Jolyon Laycock

Trilithon

for orchestra
(1968 - revised and completed 2015)

Trilithon
(1986 - revised and completed 2015)

Although “Trilithon” was not finished until January 2015, in the context of my life-long output as a composer, it must be seen as an early work. I first began work on it in 1968 as a student at Nottingham University at the age of 22. I intended to submit it for the composition paper during the final year of my B.Mus degree but as the deadline approached it became obvious that in embarking on a large 20-minute composition for orchestra I had bitten off more than I could chew and would be unable to finish it in time. I managed to complete the full score of about a third of the composition in pencil manuscript. I decided to submit this together with detailed sketches of the remainder in short score. I am happy to say I still got the degree.

The piece was strongly influenced by my studies of the work of Karlheinz Stockhausen. In 1967 I was lucky enough to be awarded a bursary to attend the month-long composition course at the Dartington Summer School in Devon. In that particular year the Summer School ran an extended course in composition generously funded by the Elmhurst family. The course was headed by two French composers, Pierre Mariétan and Michel Decoust, both of them pupils of Pierre Boulez. A remarkable number of other prominent British composers were also in attendance in various advisory and teaching capacities including David Bedford, Roger Smalley, Hugh Wood and Elizabeth Lutyens. Mariétan introduced us to the formal theories of Stockhausen and gave us the task of composing examples of music using point-form, group-form, collective form and moment-form to be performed in a final concert by members of the then embryonic Nash Ensemble.

At the end of my final year at Nottingham, having retrieved the unfinished manuscript and sketches from the examination board, I again registered for the composition course at the 1968 Dartington Summer School. The course was much smaller in that year and ran for only two weeks led by Michel Decoust. I have to admit that I did not get on well with Decoust. The relationship got off to a bad start. I showed him my unfinished manuscript expecting to get some helpful feedback and maybe some encouragement to help me continue with the project. Instead he ignored the 80 pages of meticulously notated full score, and greeted the 104 pages of blank manuscript with derisive laughter, an unforgiveable act of humiliation which I have never forgotten and which probably accounts partly for my subsequent abandonment of the project.

However some unconscious inner certainty about its worth prevented me from destroying it. Instead I stuffed the manuscript and sketches into a stout brown envelope with the words “orchestral piece” scrawled on the outside and deposited it in the bottom drawer of a bureau. This particular heirloom was built by my father when he was an apprentice carpenter at Chatham Dockyard and given to me as a present when I needed to furnish my student flat in Nottingham. It has remained in my possession ever since. The sketches of the orchestral piece remained in the bureau undisturbed and untitled for 46 years until I retrieved them in 2013 and resolved to complete it and give it a name.

Throughout those 46 years, if I thought about the piece at all, I would refer to it simply as my Arch Piece. It is architectural in conception. It takes the form of three arches. Each arch begins with a foundation stone and culminates in a central “capstone”. Before I abandoned the piece in 1968 I had completed three sections of the piece: the first arch until just after its capstone, a short fragment of the second arch consisting only of the capstone, and a substantial part of the third arch from its capstone to the end of the piece.

The title only occurred to me in first weeks of 2015. The word “Trilithon” usually refers to the great arched megaliths at Stonehenge consisting of two massive vertical slabs of sarsen capped with an equally massive sarsen lintel. Although my piece was not inspired in any way by contemplation of Stonehenge itself, the word “Trilithon” seems to invoke the work’s monumental construction and the rough-hewn quality of its orchestral textures as well as embracing the number three.

Dartington was also the start of my brief association with Roger Smalley, himself a former teaching assistant of Stockhausen. Smalley possessed quite dazzling abilities as a sight-reader of the most complex modern scores. He was establishing a phenomenal reputation as an interpreter of Stockhausen’s piano music including Klavierstücke V & VI. Smalley subsequently accepted me as a private piano pupil. I backed up my studies of Stockhausen’s compositional technique with my own detailed analysis of “Gruppen for Three Orchestras”, and by reading his famous article published in Die Reihe entitled “Wie der Zeit geht” (How Time Passes) in which he describes the rhythmic techniques and theories of musical time that he used in the composition of “Gruppen”.

The article was written during the heyday of European avant-garde serialism. Stockhausen challenged the orthodoxy of the time as exemplified in works such as Messiaen’s “Modes de Valeur et d’Intensité” and Boulez’ “Structures pour deux pianos” in which every note of the composition was individually defined according to the five parameters of pitch, duration, attack, dynamic and tone colour. Applying principles of Gestalt Psychology, Stockhausen argued that the human mind perceived differences of duration in terms of logarithmic ratios and not in terms of additive arithmetical values. He pointed out that it is much easier to perceive the difference between sounds of one second and two seconds duration than the difference between sounds of eleven and twelve seconds duration. Working in the new media of electro-acoustic composition he noted that if an electronic tone such as a square wave was lowered in frequency by five or more octaves it became audible as a series of rapid clicks. Rhythmic pulse could be treated as equivalent to pitch. In “Gruppen” he used a sequence of twelve graduated metronome speeds based on the same logarithmic progression as the tuning of the notes of the mean-tone tempered chromatic scale. He also reasoned that since the tone colour of an instrument was the result of the balance between overtones sounding above the fundamental pitch, the same principle might be applied to rhythmic structure. A violin string vibrates simultaneously in different rhythmic pulse speeds with wavelengths that are whole-number fractions of its length: 1/2, 1/3, 1/4, 1/5, 1/6 etc. If the frequency of the fundamental is lowered by several octaves until it becomes an audible pulse, so too are its harmonics. Stockhausen referred to the resulting rhythmic structure as a “formant spectrum”.

Typically in “Gruppen”, a bar of 4/4 time may contain simultaneous rhythmic layers of different speeds, some of them using so-called irrational time values such a triplets, quintuplets, septuplets and so on. Further rhythmic variety is created by introducing tied notes and rests into the texture. The resulting “formant spectra” can be very complex and are productive of elegant visual patterns.

I used similar rhythmic principles in the composition of “Trilithon”. The labour of writing out such a score in manuscript involves painstaking attention to detail. The bar lines must be ruled out meticulously and the different rhythmic layers within each bar must be measured out using special templates. No wonder I was unable to finish the piece in time for the submission deadline. No wonder Stockhausen wrote the words “In Deo gratias” (Thanks be to God) at the end of the score of “Gruppen”. My completion of the score of “Trilithon” in 2015 was aided not so much by God but rather by Sibelius music software which automatically adjusts the horizontal position of the irrational values.

I have been able to reconstruct the entire temporal structure of “Trilithon” from the original sketches. It uses a logarithmic series of nine metronome speeds based not on the chromatic scale, but on the division of a temporal octave into four equal steps, the temporal equivalent of a diminished 7th chord:

58 69 82 97 116 138 164 194

The ratio between adjacent terms in the sequence is approximately 5:6. Between alternate terms it is approximately 5:7 and between every three terms it is 3:5. Every fourth term is of course a temporal octave: 1:2. These ratios are shown in the score as “metric modulations”.

Precise temporal proportions also determine the structure of “Trilithon” on the large scale. As I have already indicated, the work falls into three parts. Each of these has a similar arch-like structure consisting of three elements: an initial rising “pier”, a central “capstone” and a final falling “pier”. Each of these elements is divided into a number of shorter “Moments”. The rising piers and the capstones each consist of twelve moments. The falling piers vary in structure. The durations of the Moments follow a graduated logarithmic sequence of nine terms measured in seconds:

17.5; 14.7; 12.3; 10.4; 8.7; 7.3; 6.2; 5.2; 4.3

These values are exactly equivalent to the sequence of metronome speeds but expressed as durations rather than as frequencies. Every fourth duration is in the ration 2:1.

In 1968 I worked out the metronome speeds and the duration series using a cumbersome process involving the use of logarithm tables and without even the aid of a pocket calculator. In 2015 I was able to double-check and recalculate the values using computer software so discovering that there were small inaccuracies in the original calculations. The chart overleaf shows the structure of the piece using the recalculated values. Durations sometimes deviate from the original values, but only by one or two decimal points.

I presume that I must also have created the pitch content of “Trilithon” systematically but after 45 years I am unable to remember how it was done. The piece seems to be based on a progression of chords with a shifting profile of upper and lower pitches. The textures are mostly chromatically saturated. The harmonies shift at varying frequencies, sometimes changing every bar, or half-bar, sometimes remaining static for up to 30 bars at a time.

Parts 1 and 3 are of equal duration: 6’ 35”.
Part 2 is longer: 7’ 50”.

Parts 1 and 3 begin with a sequence of 12 moments with varying durations and fixed metronome speeds. (bars 1-50; 407-473)

In Part 2, the first 6 moments are joined together to create a single continuous Moment 1’ 22” in length. (bars 165-197)

All three Parts have a central “capstone” preceded by 4 Moments of continuous acceleration. The capstone itself consists of 4 static Moments punctuated by a tam-tam stroke. (bars 71-94; 262-286; 503-525)

In Parts 1 and 2 this is followed by 4 Moments of decceleration. (bars 95-114; 287-316)

The third sequences of each part differ in various ways:
The third sequence of Part 1 consists of 10 Moments with varying durations and fixed metronome speeds. (bars 115-164)
The third sequence of Part 2 consists of 12 Moments of which the final eight are joined together to create a single continuous Moment of 1’44” duration. (bars 317-406)
The capstone of Part 3 is not followed by a decceleration sequence. Instead there is an extended section of continuously fluctuating but ultimately accelerating tempi culminating in Moments of maximum speed and brevity with a total duration of 2’58. (bars 526-604)

The final staccato chord is a kind of homage to Igor Stravinsky whose Symphony in Three Movements ends with a similar flourish. (bar 609)

Jolyon Laycock, Woollard, January 2015

Chart of the temporal structure of “Trilithon”

Part 1

	mm		beats	dura-tion	ratios
fixed tempi	58		14	14.5	
	69		14	12.2	0.8
	69		12	10.4	0.9
	97		14	8.7	0.8
	97		17	10.5	1.2
	97		20	12.4	1.2
	116		20	10.3	0.8
	116		17	8.8	0.9
	82		10	7.3	0.8
	82		12	8.8	1.2
	138		24	10.4	1.2
	138		28	12.2	1.2
Accelerando	69	82	18	14.3	1.2
	82	98	18	12.0	0.8
	97	116	18	10.1	0.8
	116	138	26	12.3	1.2
Capstone	138		24	10.4	0.8
	138		20	8.7	0.8
	138		24	10.4	1.2
	138		28	12.2	1.2
Rallentando	138	116	30	14.2	1.2
	116	97	22	12.4	0.9
	97	82	15	10.1	0.8
	82	69	16	12.7	1.3
fixed tempi	138		34	14.8	1.2
	138		28	12.2	0.8
	82		20	14.6	1.2
	82		24	17.6	1.2
	82		20	14.6	0.8
	116		24	12.4	0.8
	116		20	10.3	0.8
	69		10	8.7	0.8
	69		12	10.4	1.2
	69		14	12.2	1.2

667	394.1

Part 2

	mm		beats	dura-tion	ratios
fixed tempi	97		24	14.8	1.2
	97		20	12.4	0.8
	97		17	10.5	0.9
	97		20	12.4	1.2
	97		24	14.8	1.2
	97		28	17.3	1.2
	58		14	14.5	0.8
	58		12	12.4	0.9
	82		14	10.2	0.8
	82		12	8.8	0.9
	116		20	10.3	1.2
	116		24	12.4	1.2
Accelerando	58	69	15	14.2	1.1
	69	82	16	12.7	0.9
	82	97	22	14.7	1.2
	97	116	31	17.5	1.2
Capstone	116		28	14.5	0.8
	116		24	12.4	0.9
	116		20	10.3	0.8
	116		24	12.4	1.2
Rallentando	116	97	26	14.6	1.2
	97	82	18	12.1	0.8
	82	69	18	14.3	1.2
	69	58	18	17.0	1.2
fixed tempi	116		28	14.5	0.9
	116		24	12.4	0.9
	116		20	10.3	0.8
	116		17	8.8	0.9
	82		14	10.2	1.2
	82		17	12.4	1.2
	82		20	14.6	1.2
	82		17	12.4	0.9
	82		14	10.2	0.8
	82		17	12.4	1.2
	82		20	14.6	1.2
	82		24	17.6	1.2

721	468.4

Part 3

	mm		beats	dura-tion	Ratios
fixed tempi	58		14	14.5	0.8
	97		20	12.4	0.9
	97		17	10.5	0.9
	97		14	8.7	0.8
	69		12	10.4	1.2
	69		14	12.2	1.2
	116		20	10.3	0.8
	116		17	8.8	0.9
	82		10	7.3	0.8
	82		12	8.8	1.2
	138		24	10.4	1.2
	138		28	12.2	1.2
Accelerando	69	82	18	14.3	1.2
	82	97	18	12.1	0.8
	97	116	18	10.1	0.8
	116	138	26	12.3	1.2
Capstone	138		24	10.4	0.8
	138		20	8.7	0.8
	138		24	10.4	1.2
	138		28	12.2	1.2
Variable	69	82	14	12.2	1.0
Tempi	82	97	14	10.2	0.8
	97	116	14	8.7	0.8
	116	138	14	7.2	0.8
	138	116	14	6.1	0.8
	116	97	14	7.2	1.2
	97	82	14	8.7	1.2
	82	97	14	10.2	1.2
	97	116	14	8.7	0.8
	116	138	14	7.2	0.8
	138	164	14	6.1	0.8
	164	138	14	5.1	0.8
	138	116	14	6.1	1.2
	116	97	14	7.2	1.2
	97	82	14	8.7	1.2
	82	97	14	10.2	1.2
	97	116	14	8.7	0.8
	116	138	14	7.2	0.8
	138	164	14	6.1	0.8
	164	194	14	5.1	0.8
	194	164	14	4.3	0.8
	164	138	14	5.1	1.2
	138		14	6.1	1.2
	69		7	6.1	1.2

707	395.6

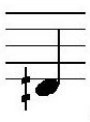
Performance notes:

All transposing instruments at sounding pitch

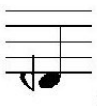
Metric modulations:

(♩=♪) :- ♩ in the old speed equals ♪ in the new speed

(♪5=♪7) :- quintuplet in the old speed equals septuplet in the new speed (new metronome speed will be slower.)



Quarter tone sharp



Quarter tone flat

L.batt. – Legno battuto – hit the strings with the wood of the bow.

Trilithon

for orchestra

Part 1

Jolyon Laycock

A

4/4 ♩=58

3/2 ♩=69 (♪6 = ♪5)

4/4

Flutes

(flute II doubles Piccolo)

Oboes

Clarinets in B♭

(Clarinet II doubles E flat)

Bassoons

Horns in F

Trumpets in B♭

Trombone

Bass Trombone

Suspended cymbals

4 tomtoms

Marimba (doubling vibraphone)

Celesta

Piano

Violins I

Violins II

Violas

Violoncellos

Double Bass

7

B

♩=97

(♪7=♪5)

Fl.

Ob.

Cl.

Bsn.

Hn.

Tpt.

Tbn.

B. Tbn.

Susp. cym.

Toms

Pno.

Vln. I

Vln. II

Vla.

Vc.

15

Fl.
Ob.
Cl.
Bsn.
Hn.
Tpt.
Tbn.
B. Tbn.
Susp. cym.
Toms
Pno.
Vln. I
Vln. II
Vla.
Vc.

C

♩=116
(♪6=♪5)

23

Fl.
Cl.
Bsn.
Hn.
Tpt.
Tbn.
B. Tbn.
Susp. cym.
Toms
Mar.
Cel.
Pno.

C

♩=116
(♪6=♪5)

Vln. I
Vln. II
Vla.
Vc.
Db.

D

♩=82

(♪5 = ♪7)

31

Fl.

Ob.

Cl.

Bsn.

Hn.

Tpt.

Tbn.

B. Tbn.

Susp. cym.

Toms

Mar.

Cel.

Pno.

Vln. I

Vln. II

Vla.

Vc.

Db.

E

♩=138

(♪5=♪3)

37

Fl.

Ob.

Cl.

Bsn.

Hn.

Tpt.

Tbn.

B. Tbn.

Susp. cym.

Toms

Mar.

Cel.

Pno.

E

♩=138

(♪5=♪3)

Vln. I

Vln. II

Vla.

Vc.

Db.

47

F

♩=69

(♪=♩)

accel.

Fl.

Ob.

Cl.

Bsn.

Hn.

Tpt.

Tbn.

B. Tbn.

Susp. cym.

Toms

Mar.

Cel.

Pno.

F

♩=69

(♪=♩)

accel.

l.batt.

Vln. I

Vln. II

Vla.

Vc.

Db.

pizz.

arco

55

♩=82 accel.

♩=97 accel.

Fl.

Ob.

Cl.

Bsn.

Hn.

Tpt.

mute off

mute off

Tbn.

B. Tbn.

Susp. cym.

Toms

Mar.

Pno.

♩=82 accel.

♩=97 accel.

Vln. I

arco

Vln. II

arco

Vla.

arco

Vc.

arco

64

♩=116 accel.

G

♩=138

flutter

Fl.

Ob.

Cl.

Bsn.

Hn.

Tpt.

Tbn.

B. Tbn.

Susp. cym.

damp

Toms

Mar.

Pno.

pizz.

arco

Vln. I

Vln. II

Vla.

Vc.

74

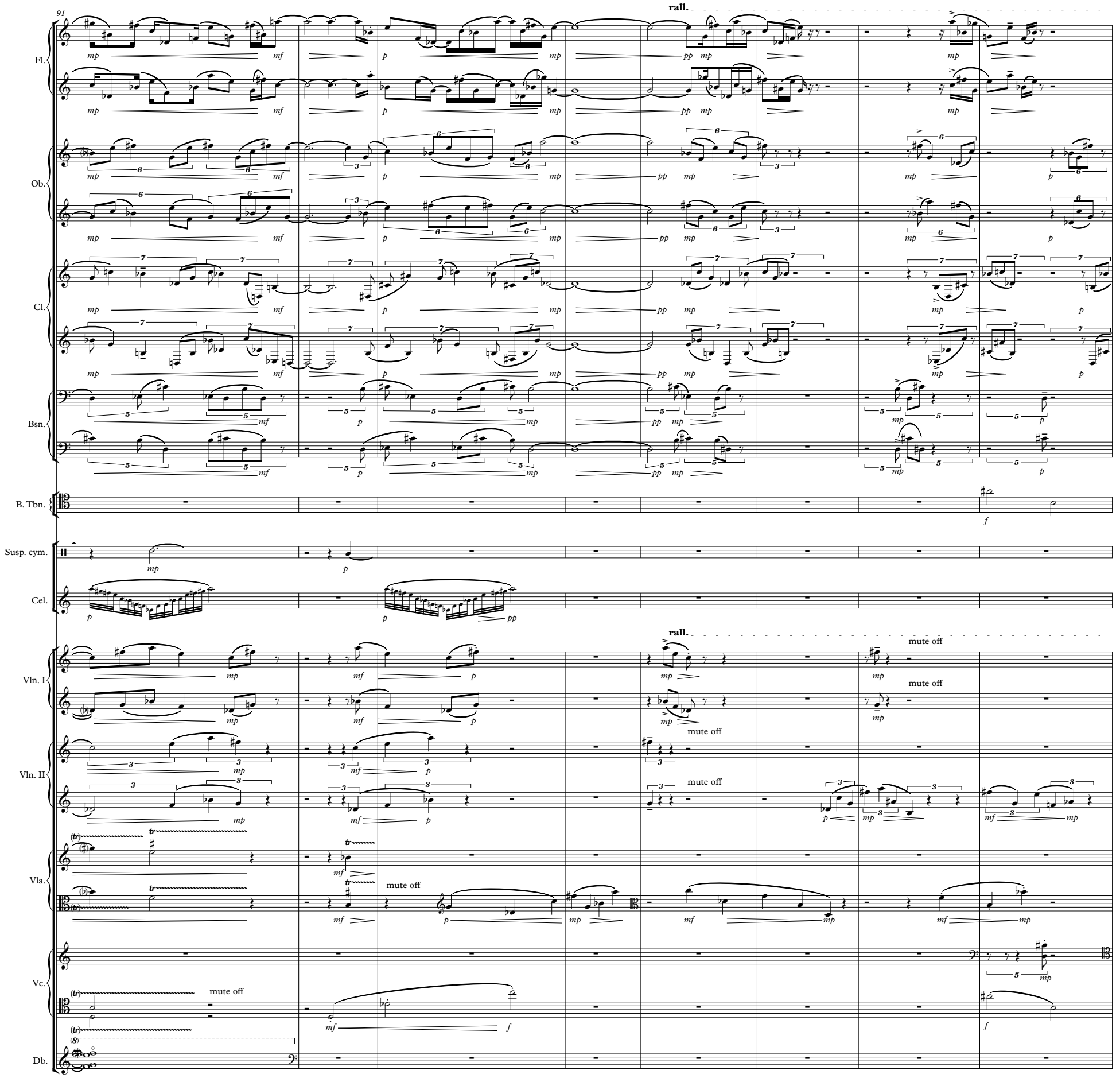
Fl.
Ob.
Cl.
Bsn.
Hn.
Tpt.
Tbn.
B. Tbn.
Susp. cym.
Toms
Tam-tam
Mar.
Cel.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.

mf f ff sffz p cresc. sfz pp fff molto let vibrate pizz. mutes on sul G sul A

84

Fl.
Ob.
Cl.
Bsn.
Hn.
Tpt.
Susp. cym.
Cel.
Vln. I
Vln. II
Vla.
Vc.
Db.

pizz.
arco
div.


91
rall.
Fl.
Ob.
Cl.
Bsn.
B. Tbn.
Susp. cym.
Cel.
Vln. I
Vln. II
Vla.
Vc.
Db.
mute off

99

♩=116

rall.

Fl.

Ob.

Cl.

Bsn.

Hn.

Tpt.

Tbn.

B. Tbn.

Susp. cym.

Mar.

Cel.

Pno.

♩=116

rall.

Vln. I

Vln. II

Vla.

Vc.

106

3/2 ♩.=97 rall.

4/4

Fl.

Ob.

Cl.

Bsn.

Hn.

Susp. cym.

Mar.

Cel.

Pno.

Vln. I

Vln. II

Vla.

Vc.

111

♩=82 **rall.**

H ♩=138

3/2 (♪=♩) **4/4**

Fl.

Ob.

Cl.

Bsn.

Hn.

Susp. cym.

Toms

Mar.

Cel.

Pno.

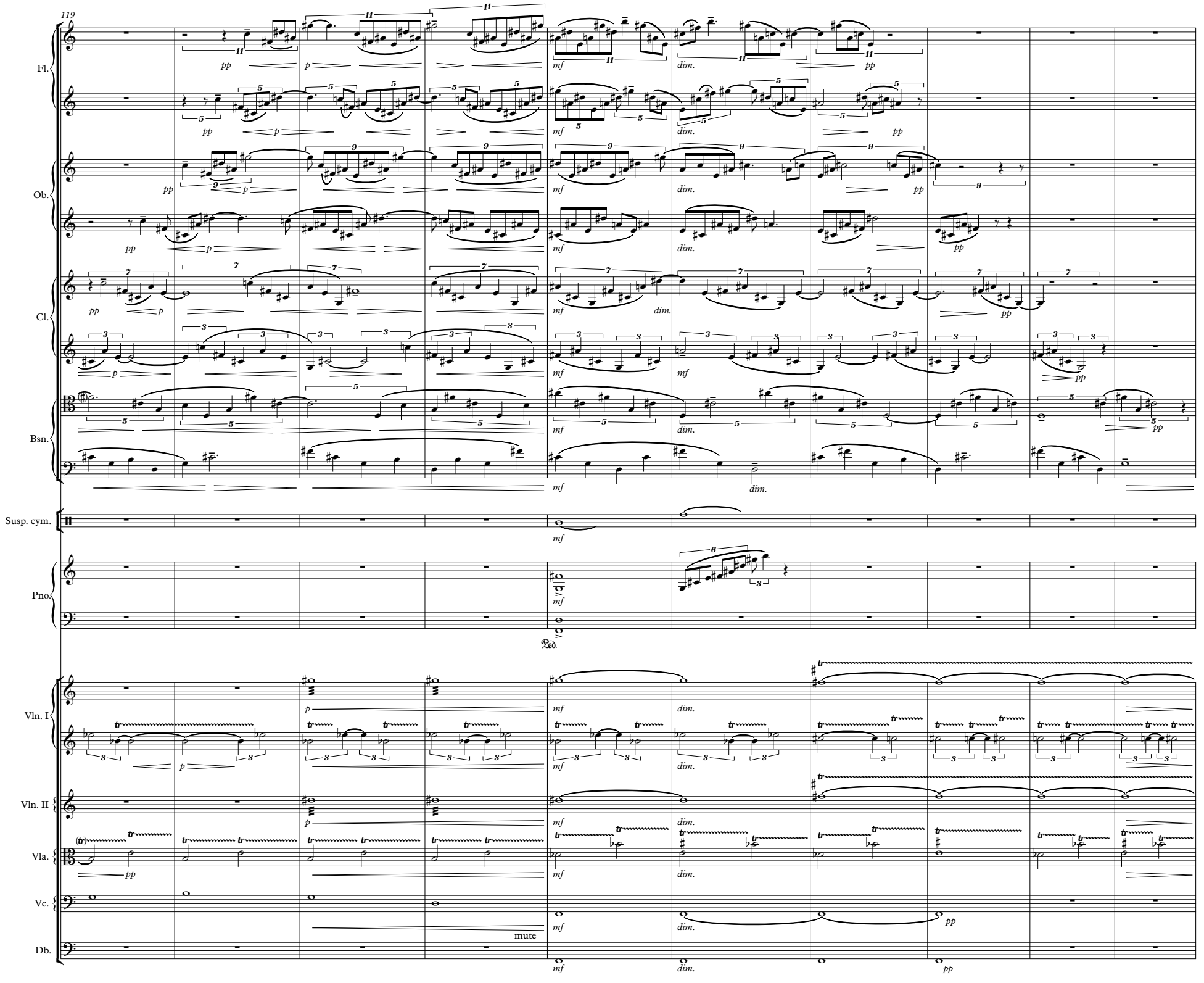
Vln. I

Vln. II

Vla.

Vc.

pizz. arco mute


119
Fl.
Ob.
Cl.
Bsn.
Susp. cym.
Pno.
Ped.
Vln. I
Vln. II
Vla.
Vc.
Db.
mute

I

♩=82

(♪3 = ♪5)

129

Fl.

Ob.

Cl.

Bsn.

Hn.

Tpt.

Tbn.

B. Tbn.

I

♩=82

(♪3 = ♪5)

Vln. I

Vln. II

Vla.

Vc.

139

J

♩=116

(♪7 = ♪5)

Fl.

Ob.

Cl.

Bsn.

Hn.

Tpt.

Tbn.

B. Tbn.

Pno.

J

♩=116

(♪7 = ♪5)

Vln. I

Vln. II

Vla.

Vc.

Db.

149

K

♩=69

(♪3 = ♪5)

Fl.

Ob.

Cl.

Bsn.

Hn.

Tpt.

mute

Mar.

Pno.

K

♩=69

(♪3 = ♪5)

Vln. I

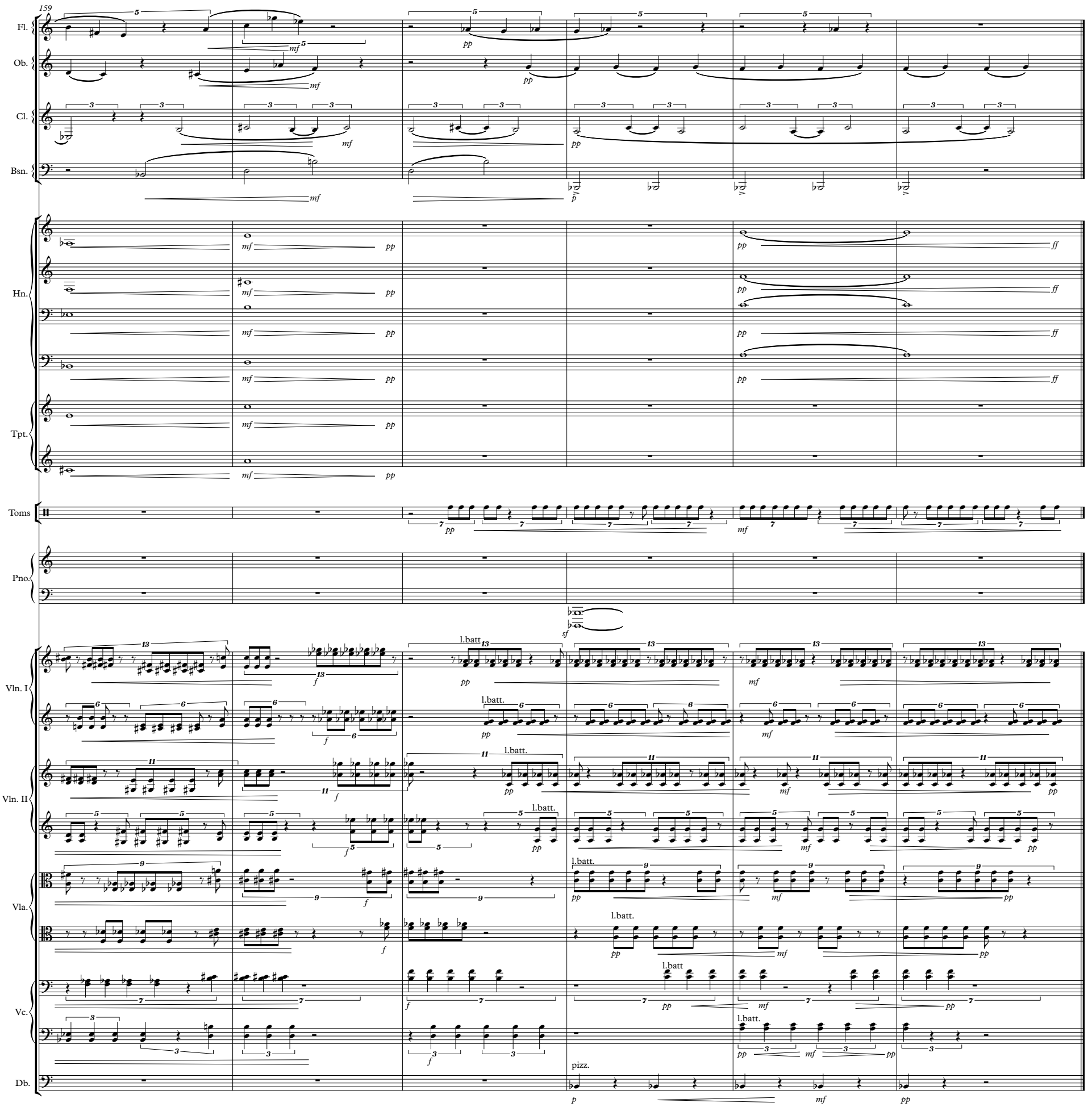
Vln. II

Vla.

Vc.

pizz.

gliss.


159
Fl.
Ob.
Cl.
Bsn.
Hn.
Tpt.
Toms
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.
l.batt
pizz.