasteland_ambience</sound_name>
    <text_to_display>The Wasteland</text_to_display>
    <cluster_number>15</cluster_number>
    <tag>wasteland_ambience</tag>
    <next_starts>Act 01 Scene 03 Page 043_2</next_starts>
</sequence_item>

```

4.6.1 Act 01 Scene 03 Page 044: Birth of Cain and Abel

Use the cry of a newborn baby for each birth. Label each cluster with the name of the baby.

```

<!-- Page 044: Two baby cry sounds, for Cain and Abel. -->

<sound>
    <name>baby_cry_1</name>
    <wav_file_name>baby_cry_1.wav</wav_file_name>
</sound>
<sound>
    <name>baby_cry_2</name>
    <wav_file_name>baby_cry_2.wav</wav_file_name>
</sound>

<sequence_item>
    <name>Act 01 Scene 03 Page 043_2</name>
    <type>offer_sound</type>
    <next_to_start>baby_cry_1</next_to_start>
    <cluster_number>0</cluster_number>
    <text_to_display>Cain birth</text_to_display>
    <tag>baby_cry</tag>
    <next>Act 01 Scene 03 Page 043_3</next>

```

```

</sequence_item>

<sequence_item>
  <name>baby_cry_1</name>
  <type>start_sound</type>
  <sound_name>baby_cry_1</sound_name>
  <text_to_display>Cain is born</text_to_display>
  <cluster_number>0</cluster_number>
  <importance>2</importance>
</sequence_item>

<sequence_item>
  <name>Act 01 Scene 03 Page 043_3</name>
  <type>offer_sound</type>
  <next_to_start>baby_cry_2</next_to_start>
  <cluster_number>1</cluster_number>
  <text_to_display>Abel birth</text_to_display>
  <tag>baby_cry</tag>
  <next>Act 01 Scene 03 Page 043_4</next>
</sequence_item>

<sequence_item>
  <name>baby_cry_2</name>
  <type>start_sound</type>
  <sound_name>baby_cry_2</sound_name>
  <text_to_display>Abel is born</text_to_display>
  <cluster_number>1</cluster_number>
  <importance>2</importance>
</sequence_item>

```

4.6.2 Act 01 Scene 03 Page 061: Eve slaps Cain

The slap is a spot sound. In the 2010 Amherst PTA Play production we eliminated this sound since the actress playing Eve, who is an elementary school teacher in real life, could not bring herself to slap the actor playing Cain. If your Eve is made of sterner stuff you can use Adam's slap below, or perhaps a softer version of it.

4.6.3 Act 01 Scene 03 Page 062: Circle of Giant Standing Stones

To convey that this is a different place, the wasteland sound should be different, perhaps with more life in it. Do that by adding this sound:

```

<!--
  Page 063: Added ambience when the family is in the standing
  stones.
-->

```

```

<sound>
  <name>Standing Stones ambience</name>
  <wav_file_name>garden_ambience.wav</wav_file_name>
  <attack_duration_time>1.0</attack_duration_time>
  <designer_volume_level>0.25</designer_volume_level>
  <release_duration_time>1.0</release_duration_time>
  <loop_from_time>53.5</loop_from_time>
  <loop_to_time>0.75</loop_to_time>
  <loop_limit>0</loop_limit>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
    <channel>
      <number>1</number>
      <speakers>
        <speaker>
          <name>front_right</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
    <channel>
      <number>2</number>
      <speakers>
        <speaker>
          <name>rear_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
    <channel>
      <number>3</number>
      <speakers>
        <speaker>
          <name>rear_right</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
  </channels>

```

```

    </channels>
</sound>

<sequence_item>
  <name>Act 01 Scene 03 Page 043_4</name>
  <type>offer_sound</type>
  <next_to_start>standing_stones_ambience</next_to_start>
  <text_to_display>Standing Stones</text_to_display>
  <tag>standing_stones_ambience</tag>
  <cluster_number>2</cluster_number>
  <next>Act 01 Scene 03 Page 043_5</next>
</sequence_item>

<sequence_item>
  <name>standing_stones_ambience</name>
  <type>start_sound</type>
  <sound_name>Standing Stones ambience</sound_name>
  <text_to_display>Standing Stones</text_to_display>
  <cluster_number>2</cluster_number>
  <tag>standing_stones_ambience</tag>
</sequence_item>

```

4.6.4 Act 01 Scene 03 Page 065: Distant Rumble of Thunder

Use the rear speakers only, to convey that the thunder is distant.

```

<!--
  Page 065: distant rumble of thunder.
-->

<sound>
  <name>thunder_065</name>
  <wav_file_name>Weather/thunder_072.wav</wav_file_name>
  <designer_volume_level>0.25</designer_volume_level>
  <default_volume_level>0.5</default_volume_level>
  <release_start_time>25.0</release_start_time>
  <release_duration_time>5.0</release_duration_time>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>
          <volume_level>0.1</volume_level>
        </speaker>
      </speakers>
    </channel>
    <channel>

```

```

        <number>1</number>
        <speakers>
            <speaker>
                <name>front_right</name>
                <volume_level>0.1</volume_level>
            </speaker>
        </speakers>
    </channel>
    <channel>
        <number>2</number>
        <speakers>
            <speaker>
                <name>rear_left</name>
                <volume_level>1.0</volume_level>
            </speaker>
        </speakers>
    </channel>
    <channel>
        <number>3</number>
        <speakers>
            <speaker>
                <name>rear_right</name>
                <volume_level>1.0</volume_level>
            </speaker>
        </speakers>
    </channel>
    <channel>
        <number>4</number>
        <speakers>
            <speaker>
                <name>LFE1</name>
                <volume_level>0.2</volume_level>
            </speaker>
        </speakers>
    </channel>
</channels>
</sound>

<sequence_item>
    <name>Act 01 Scene 03 Page 043_5</name>
    <type>offer_sound</type>
    <next_to_start>distant_thunder</next_to_start>
    <text_to_display>Distant Thunder</text_to_display>
    <tag>weather</tag>
    <cluster_number>10</cluster_number>
    <next>Act 01 Scene 03 Page 043_6</next>

```

```

</sequence_item>

<sequence_item>
  <name>distant_thunder</name>
  <type>start_sound</type>
  <sound_name>thunder_065</sound_name>
  <text_to_display>Distant Thunder</text_to_display>
  <cluster_number>10</cluster_number>
  <importance>2</importance>
  <tag>weather</tag>
</sequence_item>

```

4.6.5 Act 01 Scene 03 Page 069: Adam Strikes Cain

A slap sound effect must be timed perfectly. During rehearsal pay close attention to the actor who delivers the slap so you can use his body language to time the slap. When I was learning to do this on a different show I asked the actor to give me a big windup so I could get the timing right. That works for slapstick but not for Children of Eden.

```

<!--
  Page 069: Adam slaps Cain.
-->
<sound>
  <name>slap</name>
  <wav_file_name>slap.wav</wav_file_name>
</sound>

<sequence_item>
  <name>Act 01 Scene 03 Page 043_6</name>
  <type>offer_sound</type>
  <next_to_start>slap_Cain</next_to_start>
  <cluster_number>3</cluster_number>
  <text_to_display>slap Cain</text_to_display>
  <tag>slap</tag>
  <next>Act 01 Scene 03 Page 043_7</next>
</sequence_item>

<sequence_item>
  <name>slap_Cain</name>
  <type>start_sound</type>
  <sound_name>slap</sound_name>
  <text_to_display>slap Cain</text_to_display>
  <cluster_number>3</cluster_number>
  <importance>2</importance>
</sequence_item>

```

4.6.6 Act 01 Scene 03 Page 070: Adam Strikes Cain Again

Use the same slap.

4.6.7 Act 01 Scene 03 Page 071: Cain Kills Abel

Use a bonk sound for the blows that Cain strikes. The sound effects operator can push the button for each blow.

```
<!--
    Page 071: Cain beats Abel.
-->
<sound>
    <name>bonk</name>
    <wav_file_name>bonk.wav</wav_file_name>
</sound>

<sequence_item>
    <name>Act 01 Scene 03 Page 043_7</name>
    <type>offer_sound</type>
    <next_to_start>beat_Abel</next_to_start>
    <cluster_number>4</cluster_number>
    <text_to_display>Cain beats Abel</text_to_display>
    <tag>beat</tag>
    <next>Act 01 Scene 03 Page 043_8</next>
</sequence_item>

<sequence_item>
    <name>beat_Abel</name>
    <type>start_sound</type>
    <sound_name>bonk</sound_name>
    <text_to_display>Cain beats Abel</text_to_display>
    <cluster_number>4</cluster_number>
    <importance>2</importance>
</sequence_item>
```

4.7 Act 01 Scene 04 Page 072a: The Mark of Cain

This is a new location so we call it Scene 4, but for sound effects purposes we just add it onto the end of scene 3.

As Adam and Eve exit with Abel's body, we transition to a new scene. The background sounds are wind and rain, though the wasteland is still there. Put them on separate clusters so the sound effects operator can adjust them as needed. They slowly fade in when he starts them.

```
<!--
    Page 072: wind, rain and thunder.
```

```

-->
<sound>
  <name>wind</name>
  <wav_file_name>Weather/wind.wav</wav_file_name>
  <designer_volume_level>0.3</designer_volume_level>
  <default_volume_level>0.5</default_volume_level>
  <attack_duration_time>4.5</attack_duration_time>
  <decay_duration_time>1.0</decay_duration_time>
  <sustain_level>0.33</sustain_level>
  <release_duration_time>1.0</release_duration_time>
  <loop_from_time>28</loop_from_time>
  <loop_to_time>0</loop_to_time>
  <loop_limit>0</loop_limit>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
        <speaker>
          <name>rear_right</name>
          <volume_level>0.75</volume_level>
        </speaker>
      </speakers>
    </channel>
    <channel>
      <number>1</number>
      <speakers>
        <speaker>
          <name>front_right</name>
          <volume_level>1.0</volume_level>
        </speaker>
        <speaker>
          <name>rear_left</name>
          <volume_level>0.75</volume_level>
        </speaker>
      </speakers>
    </channel>
  </channels>
</sound>

<sound>
  <name>rain_01</name>
  <wav_file_name>Weather/rain.wav</wav_file_name>

```

```

<designer_volume_level>0.3</designer_volume_level>
<default_volume_level>0.5</default_volume_level>
<attack_duration_time>5</attack_duration_time>
<release_duration_time>1</release_duration_time>
<loop_from_time>60</loop_from_time>
<loop_to_time>0</loop_to_time>
<loop_limit>0</loop_limit>
<channels>
  <channel>
    <number>0</number>
    <speakers>
      <speaker>
        <name>front_left</name>
        <volume_level>1.0</volume_level>
      </speaker>
      <speaker>
        <name>rear_right</name>
        <volume_level>0.75</volume_level>
      </speaker>
    </speakers>
  </channel>
  <channel>
    <number>1</number>
    <speakers>
      <speaker>
        <name>front_right</name>
        <volume_level>1.0</volume_level>
      </speaker>
      <speaker>
        <name>rear_left</name>
        <volume_level>0.75</volume_level>
      </speaker>
    </speakers>
  </channel>
</channels>
</sound>

<sequence_item>
  <name>Act 01 Scene 03 Page 043_8</name>
  <type>offer_sound</type>
  <next_to_start>wind_01</next_to_start>
  <cluster_number>5</cluster_number>
  <text_to_display>Wind</text_to_display>
  <tag>weather</tag>
  <next>Act 01 Scene 03 Page 043_9</next>
</sequence_item>

```

```

<sequence_item>
  <name>wind_01</name>
  <type>start_sound</type>
  <sound_name>wind</sound_name>
  <text_to_display>Wind</text_to_display>
  <cluster_number>5</cluster_number>
  <importance>2</importance>
  <tag>weather</tag>
</sequence_item>

<sequence_item>
  <name>Act 01 Scene 03 Page 043_9</name>
  <type>offer_sound</type>
  <next_to_start>rain_01</next_to_start>
  <cluster_number>6</cluster_number>
  <text_to_display>Rain</text_to_display>
  <tag>weather</tag>
  <next>Act 01 Scene 03 Page 043_10</next>
</sequence_item>

<sequence_item>
  <name>rain_01</name>
  <type>start_sound</type>
  <sound_name>rain_01</sound_name>
  <text_to_display>Rain</text_to_display>
  <cluster_number>6</cluster_number>
  <importance>2</importance>
  <tag>weather</tag>
</sequence_item>

```

4.8 Act 01 Scene 04 Page 072b: The Mark of Cain

When Father first calls out to Cain there is thunder from all four speakers, but it ends just before Father calls out a second time.

```

<sound>
  <name>thunder_072</name>
  <wav_file_name>Weather/thunder_072.wav</wav_file_name>
  <default_volume_level>1.0</default_volume_level>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>

```

```

        <volume_level>1.0</volume_level>
    </speaker>
</speakers>
</channel>
<channel>
    <number>1</number>
    <speakers>
        <speaker>
            <name>front_right</name>
            <volume_level>1.0</volume_level>
        </speaker>
    </speakers>
</channel>
<channel>
    <number>2</number>
    <speakers>
        <speaker>
            <name>rear_left</name>
            <volume_level>1.0</volume_level>
        </speaker>
    </speakers>
</channel>
<channel>
    <number>3</number>
    <speakers>
        <speaker>
            <name>rear_right</name>
            <volume_level>1.0</volume_level>
        </speaker>
    </speakers>
</channel>
<channel>
    <number>4</number>
    <speakers>
        <speaker>
            <name>LFE1</name>
            <volume_level>1.0</volume_level>
        </speaker>
    </speakers>
</channel>
</channels>
</sound>

<sequence_item>
    <name>Act 01 Scene 03 Page 043_10</name>
    <type>offer_sound</type>

```

```

<next_to_start>thunder_072</next_to_start>
<cluster_number>7</cluster_number>
<text_to_display>Thunder</text_to_display>
<tag>weather</tag>
<next>Act 01 Scene 03 Page 043_11</next>
</sequence_item>

```

```

<sequence_item>
  <name>thunder_072</name>
  <type>start_sound</type>
  <sound_name>thunder_072</sound_name>
  <text_to_display>Thunder</text_to_display>
  <cluster_number>7</cluster_number>
  <importance>3</importance>
  <tag>weather</tag>
</sequence_item>

```

4.8.1 Act 01 Scene 04 Page 073a: Cain is Marked

When Father and Storytellers sing “the race of Cain must ever bear this mark!” there is immediately a flash of lightning and a loud crash of thunder. I know that thunder is supposed to follow lightning, but I did not want to wait for the lighting guys so I told them that I had rehearsed the thunder and knew just when it should sound, and they should do their best to keep up. I used the sound from page 42.

```

<sequence_item>
  <name>Act 01 Scene 03 Page 043_11</name>
  <type>offer_sound</type>
  <next_to_start>mark_of_cain</next_to_start>
  <cluster_number>8</cluster_number>
  <text_to_display>"must ever bear this mark"</text_to_display>
  <tag>weather</tag>
  <next>Act 01 Scene 03 Page 043_12</next>
</sequence_item>

```

```

<sequence_item>
  <name>mark_of_cain</name>
  <type>start_sound</type>
  <sound_name>lightning_crash</sound_name>
  <text_to_display>Cain being marked</text_to_display>
  <cluster_number>8</cluster_number>
  <importance>4</importance>
  <tag>weather</tag>
</sequence_item>

```

```

<sequence_item>

```

```

<name>Act 01 Scene 03 Page 043_12</name>
<type>operator_wait</type>
<text_to_display>Press Play when Act 1 is complete</text_to_display>
<next_play>end_act_1_1</next_play>
</sequence_item>

```

4.8.2 Act 01 Scene 04 Page 073b: Cain is Marked

When Cain exits and Eve enters we transition to a new scene, back in the wilderness. The sound effects operator stops the rain and wind sounds. They fade out over five seconds.

4.9 Act 01 Scene 05 Page 073c: Eve Enters

Use the same wilderness background as for scene 3.

4.10 Intermission

There is no background sound during intermission, but at its end there is an optional safety announcement as the audience is taking their seats. I have included the one from the Souhegan High School in Amherst, NH.

```

<sequence_item>
  <name>end_act_1_1</name>
  <type>stop_sound</type>
  <tag>wasteland_ambience</tag>
  <next>end_act_1_2</next>
</sequence_item>

<sequence_item>
  <name>end_act_1_2</name>
  <type>stop_sound</type>
  <tag>water</tag>
  <next>end_act_1_3</next>
</sequence_item>

<sequence_item>
  <name>end_act_1_3</name>
  <type>cease_offering_sound</type>
  <tag>water</tag>
  <next>end_act_1_4</next>
</sequence_item>

<sequence_item>
  <name>end_act_1_4</name>
  <type>cease_offering_sound</type>

```

```
<tag>baby_cry</tag>
<next>end_act_1_5</next>
</sequence_item>

<sequence_item>
  <name>end_act_1_5</name>
  <type>stop_sound</type>
  <tag>standing_stones_ambience</tag>
  <next>end_act_1_6</next>
</sequence_item>

<sequence_item>
  <name>end_act_1_6</name>
  <type>cease_offering_sound</type>
  <tag>standing_stones_ambience</tag>
  <next>end_act_1_7</next>
</sequence_item>

<sequence_item>
  <name>end_act_1_7</name>
  <type>cease_offering_sound</type>
  <tag>slap</tag>
  <next>end_act_1_8</next>
</sequence_item>

<sequence_item>
  <name>end_act_1_8</name>
  <type>cease_offering_sound</type>
  <tag>beat</tag>
  <next>end_act_1_9</next>
</sequence_item>

<sequence_item>
  <name>end_act_1_9</name>
  <type>stop_sound</type>
  <tag>weather</tag>
  <next>end_act_1_10</next>
</sequence_item>

<sequence_item>
  <name>end_act_1_10</name>
  <type>cease_offering_sound</type>
  <tag>weather</tag>
  <next>end_act_1_11</next>
</sequence_item>
```

```

<sequence_item>
  <name>end_act_1_11</name>
  <type>offer_sound</type>
  <tag>announcements</tag>
  <cluster_number>0</cluster_number>
  <text_to_display>Intermission Return announcement</text_to_display>
  <next_to_start>Intermission Return</next_to_start>
  <next>end_act_1_12</next>
</sequence_item>

<sequence_item>
  <name>Intermission Return</name>
  <type>start_sound</type>
  <sound_name>Announcement Intermission Return</sound_name>
  <text_to_display>Intermission Return announcement</text_to_display>
</sequence_item>

<sequence_item>
  <name>end_act_1_12</name>
  <type>operator_wait</type>
  <text_to_display>Press Play when intermission is over.</text_to_display>
  <next_play>Act 02 Scene 01 Page 081_01</next_play>
</sequence_item>

<sequence_item>
  <name>Act 02 Scene 01 Page 081_01</name>
  <type>cease_offering_sound</type>
  <tag>announcements</tag>
  <next>Act 02 Scene 01 Page 081_02</next>
</sequence_item>

```

4.11 Act 02 Scene 01 Page 081: Generations of Adam

The background should be of a nice place, with a hint of a distant stream and the occasional insect. It is not as alive as the Garden of Eden, but not as dead as the wasteland. I didn't provide any sound here for exercise 4.

4.11.1 Act 02 Scene 01 Page 91: Noah Pounds

Thud as Noah pounds in the last peg of gopher wood. This is probably better done live, or you can use the bonk from page 071.

4.11.2 Act 02 Scene 01 Page 101: Animals Appear

Each animal has an introductory sound: bunnies, turtles, chimps, panthers, birds, frogs, mike, zebras, ostriches, giraffes and elephants.

```
<!--
  Page 101: these sounds introduce the various animals. Put them all in
  the front two speakers.
-->
<sound>
  <name>rabbit</name>
  <wav_file_name>animals/101a_rabbit_purring.wav</wav_file_name>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
        <speaker>
          <name>front_right</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
  </channels>
</sound>
<sound>
  <name>turtle</name>
  <wav_file_name>animals/101b_Egyptian_turtle.wav</wav_file_name>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
        <speaker>
          <name>front_right</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
  </channels>
</sound>
<sound>
  <name>chimp</name>
  <wav_file_name>animals/101c_chimp.wav</wav_file_name>
  <channels>
```

```

    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
        <speaker>
          <name>front_right</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
  </channels>
</sound>
<sound>
  <name>panther</name>
  <wav_file_name>animals/101d_panther.wav</wav_file_name>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
        <speaker>
          <name>front_right</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
  </channels>
</sound>
<sound>
  <name>bird</name>
  <wav_file_name>animals/101e_bird.wav</wav_file_name>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
        <speaker>

```

```

        <name>front_right</name>
        <volume_level>1.0</volume_level>
    </speaker>
</speakers>
</channel>
</channels>
</sound>
<sound>
    <name>frog</name>
    <wav_file_name>animals/101f_frog.wav</wav_file_name>
    <channels>
        <channel>
            <number>0</number>
            <speakers>
                <speaker>
                    <name>front_left</name>
                    <volume_level>1.0</volume_level>
                </speaker>
                <speaker>
                    <name>front_right</name>
                    <volume_level>1.0</volume_level>
                </speaker>
            </speakers>
        </channel>
    </channels>
</sound>
<sound>
    <name>mice</name>
    <wav_file_name>animals/101g_mice.wav</wav_file_name>
    <channels>
        <channel>
            <number>0</number>
            <speakers>
                <speaker>
                    <name>front_left</name>
                    <volume_level>1.0</volume_level>
                </speaker>
                <speaker>
                    <name>front_right</name>
                    <volume_level>1.0</volume_level>
                </speaker>
            </speakers>
        </channel>
    </channels>
</sound>
<sound>

```

```

<name>zebra</name>
<wav_file_name>animals/101h_zebra.wav</wav_file_name>
<channels>
  <channel>
    <number>0</number>
    <speakers>
      <speaker>
        <name>front_left</name>
        <volume_level>1.0</volume_level>
      </speaker>
    </speakers>
  </channel>
  <channel>
    <number>1</number>
    <speakers>
      <speaker>
        <name>front_right</name>
        <volume_level>1.0</volume_level>
      </speaker>
    </speakers>
  </channel>
</channels>
</sound>
<sound>
  <name>ostrich</name>
  <wav_file_name>animals/101i_ostrich.wav</wav_file_name>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
        <speaker>
          <name>front_right</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
  </channels>
</sound>
<sound>
  <name>giraffe</name>
  <wav_file_name>animals/101j_newborn_giraffe.wav</wav_file_name>
  <channels>

```

```

<channel>
  <number>0</number>
  <speakers>
    <speaker>
      <name>front_left</name>
      <volume_level>1.0</volume_level>
    </speaker>
  </speakers>
</channel>
<channel>
  <number>1</number>
  <speakers>
    <speaker>
      <name>front_right</name>
      <volume_level>1.0</volume_level>
    </speaker>
  </speakers>
</channel>
</channels>
</sound>
<sound>
  <name>elephant</name>
  <wav_file_name>animals/101k_elephant.wav</wav_file_name>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
        <speaker>
          <name>front_right</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
  </channels>
</sound>

```

Since the order of their appearance is well-defined, we can present each to the sound effects operator when the previous one has completed. This lets us use the same button for each sound—the sound effects operator just presses “Start” when the next animal appears. He can end a sound early if necessary by pressing “Stop”. The label on the cluster shows the current or next animal, and after the last animal it is blank.

```

<sequence_item>

```

```

<name>Act 02 Scene 01 Page 081_02</name>
<type>offer_sound</type>
<next_to_start>Animal_Rabbit_1</next_to_start>
<cluster_number>0</cluster_number>
<tag>animals</tag>
<text_to_display>Rabbit</text_to_display>
<next>Act 02 Scene 01 Page 081_03</next>
</sequence_item>

<!--
    Page 101: The animal sounds play in sequence.
    The sound effects operator pushes Start when the next animal appears.
-->
<sequence_item>
    <name>Animal_Rabbit_1</name>
    <type>start_sound</type>
    <sound_name>rabbit</sound_name>
    <text_to_display>Rabbit</text_to_display>
    <importance>2</importance>
    <cluster_number>0</cluster_number>
    <next_completion>Animal_Rabbit_2</next_completion>
    <next_termination>Animal_Rabbit_2</next_termination>
    <tag>animals</tag>
</sequence_item>

<sequence_item>
    <name>Animal_Rabbit_2</name>
    <type>cease_offering_sound</type>
    <tag>animals</tag>
    <next>Animal_Rabbit_3</next>
</sequence_item>

<sequence_item>
    <name>Animal_Rabbit_3</name>
    <type>offer_sound</type>
    <next_to_start>Animal_Turtle_1</next_to_start>
    <cluster_number>0</cluster_number>
    <tag>animals</tag>
    <text_to_display>Turtle</text_to_display>
</sequence_item>

<sequence_item>
    <name>Animal_Turtle_1</name>
    <type>start_sound</type>
    <sound_name>turtle</sound_name>
    <text_to_display>Turtle</text_to_display>

```

```

    <importance>2</importance>
    <cluster_number>0</cluster_number>
    <tag>animals</tag>
    <next_completion>Animal_Turtle_2</next_completion>
    <next_termination>Animal_Turtle_2</next_termination>
</sequence_item>

<sequence_item>
    <name>Animal_Turtle_2</name>
    <type>cease_offering_sound</type>
    <tag>animals</tag>
    <next>Animal_Turtle_3</next>
</sequence_item>

<sequence_item>
    <name>Animal_Turtle_3</name>
    <type>offer_sound</type>
    <next_to_start>Animal_Chimp_1</next_to_start>
    <tag>animals</tag>
    <cluster_number>0</cluster_number>
    <text_to_display>Chimp</text_to_display>
</sequence_item>

<sequence_item>
    <name>Animal_Chimp_1</name>
    <type>start_sound</type>
    <sound_name>chimp</sound_name>
    <text_to_display>Chimp</text_to_display>
    <importance>2</importance>
    <cluster_number>0</cluster_number>
    <tag>animals</tag>
    <next_completion>Animal_Chimp_2</next_completion>
    <next_termination>Animal_Chimp_2</next_termination>
</sequence_item>

<sequence_item>
    <name>Animal_Chimp_2</name>
    <type>cease_offering_sound</type>
    <tag>animals</tag>
    <next>Animal_Chimp_3</next>
</sequence_item>

<sequence_item>
    <name>Animal_Chimp_3</name>
    <type>offer_sound</type>
    <next_to_start>Animal_Panther_1</next_to_start>

```

```

    <tag>animals</tag>
    <text_to_display>Panther</text_to_display>
</sequence_item>

<sequence_item>
  <name>Animal_Panther_1</name>
  <type>start_sound</type>
  <sound_name>panther</sound_name>
  <text_to_display>Panther</text_to_display>
  <importance>2</importance>
  <cluster_number>0</cluster_number>
  <tag>animals</tag>
  <next_completion>Animal_Panther_2</next_completion>
  <next_termination>Animal_Panther_2</next_termination>
</sequence_item>

<sequence_item>
  <name>Animal_Panther_2</name>
  <type>cease_offering_sound</type>
  <tag>animals</tag>
  <next>Animal_Panther_3</next>
</sequence_item>

<sequence_item>
  <name>Animal_Panther_3</name>
  <type>offer_sound</type>
  <next_to_start>Animal_Bird_1</next_to_start>
  <tag>animals</tag>
  <text_to_display>Bird</text_to_display>
  <cluster_number>0</cluster_number>
</sequence_item>

<sequence_item>
  <name>Animal_Bird_1</name>
  <type>start_sound</type>
  <sound_name>bird</sound_name>
  <text_to_display>Bird</text_to_display>
  <importance>2</importance>
  <cluster_number>0</cluster_number>
  <tag>animals</tag>
  <next_completion>Animal_Bird_2</next_completion>
  <next_termination>Animal_Bird_2</next_termination>
</sequence_item>

<sequence_item>
  <name>Animal_Bird_2</name>

```

```

    <type>cease_offering_sound</type>
    <tag>animals</tag>
    <next>Animal_Bird_3</next>
</sequence_item>

<sequence_item>
    <name>Animal_Bird_3</name>
    <type>offer_sound</type>
    <next_to_start>Animal_Frog_1</next_to_start>
    <tag>animals</tag>
    <cluster_number>0</cluster_number>
    <text_to_display>Frog</text_to_display>
</sequence_item>

<sequence_item>
    <name>Animal_Frog_1</name>
    <type>start_sound</type>
    <sound_name>frog</sound_name>
    <text_to_display>Frog</text_to_display>
    <importance>2</importance>
    <cluster_number>0</cluster_number>
    <tag>animals</tag>
    <next_completion>Animal_Frog_2</next_completion>
    <next_termination>Animal_Frog_2</next_termination>
</sequence_item>

<sequence_item>
    <name>Animal_Frog_2</name>
    <type>cease_offering_sound</type>
    <tag>animals</tag>
    <next>Animal_Frog_3</next>
</sequence_item>

<sequence_item>
    <name>Animal_Frog_3</name>
    <type>offer_sound</type>
    <next_to_start>Animal_Zebra_1</next_to_start>
    <tag>animals</tag>
    <cluster_number>0</cluster_number>
    <text_to_display>Zebra</text_to_display>
</sequence_item>

<sequence_item>
    <name>Animal_Zebra_1</name>
    <type>start_sound</type>
    <sound_name>zebra</sound_name>

```

```

    <text_to_display>Zebra</text_to_display>
    <importance>2</importance>
    <cluster_number>0</cluster_number>
    <tag>animals</tag>
    <next_completion>Animal_Zebra_2</next_completion>
    <next_termination>Animal_Zebra_2</next_termination>
  </sequence_item>

  <sequence_item>
    <name>Animal_Zebra_2</name>
    <type>cease_offering_sound</type>
    <tag>animals</tag>
    <next>Animal_Zebra_3</next>
  </sequence_item>

  <sequence_item>
    <name>Animal_Zebra_3</name>
    <type>offer_sound</type>
    <next_to_start>Animal_Ostrich_1</next_to_start>
    <tag>animals</tag>
    <cluster_number>0</cluster_number>
    <text_to_display>Ostrich</text_to_display>
  </sequence_item>

  <sequence_item>
    <name>Animal_Ostrich_1</name>
    <type>start_sound</type>
    <sound_name>ostrich</sound_name>
    <text_to_display>Ostrich</text_to_display>
    <importance>2</importance>
    <cluster_number>0</cluster_number>
    <tag>animals</tag>
    <next_completion>Animal_Ostrich_2</next_completion>
    <next_termination>Animal_Ostrich_2</next_termination>
  </sequence_item>

  <sequence_item>
    <name>Animal_Ostrich_2</name>
    <type>cease_offering_sound</type>
    <tag>animals</tag>
    <next>Animal_Ostrich_3</next>
  </sequence_item>

  <sequence_item>
    <name>Animal_Ostrich_3</name>
    <type>offer_sound</type>

```

```

    <next_to_start>Animal_Giraffe_1</next_to_start>
    <tag>animals</tag>
    <cluster_number>0</cluster_number>
    <text_to_display>Giraffe</text_to_display>
</sequence_item>

<sequence_item>
    <name>Animal_Giraffe_1</name>
    <type>start_sound</type>
    <sound_name>giraffe</sound_name>
    <text_to_display>Giraffe</text_to_display>
    <importance>2</importance>
    <cluster_number>0</cluster_number>
    <tag>animals</tag>
    <next_completion>Animal_Giraffe_2</next_completion>
    <next_termination>Animal_Giraffe_2</next_termination>
</sequence_item>

<sequence_item>
    <name>Animal_Giraffe_2</name>
    <type>cease_offering_sound</type>
    <tag>animals</tag>
    <next>Animal_Giraffe_3</next>
</sequence_item>

<sequence_item>
    <name>Animal_Giraffe_3</name>
    <type>offer_sound</type>
    <next_to_start>Animal_Elephant_1</next_to_start>
    <tag>animals</tag>
    <cluster_number>0</cluster_number>
    <text_to_display>Elephant</text_to_display>
</sequence_item>

<sequence_item>
    <name>Animal_Elephant_1</name>
    <type>start_sound</type>
    <sound_name>elephant</sound_name>
    <text_to_display>Elephant</text_to_display>
    <importance>2</importance>
    <cluster_number>0</cluster_number>
    <tag>animals</tag>
    <next_completion>Animal_Elephant_2</next_completion>
    <next_termination>Animal_Elephant_2</next_termination>
</sequence_item>

```

```

<sequence_item>
  <name>Animal_Elephant_2</name>
  <type>cease_offering_sound</type>
  <tag>animals</tag>
</sequence_item>

```

4.11.3 Act 02 Scene 01 Page 103: Thunder

The script calls for just one thunder on this page, but the director of the 2010 Amherst PTA play asked for four: a very distant, very bass rumble at the top of the page, a closer rumble at “not a stranger to the rain”, closer yet at “sacred and profane”, and even closer at “let it rain”, which is where the script calls for thunder.

```

<!--
  Page 103: four thunder sounds, coming closer.
-->
<sound>
  <name>thunder_103a</name>
  <wav_file_name>Weather/thunder_103a.wav</wav_file_name>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>rear_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
    <channel>
      <number>1</number>
      <speakers>
        <speaker>
          <name>rear_right</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
  </channels>
</sound>
<sound>
  <name>thunder_103b</name>
  <wav_file_name>Weather/thunder_103b.wav</wav_file_name>
  <channels>
    <channel>
      <number>0</number>

```

```

    <speakers>
      <speaker>
        <name>rear_left</name>
        <volume_level>0.75</volume_level>
      </speaker>
      <speaker>
        <name>front_left</name>
        <volume_level>0.25</volume_level>
      </speaker>
    </speakers>
  </channel>
  <channel>
    <number>1</number>
    <speakers>
      <speaker>
        <name>rear_right</name>
        <volume_level>0.75</volume_level>
      </speaker>
      <speaker>
        <name>front_right</name>
        <volume_level>0.25</volume_level>
      </speaker>
    </speakers>
  </channel>
</channels>
</sound>
<sound>
  <name>thunder_103c</name>
  <wav_file_name>Weather/thunder_103c.wav</wav_file_name>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>rear_left</name>
          <volume_level>0.5</volume_level>
        </speaker>
        <speaker>
          <name>front_left</name>
          <volume_level>0.5</volume_level>
        </speaker>
      </speakers>
    </channel>
    <channel>
      <number>1</number>
      <speakers>

```

```

        <speaker>
          <name>rear_right</name>
          <volume_level>0.5</volume_level>
        </speaker>
        <speaker>
          <name>front_right</name>
          <volume_level>0.5</volume_level>
        </speaker>
      </speakers>
    </channel>
  </channels>
</sound>
<sound>
  <name>thunder_103d</name>
  <wav_file_name>Weather/thunder_103d.wav</wav_file_name>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
    <channel>
      <number>1</number>
      <speakers>
        <speaker>
          <name>front_right</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
  </channels>
</sound>

<!--
  Pages 103, 107 and 109: Similarly for the four thunder sounds
  on page 103, the two on page 107 and the one on page 109.
-->

<sequence_item>
  <name>Act 02 Scene 01 Page 081_03</name>
  <type>offer_sound</type>
  <next_to_start>thunder_103a_1</next_to_start>

```

```

    <cluster_number>1</cluster_number>
    <tag>thunder</tag>
    <text_to_display>Thunder 103 A</text_to_display>
    <next>Act 02 Scene 01 Page 081_4</next>
</sequence_item>

<sequence_item>
    <name>thunder_103a_1</name>
    <type>start_sound</type>
    <sound_name>thunder_103a</sound_name>
    <text_to_display>Thunder 103 A</text_to_display>
    <importance>2</importance>
    <cluster_number>1</cluster_number>
    <next_completion>thunder_103a_2</next_completion>
    <next_termination>thunder_103a_2</next_termination>
    <tag>thunder</tag>
</sequence_item>

<sequence_item>
    <name>thunder_103a_2</name>
    <type>cease_offering_sound</type>
    <tag>thunder</tag>
    <next>thunder_103a_3</next>
</sequence_item>

<sequence_item>
    <name>thunder_103a_3</name>
    <type>offer_sound</type>
    <next_to_start>thunder_103b_1</next_to_start>
    <cluster_number>1</cluster_number>
    <tag>thunder</tag>
    <text_to_display>Thunder 103 B</text_to_display>
</sequence_item>

<sequence_item>
    <name>thunder_103b_1</name>
    <type>start_sound</type>
    <sound_name>thunder_103b</sound_name>
    <text_to_display>Thunder 103 B</text_to_display>
    <importance>2</importance>
    <cluster_number>1</cluster_number>
    <next_completion>thunder_103b_2</next_completion>
    <next_termination>thunder_103b_2</next_termination>
    <tag>thunder</tag>
</sequence_item>

```

```

<sequence_item>
  <name>thunder_103b_2</name>
  <type>cease_offering_sound</type>
  <tag>thunder</tag>
  <next>thunder_103b_3</next>
</sequence_item>

<sequence_item>
  <name>thunder_103b_3</name>
  <type>offer_sound</type>
  <next_to_start>thunder_103c_1</next_to_start>
  <cluster_number>1</cluster_number>
  <tag>thunder</tag>
  <text_to_display>Thunder 103 C</text_to_display>
</sequence_item>

<sequence_item>
  <name>thunder_103c_1</name>
  <type>start_sound</type>
  <sound_name>thunder_103c</sound_name>
  <text_to_display>Thunder 103 C</text_to_display>
  <importance>2</importance>
  <cluster_number>1</cluster_number>
  <next_completion>thunder_103c_2</next_completion>
  <next_termination>thunder_103c_2</next_termination>
  <tag>thunder</tag>
</sequence_item>

<sequence_item>
  <name>thunder_103c_2</name>
  <type>cease_offering_sound</type>
  <tag>thunder</tag>
  <next>thunder_103c_3</next>
</sequence_item>

<sequence_item>
  <name>thunder_103c_3</name>
  <type>offer_sound</type>
  <next_to_start>thunder_103d_1</next_to_start>
  <cluster_number>1</cluster_number>
  <tag>thunder</tag>
  <text_to_display>Thunder 103 D</text_to_display>
</sequence_item>

<sequence_item>
  <name>thunder_103d_1</name>

```

```

<type>start_sound</type>
<sound_name>thunder_103d</sound_name>
<text_to_display>Thunder 103 D</text_to_display>
<importance>2</importance>
<cluster_number>1</cluster_number>
<next_completion>thunder_103d_2</next_completion>
<next_termination>thunder_103d_2</next_termination>
<tag>thunder</tag>
</sequence_item>

<sequence_item>
  <name>thunder_103d_2</name>
  <type>cease_offering_sound</type>
  <tag>thunder</tag>
  <next>thunder_103d_3</next>
</sequence_item>

<sequence_item>
  <name>thunder_103d_3</name>
  <type>offer_sound</type>
  <next_to_start>thunder_107a_1</next_to_start>
  <cluster_number>1</cluster_number>
  <tag>thunder</tag>
  <text_to_display>Thunder 107 A</text_to_display>
</sequence_item>

```

4.11.4 Act 02 Scene 01 Page 107: Thunder

As Japheth and Yonah kiss, there is a close rumble of thunder. Use all four speakers, though mostly in the rear. When Japheth says “come on!” there is a louder and closer thunder clap. Use front and rear speakers equally. We can use the same cluster as the thunders on page 103.

```

<!--
  Page 107: two more thunder sounds.
-->
<sound>
  <name>thunder_107a</name>
  <wav_file_name>Weather/thunder_107a.wav</wav_file_name>
  <release_duration_time>0.5</release_duration_time>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>

```



```

        <volume_level>1.0</volume_level>
      </speaker>
      <speaker>
        <name>rear_right</name>
        <volume_level>1.0</volume_level>
      </speaker>
    </speakers>
  </channel>
</channels>
</sound>

<sequence_item>
  <name>thunder_107a_1</name>
  <type>start_sound</type>
  <sound_name>thunder_107a</sound_name>
  <text_to_display>Thunder 107 A</text_to_display>
  <importance>2</importance>
  <cluster_number>1</cluster_number>
  <next_completion>thunder_107a_2</next_completion>
  <next_termination>thunder_107a_2</next_termination>
  <tag>thunder</tag>
</sequence_item>

<sequence_item>
  <name>thunder_107a_2</name>
  <type>cease_offering_sound</type>
  <tag>thunder</tag>
  <next>thunder_107a_3</next>
</sequence_item>

<sequence_item>
  <name>thunder_107a_3</name>
  <type>offer_sound</type>
  <next_to_start>thunder_107b_1</next_to_start>
  <cluster_number>1</cluster_number>
  <tag>thunder</tag>
  <text_to_display>Thunder 107 B</text_to_display>
</sequence_item>

<sequence_item>
  <name>thunder_107b_1</name>
  <type>start_sound</type>
  <sound_name>thunder_107b</sound_name>
  <text_to_display>Thunder 107 B</text_to_display>
  <importance>2</importance>
  <cluster_number>1</cluster_number>

```

```

    <next_completion>thunder_107b_2</next_completion>
    <next_termination>thunder_107b_2</next_termination>
    <tag>thunder</tag>
</sequence_item>

<sequence_item>
  <name>thunder_107b_2</name>
  <type>cease_offering_sound</type>
  <tag>thunder</tag>
  <next>thunder_107b_3</next>
</sequence_item>

```

4.12 Act 02 Scene 02 page 108: Rain

The script suggests that the rain should start here, saying “the thunderstorm breaks on the scene in earnest”. Instead of starting a new scene here, we will just have the rain as another sound effect, since the director might want it to start in a different place.

```

<!--
  Page 108: rain.
-->
<sound>
  <name>rain_02</name>
  <wav_file_name>Weather/rain.wav</wav_file_name>
  <designer_volume_level>0.3</designer_volume_level>
  <default_volume_level>0.5</default_volume_level>
  <attack_duration_time>5</attack_duration_time>
  <release_duration_time>15</release_duration_time>
  <loop_from_time>60</loop_from_time>
  <loop_to_time>0</loop_to_time>
  <loop_limit>0</loop_limit>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
        <speaker>
          <name>rear_right</name>
          <volume_level>0.75</volume_level>
        </speaker>
      </speakers>
    </channel>
  </channels>
</sound>

```

```

    <number>1</number>
    <speakers>
      <speaker>
        <name>front_right</name>
        <volume_level>1.0</volume_level>
      </speaker>
      <speaker>
        <name>rear_left</name>
        <volume_level>0.75</volume_level>
      </speaker>
    </speakers>
  </channel>
</channels>
</sound>

<!--
  Page 108: rain.
-->
<sequence_item>
  <name>Act 02 Scene 01 Page 081_4</name>
  <type>offer_sound</type>
  <next_to_start>rain_02</next_to_start>
  <cluster_number>6</cluster_number>
  <text_to_display>Rain</text_to_display>
  <tag>weather</tag>
  <next>Act 02 Scene 01 Page 081_5</next>
</sequence_item>

<sequence_item>
  <name>rain_02</name>
  <type>start_sound</type>
  <sound_name>rain_02</sound_name>
  <text_to_display>Rain</text_to_display>
  <cluster_number>6</cluster_number>
  <importance>2</importance>
  <tag>weather</tag>
</sequence_item>

```

4.12.1 Act 02 Scene 02 Page 109: Thunder

The director might specify that the rain starts, or perhaps gets louder, on “An endless hurricane”.

After “forever will it rain” there is a flash of lightning and a big clap of thunder. Start it in the rear speakers and move it quickly to the front. After “And now I feel so old” there is another thunder. Tack these two thunders onto the ones from pages 103 and 107.

```

<!--
    Page 109: Lightning and thunder.
-->
<sound>
  <name>thunder_109b</name>
  <wav_file_name>Weather/thunder_109b.wav</wav_file_name>
  <release_duration_time>1.0</release_duration_time>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
    <channel>
      <number>1</number>
      <speakers>
        <speaker>
          <name>front_right</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
    <channel>
      <number>2</number>
      <speakers>
        <speaker>
          <name>rear_left</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
    <channel>
      <number>3</number>
      <speakers>
        <speaker>
          <name>rear_right</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
  </channels>
</sound>

```

```

<sequence_item>
  <name>thunder_107b_3</name>
  <type>offer_sound</type>
  <next_to_start>thunder_109b_1</next_to_start>
  <cluster_number>1</cluster_number>
  <tag>thunder</tag>
  <text_to_display>Thunder 109 B</text_to_display>
</sequence_item>

<sequence_item>
  <name>thunder_109b_1</name>
  <type>start_sound</type>
  <sound_name>thunder_109b</sound_name>
  <text_to_display>Thunder 109 B</text_to_display>
  <importance>2</importance>
  <cluster_number>1</cluster_number>
  <next_completion>thunder_109b_2</next_completion>
  <next_termination>thunder_109b_2</next_termination>
  <tag>thunder</tag>
</sequence_item>

<sequence_item>
  <name>thunder_109b_2</name>
  <type>cease_offering_sound</type>
  <tag>thunder</tag>
</sequence_item>

```

4.13 Act 02 Scene 03 Page 110: On the Deck of the Ark

There is rain falling onto the gopher-wood ark. The rain is mostly in the front speakers. There is also wind, using all four speakers. We can use the same sound as page 072.

```

<sequence_item>
  <name>Act 02 Scene 01 Page 081_5</name>
  <type>offer_sound</type>
  <next_to_start>wind_02</next_to_start>
  <cluster_number>5</cluster_number>
  <text_to_display>Wind</text_to_display>
  <tag>weather</tag>
  <next>Act 02 Scene 01 Page 081_6</next>
</sequence_item>

<sequence_item>
  <name>wind_02</name>
  <type>start_sound</type>
  <sound_name>wind</sound_name>

```

```

    <text_to_display>Wind</text_to_display>
    <cluster_number>5</cluster_number>
    <importance>2</importance>
    <tag>weather</tag>
  </sequence_item>

```

4.13.1 Act 02 Scene 03 Page 114: Bird Call

There is a bird sound from a birdcage. Put this in the speaker closest to the birdcage.

```

<sound>
  <name>Dove</name>
  <wav_file_name>Steve_Devino/07-Dove_cooing.wav</wav_file_name>
  <channels>
    <channel>
      <number>0</number>
      <speakers>
        <speaker>
          <name>front_right</name>
          <volume_level>1.0</volume_level>
        </speaker>
      </speakers>
    </channel>
  </channels>
</sound>

<!--
  Page 110: Dove.
-->
<sequence_item>
  <name>Act 02 Scene 01 Page 081_6</name>
  <type>offer_sound</type>
  <next_to_start>Dove</next_to_start>
  <cluster_number>3</cluster_number>
  <text_to_display>Dove</text_to_display>
  <tag>animals</tag>
  <next>Act 02 Scene 01 Page 081_7</next>
</sequence_item>

<sequence_item>
  <name>Dove</name>
  <type>start_sound</type>
  <sound_name>Dove</sound_name>
  <text_to_display>Dove cooing</text_to_display>
  <cluster_number>3</cluster_number>
  <importance>2</importance>

```

```

    <tag>animals</tag>
  </sequence_item>

```

4.13.2 Act 02 Scene 03 Page 116: Commotion of People and Animals

We can re-use a sound from act 1.

```

<sequence_item>
  <name>Act 02 Scene 01 Page 081_7</name>
  <type>offer_sound</type>
  <next_to_start>Animal Medley_02</next_to_start>
  <cluster_number>4</cluster_number>
  <tag>animals</tag>
  <text_to_display>Commotion</text_to_display>
  <next>Act 02 Scene 01 Page 081_8</next>
</sequence_item>

<sequence_item>
  <name>Animal Medley_02</name>
  <type>start_sound</type>
  <sound_name>Animal Medley</sound_name>
  <cluster_number>4</cluster_number>
  <text_to_display>Commotion</text_to_display>
  <tag>animals</tag>
</sequence_item>

```

4.13.3 Act 02 Scene 03 Page 118: Noah Strikes Japheth

Use the same slap as in act 1 when Adam struck Cain.

```

<sequence_item>
  <name>Act 02 Scene 01 Page 081_8</name>
  <type>offer_sound</type>
  <next_to_start>slap_Japheth</next_to_start>
  <cluster_number>2</cluster_number>
  <text_to_display>Noah slaps Japheth</text_to_display>
  <tag>slap</tag>
  <next>Act 02 Scene 01 Page 081_9</next>
</sequence_item>

<sequence_item>
  <name>slap_Japheth</name>
  <type>start_sound</type>
  <sound_name>slap</sound_name>
  <text_to_display>Noah slaps Japheth</text_to_display>
  <cluster_number>2</cluster_number>
  <importance>2</importance>

```

```

</sequence_item>

<sequence_item>
  <name>Act 02 Scene 01 Page 081_9</name>
  <type>operator_wait</type>
  <text_to_display>Press Play when the scene shifts</text_to_display>
  <text_to_display> to Mount Ararat.</text_to_display>
  <next_play>Act 02 Scene 01 done_01</next_play>
</sequence_item>

<sequence_item>
  <name>Act 02 Scene 01 done_01</name>
  <type>cease_offering_sound</type>
  <tag>animals</tag>
  <next>Act 02 Scene 01 done_02</next>
</sequence_item>

<sequence_item>
  <name>Act 02 Scene 01 done_02</name>
  <type>cease_offering_sound</type>
  <tag>thunder</tag>
  <next>Act 02 Scene 01 done_03</next>
</sequence_item>

<sequence_item>
  <name>Act 02 Scene 01 done_03</name>
  <type>cease_offering_sound</type>
  <tag>weather</tag>
  <next>Act 02 Scene 01 done_04</next>
</sequence_item>

<sequence_item>
  <name>Act 02 Scene 01 done_04</name>
  <type>stop_sound</type>
  <tag>weather</tag>
  <next>Act 02 Scene 01 done_05</next>
</sequence_item>

<sequence_item>
  <name>Act 02 Scene 01 done_05</name>
  <type>stop_sound</type>
  <tag>animals</tag>
  <next>Act 02 Scene 01 done_06</next>
</sequence_item>

<sequence_item>

```

```

<name>Act 02 Scene 01 done_06</name>
<type>cease_offering_sound</type>
<tag>slap</tag>
<next>Act 02 Scene 04 Page 130_01</next>
</sequence_item>

```

4.13.4 Act 02 Scene 03 Page 119a: Noah Strikes Japheth Again

The same sound again.

4.13.5 Act 02 Scene 03 Page 119b: Wind stops

When Yonah says “No!” stop the wind. This is not called for in the script, but it is a good time for the wind to stop.

4.13.6 Act 02 Scene 03 Page 126: Rain Fades

When Japheth says “Look!”, start to fade the rain. The release time should be 15 seconds, so the rain is gone by the time Mama says “An olive tree” on page 127. To facilitate this, the release time on the rain is 15 seconds, so the sound effects operator just pushes Stop at the right time.

4.14 Act 02 Scene 04 Page 130: Back on Land

This scene is “early one morning a few weeks later”. We can re-use a sound from act 1.

```

<sequence_item>
  <name>Act 02 Scene 04 Page 130_01</name>
  <type>start_sound</type>
  <sound_name>Garden ambience</sound_name>
  <text_to_display>ambience</text_to_display>
  <cluster_number>15</cluster_number>
  <tag>ambience</tag>
  <next_starts>Act 02 Scene 04 Page 130_02</next_starts>
</sequence_item>

<sequence_item>
  <name>Act 02 Scene 04 Page 130_02</name>
  <type>operator_wait</type>
  <text_to_display>Press Play when the curtain falls.</text_to_display>
  <next_play>Act 02 Scene 04 Page 130 done_01</next_play>
</sequence_item>

```

4.15 After the Show

When the last curtain has fallen, play some nice music as the audience is leaving.

```

<sequence_item>
  <name>Act 02 Scene 04 Page 130 done_01</name>
  <type>stop_sound</type>
  <tag>ambience</tag>
  <next>Act 02 Scene 04 Page 130 done_02</next>
</sequence_item>

<sequence_item>
  <name>Act 02 Scene 04 Page 130 done_02</name>
  <type>start_sound</type>
  <sound_name>pre-show music</sound_name>
  <cluster_number>15</cluster_number>
  <text_to_display>post-show music</text_to_display>
  <tag>post-show music</tag>
  <next_starts>Act 02 Scene 04 Page 130 done_03</next_starts>
</sequence_item>

<sequence_item>
  <name>Act 02 Scene 04 Page 130 done_03</name>
  <type>operator_wait</type>
  <text_to_display>Press Play when the audience</text_to_display>
  <text_to_display> has left the theater.</text_to_display>
  <next_play>Act 02 Scene 04 Page 130 done_04</next_play>
</sequence_item>

<sequence_item>
  <name>Act 02 Scene 04 Page 130 done_04</name>
  <type>stop_sound</type>
  <tag>post-show music</tag>
  <next>Act 02 Scene 04 Page 130 done_05</next>
</sequence_item>

<sequence_item>
  <name>Act 02 Scene 04 Page 130 done_05</name>
  <type>wait</type>
  <time_to_wait>5.0</time_to_wait>
  <text_to_display>show is complete</text_to_display>
</sequence_item>

```

5 Try it

You can experience the show from the point of view of the sound effects operator by running example 4 from `sound_effects_player` while reading the script.

6 Acknowledgments

In preparing this example I downloaded the following sound files from freesound. In each case I modified the sound, sometimes heavily, and in must cases combined it with other sounds.

27510 DrNI: “old radio noise defective medium wave” Siemens Kleinsuper A8 Tube Radio Noise. Creative Commons Attribution Noncommercial license.

29675 artifact: “lightning strike” Creative Commons Attribution license.

72932 nlm: “garden-evening” Atmospheres. Creative Commons Attribution Noncommercial license.

88568 FatLane: “100121” Creative Commons Attribution license.

109115 inchadney: “wind” Creative Commons Attribution license.

148449 snowcrane: “ambient-garden-sheffield” Creative Commons 0 license.

165526 felix-blume: “wind singing in the mountain some night cricket in background” Mexico Desert. Creative Commons 0 license.

238302 noisenoir: “lightningcrash” Creative Commons attribution license.

264900 speedenza: “desolate wasteland background” Creative Commons Attribution Noncommercial license.

275015 wadaltmon: “bite apple” Creative Commons 0 license.

339324 inspectorj: “stream-water-c” URL: <https://www.jshaw.co.uk/>. Creative Commons Attribution license.

341606 mike stranks: “trickling stream” Water. Creative Commons Attribution Noncommercial license.

349076 yoyodaman234: “trickling water 5” Water. Creative Commons 0 license.

382322 sterferny: “stream” Various field recordings. Creative Commons 0 license.

385280 bajko: sfx amb forest spring afternoon 01” forest. Creative Commons 0 license.

393899 rodzuz: “slaps” Creative Commons 0 license.

427401 imjeax: “desert ambient loop” This file uses these sounds from Freesounds:

23143 martypinso: “DMP-009007-SILENCE DESERT” Creative Commons 0 license.

182868 FableVision_Studios: “Sandy Breeze (foley)” Creative Commons 0 license.

361053 jorge000: “wind-noise” Creative Commons 0 license.

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430765 joedeshon: “long easy rain 08” Rain. Creative Commons 0 license.

431644 blukotek: “newborn baby crying” Creative Commons 0 license.

446753 bluedelta: “heavy thunder strike no rain quadro” Four-channel recording.
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489767 nickronk123: “metaldrop” Creative Commons 0 license.

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