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Robert Casteels



*Bird Songs*



Full Score

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Robert Casteels

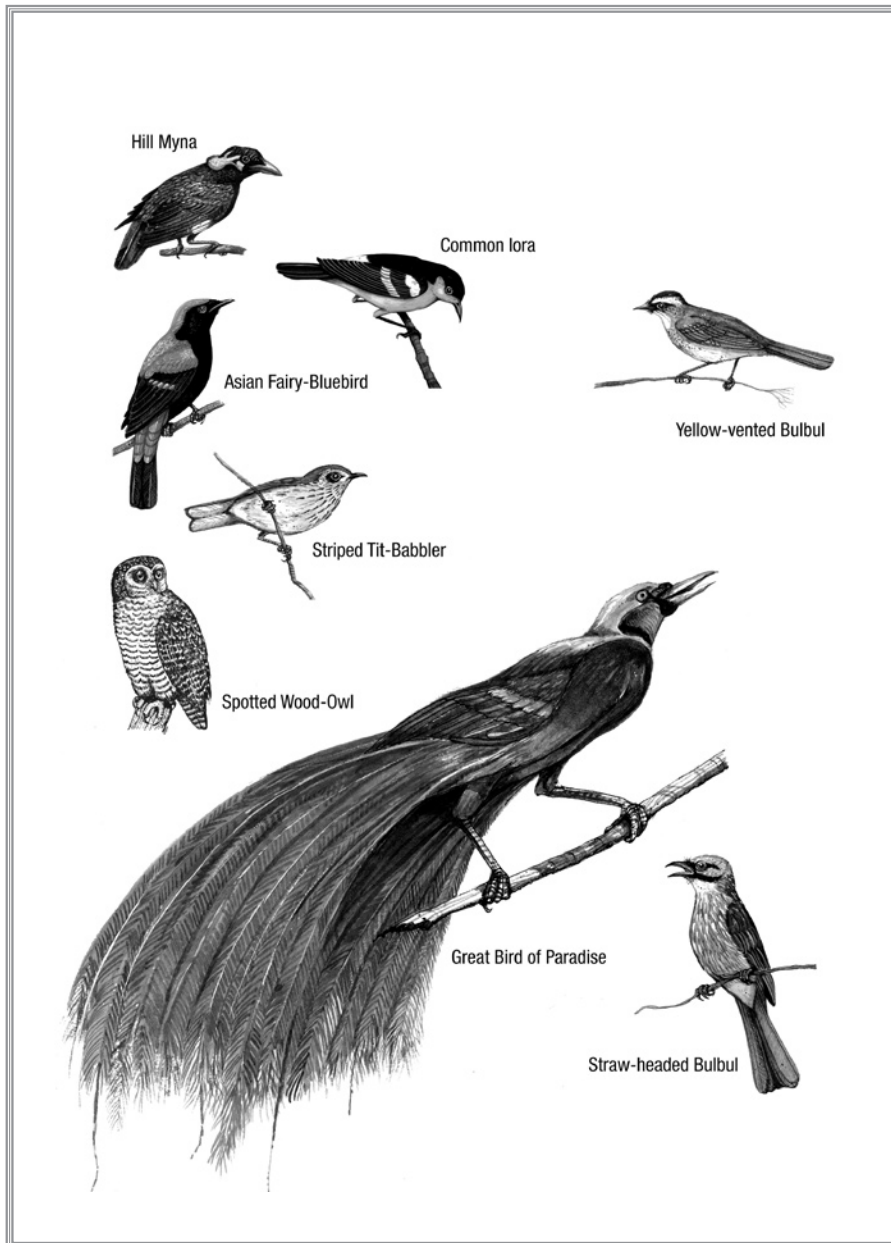
*Bird Songs*

Dedicated to Birds, the True Masters

Commissioned by the Garden City Fund  
in celebration of the 150th Anniversary of  
Singapore Botanic Gardens

With gratitude to Sutari Supari and  
the Nature Society (Singapore) for the avian recordings

First performance on 5-XII-2009  
on the Shaw Foundation Symphony Stage,  
Palm Valley Singapore Botanic Gardens



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## Programmes notes

On the 5th of December 2009, Singapore's Minister for National Development, Mr Mah Bow Tan, graced as Guest-of-Honour a concert for the grand finale of Singapore Botanic Gardens' 150th Anniversary, which included the premiere of *Bird Songs* by Robert Casteels. In 2003 for the official launch of the Garden City Fund at the Istana, Casteels had recorded nature sounds from Singapore parks and woven them into a composition for percussion and piano. For his *Birds Songs*, he opted for 4 wind instruments, 4 electric string instruments, 4 voices, keyboard and vibraphone. Overwhelmed by the beauty of the bird calls, Casteels decided against transcribing them for instruments or transforming them through audio manipulation. He also abandoned the idea of bringing caged birds on stage and using the recordings he made in the mountains of Northern Thailand and Laos. With the gracious permission of Nature Society (Singapore) and Mr Sutari Supari, Casteels selected ten bird calls on the basis of their esthetic beauty and contrasting variety. He then had the chosen tracks filtered from background noises and wind, and submitted them for sonogram analyses. A sonograph plots the sound frequency in kilohertz against time in seconds. This scientific information helped him in the composition of the interaction between the instrumental sounds and bird sounds. Casteels' *Bird Songs* is a dense composition, a journey from artificial imitation to forceful imprisonment to endangered freedom. The first three minutes of the composition may sound like a senseless chaos, as all instruments are competing whilst singers sing the binomial names and improvise in the manner of jazz scat on avian onomatopoeic syllables. The pre-recorded tape plays in succession, mechanical bird sounds that are MIDI cloned sounds, an ear shattering crowd of *mata puteh* recorded in the void deck of Block 440 Ang Mo Kio Avenue 10, where aviculturalists and bird-fanciers show off their countersinging birds and

elaborate cages every Sunday morning, and a dawn choruses recorded in HDB estates. In reality, this first part of the composition is far from chaotic. Just as in a crowded bird colony, parents are able to locate each other, recognize a neighbor from a complete stranger and identify their own young among thousands of others all packed together, every single pitch and rhythm in the beginning of this composition is explainable. After these initial three minutes, all instruments converge towards a single note that signals the beginning of the second part of the piece. From this point, instrumentalists will dialogue with the following ten birds which are resident in the Republic of Singapore: the Yellow-vented Bulbul, the Spotted Wood-owl, the Common Iora, the Rufus-tailed Tailorbird, the Hill Myna, the Drongo Cuckoo, the Asian Fairy Bluebird, the Straw-headed Bulbul, the Striped Tit-babbler and the Malaysian-eared Nightjar. Finally, the sound of the human instruments gently wafts away in a gracious bow to a chorus of the *Paradisaea apoda*, also known as the Greater Bird of Paradise. This species was named by 18th c. Swedish botanist, Carl Linnaeus. Paradise referred then to New Guinea. Paradisea refers to the belief that this bird never alighted. *Apoda* was a neologism from Ancient Greek that means without legs, because Europeans only ever saw the magnificent long tail feathers. Thousands of massacred birds had their feet chopped off before being shipped to satisfy a high demand in European millinery. Like any other citizen, contemporary artists also inherited the magnificent environment that is our planet earth. Progress has enabled many of us to appreciate the beauty of nature, yet the same progress is destroying much of that beauty. In composing *Bird Songs*, Casteels humbly endeavoured to share his wonder for nature's magnificence and his sense of responsibility on how to pass the legacy to future generations.

## *Duration, 9'30"*

### *Instrumentation*

- 1 piccolo flute
- 1 clarinet
- 1 sax doubling on soprano and tenor
- 1 trombone doubling on euphonium
- 1 88-keys keyboard
- 2 percussionists (vibraphone with pedal and motor, flexatone, suspended cymbal, whip, high wood block, pre-recorded avian sounds and bird calls)
- 4 voices (2 soprano and 2 mezzo soprano)  
(alternatively 2 countertenors, 2 tenors)
- 1 electric or acoustic violin
- 1 electric guitar
- 1 electric or acoustic cello
- 1 electric or acoustic double bass



## Performance notes

- **for the conductor:**

The pre-recorded avian sounds and the instrumental parts containing cues in small notes can be rented from the publisher for performances. All percussion parts and the time-line to handle the pre-recorded sounds are combined into one part. The four singing parts are combined into one part. Track 2 comprises 26" of captive singing birds with comments by aviculturalists, followed by a reiteration of mechanical birds which should ideally start at the same time as rehearsal letter D and the flexatone. Track 3 is actually a concatenation of tracks 5 to 14. Track 5 can overlap with rehearsal letter K. However, all subsequent tracks should ideally be completed just before the beginning of the next section. There are no particular requirements regarding the seating positions. All instruments must be balanced whether amplified or not, particularly the electric guitar versus the other strings whether electric or not, and the saxophone versus the other wind instruments. For reference purposes, annex 1 contains the score of the mechanical birds and the full score contains the sonograms that plot the sound frequency in kilohertz against time in seconds, the general tempo being 60 for a crotchet. When performed outdoors, it is recommended to use electric string instruments. Inside a concert hall, conductors and performers may opt for acoustic string instruments. Annex 2 contains alternative instrumental parts for rehearsal letters B and F to J, in case *Bird Songs* is performed by jazz musicians.







- **for the percussionists:**

Percussion instruments can be shared between the two players. The choice of vibraphone mallets is left to the discretion of the performer.

- **for the keyboardist:**

K followed by a number and a name refers to sound effects produced by the keyboard of the brand Kurzweil. The player is at liberty to find similar sound effects on other types of keyboards. The marimba sounds could be played by a real marimba, except that the notes written for the keyboard exceed the compass of a marimba.

- **for the string players:**

When performed outdoors, it is recommended to use electric string instruments. Inside a concert hall, conductors and performers may opt for acoustic string instruments. Players are at liberty to find similar sounds for the effects, based on the particular sound effect the score numbering referred to at the time of creation of *Bird Songs*.

- **for the singers:**

Singers should be amplified. Singers are recommended to use the ancient classical Roman pronunciation for the binomial names. Avian scat singing refers to the use of syllabic onomatopoeia. If *Bird Songs* is performed in a non-English speaking context, performers are at liberty to adapt the onomatopoeia. The following list gives examples used by English speaking ornithologists: Ah-di-dee/ (nasal) ank/ caw/ chaa/ chee chee chee/ cheep/ chek/ cherry-erry-erry-erry/ chich ich ich/ chick-a-dee/ chinchirigui/ / chink/ chip-chip-chip-chip/ chirrup/ chonk/ chook / chu/ chueet chup-chup-chup/ churr/ coo/ corcorovado/ cut cut cut/ dray-zee-zee/ duck/ fee-bee fee-bay/ fee-bee-o/ fee-bee-yee/ fitz-bew/ gro-a gro-a/ ha-ha-ha/ hee-yuu/ huit/ hweet/ kee/ kek-kek-kek/ kreeee/ mee/ pee-ah-wee/ pee-oh/ peeee-poooo/ pee-o-wit/ pip pip/ pi-yoo/ / pop-pop/ puee-puee/ puh-puh-puh/ reereeree/ see/ seeoo/ seep/ seet/ shree/ srih/tch-tch-tch/ tchiirp/ tchip/ tchunk/ teet/ te-he/ tell-tell-tell-tell / tissy-che-wee-ooo/ tititititi -tt-eeee/tit/ tix / tll-ew, tll-ui/ toq toq/ tow-hee/ tsea tsea/ tsee / tseet/ tschid/tuck-tuck-tuck/ tupe/ tüt/ /twink/ twip twipyo ta/ twit/ wah/ weee-ooo/ weihp/ whee-u/ who/ wit/ witchety- witchety- witchety/ wok/ yoik/ zeer/ zeert/ zzzzz/ zhzhzh/ zhee.



# Bird Songs

Avian metamorphoses

Robert Casteels

Cadenza of 20"

to Birds, the True Masters

The piccolo starts on the downbeat. All other instruments start ad libitum after the piccolo and repeat the pitches in any order, rather fast, from *p* to *f*

The musical score is for a 20-second cadenza in 4/4 time. It features the following parts:

- Piccolo flute:** Starts on the downbeat with a whole note chord (C4, E4, G4, Bb4).
- Clarinet in Bb:** Starts ad libitum with a whole note chord (Bb3, D4, F4, Ab4).
- Soprano and tenor saxophones:** Start ad libitum with a whole note chord (Bb3, D4, F4, Ab4).
- Euphonium and tenor trombone:** Start ad libitum with a whole note chord (Bb3, D4, F4, Ab4).
- Keyboard:** Starts ad libitum with a whole note chord (Bb3, D4, F4, Ab4). Includes markings for *8va* and *15ma*.
- Vibes:** Starts ad libitum with a whole note chord (Bb3, D4, F4, Ab4). Includes a marking for *8vb*.
- Percussion + pre-recorded avian sounds:** Indicated by a vertical bar line.
- Vocalists (Soprano 1, Soprano 2, Mezzo-soprano 1, Mezzo-soprano 2):** Start once all instruments have started playing. They sing fairly quickly from *p* to *f* using the eleven binomial names present in the score and the following pitches in any order.
- Electric violin:** Starts ad libitum with a whole note chord (Bb3, D4, F4, Ab4). Includes markings for *delay* and *pizz.*
- Electric guitar:** Starts ad libitum with a whole note chord (Bb3, D4, F4, Ab4). Includes a marking for *delay*.
- Electric cello:** Starts ad libitum with a whole note chord (Bb3, D4, F4, Ab4). Includes markings for *delay* and *pizz.*
- Electric double bass:** Starts ad libitum with a whole note chord (Bb3, D4, F4, Ab4). Includes markings for *delay* and *pizz.*

**A** Tutti: single *f* only

Exactly @  $\text{♩} = 120$

2

Picc

Cl

Sax

Eph/  
tbn

Kybrd  
Kurzweil69 marimba

Vbrphn

Tape  
flexatone  
track 1 (43" = actual length of track / 28" = actual length of sound) mechanical birds

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln  
arco  
delay + reverb

Gtr  
delay + reverb

Vlc  
arco  
*f*  
delay + reverb

Db  
arco  
delay + reverb

octave divider + delay + bass enhancer

9

Score for measures 9-13, 3/4 time signature.

- Picc: Treble clef, mostly silent.
- Cl: Treble clef, mostly silent.
- Sax: Treble clef, mostly silent.
- Eph/tnb: Bass clef, mostly silent.
- Kybrd: Grand staff (treble and bass clefs), mostly silent.
- Vbrphn: Treble clef, mostly silent. A box labeled "motor off, no pedal" is present above the staff in measures 10-13.
- Tape: Percussion part with rhythmic markings.
- Sop 1: Treble clef, mostly silent.
- Sop 2: Treble clef, mostly silent.
- Mezz 1: Treble clef, mostly silent.
- Mezz 2: Treble clef, mostly silent.
- Vln: Treble clef, mostly silent.
- Gtr: Treble clef, mostly silent.
- Vlc: Bass clef, mostly silent.
- Db: Bass clef, mostly silent.

**B** Tutti: single *f* only, very short with accent on concert pitch a 4

16

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

no sustained pedal

4 singers: avian scat and balanced with the instruments

(balanced with strings)

The score is for a tutti section in 3/4 time, marked *f*. It features a variety of instruments and vocalists. The Piccolo part starts at measure 16 and includes sixteenth-note runs with sixteenth rests. The Clarinet part features quintuplets. The Saxophone part has triplet eighth notes. The Euphonium/Tuba part has triplet eighth notes. The Keyboard part has sixteenth-note runs with sixteenth rests and includes the instruction "no sustained pedal". The Vibraphone part has quintuplets. The Tape part is silent. The Singers (Soprano 1, Soprano 2, Mezzo 1, Mezzo 2) perform avian scat. The Violin part has sixteenth-note runs with sixteenth rests. The Guitar part has triplet eighth notes and includes the instruction "(balanced with strings)". The Viola part has quintuplets. The Double Bass part has triplet eighth notes.

18

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

20

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

K193 environments

Musical score for page 22, featuring the following instruments and parts:

- Picc**: Piccolo flute, mostly silent.
- Cl**: Clarinet, playing a melodic line with a quintuplet in the first measure.
- Sax**: Saxophone, playing a melodic line with triplets.
- Eph/tbn**: Euphonium/Trombone, playing a rhythmic accompaniment.
- Kybrd**: Keyboard, mostly silent.
- Vbrphn**: Vibraphone, playing a melodic line with a quintuplet in the first measure.
- Tape**: Tape, mostly silent.
- Sop 1**: Soprano 1, playing a melodic line.
- Sop 2**: Soprano 2, playing a melodic line.
- Mezz 1**: Mezzo-soprano 1, playing a melodic line.
- Mezz 2**: Mezzo-soprano 2, playing a melodic line.
- Vln**: Violin, mostly silent.
- Gtr**: Guitar, playing a melodic line with triplets.
- Vlc**: Violoncello, playing a rhythmic accompaniment.
- Db**: Double Bass, playing a rhythmic accompaniment with triplets.



C

25

Sax

Tape

Gtr

Db

track 2 (67"/ 52"): captive birds with talking aviculturists

whip

D

35 (sounding like mechanical bird calls)

Kybrd

Tape

mp

mf

(track 2 + mechanical birds)

flexatone

38

Kybrd

Tape

f

ff

f

41

Kybrd

Tape

mf

E

44

Kybrd

Tape

p

47

Tape

(end of track)

**F** Tutti: *ff*, very short with accent on concert pitch a ♯

53

Picc

Cl

Sax

Eph/  
tbn

Kybrd  
K69 marimba

Vbrphn

Tape  
(end of track)

4 singers: avian scat, *ff* and balanced with the instruments

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln  
arco  
flanger

Gtr  
normal 3

Vlc  
arco 5

Db  
arco 5

Detailed description: This page of a musical score, numbered 53, features a variety of instruments and vocalists. The woodwind section includes Piccolo (Picc), Clarinet (Cl), Saxophone (Sax), and Euphonium/Tuba (Eph/tbn). The keyboard section consists of a K69 marimba. The percussion section includes Vibraphone (Vbrphn) and Tape. The vocal section has four parts: Soprano 1 (Sop 1), Soprano 2 (Sop 2), Mezzo-soprano 1 (Mezz 1), and Mezzo-soprano 2 (Mezz 2). The string section includes Violin (Vln), Guitar (Gtr), Viola (Vlc), and Double Bass (Db). The score is in 3/4 time and contains complex rhythmic patterns with many sixteenth and thirty-second notes. It includes numerous slurs, ties, and articulation marks such as accents and staccato. Performance instructions like 'Tutti: ff, very short with accent on concert pitch a ♯' and '4 singers: avian scat, ff and balanced with the instruments' are provided. Specific techniques like 'arco' and 'flanger' are noted for the strings and guitar. The score concludes with a 'Tape' part marked '(end of track)'.

55

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

57

Picc  
 Cl  
 Sax  
 Eph/  
 tbn  
 Kybrd  
 Vbrphn  
 Tape  
 Sop 1  
 Sop 2  
 Mezz 1  
 Mezz 2  
 Vln  
 Gtr  
 Vlc  
 Db

Musical score for measures 57-60. The score includes parts for Piccolo, Clarinet, Saxophone, Euphonium/Tuba, Keyboard, Vibraphone, Tape, Soprano 1, Soprano 2, Mezzosoprano 1, Mezzosoprano 2, Violin, Guitar, Viola, and Double Bass. The key signature is one flat (B-flat major/D minor). The score features complex rhythmic patterns, including sixteenth and thirty-second notes, and various articulations such as accents and slurs. Fingerings and breath marks are indicated throughout.

This musical score page, numbered 59, features a variety of instruments and vocal parts. The instruments are arranged in a standard orchestral layout. The Piccolo (Picc) and Keyboard (Kybrd) parts are mostly silent. The Clarinet (Cl) has a five-note melodic phrase in the first measure. The Saxophone (Sax) and Trombone/Euphonium (Eph/tbn) parts have complex rhythmic patterns with triplets and accents. The Euphonium/Trombone part includes a box labeled "change to trombone" in the second measure. The Vibraphone (Vbrphn) has a five-note phrase in the first measure. The Tape part is silent. The vocal parts (Sop 1, Sop 2, Mezz 1, Mezz 2) have melodic lines with accents. The Violin (Vln) part is silent. The Guitar (Gtr) and Double Bass (Db) parts have rhythmic patterns with triplets. The Viola (Vlc) part is silent.

62 **G** Tutti: *mf* only

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

trombone

K69 marimba

(together with the string bass) 3

(together with voices)

(with one 8-bar pedal)

track 3 (25"): wild birds

flexatone

Singers: short percussive avian onomatopoeia, *mf*, together with the vibraphone

pizz. 3

pizz. 3

3 (pizz. together with the sax) 3

This musical score page, numbered 65, features a variety of instruments. The woodwind section includes Piccolo (Picc) and Clarinet (Cl), both of which are silent in this section. The saxophone section consists of Saxophone (Sax) and Euphonium/Tuba (Eph/tbn), both playing complex rhythmic patterns with frequent triplets. The keyboard section (Kybrd) also plays a complex rhythmic accompaniment with triplets. The brass section includes Trumpet (Vbrphn), which plays sustained notes, and Trombone (Tape), which is silent. The vocal section includes Soprano 1 (Sop 1) and Soprano 2 (Sop 2), who sing sustained notes, and Mezzo-soprano 1 (Mezz 1) and Mezzo-soprano 2 (Mezz 2), who sing more active lines. The string section includes Violin (Vln), which is silent, and Guitar (Gtr), Violoncello (Vlc), and Double Bass (Db), all of which play complex rhythmic patterns with triplets.

Musical score for page 68, featuring the following instruments and parts:

- Picc**: Piccolo, rests throughout.
- Cl**: Clarinet, rests throughout.
- Sax**: Saxophone, playing a rhythmic pattern of eighth notes with triplets.
- Eph/tbn**: Euphonium/Trombone, playing a complex rhythmic pattern with triplets and sixteenth notes.
- Kybrd**: Keyboard, playing a complex rhythmic pattern with triplets and sixteenth notes.
- Vbrphn**: Vibraphone, playing a simple rhythmic pattern with accents, including a \* symbol in the second measure.
- Tape**: Tape part, indicated by a double bar line and a bracket.
- Sop 1**: Soprano 1, playing a simple rhythmic pattern with accents.
- Sop 2**: Soprano 2, playing a simple rhythmic pattern with accents.
- Mezz 1**: Mezzo-soprano 1, playing a simple rhythmic pattern with accents.
- Mezz 2**: Mezzo-soprano 2, playing a simple rhythmic pattern with accents.
- Vln**: Violin, rests throughout.
- Gtr**: Guitar, playing a complex rhythmic pattern with triplets and sixteenth notes.
- Vlc**: Violoncello, playing a complex rhythmic pattern with triplets and sixteenth notes.
- Db**: Double Bass, playing a simple rhythmic pattern with accents.



**H** Tutti: *f*, piccolo *mf* only

71

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

motor off, no pedal

Singers: avian scat, pedal on pitch a is together with the violin

pizz.

(together with the voices)

arco off

arco off

73

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2  
(together with violin)

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

75

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

(approximate end of track)

77

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

change quickly to soprano sax

arco

78 **I** Tutti: *ff*

Picc

Cl

Sop Sax

Eph/tbn

Kybrd

Vbrphn

track 4 (14"): dawn chorus 1

Tape

whip

Sop 1

Sop 2

Mezz 1

Mezz 2

arco off

Vln

Gtr

Vlc

Db

(together with the low vces)

Musical score for page 79, featuring the following instruments and parts:

- Picc
- Cl
- Sax
- Eph/tbn
- Kybrd
- Vbrphn
- Tape
- Sop 1
- Sop 2
- Mezz 1
- Mezz 2
- Vln
- Gtr
- Vlc
- Db

The score includes various musical notations such as notes, rests, and dynamic markings like *ff*. Brackets with the number '5' are used to indicate fingering for several instruments, including the Clarinet, Saxophone, Euphonium/Tuba, Keyboard, Vibraphone, Mezzosoprano 2, Violin, Guitar, Viola, and Double Bass.

80

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

*mf*

81

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

Detailed description: This page of a musical score covers measures 81 to 84. The score is for a large ensemble, including woodwinds, brass, keyboard, strings, and vocalists. The key signature has one flat (B-flat), and the time signature is 3/4. The Piccolo (Picc) part starts with a whole note G4, followed by a half rest, and then a half note B-flat4. The Clarinet (Cl), Saxophone (Sax), and Euphonium/Tuba (Eph/tbn) parts play a rhythmic pattern of eighth notes: G4, A-flat4, B-flat4, C5, with a fermata over the final C5. The Keyboard (Kybrd) part features a similar eighth-note pattern in the right hand, while the left hand has a sustained bass line. The Vibraphone (Vbrphn) part plays a melodic line of eighth notes: G4, A-flat4, B-flat4, C5, with a fermata over the final C5. The Tape part is marked with a double bar line and a fermata. The vocal parts (Sop 1, Sop 2, Mezz 1, Mezz 2) have various melodic lines, with Soprano 1 and Mezzo 2 featuring eighth-note patterns. The string parts (Vln, Gtr, Vlc, Db) provide harmonic support with sustained notes and rhythmic patterns. The page number 81 is written at the top left.



82

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

chorus

Detailed description: This page of a musical score covers measures 82, 83, and 84. The score is for a large ensemble and includes parts for Piccolo, Clarinet, Saxophone, Euphonium/Tuba, Keyboard (Grand Piano), Vibraphone, Tape, Soprano 1, Soprano 2, Mezzosoprano 1, Mezzosoprano 2, Violin, Guitar, Viola, and Double Bass. The music is in 3/4 time and features a complex rhythmic pattern with many eighth and sixteenth notes. Fingerings (e.g., 5) and breath marks (v) are indicated throughout. A 'chorus' marking is present in the Viola part in measure 84. The score concludes with a double bar line and repeat dots at the end of each staff.

**J** All instruments: really *fff*, piccolo and guitar only *ff*

83

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

added dawn chorus 2 in track 4

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

chorus

Detailed description: This page of a musical score covers measures 83 to 86. It features a variety of instruments including woodwinds (Piccolo, Clarinet, Saxophone, Euphonium/Tuba), keyboard, vibraphone, vocalists (Soprano 1 & 2, Mezzosoprano 1 & 2), strings (Violin, Viola, Double Bass), and guitar. The score is in 4/4 time and includes dynamic markings such as *fff* and *ff*. A rehearsal mark 'J' is placed at the beginning of the page. A specific instruction 'added dawn chorus 2 in track 4' is noted above the Tape part. The Double Bass part includes a 'chorus' marking. The score is heavily annotated with slurs and sixteenth-note groupings, indicating complex rhythmic patterns and phrasing.

84

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

The musical score for page 84 is arranged in a standard orchestral layout. It begins with a Piccolo part on a single staff, marked with a piano (*p*) dynamic and a fermata. The woodwind section includes Clarinet (Cl), Saxophone (Sax), Euphonium/Tuba (Eph/tbn), and Vibraphone (Vbrphn). The keyboard section (Kybrd) is split into two staves. The brass section includes Euphonium/Tuba (Eph/tbn) and Double Bass (Db). The vocal section consists of Soprano 1 (Sop 1), Soprano 2 (Sop 2), Mezzosoprano 1 (Mezz 1), and Mezzosoprano 2 (Mezz 2). The string section includes Violin (Vln), Guitar (Gtr), Viola (Vlc), and Double Bass (Db). The score features complex rhythmic patterns, including sixteenth-note runs and slurs, with dynamic markings such as *p* and *6*. The Vibraphone part includes a 'Tape' section with a square symbol and a fermata. The vocal parts are mostly silent, indicated by a horizontal line with a fermata.

85

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

Detailed description of the musical score: This page of a musical score covers measures 85 through 88. The instrumentation includes Piccolo, Clarinet, Saxophone, Euphonium/Tuba, Keyboard, Vibraphone, Tape, Soprano 1, Soprano 2, Mezzosoprano 1, Mezzosoprano 2, Violin, Guitar, Viola, and Double Bass. The Piccolo part begins with a grace note on measure 85. The Clarinet, Saxophone, and Keyboard parts feature complex sixteenth-note passages, many of which are bracketed with a '6' to indicate sextuplets. The Vibraphone part also contains sextuplets. The Euphonium/Tuba, Soprano 1, Soprano 2, Mezzosoprano 1, Mezzosoprano 2, Viola, and Double Bass parts are mostly silent, indicated by a horizontal line with a dash. The Guitar part has a few notes with accents. The Tape part shows a standard tape symbol. The page number '85' is at the top left, and the page number '34' is at the bottom left.

86

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

(the ending of track 5 may overlap with rehearsal letter K)

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

Detailed description of the musical score for rehearsal mark 86: The score is for a rehearsal mark starting at measure 86. It features a woodwind section with Piccolo, Clarinet, and Saxophone, and a string section with Violin, Viola, and Double Bass. A keyboard part is also present. The woodwinds and strings play a melodic line with sixteenth notes, often grouped with slurs and a '6' marking. The saxophone part has a similar melodic line. The keyboard part provides harmonic support. The string parts are mostly silent, with some activity in the Violin and Viola parts. A text box indicates that the ending of track 5 may overlap with rehearsal letter K. The score ends with a double bar line and a repeat sign.

**K** Tutti: *ff* Tutti: diminuendo to *p*

87

Picc  
Cl  
Sax  
Eph/ tbn  
Kybrd  
Vbrphn  
Tape  
Sop 1  
Sop 2  
Mezz 1  
Mezz 2  
Vln  
Gtr  
Vlc  
Db

suspended cymbal

chorus

dim.

arco

3

4/4

95 (Avian solo)

Picc

Cl

Sax *p* 3

Eph/tbn

Kybrd K971 glockenspiel

Vbrphn

Tape

Sop 1

Sop 2 Yel - - - - -  
sustained *pp*

Mezz 1 Yel - - - - - low  
sustained *pp*

Mezz 2 Yel - - - - -  
sustained *pp*

Vln light pizz. *pp*

Gtr *pp*

Vlc

Db tube sound

97

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

3

3

Yel - - - - low

*sustained pp*

low ven - - -

ven - - - ted

low ven - -

*mp* (still in pizz.)



99

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn



track 5 (45"/25") *Pycnonotus goiavier*

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

3

*mp*

*p*

5

5

ven - - - - - te -

te - - - - - d Bul - - - - - bul

Bul - - - - - bul

te - - - - - d

arco

*mf* 3 3 3 3

101

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

*mp*

K971 glockenspiel

(sounds loco)

*legato mp*

*f*

*arco*

d

Bul - - bul

Bul - bul

Pyc - - no

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

C7  
B  
A#  
A  
G#  
G  
F#  
F  
E  
D#  
D  
C#  
C6  
B  
A#  
A  
G#

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

*cresc.*

*Pyc cresc.* - - no - - no - - tus

no - - - - tus

104

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

C#  
C7  
B  
A#  
A  
G#  
G  
F#  
F  
E

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

*mf* 6 6 6 6

5 5 5 5

3

Pyc - - no - - no - - tus

*f* Pyc - - no - - no - - tus

*f* Pyc - - no - - no - - tus

*f*

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

C7  
B  
A#  
A  
G#  
G  
F#  
F  
E

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

3

5

5

5

5

5

6

6

go - ia - vier

go - ia - vier

go - ia - vier

go - ia - vier

*f*

Detailed description of the musical score: This page of a musical score, numbered 105, features a variety of instruments and vocalists. The woodwind section includes Piccolo (Picc), Clarinet (Cl), Saxophone (Sax), and Euphonium/Tuba (Eph/tbn). The keyboard section (Kybrd) is shown in both treble and bass clefs. The string section (Vbrphn) includes Violin (Vln), Guitar (Gtr), Viola (Vlc), and Double Bass (Db). The vocal section consists of Soprano 1 (Sop 1), Soprano 2 (Sop 2), Mezzo-soprano 1 (Mezz 1), and Mezzo-soprano 2 (Mezz 2). The lyrics for the vocalists are "go - ia - vier". The score includes several technical markings: a triplet of eighth notes in the Clarinet part, five groups of eighth notes in the Saxophone part, and two groups of sixteenth notes in the Keyboard part. A guitar chord chart is provided, showing chords C7, B, A#, A, G#, G, F#, and E. A tape section is indicated by a double bar line with a square symbol. The dynamic marking *f* (forte) is present in the Violin part.

107

Picc

Cl  
*pp legato* 5 5 5 5 5

Sax  
*pp* 3

Eph/  
tbn

Kybrd  
*pp* 6 6  
K28 bamboo voices or  
K13 brite klav

Vbrphn

C 7  
B  
A#  
A  
G#  
G  
F#  
F  
E  
D#  
D

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln  
*pp*

Gtr

Vlc

Db

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

motor off, no pedal

*pp* 6 5 3

C#  
C 7  
B  
A#  
A  
G#  
G  
F#  
F  
E  
D#

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

**L**

111

Picc *p* *mf*

Cl *p* *mf* *mp*

Sax *p* *mp*

Eph/ tbn

Kybrd *mf* *mp*  
K28 Bamboo Voices

Vbrphn *p* *f* *mf*  
motor on, middle speed, pedal  
Ped. *p subito*  
(use tuning wheel for gliss. without affecting R.H.)

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln arco *p* *compressor*

Gtr *p* *compressor*

Vlc *p* *mf*  
(gliss. without articulating pitch c)

Db *p* *f* *mf*  
tube sound  
A string  
(gliss. without articulating pitch c)



Picc

Cl

Sax

Eph/ tbn

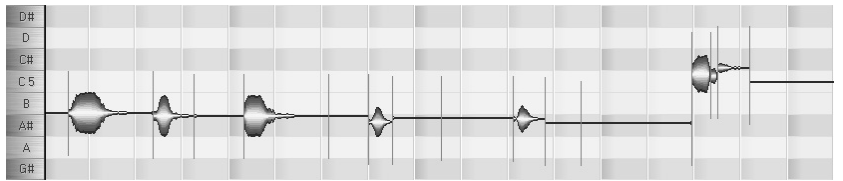
(gliss. without articulating pitch c)

Kybrd

Vbrphn

Tape

track 7 (29"/ 24")  
*Strix seloputo*



Sop 1

Sop 2

Mezz 1

Mezz 2

*mp* Spot - te - d woo - d 0 - w - l

*mp* Spot - te - d woo - d 0 - w - l

*mp* Spot - te - d woo - d 0 - w - l

*mp* Spot - te - d woo - d 0 - w - l

Vln

Gtr

Vlc

Db

*mp*

(gliss. without articulating pitch c)

normal

normal *pp*

(on D string, artificial harmonic es bes, in unison with violin)

126

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

D  
C#  
C5  
B  
A#  
A

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

*ppp* (gliss. without articulating pitch c)

*pp* (gliss. without articulating pitch c)

change to euphonium

*ppp* <sup>8va</sup>

*pp* *pp* *ppp* K69 marimba

*pp* *pp* *ppp* (harmonic in unison with violin)

normal

*ppp* (harmonic in unison with keyboard)

*pp* *pp* (on II, harmonic in unison with violin)

M

133 *p*

Picc *p* *p subito*

Cl *p* *p subito*

Sax *p* *p subito* change to tenor sax

Eph/ tbn *p* *p subito*

Kybrd *p* *p subito*

Vbrphn *p* *p subito*

Tape II

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln *p* *p subito*

Gtr *p* *p subito*

Vlc *p* *p subito* *p cresc.*

Db *p* *p cresc.*

Picc  
 Cl  
 Sax  
 Eph/  
tbn  
 Kybrd  
 Vbrphn  
 Tape  
 Sop 1  
 Sop 2  
 Mezz 1  
 Mezz 2  
 Vln  
 Gtr  
 Vlc  
 Db

con sord.

A gi-thi-na Ti-phia Sin-ga-pu-ren-sis  
*p cresc.*

Ae-gi-thi-na Ti-phia Sin-ga-pu-ren-sis  
*p cresc.*

Ae-gi-thi-na Ti-phia Sin-ga-pu-ren-sis  
*p cresc.*

*p cresc.*

137 (Avian solo)

Picc

Cl

Sax

Eph/tbn

Kybrd

Vbrphn

A  
Ab  
G  
Gb  
F  
E  
Eb  
D  
Db  
C7  
B  
Bb  
A  
Ab

track 8 (26"/ 21") *Aegithina tiphia singapurensis*

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

*p* legato on A string

*p* tenor

*ppp* (balance with strings)

*ppp* (balance with strings)

fastest speed, pedal

*p*

*p*

*p* Com-mon I - o - ra

*p* Com-mon I - o - ra

*p* (balance with strings)

*ppp*

*p*

*p* legato on A string

140

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

B  
Bb  
A  
Ab  
G  
Gb  
F  
E  
Eb  
D  
Db  
C7  
B  
Bb

Tape

Sop 1  
Com mon I - o-ra  
*p*

Sop 2  
Com mon I - o-ra  
*p*

Mezz 1  
Com mon I - o-ra

Mezz 2  
Com mon I - o-ra

Vln

Gtr

Vlc

Db

143

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Bb  
A  
Ab  
G  
Gb  
F  
E  
Eb  
D  
Db  
C7  
B  
Bb  
A

Tape

Sop 1  
Com mon I - o-ra

Sop 2  
Com mon I - o-ra

Mezz 1  
Com mon I - o-ra

Mezz 2  
Com mon I - o-ra

Vln

Gtr

Vlc

Db

146 **N**

Picc *f* *p*

Cl *f* *p*

Sax *f* *p*  
change to soprano sax *sop*

Eph/tbn *f* *p*

Kybrd *f* *p* *f*

Vbrphn motor on, slowest speed, pedal

F			
E			
D			
C#			
C			
B			
A			
A#			
G			
F#			
F			
E			
D			
C#			
C			
B			
A			
A#			
G			
F#			
F			

Tape

Sop 1 Com-mon I - o - ra *f* Or-tho

Sop 2 Com-mon I - o - ra

Mezz 1 Com-mon I - o - ra

Mezz 2 Com-mon I - o - ra

Vln *f* *p*

Gtr *f* *poco f* *p*

Vlc *f*

Db *f* *f* on A string chorus + delay



Picc

Cl

Sax

Eph/  
tbn

Kybrd  
*p*

Vbrphn  
*f p*

track 8 (31"/ 21")  
*Orthotomus sericeus*

Tape

Sop 1  
to Ru fou - s taile - d tai - lor bir - d

Sop 2  
*f* to-mus se Ru fou - s taile - d tai - lor bir - d

Mezz 1  
*f* se-ri-ce Ru fou - s taile - d tai - lor bir - d

Mezz 2  
*f* ce-us Ru fou - s taile - d tai - lor bir - d

Vln  
*f p*

Gtr

Vlc

Db

*poco f p*

*poco f p*

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

F

E

Eb

D

Db

C7

B

Bb

A

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

change to trombone

*poco f* *p*

*poco f* *p*

*poco f* *p*

*p*

arpeggio whistle in E flat Major

arpeggio whistle in E flat Major

chorus + delay

chorus + delay

chorus + delay

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

fastest speed, pedal

arpeggio whistle in E flat Major

whistle in e flat minor

whistle in e flat Major

whistle in e flat minor

whistle gliding down from pitch e flat

whistle in e flat minor

whistle gliding down from pitch e flat

whistle in e flat minor

whistle gliding down from pitch e flat

Strings: everytime forceful crescendo

gliss. on E string

(slide with bottle neck)

gliss. on low E string

gliss.

gliss. on D string

gliss. on E string

chorus + delay

Four winds: *p*, very short and balanced

164

Picc

Cl

Sax

Eph/ tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

trbn

whistle gliding down from pitch e flat

gliss.

gliss. on high E string

Detailed description: This page of a musical score covers measures 164 and 165. The woodwind section (Piccolo, Clarinet, Saxophone, and Euphonium/Tuba) features complex rhythmic patterns with sixteenth and thirty-second notes, often beamed in groups of six or five. The string section (Violins, Viola, and Double Bass) includes glissando markings. The vocal section (Soprano 1, Soprano 2, Mezzo 1, and Mezzo 2) has wavy lines indicating a whistle effect. The keyboard, vibraphone, and tape parts are marked with a flat line, indicating they are silent. A specific instruction for the guitar is 'gliss. on high E string'. The score is in a key with one flat and a 4/4 time signature.

166

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

track 9 (44"/ 24") *Gracula religiosa*

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

gliss. on A string

gliss. on D string

gliss. on D string

Picc

Cl

Sax

Eph/ tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

only with mouth piece

fastest speed, pedal

#8

F  
E  
Eb  
D  
Db  
C7  
B  
Bb  
A  
Ab  
G  
Gb  
F  
E  
Eb  
D

Hill my - na Gra-cu  
*mp* very short

Gra - cu - - la re - li - gio - sa  
*mp* very short

gliss. on G string

gliss.

gliss. on D string

normal

Picc

Cl

Sax *mf* *gliss.*

Eph/tbn *gliss.* *gliss.*

Kybrd

Vbrphn

Ab

G

Gb

F

E

Eb

D

Db

C 6

Tape

Sop 1 *mp* very short *5* *5* *5*  
Gra - cu - la re - li - gio - sa

Sop 2 *mp* very short *5* *5* *5* *5*  
Gra - cu - la re - li - gio

Mezz 1 la re - li - gi - o - sa Hill my - na Gra - cu -

Mezz 2 Hill my - na My - - - na

Vln *normal*

Gtr

Vlc *gliss.* *gliss.*  
*gliss. on C string*

Db

Picc

Cl

Sax *gliss.*

Eph/  
tbn *gliss.*

Kybrd

Vbrphn

Tape

Sop 1  
sa re - li - gio - sa

Sop 2  
sa Gra - cu - la re - li - gio - sa

Mezz 1  
la re - li - gio - sa Hill my - na Gra - cu -

Mezz 2  
Hill my - na re - - -

Vln

Gtr normal

Vlc

Db *gliss.*

*gliss. on D string*



176 **P**

Picc

Cl

Sax  
soprano sax with mouth piece

Eph/  
tbn

Kybrd

Vbrphn

Tape



Tutti: crescendo from *p*

Tutti: *f* diminuendo

Tutti:  
repeated notes: sub. *p*  
and moving pitches: *f*

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

re - li - gio - sa

la re - li - gio - sa

li - gio - sa arco off

arco off

normal

gliss. on E string

Picc

Cl *mp*

Sax *mp*

Eph/ tbn *mp*

Kybrd *mp*

Vbrphn *mp* Ped. motor on

Tape

Sop 1 *p* cu

Sop 2 *f* Sur-ni-cu-lus lu-gu-bris

Mezz 1 *p* Dron go

Mezz 2 *p* Dron

Vln *mp* *mf* pizz.

Gtr *mp*

Vlc *mp* *mf* pizz.

Db *mf*

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

ckoo

Sur-ni-cu-lus lu-gu - bris

Dron

cu

go

Sur-ni - cu-lus lu-gu-bris

*f*

*p*

*f*

*mf*

*f*

*p*

*f*

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

track 10 (20")  
*Surniculus lugubris*

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

change to tenor sax

change to euphonium

*f* Sur-ni - cu-lus lu-gu-bris Dron - go cu -

go cu

ckoo *f* Sur-ni-cu-lus lu-gu-bris *p* Dron - go

Dron - go cu - ckoo *f* Sur-ni-cu-lus

*mf*

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn



A

Ab

G

Gb

F

E

Eb

Tape

Sop 1

ckoo

*f* Sur-ni-cu-lus lu-gu-bris

Sop 2

ckoo

Mezz 1

cu ckoo

Mezz 2

lu-gu-bris

*p* Dron - go

Vln

Gtr

Vlc

Db

202

Picc *slap tongue*

Cl *slap tongue*

Sax *slap tongue*

Euph/ tbn *slap tongue*

Kybrd

Vbrphn

Tape

Sop 1 *7-pitch ascending chromatic whistle*

Sop 2 *7-pitch ascending chromatic whistle*

Mezz 1 *7-pitch ascending chromatic whistle*

Mezz 2 *7-pitch ascending chromatic whistle*

Vln *Bartok pizz.*

Gtr *Bartok pizz.*

Vlc *Bartok pizz.*

Db *Bartok pizz.*

**Q** **Tutti: subito *f***

*high WB* *f sub*

Singers: *subito f*, half spoken, half sung

**track 11 (20"/20"): Irena puella**

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn



Bb

A

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

sian Fai - ry blue - bird

sian Fai - ry blue - bird

sian Fai - ry blue - bird

sian Fai - ry blue - bird

212 R

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

motor on,  
slowest speed,  
pedal

B

Bb

A

Tape

floor tom

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

arco off

normal

arco off

arco off



Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

*p* blending with voices

*p* blending with voices

*p* blending with voices

*p* blending with voices

*mf*

*mf*

*mf*

*mf*

*p* blending with voices

solo

3

5

solo

3

5

solo

3

5

Straw hea-ded bul-bul

Straw hea-ded bul-bul

Straw hea-ded bul-bul

Straw hea-ded bul-bul

Straw hea-ded bul-bul

Straw hea-ded bul-bul

Straw hea-ded bul-bul

Straw hea-ded bul-bul

Straw hea-ded bul-bul

Straw hea-ded bul-bul

Straw hea-ded bul-bul

Straw hea-ded bul-bul

Musical score for measures 220-221. The score is in 3/4 time and features the following instruments and parts:

- Picc:** Piccolo, rests in both measures.
- Cl:** Clarinet, plays a quarter note in measure 220, followed by a quarter rest, and a half note in measure 221.
- Sax:** Saxophone, rests in both measures.
- Eph/tbn:** Euphonium/Tuba, plays a quarter note in measure 220, followed by a quarter rest, and a half note in measure 221.
- Kybrd:** Keyboard, plays a sequence of notes in measure 220, including a sixteenth-note triplet marked with a '6', followed by a quarter rest in measure 221.
- Vbrphn:** Vibraphone, plays a quarter note in measure 220, followed by a quarter rest, and a half note in measure 221.
- Tape:** Tape machine, rests in measure 220 and has three downward strokes in measure 221.
- Sop 1, Sop 2, Mezz 1, Mezz 2:** Vocalists, all have rests in both measures.
- Vln:** Violin, plays a quarter note in measure 220, followed by a quarter rest, and a half note in measure 221.
- Gtr:** Guitar, plays a sequence of notes in measure 220, including a quintuplet marked with a '5', followed by a quarter rest in measure 221.
- Vlc:** Violoncello, plays a sequence of notes in measure 220, including a triplet marked with a '3' and a quintuplet marked with a '5', followed by a quarter rest in measure 221.
- Db:** Double Bass, plays a sequence of notes in measure 220, including a quintuplet marked with a '5', followed by a quarter rest in measure 221.

Picc

Cl solo 6

Sax

Eph/  
tbn solo

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

Straw hea - ded bul - bul

Straw hea - ded bul - bul

Straw hea - ded bul - bul

Straw hea - ded bul - bul

on G string

Picc

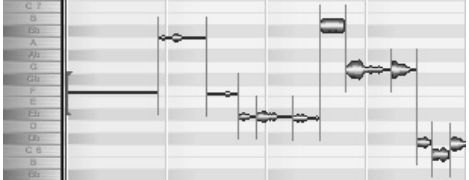
Cl  
solo

Sax

Eph/  
tbn

Kybrd

Vbrphn



track 12 (28"/ 14")  
*Pycnonotus zeylanicus*

Tape

Sop 1  
Straw hea - ded bul - bul

Sop 2  
Straw hea - ded bul - bul

Mezz 1  
Straw hea - ded bul - bul

Mezz 2  
Straw hea - ded bul - bul

Vln  
arco off

Gtr

Vlc

Db

Picc

Cl <sup>6</sup>

Sax <sup>6</sup> to soprano

Eph/  
tbn

Kybrd <sub>7</sub>

Vbrphn



Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln *solo* <sup>6</sup>

Gtr <sub>3</sub>

Vlc <sub>3 5</sub>

Db

Pyc - no - no - tus

Pyc - no - no - tus

Pyc - no - no - tus

Pyc - no - no - tus

Pyc - no - no - tus

Picc

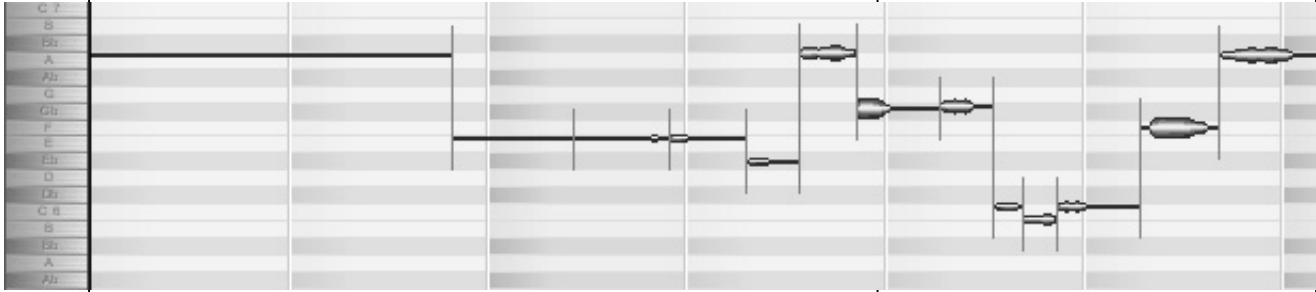
Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn



Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

6

3

5

3

5

6

pp

pp

zey - la - ni - cus

zey - la - ni - cus

zey - la - ni - cus

zey - la - ni - cus

zey - la - ni - cus

pp

pp

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

Detailed description of the musical score: The score is for a 4/4 time piece. The Piccolo part is a whole rest. The Clarinet, Saxophone, and Violin parts play a melodic line with slurs and fingerings (5, 3, 5). The Saxophone part includes fingerings 5, 3, and 5. The Keyboard part has a similar melodic line with fingerings 5 and 3. The Violin part has fingerings 3 and 5. The Euphonium/Tuba, Violin/Phonograph, Tape, and Double Bass parts play sustained chords. The vocal parts (Sop 1, Sop 2, Mezz 1, Mezz 2) are silent.

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

C 7					
B					
Bb					
A					
Ab					
G					

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db



232 Tutti: *f*

(Avian solo)

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

C 7  
B  
Bb  
A  
Ab  
G  
Gb  
F  
E  
Eb  
D  
Db  
C 6  
B  
Bb

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

5 3

5 3

3 5

3

Pyc - no - no - tus

Pyc - no - no - tus

Pyc - no - no - tus

Pyc - no - no - tus

3 5

234

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

B  
Bb  
A  
Ab  
G  
Gb  
F  
E  
Eb  
D  
Db  
C 8  
B  
Bb  
A  
Ab  
G  
Gb

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

236

Tutti: *p* cresc.

**S**

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

3

8<sup>vb</sup>

motor off, with pedal

Tutti: *f*

Tutti: play in any order

no mute/ chorus + delay

pizz.

no mute/ chorus + delay

pizz.

no mute/ chorus + delay

pizz.

no mute/ chorus + delay

pizz.

240 Tutti: play in any order and diminuendo

Picc

Cl

Sax

Eph/ tbn

Kybrd

Vbrphn

track 13 (35"/ 22") *Macronous gularis*

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

*fp*

*fp*

*mf*

*f*

*mf*

*fp*

*fp*

Ma - cro -

Striped tit bab - bler

(tapping)

arco

arco

Picc

Cl  
*f* solo *pp* solo to tenor

Sax  
*f*

Eph/  
tbn

Kybrd

Vbrphn

B  
A#  
A  
G#  
G  
F#  
F

Tape

Sop 1  
*mp* Ma - - cro - - nous gu -

Sop 2  
*mp* Ma - - cro - - nous *f* Striped tit bab bler

Mezz 1  
nous gu - la - ris Striped tit bab - bler *mf* Ma -

Mezz 2  
Striped tit bab - bler *mf* Ma -

Vln  
*arco* *fp* (tapping) (tapping) (tapping)

Gtr

Vlc

Db

248 *solo*

Picc *f*

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

B

A#

A

G#

G

F#

F

Tape

Sop 1  
la - - - ris *Ma - cro -*  
*mf*

Sop 2  
Striped tit bab bler *Ma - cro -*  
*mf*

Mezz 1  
cro - - - nous gu - - -

Mezz 2  
cro - - - nous gu - - -

Vln  
(tapping)

Gtr

Vlc

Db

251

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

B

A#

A

G#

G

F#

F

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

*cresc.*

*cresc.*

*f*

*f*

*normal*

*legato cresc.*

*normal*

*legato cresc.*

*normal*

*legato cresc.*

*legato cresc. 3*

nous gu - la - ris

Striped tit bab - bler

nous gu - la - ris

Striped tit bab - bler

la - - - ri - - - s

la - - - ri - - - s

*5*

*6*

*3*

*6*

*5*

*5*

*3*

*5*

*3*

*3*

*3*

T

253

This musical score page contains the following parts and markings:

- Picc:** Piccolo flute, starting in measure 255 with a forte (*f*) dynamic.
- Cl:** Clarinet, playing a triplet in measure 253 and a melodic line in measure 255 with a fortissimo (*ff*) dynamic.
- Sax:** Saxophone, playing a melodic line in measure 255 with a fortissimo (*ff*) dynamic.
- Eph/tbn:** Euphonium and tuba, playing a triplet in measure 253 and a melodic line in measure 255 with a fortissimo (*ff*) dynamic.
- Kybrd:** Keyboard, playing chords in measure 255 with a fortissimo (*ff*) dynamic. Includes the instruction "no pedal".
- Vbrphn:** Vibraphone, playing chords in measure 255 with a forte (*f*) dynamic.
- Tape:** Tape part, silent.
- Sop 1:** Soprano 1, singing the word "Ma-lay - sian" in measure 255 with a forte (*f*) dynamic.
- Sop 2:** Soprano 2, silent.
- Mezz 1:** Mezzo-soprano 1, silent.
- Mezz 2:** Mezzo-soprano 2, silent.
- Vln:** Violin, playing a triplet in measure 253 and a melodic line in measure 255 with a fortissimo (*ff*) dynamic.
- Gtr:** Guitar, playing a triplet in measure 253 and a melodic line in measure 255 with a fortissimo (*ff*) dynamic.
- Vlc:** Violoncello, playing a triplet in measure 253 and a melodic line in measure 255 with a fortissimo (*ff*) dynamic.
- Db:** Double bass, playing a triplet in measure 253 and a melodic line in measure 255 with a forte (*f*) dynamic, including the instruction "pizz." (pizzicato).



256

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1  
eared

Sop 2  
night jar night jar  
*f*

Mezz 1  
Ma-lay - sian eared  
*f*

Mezz 2  
night jar night jar

Vln

Gtr

Vlc

Db

*f* *mf*

259

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

*mf*

*p*

*p*

*p*

*mf*

*p*

*mf*

*p*

Eu - ro - sto - po - dus  
*non dim.*

tem - min - cki - i  
*non dim.*

tem -

261

Picc *non dim.*

Cl

Sax

Eph/  
tbn

Kybrd K20 prophet

Vbrphn *non dim.*

track 14 (37"/ 23") *Eurostopodus temminckii*

Tape

Sop 1  
Eu - - ro - sto - po - dus  
*non dim.*

Sop 2  
Eu - - ro - sto - po - dus  
*non dim.*

Mezz 1  
min - cki - i

Mezz 2  
*non dim.*  
Eu - - ro - sto - po - dus  
*non dim.*

Vln

Gtr

Vlc

Db *non dim.*

ad lib: arco octave divider + delay + bass enhancer  
or normal pizz.

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

D  
C#  
C 7  
B  
A#  
A  
G#  
G  
F#  
F  
E

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

Detailed description: This page of a musical score is for rehearsal mark 263. It features a grand staff with staves for Piccolo, Clarinet, Saxophone, Euphonium/Tuba, Keyboard (two staves), Vibraphone, and a guitar solo section. The guitar solo section includes a fretboard diagram with a vertical scale of notes from D to E. Below the guitar solo is a 'Tape' section with three measures of tape marks. The bottom half of the score includes staves for Soprano 1 and 2, Mezzosoprano 1 and 2, Violin, Guitar, Viola, and Double Bass. All staves are currently empty, with only a few rests visible in the upper staves.

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

C#																			
C 7																			
B																			
A#																			
A																			
G#																			
G																			
F#																			
F																			
E																			

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

Picc

Cl

Sax

Eph/  
tbn

Kybrd

Vbrphn

Tape

Sop 1

Sop 2

Mezz 1

Mezz 2

Vln

Gtr

Vlc

Db

*p*

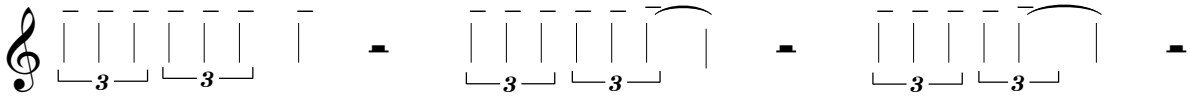
*p*

K20 prophet

# U

## Coda:

- in an increasingly serene and calm manner, using *louré* articulation, all musicians and singers use only pitches f, a flat and e flat in free unconducted tempo, with a gradual *diminuendo* and free *ritardando al fine*, totally unsynchronised with each other;
- the choice of sax soprano or tenor, euphonium or trombone, is left to the discretion of the players;
- singers use the words: Greater Bird of Paradise and *Paradisaea apoda*;
- the conductor chooses the moment to start track 15 in such a manner that this last track of 24"/ 22" still sounds after all the improvisations have faded away;
- the rhythms are the following:



Singapore, 8-XI-2009





*Annex 1*



*Score of the mechanical birds*

♩ = 120

The image shows a musical score for 12 bird songs, labeled Birdsong 1 through Birdsong 12. Each song is written on a five-line staff with a treble clef and a 4/4 time signature. The tempo is marked as ♩ = 120. Birdsong 1 and Birdsong 2 are marked with a mezzo-forte (*mf*) dynamic. Birdsong 1 begins with a half note on G4, followed by quarter notes on F4, E4, D4, C4, B3, A3, G3, F3, E3, and D3. Birdsong 2 starts with two eighth notes on G4, followed by quarter notes on F4, E4, D4, C4, B3, A3, G3, F3, E3, and D3. Birdsongs 3 through 12 are mostly silent, indicated by a dash in the first measure and a vertical bar line at the end of the staff. Birdsong 3 has a quarter note on F4 in the second measure. Birdsong 4 has a quarter note on E4 in the third measure. Birdsong 5 has a quarter note on D4 in the fourth measure. Birdsong 6 has a quarter note on C4 in the fifth measure. Birdsong 7 has a quarter note on B3 in the sixth measure. Birdsong 8 has a quarter note on A3 in the seventh measure. Birdsong 9 has a quarter note on G3 in the eighth measure. Birdsong 10, 11, and 12 are completely silent.

6

1 *f* 6

2 *f* 5

3 *f* 3

4 *f*

5 *f* 6

6 *f* 5

7 *f*

8 *f* 6

9 3

10 *f* 5 3

11 *f* 3

12 *f*

8

1 2 3 4 5 6 7 8 9 10 11 12

9

1  $\overbrace{\text{6}}$   $\overbrace{\text{6}}$   $\overbrace{\text{6}}$

2  $\underbrace{\text{5}}$   $\underbrace{\text{5}}$   $\underbrace{\text{5}}$

3  $\overbrace{\text{3}}$   $\underbrace{\text{3}}$   $\overbrace{\text{3}}$

4

5  $\overbrace{\text{6}}$   $\overbrace{\text{6}}$   $\overbrace{\text{6}}$   $\underbrace{\text{6}}$

6  $\underbrace{\text{5}}$   $\underbrace{\text{5}}$   $\underbrace{\text{5}}$   $\underbrace{\text{5}}$

7  $\overset{\text{v}}{\#} \overset{\text{v}}{\flat}$

8  $\overbrace{\text{6}}$   $\overbrace{\text{6}}$

9  $\overbrace{\text{3}}$   $\underbrace{\text{3}}$   $\underbrace{\text{3}}$

10  $\underbrace{\text{5}}$   $\underbrace{\text{5}}$   $\underbrace{\text{5}}$   $\underbrace{\text{5}}$

11  $\overbrace{\text{3}}$   $\underbrace{\text{3}}$   $\underbrace{\text{3}}$

12  $\overset{\text{v}}{\#} \overset{\text{v}}{\flat}$

10

1 6 6 6 6

2 5 5 5 5 5 5

3 3 3 3

4

5 6 6 6

6 5 5 5 5 5 5

7

8 6 6 6

9 3 3 3

10 5 5 5 5 5 5

11 3 3 3

12

This musical score consists of 12 staves. Staves 1, 2, 5, 6, 8, and 10 are mostly empty, with only bar lines and repeat signs. Staves 3, 4, 9, and 11 contain complex musical notation, including triplets of eighth and sixteenth notes, slurs, and various accidentals. Staves 7 and 12 feature a single note with a flat and a dynamic marking.





*Annex 2*



*Score of the ossia, improvisatory bars*

# Bird Songs

(impro ossia bars, notated in C)

Robert Casteels

## rehearsal letter B

**Piccolo flute**  
*f* 6plet  $\text{♩}$  impro for 11", using this row of staccato pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

**Clarinet in B $\flat$**   
*f* 5plet  $\text{♩}$  impro for 13", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

**Soprano and tenor saxophones**  
*f* 3plet  $\text{♩}$  impro for 21", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

**Trombone**  
*f*  $\text{♩}$  impro for 15", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

**Keyboard**  
*f* 6plet  $\text{♩}$  impro for 11", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

**Vibes**  
*f* 5plet  $\text{♩}$  impro for 13", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

**Electric violin**  
*f* 6plet  $\text{♩}$  impro for 11", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

**Electric guitar**  
*f* 3plet  $\text{♩}$  impro for 21", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

**Electric cello**  
*f* 5plet  $\text{♩}$  impro for 13", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

**Electric string bass**  
*f* 3plet  $\text{♩}$  impro for 21", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

**rehearsal letter F**

*ff* 6plet ♩ impro for 11", using this row of staccato pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Picc

*ff* 5plet ♩ impro for 13", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Cl

*ff* 3plet ♩ impro for 21", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Sax

*ff* ♩ impro for 15", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Tbn

*ff* 6plet ♩ impro for 11", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Kybrd

*ff* 5plet ♩ impro for 13", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Vbrphn

*ff* 6plet ♩ impro for 11", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Vln

*ff* 3plet ♩ impro for 21", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Gtr

*ff* 5plet ♩ impro for 13", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Vlc

*ff* 3plet ♩ impro for 21", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Db

### rehearsal letter G

*mf* 3plet ♩ impro for 16", using this row of staccato pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Tbn

*mf* 3plet ♩ impro for 16", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Kybrd

*mf* 3plet ♩ impro for 16", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Gtr

*mf* 3plet ♩ impro for 16", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Vlc

rehearsal letter H

*f* 1/2 note impro for 12", using this row of staccato pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Cl

*f* 1/2 note impro for 12", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Sax

*f* 1/2 note impro for 12", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Tbn

*f* 1/2 note impro for 12", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Kybrd

*f* 1/2 note impro for 12", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Vbrphn

motor off, no pedal

*f* 1/2 note impro for 12", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Gtr

*f* 1/2 note impro for 12", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

Vlc

pizz.

# rehearsal letter I

*ff* 5plet ♩ impro for 10", using this row of staccato pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

*ff* 5plet ♩ impro for 10", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

*ff* 5plet ♩ impro for 10", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

*ff* 5plet ♩ impro for 10", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

*ff* 5plet ♩ impro for 10", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

*ff* 5plet ♩ impro for 10", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

*ff* 5plet ♩ impro for 10", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

*ff* 5plet ♩ impro for 10", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

*ff* 5plet ♩ impro for 10", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

The musical score consists of nine staves, each representing a different instrument. Each staff contains a 5-note staccato pattern with rests of varying lengths, marked with accents and dynamics. The notes are: G4, F#4, E4, D4, C4. The rests are: 1/4, 1/2, 3/4, 1, 1/2, 1/4. The dynamics are: *ff*. The accents are: natural.

rehearsal letter J

*fff* 6plet ♩ impro for 8", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

*fff* 6plet ♩ impro for 8", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

*fff* 6plet ♩ impro for 8", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

*fff* 6plet ♩ impro for 8", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

*fff* 6plet ♩ impro for 8", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

*fff* 6plet ♩ impro for 8", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

*fff* 6plet ♩ impro for 8", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural

The image shows a musical score for rehearsal letter J, consisting of seven staves for different instruments: Clarinet (Cl), Saxophone (Sax), Trombone (Tbn), Keyboard (Kybrd), Violin (Vln), Guitar (Gtr), and Viola (Vlc). Each staff contains a 6-note melodic line with dynamic marking 'fff' and performance instructions: '6plet ♩ impro for 8", using this row of pitches interspersed with rests of increasing then decreasing length, only accentuating each pitch a natural'. The notes are: Cl (Bb, A, G, F, E, D), Sax (Bb, A, G, F, E, D), Tbn (Bb, A, G, F, E, D), Kybrd (Bb, A, G, F, E, D), Vln (Bb, A, G, F, E, D), Gtr (Bb, A, G, F, E, D), and Vlc (Bb, A, G, F, E, D). The notes are interspersed with rests of increasing then decreasing length, and each note is accented.





*Annex 3*



*Birds are the True Masters*

*by Dr Robert Casteels*

# *Birds are the True Masters*

by Dr Robert Casteels

I enjoy the sound of birds, frogs and insects. I am content to stroll quietly in nature, initially without concern for ornithological identification. I can relate to stories related by bird enthusiasts about birds singing in a particular musical key or developing elaborate structural patterns. I am overwhelmed by the melodic complexity and avoidance of rigid numerical repetition in bird songs. In short, all that surpasses what my trained ear as a professional musician can grasp. My interest was spurred by an interesting article published in 2006 by Nature Watch. Two years later, this journey led to the creation of an original music composition based on the songs of some birds resident in South East Asia.

## **Why, when, for whom and how do birds sing? How do they learn?**

The short answer is that the scientific community has not yet been able to come up with factual answers applicable to all bird species. Avian diversity is far richer in the tropics than in the temperate zones, yet most research has taken place in the temperate regions. The study of bird song is more intimidating than ever. I attempt here to highlight ten points for which there is experimental evidence.

1. Birds have a rather poorly developed olfactory system. They depend heavily on sound which travels in all directions and over long distances, making it a more effective means of communication than visual signals especially in darkness and poor light. However, there are factors, such as humidity, temperature and landscape, that affect the quality of sound transmission.



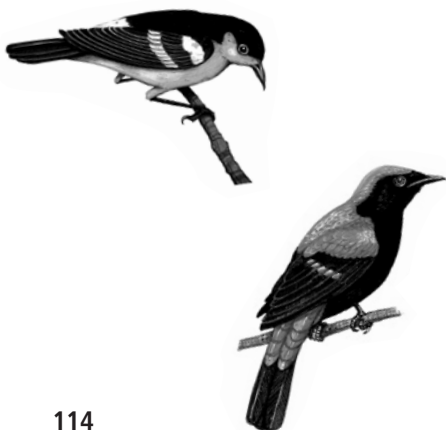
2. The syrinx, the equivalent of the human larynx, is the sound-producing organ in birds. Located at the bronchial junction, the syrinx has two potential sound sources, one in each bronchus. Hence, the two sides of a bird's syrinx can operate independently. Therefore, it is possible for a bird to repeat a sound at such high speeds of that we humans seemingly hear one constant pitch instead of a series of short sounds interrupted by interval of about 10 milliseconds. In mammals, it is clear that the sound is produced during exhalation, akin to how sound is produced by a wind instrument. However, in birds, ornithologists disagree as to how and when sound is produced, whether it is during exhalation or inhalation.
3. Unhatched eggs can already vocalize, but the song learning process takes place at different times for different species - some bird species learn as juveniles while others learn as juveniles and young adults. There is a great difficulty in determining exactly how much song learning and song recognition is innate as opposed to learnt from what the young bird hears. Bird songs and human music resemble each other acoustically. Just as babbling human babies, young birds go through a period of so called subsong or whisper song, which is quiet and variable. Gradually the song crystallizes into the full song typical of adults of the species. Some birds reared in acoustic isolation produce aberrant songs, some do not. After a critical time window for song learning, some species will no longer enlarge its repertoire. On the other hand, males of other species do update their song repertoire from year to year, possibly to rival new males.
4. Huge variations exist between species in the variety and size of their repertoire as well as the way this repertoire is used. Most birds sing more than one version of their principal species' song while others do not have such variations. These geographical variations are known by ornithologists as dialects. Some species develop intricate songs, others do not. A complex song individualizes its singer, to its advantage versus a potential mate, but also at the same time to its disadvantage versus a possible predator.
5. In most species, only the male sings. Experimental evidence has shown that variations in testosterone levels have an effect upon chicks' vocalizations, and in turn, the songs they sing. Males do not necessarily learn the songs of their natal area. Males proclaim and defend their territory by countersinging against rival males, which stimulates the females for sexual display and readiness. The rate of male songs peaks with the fertile periods of the females. In a Darwinian logic, female birds may be selecting males on the basis of the amount and complexity of the songs males sing as a guarantee of excellent genes. Females do not necessarily prefer to mate with males singing the same dialect as their fathers. The better a male sings in quantity and quality, the less he spends time feeding. Consequently, he must be an efficient feeder holding a territory of good feeding quality.
6. In a few species, females also sing. Females sing within the mated pair in situations such as when other females appear, or to trick the male into returning by giving the impression that a rival male is trespassing on his territory. Some pairs of male and female sing elaborate antiphonal duets, alternating different notes. Sometimes the duet is so tight that the song sounds like a single call.

7. There are annual song-cycles and daily song-cycles. Some species sing up to 22,200 songs during a single day. The dawn chorus, which refers to the marked increase of singing during dawn, is still not fully explained. Some species sing their last song of the day in about the reverse order of their first song of that day. The song production peaks in the morning, decreases and reaches a minimum after midday, increases again towards the evening.
8. Most species of birds learn only the song of their own species and seem to be attracted by the song of their own species. The songs that are attractive to human ears are not necessarily those birds use for wooing. Mimicry is rare, except when imitating competing species or predators, so that the singer's territory appears to be dangerous and well defended.
9. Parent-offspring recognition works even in a crowded restricted space such as on a small isolated island. Many species have two clearly different alarm calls, one for a flying predator and another for a predator on the ground or perched in a tree. Defending food always corresponds to the lowest-pitched of all the sounds a species makes.

10. Insects, amphibia, birds and mammals have developed a language of sound to a high degree of sophistication. Singing is expensive in terms of energy and must therefore be utilitarian and functional. However, nothing prevents us to accept that a relaxed and satiated bird may at times emit songs for sheer pleasure.

### **Birds are the True Masters**

Ornithologist Charles Harsthorne coined the word 'ornithomorphism' or the bird's judgment of human music as opposed to anthropomorphism. What did the original inhabitants of the Botanic Gardens, that is, the birds, make of my music? I wonder. In 1892, the then famous 51-year-old Czech composer Antonin Dvořák accepted a lucrative academic position in New York city. However, disliking the urban and socialite environment, Dvořák spent time in the country side of Iowa that reminded him of his native Bohemia. There he is said to have been irritated by the incessant call of a scarlet tanager (quote: "that damned bird") and to have exclaimed: (quote) "Birds are the true masters". In all humility, I concur.



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