

Swarm Theory

Composed by
Gary Fagan ASCAP

Program Notes For “Swarm Theory”

A single ant or bee does not display high levels of intelligence, but their colonies do. The study of swarm intelligence is providing insights that can help humans manage complex systems from truck routing to military robots. Swarm Theory seeks to investigate this group intelligence comes from and answer the question “How do the simple actions of individuals add up to the complex behaviour of a group?”. How do hundreds of honeybees make a critical decision about their hive if many of them disagree? What enables a school of fish to co-ordinate its movements so precisely it can change direction in a flash like a single organism? The collective abilities of such animals (none of which grasps the big picture, but each of which contributes to the groups success) seem miraculous even to the biologists who study them. This piece seeks to musically depict swarm behaviour. The “insectile” sound effects and the sudden harmonic and melodic turns are used to illustrate this type of behavioural phenomenon musically. The angular lines and rhythms help convey this idea further. Researchers are currently studying swarm behaviours in the hope that they may one day help humans work toward more efficiency in dealing with large systems in our everyday lives.

Instrumentation:

1	Conductor	3	B♭ Trumpet 1
10	Flutes	3	B♭ Trumpet 2
2	Oboe	3	B♭ Trumpet 3
2	Bassoon	2	F Horn 1
4	B♭ Clarinet 1	2	F Horn 2
4	B♭ Clarinet 2	2	Trombone 1
4	B♭ Clarinet 3	2	Trombone 2
2	B♭ Bass Clarinet	2	Trombone 3
2	E♭ Alto Saxophone 1	2	Euphonium
2	E♭ Alto Saxophone 2	2	Baritone T. C.
2	B♭ Tenor Saxophone	3	Tuba
2	E♭ Baritone Saxophone	2	Chimes/Bells/Xylophone
		2	Snare Drum/Bass Drum
		4	Tambourine/Triangle/ Break Drum/Cabasa/Bongos
		2	Timpani

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Transposed Score
(Duration: 3:40)

Swarm Theory

Commissioned by the Canonsburg Middle School Symphonic Band
Paul Rush, Conductor

Composed by
Gary Fagan
ASCAP

Adagio ♩ = 60

The score is written for a symphonic band. The instruments and their parts are as follows:

- Flute:** Part 1, playing a continuous sixteenth-note pattern.
- Oboe:** Part 1, playing a continuous sixteenth-note pattern.
- Bassoon:** Part 1, playing a continuous sixteenth-note pattern.
- B♭ Clarinet:** Parts 1 and 2, 3, playing a continuous sixteenth-note pattern.
- B♭ Bass Clarinet:** Part 1, playing a continuous sixteenth-note pattern.
- E♭ Alto Saxophone:** Parts 1 and 2, playing a continuous sixteenth-note pattern.
- B♭ Tenor Saxophone:** Part 1, playing a continuous sixteenth-note pattern.
- E♭ Baritone Saxophone:** Part 1, playing a continuous sixteenth-note pattern.
- B♭ Trumpet:** Parts 1 and 2, 3, playing a continuous sixteenth-note pattern.
- F Horn:** Parts 1 and 2, playing a continuous sixteenth-note pattern.
- Trombone:** Parts 1 and 2, 3, playing a continuous sixteenth-note pattern.
- Euphonium:** Part 1, playing a continuous sixteenth-note pattern.
- Tuba:** Part 1, playing a continuous sixteenth-note pattern.
- Chimes/Bells:** Part 1, playing a continuous sixteenth-note pattern.
- Xylophone:** Part 1, playing a continuous sixteenth-note pattern.
- Snare Drum:** Part 1, playing a continuous sixteenth-note pattern.
- Bass Drum:** Part 1, playing a continuous sixteenth-note pattern.
- Tambourine:** Part 1, playing a continuous sixteenth-note pattern.
- Triangle:** Part 1, playing a continuous sixteenth-note pattern.
- Break Drum:** Part 1, playing a continuous sixteenth-note pattern.
- Bongos:** Part 1, playing a continuous sixteenth-note pattern.
- Timpani:** Part 1, playing a continuous sixteenth-note pattern.

The score is written in 3/4 time and features a variety of instruments including woodwinds, brass, and percussion. The tempo is Adagio at 60 beats per minute. The score is divided into six measures, with some instruments entering in later measures. The dynamic is generally fortissimo (ff).

10 Allegro ♩=120

[illegible]

Swarm Theory/Fagan/p. 4

16 17 **18** 19 20 21 22 23 24

Fl.

Ob.

Bsn.

B♭ Cl.
1

B♭ Cl.
2, 3

B♭ B.
Cl.

E♭ A.
Sax.
1, 2

B♭ T.
Sax.

E♭ B.
Sax.

B♭ Tpt.
1

B♭ Tpt.
2, 3

F Hn.
1

F Hn.
2

Tbn.
1

Tbn.
2, 3

Euph.

Tba.

Xyl.

S.D.
B.D.

Tamb.
Tri.
Br. Dr.
Cab.
Bng.

Timp.

f

f

Click Sticks

On Rim

On Head

f

Swarm Theory/Fagan/p. 5

[illegible]

Swarm Theory/Fagan/p. 6

35 36 37 38 39 40 41 42 43 44

Fl.

Ob.

Bsn.

B♭ Cl.
1

B♭ Cl.
2, 3

B♭ B.
Cl.

E♭ A.
Sax.
1, 2

B♭ T.
Sax.

E♭ B.
Sax.

B♭ Tpt.
1

B♭ Tpt.
2, 3

F Hn.
1

F Hn.
2

Tbn.
1

Tbn.
2, 3

Euph.

Tba.

Xyl.

S.D.
B.D.

Tamb.
Tri.
Br. Dr.
Cab.
Bng.

Timp.

div.

The musical score is written for a large ensemble. The woodwind section includes Flute, Oboe, Bassoon, Clarinets (B♭ and E♭), and Saxophones (B♭ and E♭). The brass section includes Trumpets (B♭), Horns (F), Trombones (F and E♭), Euphonium, and Tuba. The percussion section includes Xylophone, Snare Drum, Bass Drum, Tambourine, Triangle, Bongo, Conga, and Tom-tom. The score is in B-flat major and 4/4 time. Measures 35-44 show a variety of musical textures, including melodic lines, harmonic support, and rhythmic patterns. The Oboe and B♭ Trumpet 1 parts feature a 'div.' (divisi) marking in measure 38.

Swarm Theory/Fagan/p. 7

45 46 47 48 49 50 51 52 53 54

Fl. *f*

Ob. *f*

Bsn.

B♭ Cl. 1 *f*

B♭ Cl. 2, 3 *f*

B♭ B. Cl.

E♭ A. Sax. 1, 2 *f*

B♭ T. Sax.

E♭ B. Sax.

B♭ Tpt. 1 *f*

B♭ Tpt. 2, 3 *f* *div.*

F Hn. 1

F Hn. 2

Tbn. 1

Tbn. 2, 3

Euph.

Tba.

Xyl.

S.D. B.D.

Tamb. Tri. Br. Dr. Cab. Bng.

Timp.

Swarm Theory/Fagan/p. 8

55 56 57 58 59 60 61 62 63 64

Fl. *f*

Ob. *f*

Bsn. *legato* *mf*

B♭ Cl. 1 *f*

B♭ Cl. 2, 3 *f*

B♭ B. Cl. *f*

E♭ A. Sax. 1, 2 *f*

B♭ T. Sax. *legato* *mf*

E♭ B. Sax. *legato* *mf*

B♭ Tpt. 1 *mf*

B♭ Tpt. 2, 3 *mf*

F Hn. 1 *legato* *mf*

F Hn. 2 *legato* *mf*

Tbn. 1 *legato* *mf*

Tbn. 2, 3 *legato* *mf*

Euph. *legato* *mf*

Tba. *legato* *mf*

Xyl. *Bells* *f* *Xyl.* *mf*

S.D. B.D. *mf*

Tamb. Tri. *Tri.*

Br. Dr. Cab. Bng. *Cabasa* *mf*

Timp.

65 66 67 68 69 70 71 72 73 **74** 75

Fl.

Ob.

Bsn.

B♭ Cl. 1

B♭ Cl. 2, 3

B♭ B. Cl.

E♭ A. Sax. 1, 2

B♭ T. Sax.

E♭ B. Sax.

B♭ Tpt. 1

B♭ Tpt. 2, 3

F Hn. 1

F Hn. 2

Tbn. 1

Tbn. 2, 3

Euph.

Tba.

Xyl.

S.D.
B.D.

Tamb.
Tri.
Br. Dr.
Cab.
Bng.

Timp.

marcato
f

marcato
f

marcato
f

marcato
f

marcato
f

marcato
f

marcato
f

mf

Tamb.
Bongos
f

f

Swarm Theory/Fagan/p. 10

76 77 78 79 80 81 82 83 84 85 Pencil on Stand

Fl. *f* *ff* Pencil on Stand

Ob. *f* *ff* Pencil on Stand

Bsn. *f* *ff*

B♭ Cl. 1 *f* *ff*

B♭ Cl. 2, 3 *f* *ff*

B♭ B. Cl. *ff*

E♭ A. Sax. 1, 2 *f* *ff*

B♭ T. Sax. *ff* Pencil on Stand

E♭ B. Sax. *ff*

B♭ Tpt. 1 *f* *ff* Pencil on Stand

B♭ Tpt. 2, 3 *f* *ff* Pencil on Stand

F Hn. 1 *ff* Pencil on Stand

F Hn. 2 *ff* Pencil on Stand

Tbn. 1 *ff* Pencil on Stand

Tbn. 2, 3 *ff* Pencil on Stand

Euph. *ff* Pencil on Stand

Tba. *ff* Pencil on Stand

Xyl. *f* *ff* Pencil on Stand

S.D. B.D. *ff* On Rim

Tamb. Tri. Br. Dr. Cab. Bng. *ff* On Rim

Timp. *ff*

Swarm Theory/Fagan/p. 11

86 87 88 89 90 91 92 93 94 95 96

Fl. *f* *mf*

Ob. *f* *mf*

Bsn. *f* *mf*

B♭ Cl. 1 *f* *mf*

B♭ Cl. 2, 3 *f* *mf*

B♭ B. Cl. *f* *mf*

E♭ A. Sax. 1, 2 *f* *mf*

B♭ T. Sax. *f*

E♭ B. Sax. *f* *mf*

B♭ Tpt. 1 *f*

B♭ Tpt. 2, 3 *f*

F Hn. 1 *f*

F Hn. 2 *f*

Tbn. 1

Tbn. 2, 3

Euph. *f*

Tba.

Xyl. *f* *mf*

S.D. *f* *mf*

B.D. *f* *mf*

Tamb. *f* *mf*

Tri. *f* *mf*

Br. Dr. *f* *mf*

Cab. *f* *mf*

Bng. *f* *mf*

Timp.

Bells Only

On Head