

# *Luminescence*

For choir and computer disc  
divisi into SSAATTB

### Program note

When I was living in Bali and studying the famous gamelan music of that culture, one of my most memorable musical experiences was not of that genre at all. It happened at an *oton*, a ritual that is performed 210 days after the birth of a child when the baby's feet touch the earth for the first time. Before that time she is considered still too close to the realm of the gods to be allowed to touch the ground. The only music at this ceremony came from the chanting of the officiating priest and the small bell whose sounds he wafted to the fascinated baby's ears.

Those chants, or *mantra*, are essential in Hindu worship not just as carriers of ritual text, but as a way of tuning oneself to the vibrations of the universe. These are in a very real sense the sounds of the transition from the celestial to the terrestrial world, a transition also symbolized by the screen of the Balinese shadow puppet play, the *wayang kulit*. In this revered form of drama, puppets, whose shadows flicker evanescently on the screen, act out mytho-religious epics accompanied by the bell-like tones of the gamelan, but through the screen we can only glimpse these ghostly echos of the world of gods and demons.

In some Hindu traditions, the sounds of mantra represent "music of the spheres" (to use the term from the ancient West) made audible, and as with ancient Greeks such as Pythagoras, there is a fascination with the literal connection of sacred number and sound, as represented in vibration ratios and the tones of the syllables (such as the trinity represented in the three sounds of the sacred syllable "aum," sometimes transliterated as "om"). In these traditions, the music of this transition from the celestial to the world of heard vibrations is known as "luminescent sound."

Witnessing the entry of my own children into this uncertain and violent world of today, I decided to set a Sanskrit text that expresses the Hindu ideal of *ahimsa*, or non-violence. I have set it in pitches derived entirely by ratios of 3 and 7, pitches which therefore depart considerably from the twelve-tone equal temperament standard of modern Western music. The choir sings together with these tones played by the computer-generated accompaniment on CD, recapitulating the transitions of luminescence, of children still too close to the divine to set their feet on earth.

### Text

Aum. Shânte prashânte sarva-krodha-upashamani svâhâ. Aum.

Translation:

Aum. Peace – pacifying – may all anger be subdued – hail. Aum.

### Computer accompaniment and tuning

This piece is sung with computer-generated tape or disc. This accompaniment begins alone, and the first voice enters after the gong cue shown (after about 32 seconds). Every effort should be made to blend seamlessly with the accompaniment.

The pitches the voices sing are in just intonation, which is to say, "in tune." In many cases they do not correspond to the tempered pitches found on a piano keyboard. The singers find their pitches from the accompaniment, which prominently contains drones of all pitches in the score. Some special accidentals, shown below, are used to give the singers a rough idea of where their pitches lie in relation to conventional equally tempered pitches:

↑ somewhat sharp (~ 33 cents)

↓ somewhat flat (~ 33 cents)

♯ somewhat sharp of a semitone (~ 133 cents)

The tuning system with the exact pitches used is explained in an appendix, but it is not necessary to understand the tuning system in order to be in tune with the accompaniment and with each other. As always, good intonation means good listening and being in tune with the accompaniment. Just intonation means that, despite the unusual intervals, they should mostly seem to "lock in" and be in tune with each other.

Accidentals remain in force on repeated pitches.

### Other Performance Notes

The sections of this piece, shown by the rehearsal letters, are clearly articulated by low gong sounds in the computer accompaniment. These gong tones serve as cues for the singers to begin the next section. Other tones in the accompaniment are shown in the bottom staves with timings, but the sung parts do not have to correspond exactly with those tones. In fact, in most cases the singers will have to wait to hear the tone in order to tune to it.

For the most part, the singers are not synchronized with each other, even those singers on the same part. In fact, singers should avoid synchronizing with each other and may want to adjust their speeds so that they do not. The rhythms should be free and the notated rhythms are shown as general guides only. Entries after taking a breath should be imperceptible.

After the first gong sounds at letter A, the members of the soprano 2 section enter one at a time, as in a canon, each singer taking over before the previous one runs out of breath. After having entered, each singer continues to take breaths and repeat the tone until the next change. When the first singer in the alto 2 section hears the next pitch in the accompaniment (sometime after 53 seconds, as shown), she enters and the rest of the section follows one at a time as well. Other sections follow in the same manner. At letters E and F the reverse process takes place; that is, the singers drop out one by one (though still taking staggered breaths). The vowel sound should change gradually over the time shown from "ah" to "oo" and finally "mm" at letters A, E and F, and these vowel changes should correspond across the parts.

Singing should be with little vibrato, with the detached spirituality and timeless patience of ritual chant.

# Luminescence

**A**

Soprano 1

Soprano 2

Alto 1

Alto 2

Tenor 1

Tenor 2

Bass

Computer

Gong

Enter one at a time, take staggered breaths

(Each breath)

*n* *pp* *n*

Ah [Gradually change vowel]

0:32

0:53

Enter one at a time,  
take staggered breaths *n* *pp* *n* (Each breath)

S 1  
oo - [Gradually change vowel] - mm

S 2  
oo - [Gradually change vowel] - mm

A 1  
mm

A 2  
oo - [Gradually change vowel] - mm

T 1  
oo - [Gradually change vowel] - mm

T 2

B

1:14

1:35

1:56

**B**

Staggered breaths\*  
p One full breath One full breath

fade out

S 1  
shan - te

Staggered breaths\*  
p One full breath One full breath

S 2  
shan - te

fade out

Staggered breaths\*  
p One full breath One full breath

A 1  
mm shan - te

Staggered breaths\*  
p One full breath One full breath

A 2  
shan - te

Staggered breaths\*  
p One full breath One full breath

T 1  
shan - te

Staggered breaths\*  
p One full breath One full breath

T 2  
shan - te

B

2:10 2:31 2:52

Gong

\* Breaths should be at different times, and the text from one singer to the next should not line up.

**C** *mp* Staggered breaths\*  
One full breath

S 1  
pra - shan - te

S 2  
*mp* Staggered breaths\*  
One full breath  
pra - shan - te

A 1  
*mp* Staggered breaths\*  
One full breath  
pra - shan - te

A 2

T 1  
*mp* shan - te  
*mp* Staggered breaths\*  
One full breath  
pra - shan - te

T 2

B

3:13      3:34      3:48

Gong

\* Breaths should be at different times, and the text from one singer to the next should not line up.

fade out

**D** *mf* Free rhythm\*  $\overset{3}{\curvearrowright}$

S 1 sar - va krodho pashamani sa - va-ha

S 2 sar - va krodho pashamani sa - va-ha

A 1 sar - va krodho pashamani sa - va-ha

A 2 One full breath pra - shan - te sar - va krodho pashamani sa - va-ha

T 1

T 2 One full breath pra - shan - te

B

4:16 4:37 5:26

Gong

\*Rhythmic notation is given only as a general guide. Rhythms should be free and should not line up from one singer to the next.



(Continue repeating pattern) *Gradual crescendo...*

S 1

(Continue repeating pattern) *Gradual crescendo...*

S 2

(Continue repeating pattern) *mf* 3 *Gradual crescendo...*

A 1

sar - va krodhopashamani sa - va-ha

(Continue repeating pattern) *Gradual crescendo...* *mf*

A 2

sar-va krodho pashamani sa-va-ha

T 1

T 2

B

5:40 5:54 6:08

*Gradual crescendo...*

**S 1**  
*f* sar - va krodho pashamani sa - va - ha  
*Gradual crescendo...* *ff*

**S 2**  
*f* sar - va krodho pashamani sa - va - ha  
*Gradual crescendo...* *ff*

**A 1**  
*f* *Gradual crescendo...* *ff*

**A 2**  
*f* sar - va krodho pashamani sa - va - ha  
*Gradual crescendo...* *ff*

**T 1**

**T 2**

**B**

**6:22** **6:36** **6:50**

*f* *Gradual crescendo...* *ff*

Detailed description: This is a musical score for a vocal ensemble and piano. The score is written in G major (one sharp) and 4/4 time. It features six vocal parts: Soprano 1 (S 1), Soprano 2 (S 2), Alto 1 (A 1), Alto 2 (A 2), Tenor 1 (T 1), and Tenor 2 (T 2), and a Bass (B) part. The lyrics are 'sar - va krodho pashamani sa - va - ha'. The vocal parts have dynamic markings of *f* (forte) and *ff* (fortissimo). The piano part includes a 'Gradual crescendo...' section. Time stamps 6:22, 6:36, and 6:50 are marked above the piano staff. The score includes various musical notations such as triplets, slurs, and dynamic markings.

**E**

Staggered breaths\*

*ff* *pp*

S 1  
Ah - - - -

*ff dim.* Staggered breaths\* *mf* [Gradually change vowel] *dim.* *mp* [Gradually change vowel]

S 2  
Ah - - - - - - - - - - oo - - - - -

*ff dim.* Staggered breaths\* *mf* [Gradually change vowel] *pp*

A 1  
Ah - - - - - - - - - - oo

*ff dim.* Staggered breaths\* *mf* [Gradually change vowel] *dim.* *pp*

A 2  
Ah - - - - - - - - - - oo - - - - -

*ff dim.* Staggered breaths\* *mf* [Gradually change vowel] *dim.* *mp* [Gradually change vowel]

T 1  
Ah - - - - - - - - - - oo - - - - -

*mf* [Gradually change vowel] *dim.* *mp* [Gradually change vowel]

T 2  
Ah - - - - - oo - - - - -

*ff dim.* Staggered breaths\* *mf* [Gradually change vowel] *dim.* *mp* [Gradually change vowel]

B  
Ah - - - - - - - - - - oo - - - - -

7:04 7:31 7:58 8:20

*mf* *dim.* *mp*

Gong

\*As at letter A, breaths should be staggered and entries as imperceptible as possible. To help effect the overall diminuendo, singers should drop out one at a time.

F

S 1

S 2 *p* *n*  
mm

A 1

A 2

T 1 *p* *n*  
mm

T 2 *p* *pp* *n*  
mm

B *p* *n*  
mm

8:28

8:42

8:56

9:13

9:26

Gong *p* *n*

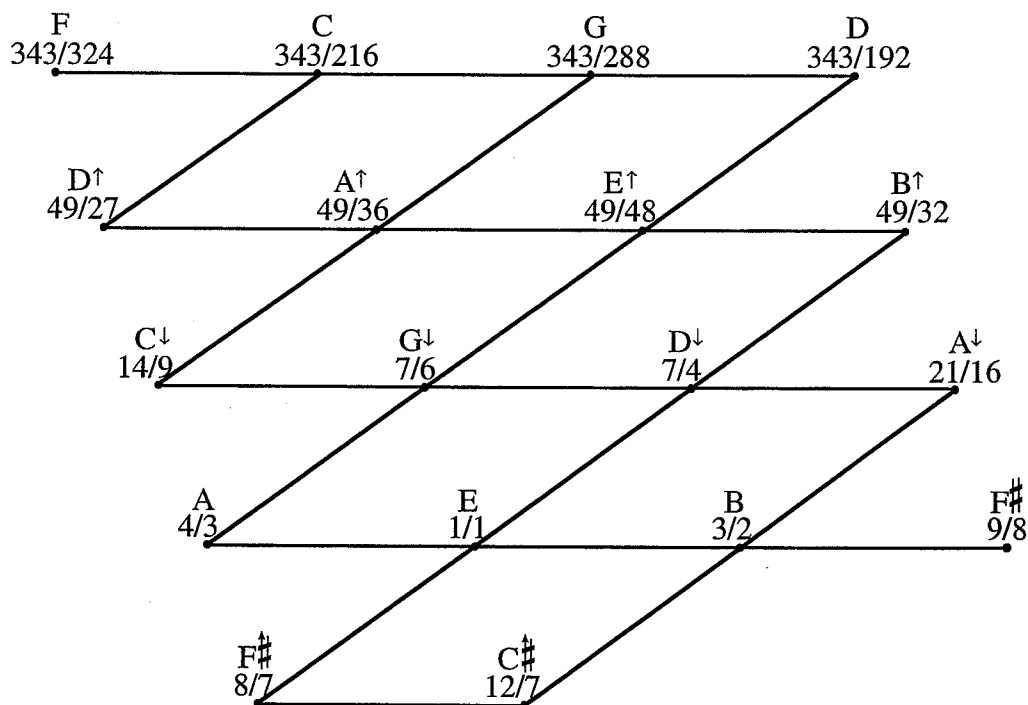
### Appendix: Technical Notes on the Tuning

The following information is for those with a special interest in the details of the tuning for this piece and need not appear with the program notes for performance. While some may find it helpful, is not at all necessary to fully understand the following in order to effectively perform the piece.

*Luminescence* is in extended just intonation, that is, the pitches are related to one another by relatively simple numerical ratios. The singers tune to the computer accompaniment, which, unlike many acoustic instruments, is not constrained to fixed set of twelve pitches. The relationships between notes are conventionally shown graphically in a "lattice diagram."

In the tuning used in *Luminescence*, the pitches may be expressed in terms of ratios only having prime factors 2 (the octave), 3, and 7. In a lattice diagram, relations of 3 are shown by two pitches (represented by dots) being connected by a horizontal line — the pitch to the right is a  $3/2$  (a pure perfect fifth) higher than the pitch to the left. Relationships of 7 are shown by diagonal lines. The upper pitch is a  $7/4$  (a somewhat flat minor seventh) higher than the lower.

With that in mind, here is the lattice diagram for *Luminescence*. Next to each dot is the ratio of that pitch relative to the original tonic ( $1/1$ , in this case E) as well as the letter name and accidental used in the notation.



Here are the same pitches arranged in ascending order, with ratios and cents relative to 1/1.  
(Cents are 100ths of semitones.)

<u>Pitch</u>	<u>Ratio</u>	<u>Cents</u>
E	1/1	0
E↑	49/48	36
F	343/324	99
F#	9/8	204
F#	8/7	232
G↓	7/6	267
G	343/324	303
A↓	21/16	471
A	4/3	498
A↑	49/36	534
B	3/2	702
B↑	49/32	738
C↓	14/9	765
C	343/216	801
C↑	12/7	834
D↓	7/4	969
D	343/192	1005
D↑	49/27	1037
E	2/1	1200