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Bacteria



For Flute, Oboe /
Cor anglais, and
Clarinet
(3 Players)

Tags / Keywords

Contemporary Music / Zeitgenössische Musik / Chamber Music / Kammermusik
Music for Wood Instruments / Music for Flute, Oboe – Cor anglais, and Clarinet
Music of the early 21th century

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Further notice

If you need performance material, e.g. voice / part extracts / Stimmenauszüge, feel free to contact me via one of the following mail addresses:

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Spielanweisungen / Playing instructions

- Die Partitur ist transponierend. / The score is transposing.
- Vorzeichen gelten für den ganzen Takt / Accidentals apply to the entire measure.
- Der Oboe – Englischhorn-Part soll von einem Spieler gespielt werden. / The Oboe – Cor Anglais part shall be performed by a single player.

Concept

The piece maps biological processes and structures in the context of bacteria, in particular Escherichia Coli (E. Coli), to music.

Structure

The piece consists of the parts A, B C and D.

A

Part A (Spreading) maps the cell proliferation process of a bacterial culture (starting with one individuum) on the base of the numerical schema in Fig. 1 to a note schema (starting with Gis / G sharp for the Generation 1 cell).

B

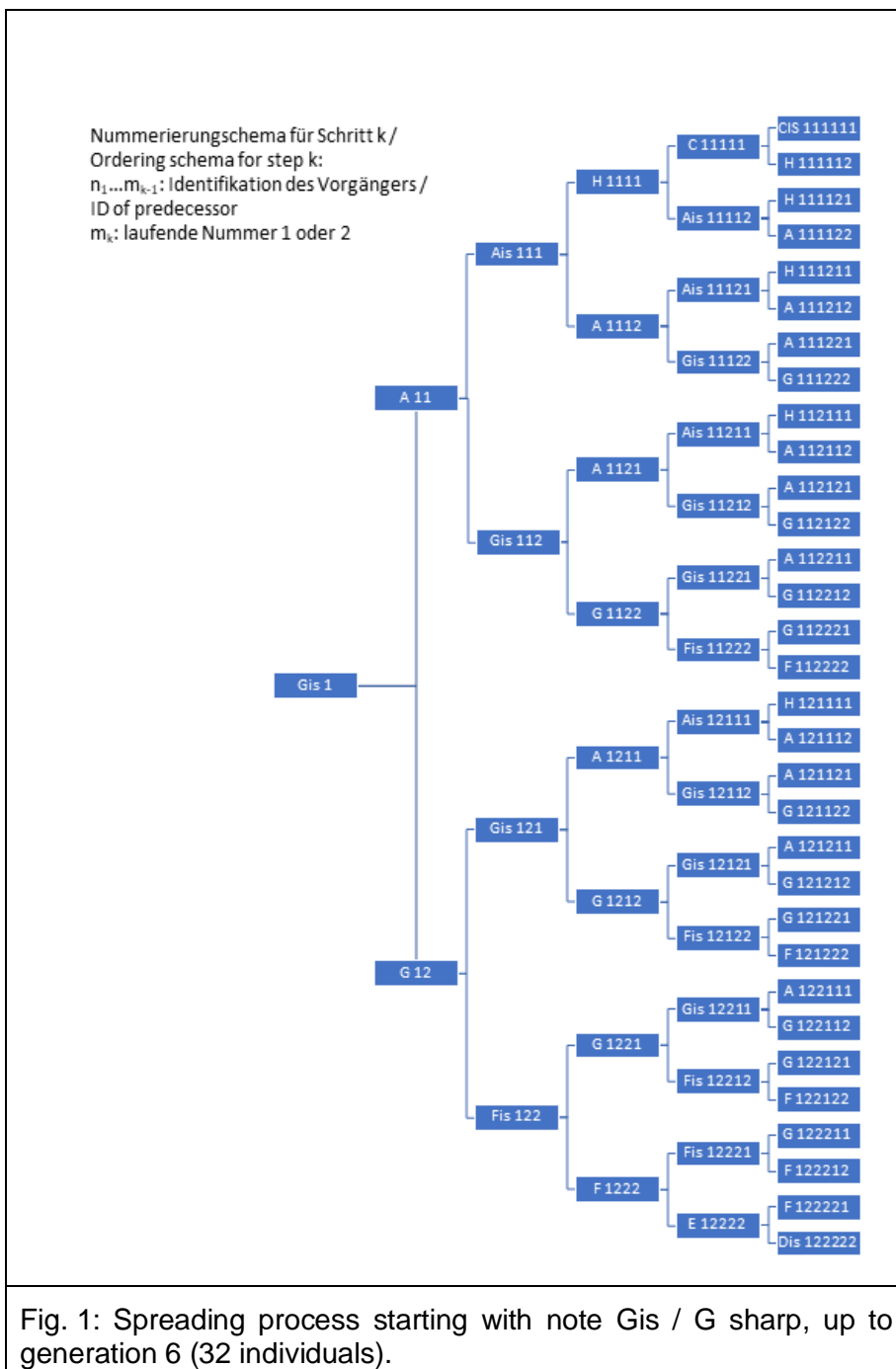
Part B (Name Canon) is based on a row derived from the name of the bacteria:

Escherichia coli

→

Es-c-h-e-/-c-h-/-a-c-/-/-

and develops a canon using the rows in Fig. 2:



Escherichia Coli: Es-c-h-e-/-/-c-h-/-a-c-/-/-/

G1 → K (Kr)

Fig. 2: Used row and transformations

C

Part C (DNA) maps the beginning (first 16 x 8 nucleobases) of the E-Coli genome¹² and the complementary strand to a note sequence and constructs a fugue on this sequence. The nucleotide mapping is as follows:

Nucleobase	Pitch / note
A	A
C	C
G	G
T	Fis

The sequence is (organized in 16 octets):

1. AGCTTTTC	9. AGCAGCTT
2. ATTCTGAC	10. CTGAACTG
3. TGCAACGG	11. GTTACCTG
4. GCAATATG	12. CCGTGAGT
5. TCTCTGTG	13. AAATTAAA
6. TGGATTAA	14. ATTTTATT
7. AAAAAGAG	15. GACTTAGG
8. TGTCTGAT	16. TCACTAAA

D

The piece ends with a retrograde (Krebs) of part A.

A version of the score with all mapping references and number codes can be find at

<https://die-einsamkeit-der-partitur.de/wp-content/uploads/bacteria-4-systeme-with-number-codes.pdf>

¹ From Escherichia coli str. K-12 substr. MG1655, complete genome

² <https://www.ncbi.nlm.nih.gov/nuccore/U00096.2?report=fasta>

The score is transposing

A ♩ = 100 (Spreading) 5 2 individuals 10 15 4 ind.

Flute: - - - - -

Oboe / C. A.: - - - - - C. A. *ppp* *ppp*

Clarinet in B_♭: <> <> <> <> <> <> <> *ppp* *pp*

20 25 8 ind. 16 ind.

Fl.: - - - - - *pp* *p*

C. A.: - - - - - *pp* To Ob. Ob. *p*

Cl.: *pp* *p*

30 32 ind. 35

Fl.: *p* *p*

Ob.: *f* *f*

Cl.: *f* *f*

40

Fl.: *mf* *f*

Ob.: *mf* *f*

Cl.: *mf* *f*

45

Fl.: *f*

Ob.: *f* 3

Cl.: 3 3

Fl. *p* 50

Ob. *p*

Cl. *p*

Fl. *pp* 55 **B** (Name Canon) *mp* 60

Ob. To C. A. *p* C. A.

Cl. *p* *mf*

Fl. *f* 65

C. A. *mf* *mp*

Cl. *mp* *mf*

Fl. *mf* 70

C. A. *mf*

Cl.

Fl. *p* 75 **C** *p* *ppp* *p*

C. A. To Ob. *p*

Cl. *p*

rit. $\text{♩} = 100$ (DNA)

80 *ppp* *p* *p* *p* 85 *p*

90 95 *mf*

8^{va} 100 105 *f* *f* *f*

110 *f* *mf* *mf* *tr* (a/h) *tr* (a/h)

115 *mf* *tr* (b) *tr* (h/c) *tr* (c/d)

120 *mf* *mp* *rit.* 125 5

Fl. *mf* *mp* *rit.* 125 5

Ob. *mf* *mp* To C. A.

Cl. *mf* *mp*

4 **D** (Retrograde of A) = 100 130 135

Fl. *ppp* *pp* *ppp* *pp* *ppp* *pp* *ppp* *pp* *ppp* *ppp*

Ob. C. A. *pp* *ppp*

Cl. *pp* *ppp*

140 145

Fl. *pp* *ppp*

C. A. *pp* *ppp*

Cl. *pp* *ppp*

150

Fl. *pp* *ppp*

C. A. *pp* *ppp*

Cl. *pp* *ppp*

♩ = 100
A (Spreading) 2 individuals 4 ind. 20

Fl. 7 8

25 8 ind. *pp*

16 ind. 30 32 ind. *p*

35 *mf*

40 *f*

45

The musical score is written on a single treble clef staff. It begins with a tempo marking of quarter note = 100 and a section marker 'A'. The score is divided into measures, with some measures containing thick black bars indicating rests for specific numbers of individuals: 7, 8, and 20. The key signature has one flat (B-flat). The time signature changes from 3/4 to 2/4 at measure 8, and then to 4/4 at measure 25. Dynamics include *pp* (pianissimo), *p* (piano), *mf* (mezzo-forte), and *f* (forte). The piece concludes with a 'V.S.' (Vivace) instruction.

50
p

55
pp

(Name Canon)
B 2 60
mp

65
f 3 3 3 3 3 3

mf 3 3 3 3

70

rit. 75

Flute

C $\text{♩} = 100$ (DNA) *p*

85 *p*

90 95

8^{va}-----
100 *f*

(8)-----
105

(8)-----
110 *f* *tr* (a/h) *tr* (a/h) 115

120 *mf*

4

Flute **rit.** 125

mp

4

D (Retrograde of A)

$\text{♩} = 100$

130

135

ppp pp ppp pp ppp pp ppp pp ppp

140

145

150

Ob. /
C. A.

$\text{♩} = 100$

A

8 C.A. 10 15

20 25

To Ob. Ob. 30

35

40

45

V.S.

50

3 3

p

To C. A.
55

C. A. **B** 60

p

65

mf 3 3 3 3 3

mp 3 3

mf

70

rit. 75 To Ob.

A tempo
C Ob.

120

mf

rit. 125 To C. A.

mp

$\text{♩} = 100$
C.A. **D** 130 135

pp

140 **11**

ppp

Cl. in B

A ♩ = 100

ppp

ppp

pp

pp

p

p

mf

mf

V.S.

45

50

p

55

B 60

p *mf*

65

mp

mf

70

rit. 75

p

C ♩ = 100

ppp

p 80

ppp

85

8

95

mf

100

f

105

mf

110

Clarinet in B \flat

115

Musical staff 1: Clarinet in B \flat , measures 115-119. The staff contains a series of eighth-note runs in measures 115 and 116, followed by a quarter note in measure 117, and trills in measures 118 and 119. The trills are marked with a trill symbol and the notes (h/c) and (c/d). The dynamic is *mf*.

120

Musical staff 2: Clarinet in B \flat , measures 120-125. The staff contains eighth-note runs in measures 120-121, followed by quarter notes in measures 122-123, and eighth-note runs in measures 124-125. The dynamic is *mf* in measure 120 and *mp* in measure 124. A *rit.* marking is present at the end of the staff.

rit.
125

D ♩ = 100

130

Musical staff 3: Clarinet in B \flat , measures 130-134. The staff starts with a key signature change to two sharps (D major) and a time signature change to 2/4. It contains quarter notes in measures 130-131, followed by quarter notes in measures 132-134. The dynamic is *pp*.

135

140

Musical staff 4: Clarinet in B \flat , measures 135-140. The staff contains quarter notes in measure 135, followed by a time signature change to 3/4 in measure 136, and quarter notes in measures 137-140. The dynamic is *ppp*. Accents are placed over the notes in measures 137-140.

145

150

Musical staff 5: Clarinet in B \flat , measures 145-150. The staff contains quarter notes in measures 145-149, followed by a 3-measure rest in measure 150. The dynamic is *ppp*. Accents are placed over the notes in measures 145-149.