an introduction for school choirs & audience to orchestra

Joe Wolfe

Conjunction

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Dedicated to Colin Piper

in recognition of his efforts in introducing young people to orchestral music by programming family concerts and by enthusiastically and tolerantly conducting youth, school and amateur orchestras.

The title. The Macquarie dictionary gives five meanings for "conjunction": **1.** the act of conjoining, combination. **2.** the state of being conjoined; union; association **3.** a combination of events or circumstances. **4.** *(Grammatical)* words used to link words, phrases, clauses, or sentences. **5.** *(Astronomical)* Having the same longitude or right ascension.

All of these meanings are applicable. One of the things that astonishes me about an orchestral concert is that so many people, each with absurdly specialised skills, can be organised together at one time to perform a large, subtle and intricate task together with split second timing. There are dozens of string players who can repeatedly position the fingers of their left hands with sub-millimetre precision, there are wind players who have each developed certain muscles of the mouth and diaphragm for subtle control of the complicated plumbing and keywork of their instruments, there are people who can carve cane, there are percussionists who can follow cryptic parts and manage the logistics of an array of instruments. Each of these has an important, usually complicated and difficult part which must fit into the whole work in time, in pitch and in expression. And of course there is a conductor who has the whole project in his or her head and who can keep it under control with gestures and glances and facial expressions.

When a choir is involved, the whole project becomes more complicated by the numbers involved: dozens or hundreds of voices that must control the melody and the enunciation together. Logistically, a concert for choir and orchestra is a minor miracle, and this work aims to celebrate that wonderful conjunction. Here too is where the astronomical meaning comes in: a satisfactory non-polar performance will require all players and singers to have the same longitude (and latitude) to within a few seconds of arc! The grammatical meaning of conjunction is at least partly relevant: my background in jazz means that most of my compositions give the "and" beats of the bar a fair hearing.

The work. The main object of this piece is for school choirs to have fun with an orchestra. I would like to thank Cath Pritchard and her class at St. Anthony's School for the opportunity to find out what they liked and what they could sing. As a result of an enjoyable session with them, I discovered that they liked and could sing tonal melodies with simple intervals rather better than atonal ones, that they liked syncopation and rhythmic phrases (provided they learned them from hearing rather than from reading) and that they liked polyphony provided that the parts were easy to remember. That session also determined the vocal range. Thanks to Cath and her students, this work is tonal with lots of fifths and scales, syncopated, rhythmic, and includes repeated phrases, ostinati and canons.

The second object of the work is educational. If a hundred or more students were going to spend several hours rehearsing it, then I thought that it would be good to teach them something. Provided that the piece is rehearsed with a rehearsal tape provided by the orchestra ahead of time, then each rehearsal will teach the singers to recognise and to name from sound the orchestral instruments and some orchestral techniques. I hope that this doesn't interfere with the first objective.

The piece starts with an orchestral introduction, and a series of exchanges between choir and orchestra. The instruments are then introduced, one by one and section by section. In the introduction to the string section we do some exchanges suggested by the Suzuki method. The winds appear first in combinations of orchestral colour and then individually. The horns and brass then wake up to enter in typically rowdy fashion. Then there are some exchanges between the orchestral percussion and the body percussion of the choir, before a final tutti.

Audience participation. This piece has been written to be very easy to learn. As far as was musically possible, I wrote it so that the orchestra plays a phrase just before the choir sings it. (This was one reason for the repetition of themes and the use of passacaglie.) The principal exceptions are the first entry and the "colours" section. In the latter, the notes are unpitched and the rhythm is easy. Therefore it is very easy to "sing along" with this piece. Provided that the school choirs know the parts reasonably well, most of the audience should find it easy to join in for much of the piece. Whether or not this should happen throughout the piece is a question for the conductor and choirs. In the finale, however, audience participation is would be desirable. First, the full orchestra is used and so many voices are needed to achieve balance. Second, the final chorus has a pedal or bass line and the (primary) school choirs will not provide many baritones or basses.

The composer. Joe Wolfe began playing music in jazz and fusion groups, and has written music for such groups as well as incidental music for plays and films. This is his third orchestral work. The first, a peculiar work commissioned by the UNSW Orchestra, consists of a suite of versions of the pop song "Stairway to Heaven" in the styles of Schubert, Holst, Miller, Mahler, Bizet and Beethoven. The second, "Sydney Sketches", is four movements of light-hearted programme music.

Joe Wolfe, March 1994.

Performance notes

Choirs. For most of the piece there are two choral parts. In the brass movement, choir 1 sings with the horns and the choir 2 with the brass. It would therefore be convenient to have the choir 1 on stage right (audience left) and choir 2 on stage left. The two parts stay mainly in the range common to mezzos and most sopranos, but the second does not goes as high as the first. According to the sessions we did with St Anthony's School, the range should be comfortable. (If it were desired, adult women in the audience would be able to sing along throughout, and most adult men would be able to sing along at the octave.) Where the G below middle C occurs, it is there as a deliberately low note (to emphasise that the bass instruments are low). Children for whom this is out of range should "sing" or pronounce it unvoiced - this is what they will probably do anyway for notes which are too low. This G should never be transposed up the octave. The A below middle C should only be a problem for a small number of children. It is usually an unaccented note, and if some of the singers do it unvoiced, that will be no problem.

Where the canon occurs, the voices are split in three parts (all with the same intermediate range). About one third of choir one (call them 1*) and one third of choir two (2*) should form choir 3 for just this section. For the benefit of the conductor they should therefore be seated 1, 1*, 2* and 2.

The choral parts are written so that they may be sung by the whole class, rather than by competent choirs. Therefore there is relatively little part singing. The parts in the finale are clearly accompanied and are not difficult. For bar 35 in the introduction, however, some effort should be made to ensure that all parts are sung confidently and in tune - the reasons are obvious from the context.

Choreography. In the instrumental introductions, I imagined that the students would mime playing the instruments while they were singing. In the "colours" section, I envisaged some simple choreography using coloured objects. I am not good at such things and leave them to the imagination of the teachers organising the choirs.

Stage business. It is likely that the piece will be performed more than once with the same choir: a rehearsal then a performance, for instance. It could also happen that the final section (starting say from the horn entry) might be repeated once the audience found its voice. In either case, the stage business in the score would need to be modified for the second run. Here are some suggestions: the trumpeter could fail to "die" when "shot" by the conductor, and could, while playing, draw a gun and "shoot" the conductor. *For the rehearsal tape, bar 283 and the percussion effect of bar 284 should be cut*, so as not to give away the gag. When the cymbal player is hit on the head the second time (bar 349), a low trombone blurt rather than the tamtam would accompany the stroke. This is cued in trombone 1.

Colours. The French composer Olivier Messiaen claimed to have a simple correlation between colours and chords claimed a correspondence between colours and chords, and the Australian painter Roy de Maistre claimed a correspondence between colours and pitches. I do not sympathise with either, and suspect that any associations depend on personal tastes and connotations. These colours are my associations. For the record, I have tried to explain why I make these connections:

For me, brown lurks between rich and muddy, as do these chords, with their dangerously close harmonies in the low register and their rich wind orchestration. Yellow is open and clear, like these simple, open, major chords. Red is exciting and a bit dangerous, as is this chord. The green is that of a Queensland rain forest, with all sorts of animals and plants to be found in the undergrowth if you look/listen closely enough. The blue is that of a sunny winter sky in Sydney - transparent and pure, but a bit cold if the wind comes, and blue in the other sense if things have gone the wrong way.

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1 piccolo
2 flutes, one doubling piccolo
2 oboes
1 cor anglais
2 clarinets in Bb
1 bass clarinet in Bb
1 alto saxophone in Eb
2 bassoons
4 horns in F
3 trumpets in Bb
2 trombones
1 bass trombone
1 tuba
2 timpani (one player)
percussion (4 players, who will be rather busy on two occasions):
xylophone, marimba, 3 woodblocks, 2 conga drums, 4 timbales, snare drum, tenor drum, bass drum, tam-tam, stand cymbal, pair of cymbals, triangle, cabassa, ratchet, 4 party whistles (the ones that extend when blown and have a coloured feather on the end), cap gun (played by the conductor)
string orchestra

School choir: mezzo-soprano and soprano parts.
Audience: sopranos and altos double the choir parts in the finale, tenors and basses have a separate part (mainly pedal notes) in the finale

Performance time: 15 minutes.

For small orchestras. This piece has been printed using a note processor. It would be possible to rewrite it for small orchestra with double winds.

Acknowledgements. The composer thanks Cath Pritchard and her class at St. Anthony's School for advice about what kids like to sing. He also thanks Colin Piper, one of Sydney's busiest conductors, for encouragement in this and other works.

This music was written and published by Joe Wolfe. search "Conjunction"

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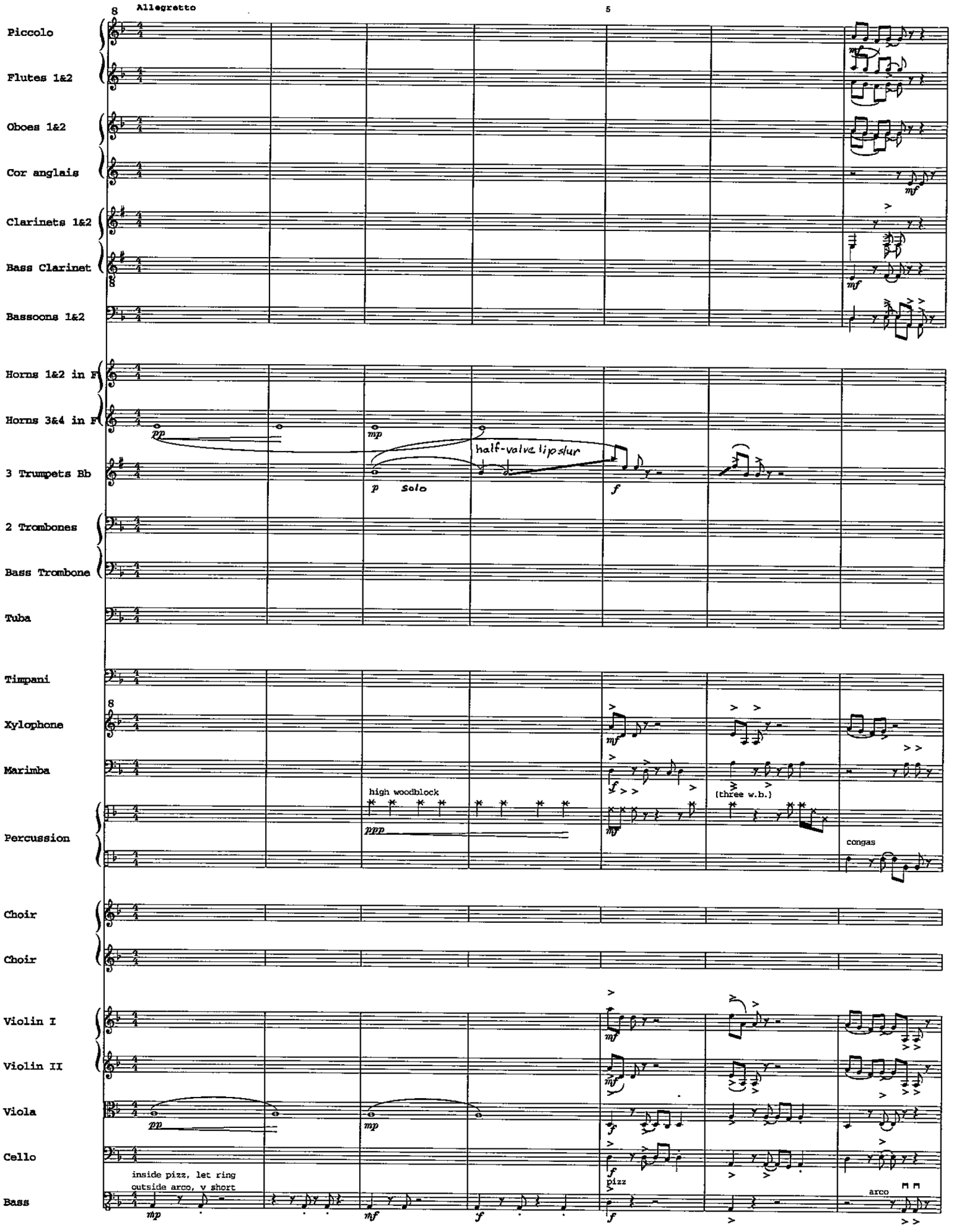
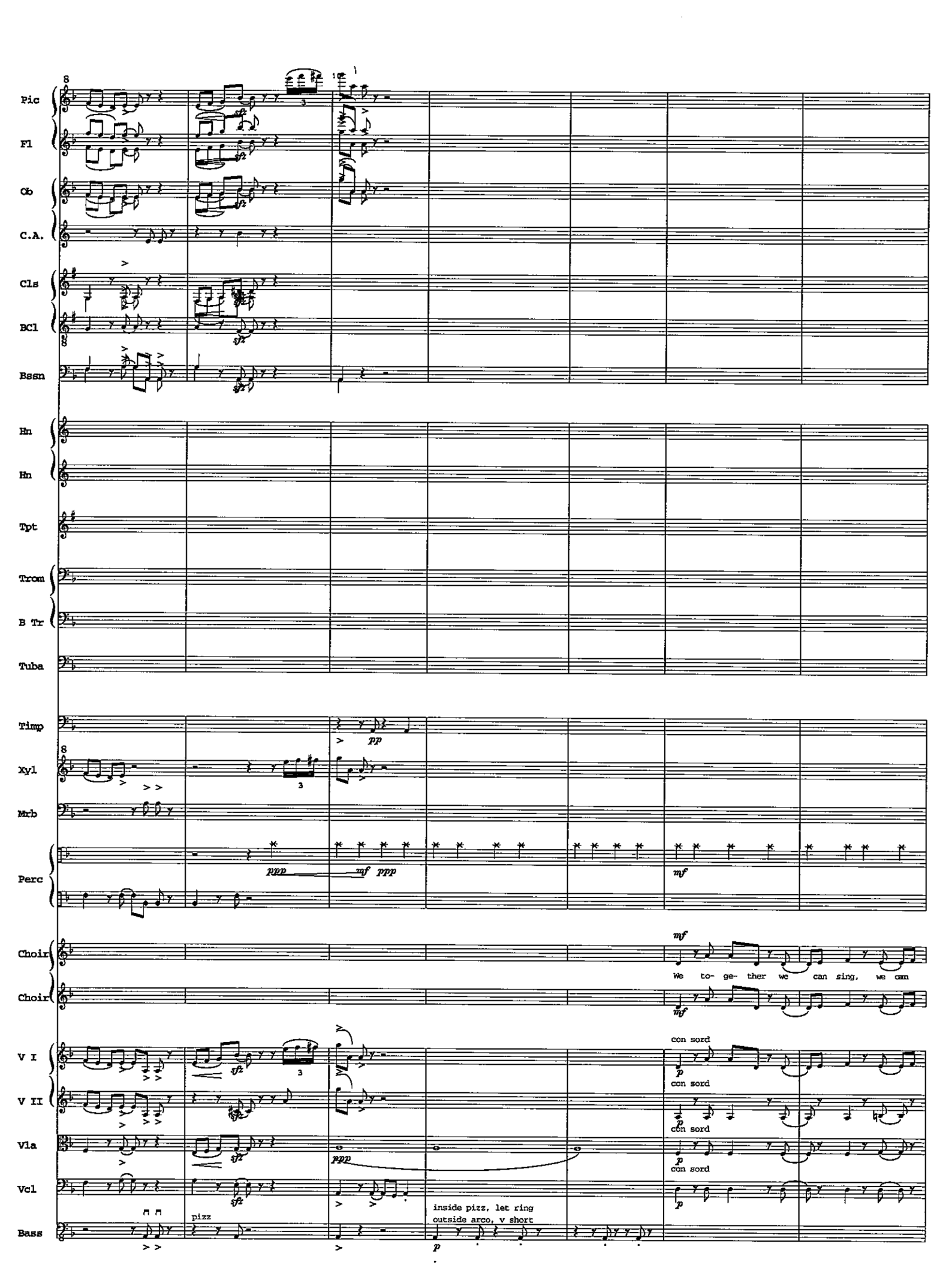
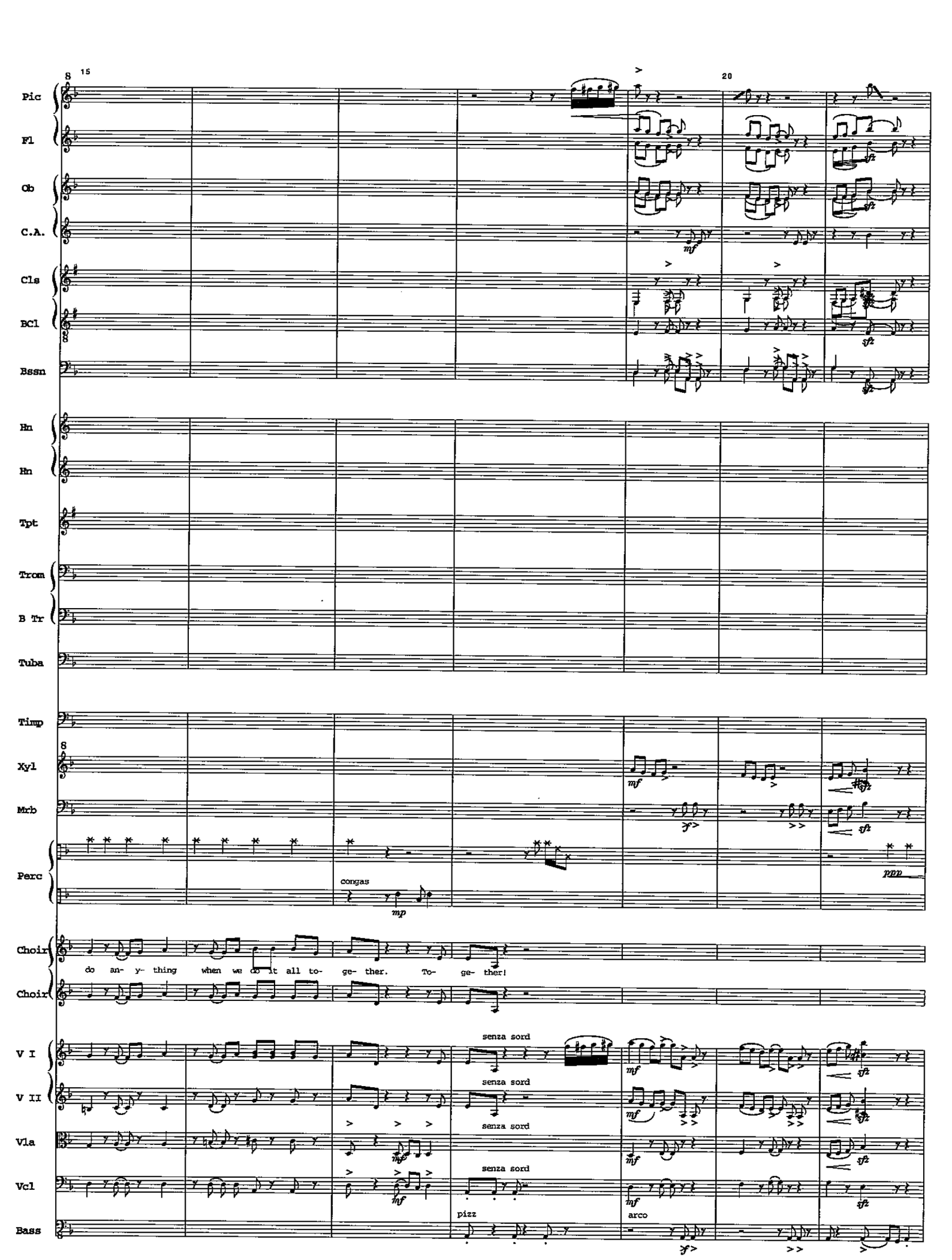
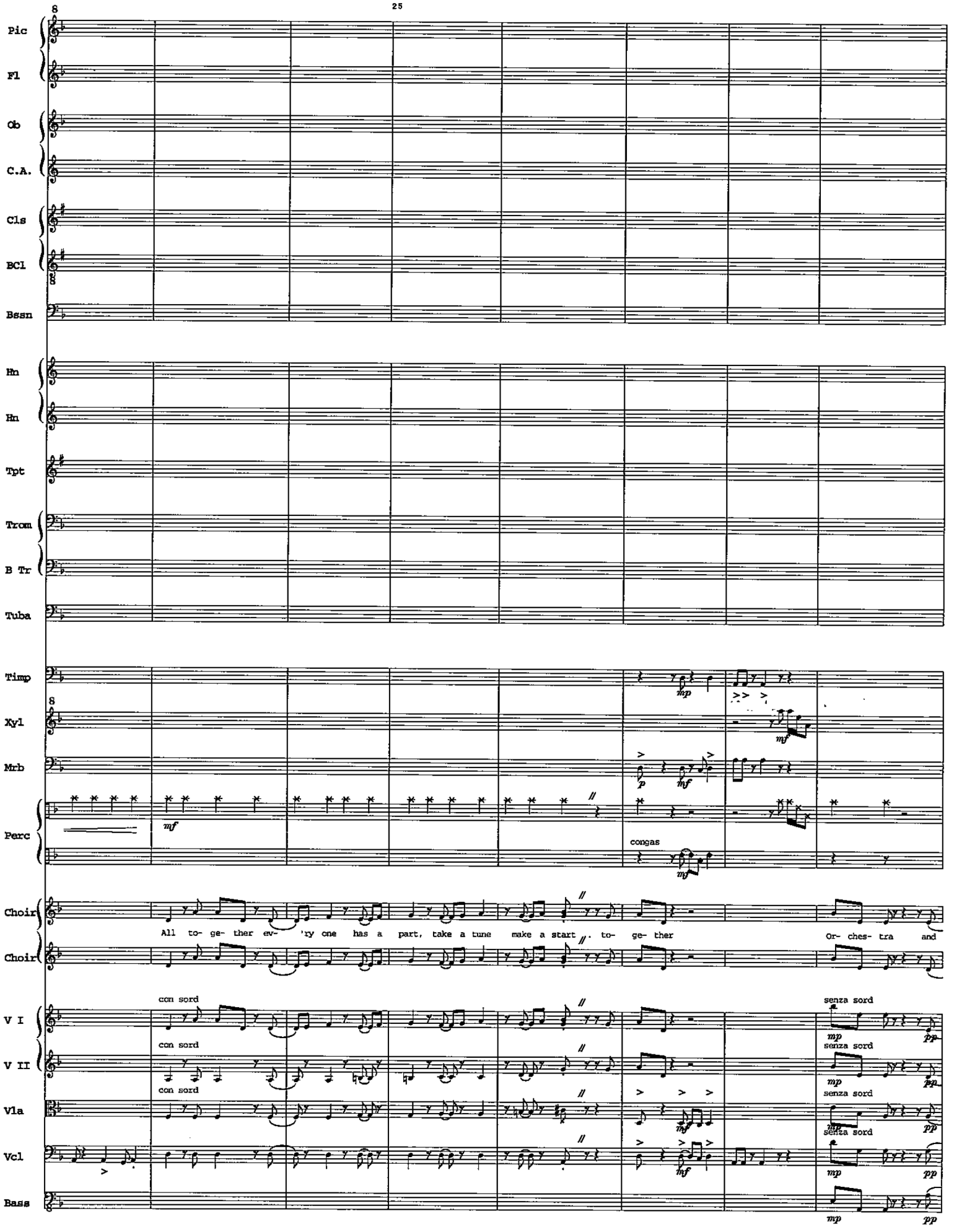
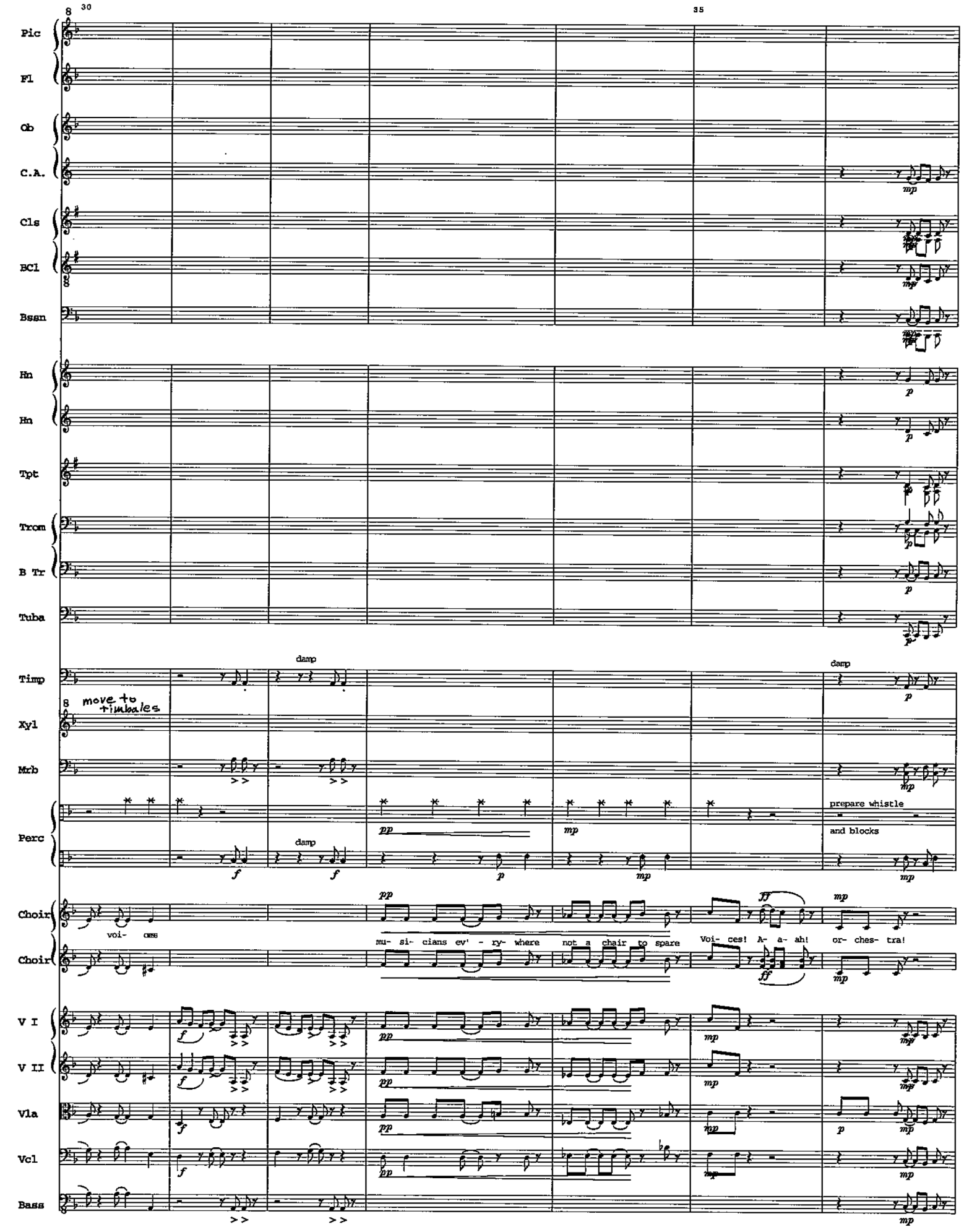
Joe Wolfe, 1994




Pic
Fl
Ob
C.A.
Cls
BCl
Bssn
Hn
Hn
Tpt
Trom
B Tr
Tuba
Timp
Xyl
Mrb
Perc
Choir
Choir
V I
V II
Vla
Vcl
Bass
pizz
inside pizz, let ring
outside arco, v short
con sord
con sord
con sord
con sord
We to- ge- ther we can sing, we can


15
20
Pic
Fl
Ob
C.A.
Cls
BCl
Bssn
Hn
Hn
Tpt
Trom
B Tr
Tuba
Timp
Xyl
Mrb
Perc
congas
Choir
do an- y- thing when we do it all to- ge- ther. To- ge- ther!
Choir
V I
V II
Vla
Vcl
Bass
senza sord
senza sord
senza sord
senza sord
pizz
arco


Pic
Fl
Ob
C.A.
Cls
BCl
Bssn
Hn
Hn
Tpt
Trom
B Tr
Tuba
Timp
Xyl
Mrb
Perc
congas
Choir
All to- ge- ther ev- 'ry one has a part, take a tune make a start to- ge- ther Or- ches- tra and
Choir
V I
con sord
senza sord
V II
con sord
senza sord
Vla
con sord
senza sord
Vcl
senza sord
Bass
senza sord


30
35
Pic
Fl
Ob
C.A.
Cls
BCl
Bsxn
Hn
Hn
Tpt
Trom
B Tr
Tuba
Timp
Xyl
Mrb
Perc
Choir
Choir
V I
V II
Vla
Vcl
Bass
damp
move to timbales
damp
damp
prepare whistle
and blocks
voi- ces
mu- si- cians ev' - ry- where
not a chair to spare
Voi- ces! A- a- ah!
or- ches- tra!

8

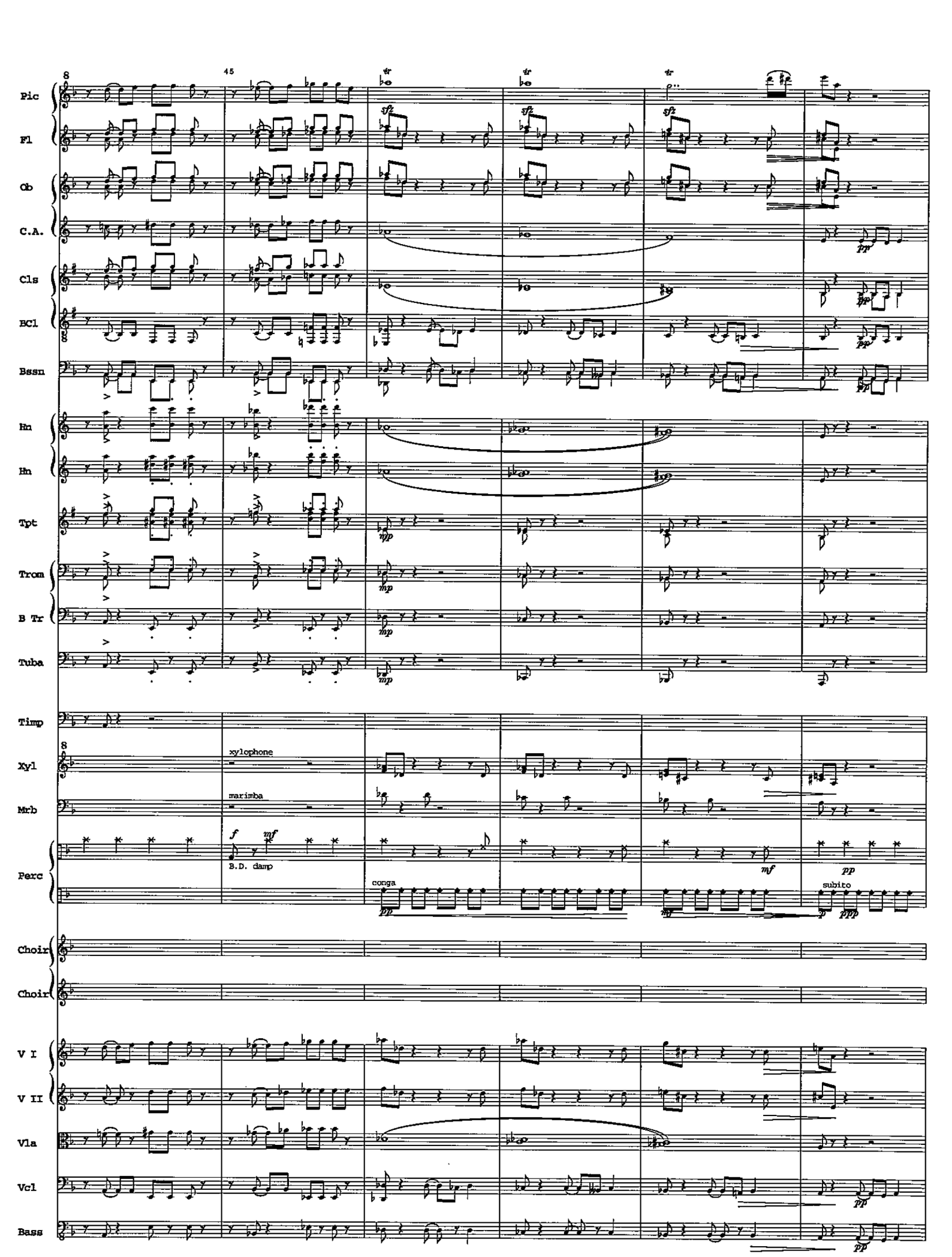
Pic
Fl
Ob
C.A.
Cls
BCl
Bssn
Hn
Hn
Tpt
Trom
B Tr
Tuba
Timp
Xyl
Mrb
Perc
Choir
Choir
V I
V II
Vla
Vcl
Bass

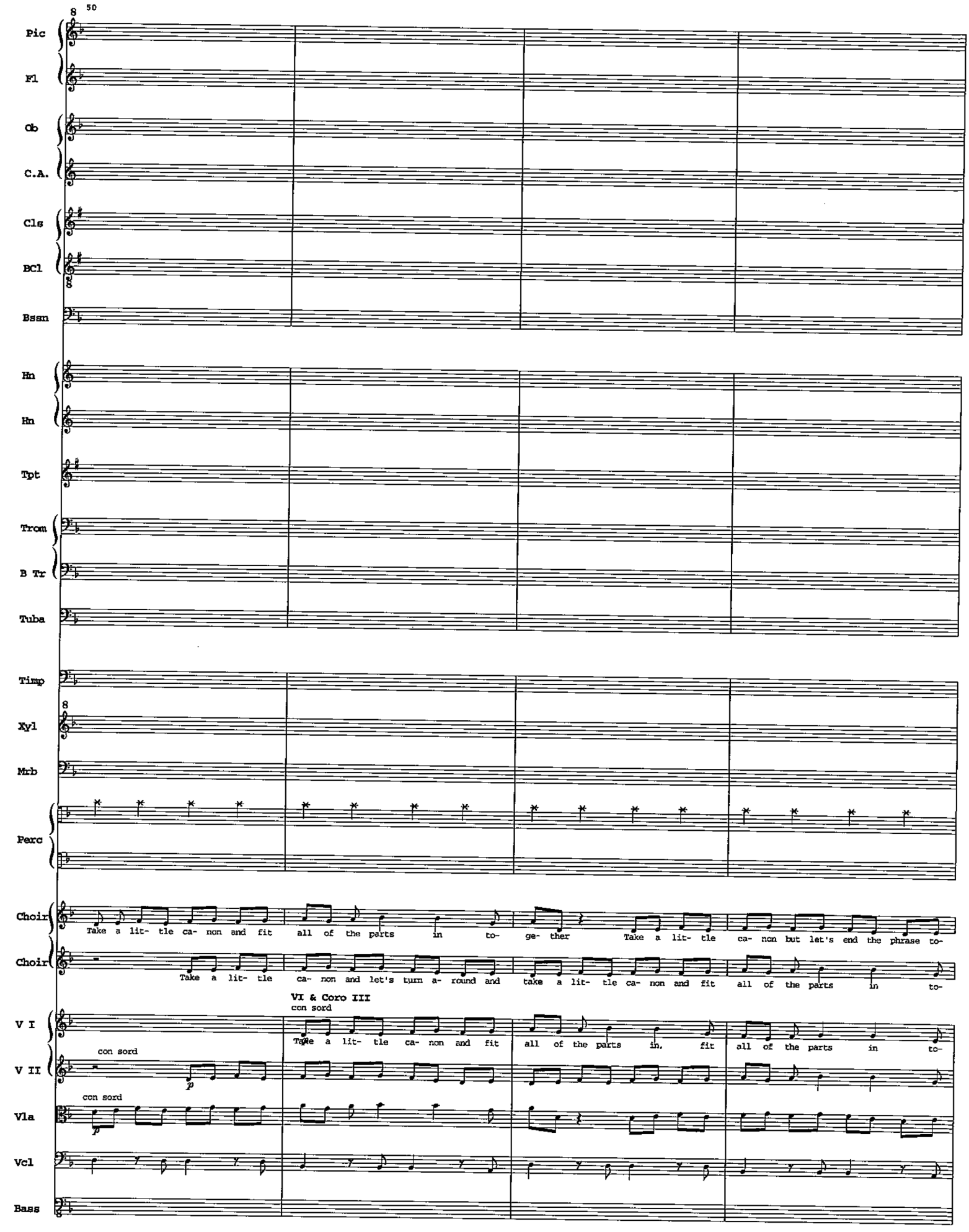
prepare whistle
ratchet & BD
prepare whistle
& cymbals

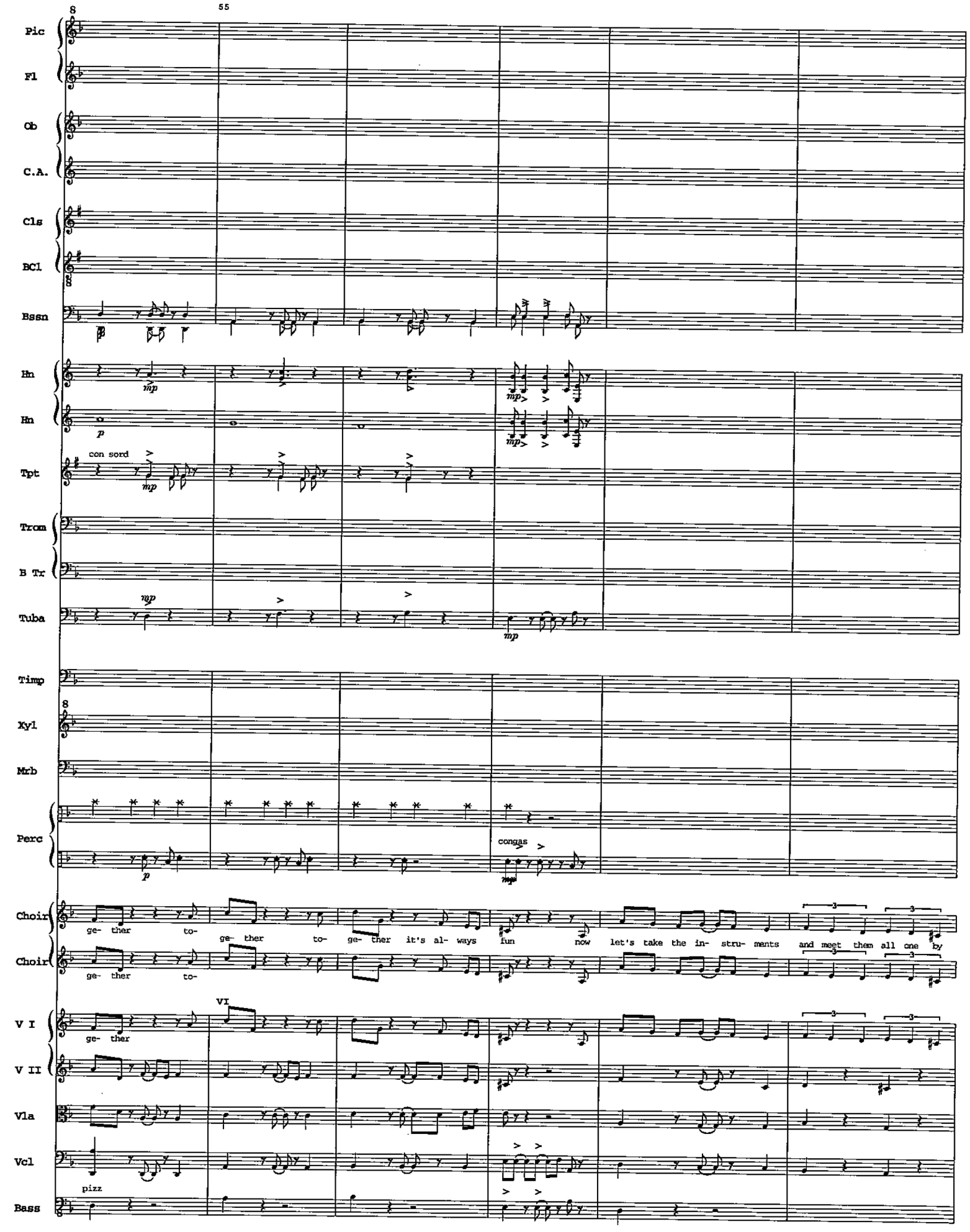
damp
party whistle
timbales
party whistle
bass drum
ratchet
blocks
party whistle
cymbals
(let ring)

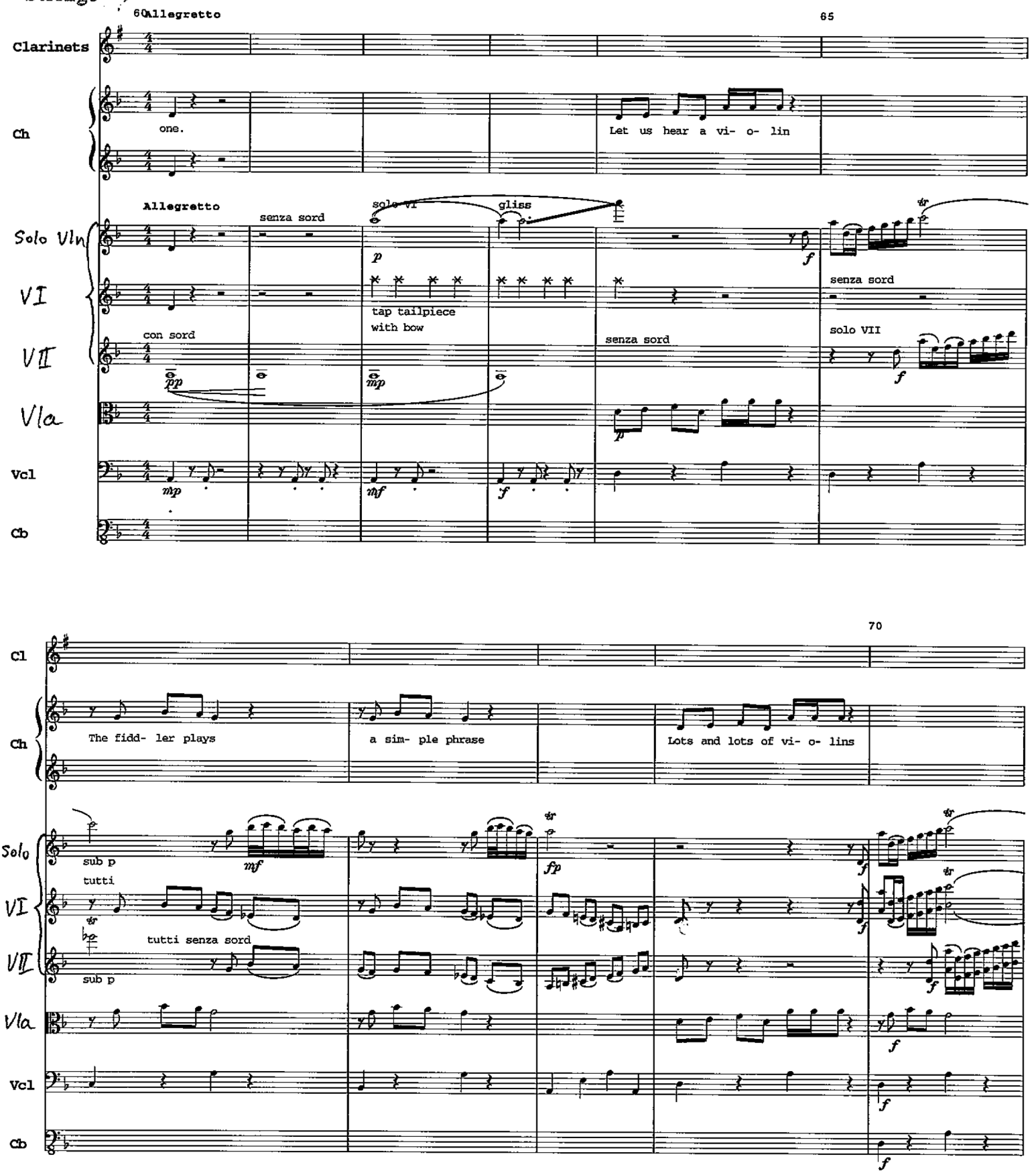
strings!
winds!
brass!
per-
cus- sion!

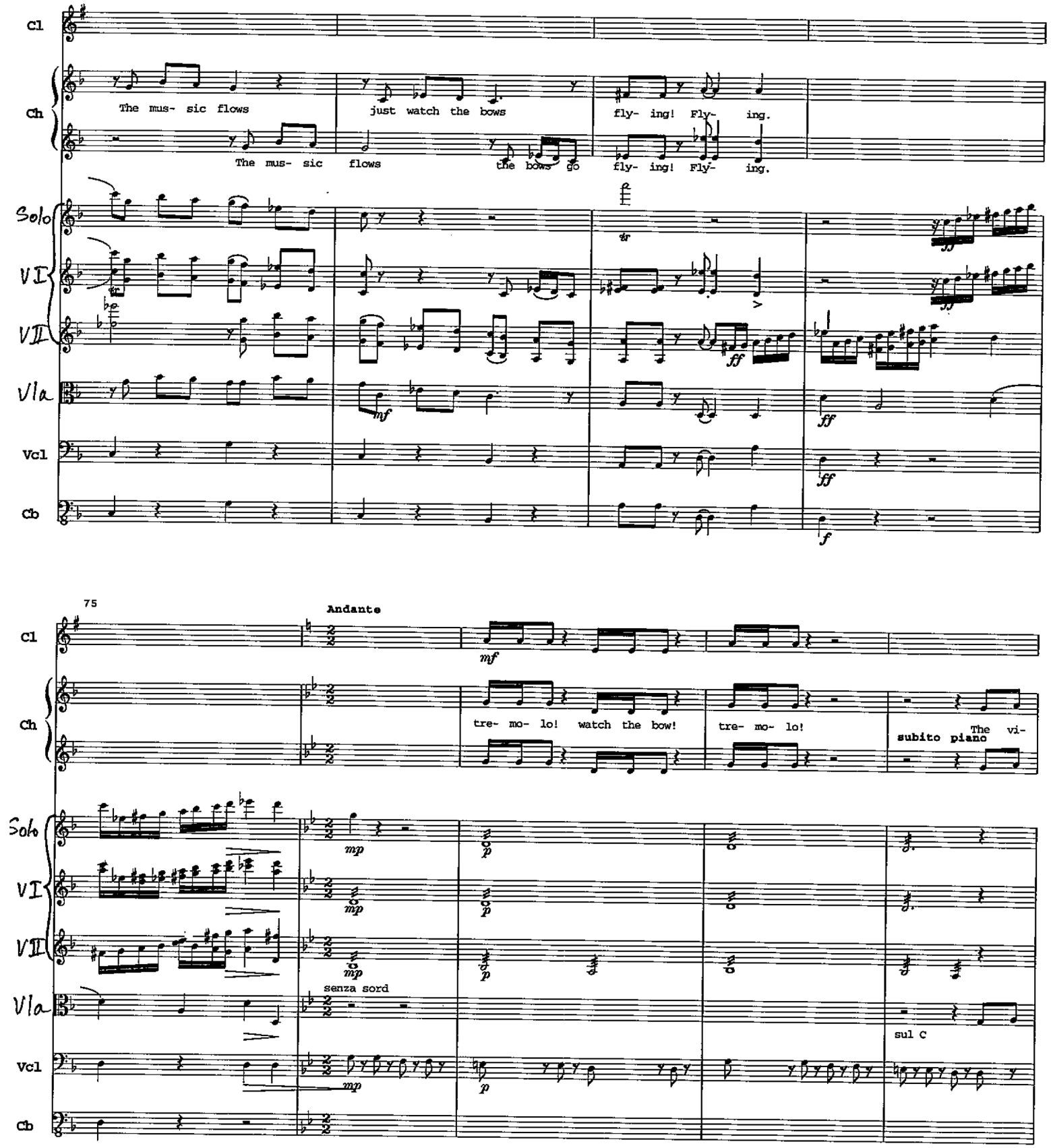
pizz

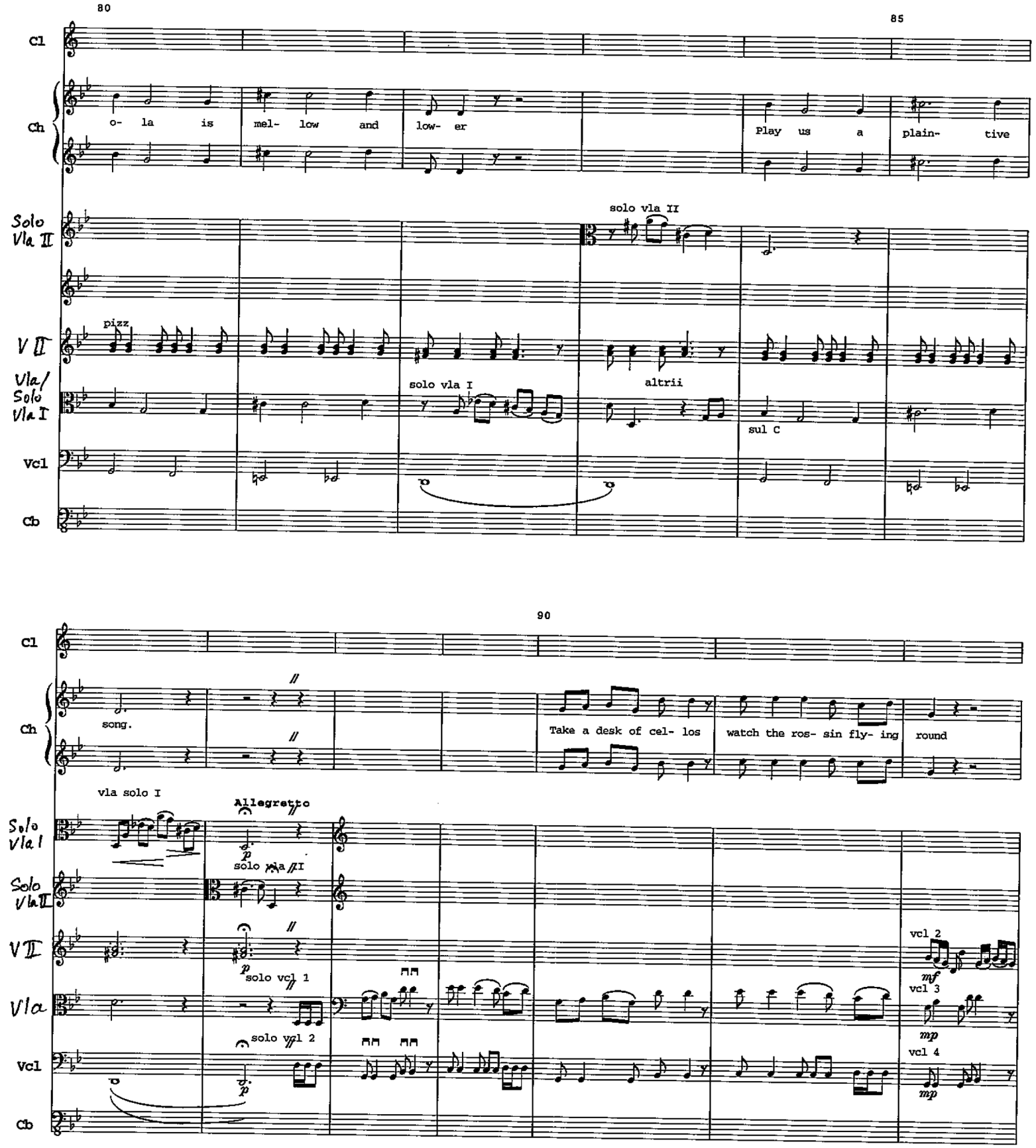

8
45
Pic
Fl
Ob
C.A.
Cls
BCl
Bssn
Hn
Hn
Tpt
Trom
B Tr
Tuba
Timp
Xyl
xylophone
Mrb
marimba
Perc
B.D. damp
conga
subito
Choir
Choir
V I
V II
Vla
Vcl
Bass

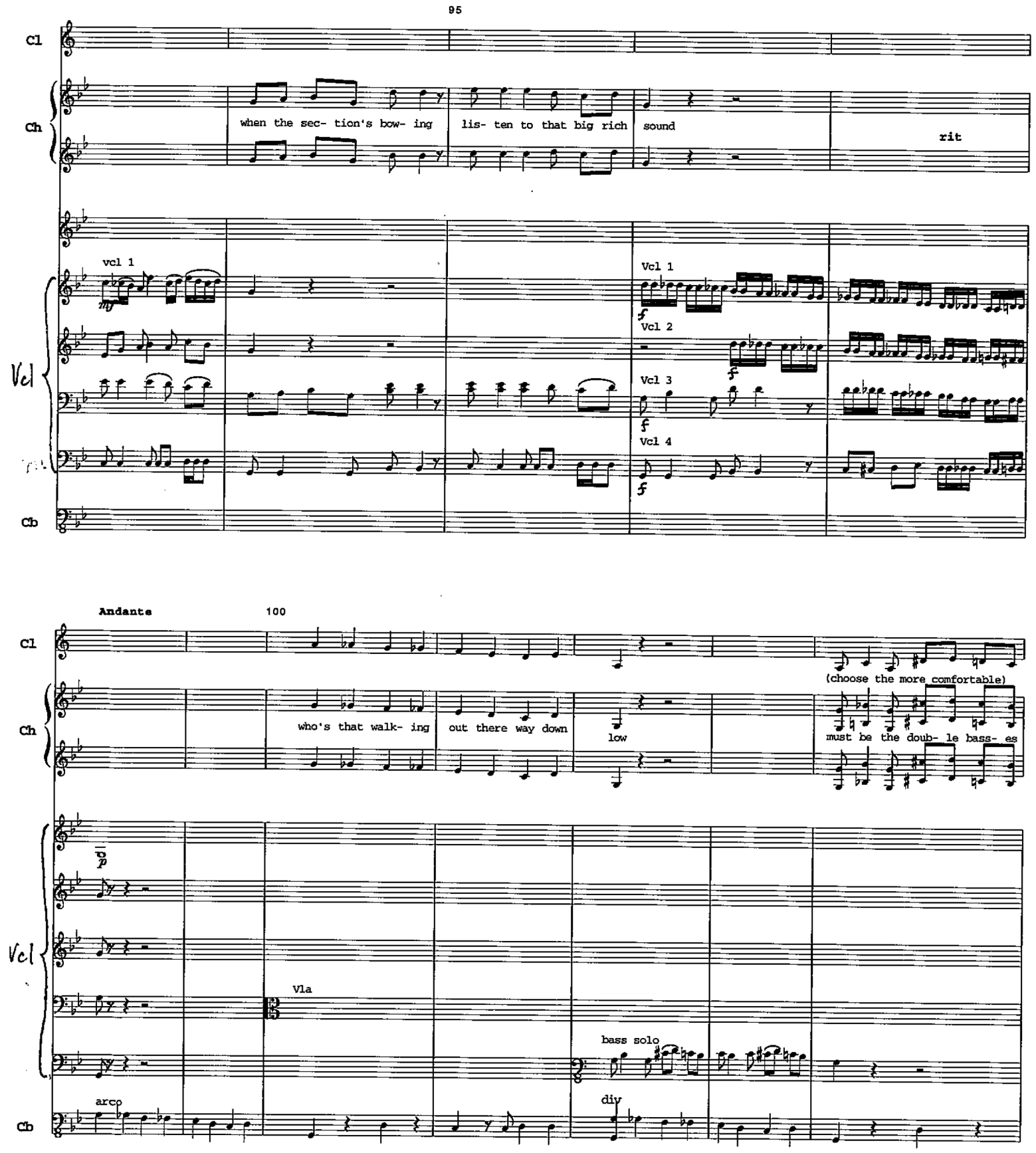

50
Pic
Fl
Ob
C.A.
Cls
BCl
Bssn
Hn
Hn
Tpt
Trom
B Tr
Tuba
Timp
Xyl
Mrb
Perc
Choir
Take a lit- tle ca- non and fit all of the parts in to- ge- ther Take a lit- tle ca- non but let's end the phrase to-
Choir
Take a lit- tle ca- non and let's turn a- round and take a lit- tle ca- non and fit all of the parts in to-
VI & Coro III
con sord
V I
Take a lit- tle ca- non and fit all of the parts in, fit all of the parts in to-
con sord
V II
p
con sord
Vla
p
Vcl
Bass


55
Pic
Fl
Ob
C.A.
Cls
BCl
Bssn
Hn
Hn
Tpt
con sord
Trom
B Tr
Tuba
Timp
Xyl
Mrb
Perc
congas
Choir
ge- ther to-
ge- ther to-
ge- ther it's al- ways fun now
let's take the in- stru- ments
and meet them all one by
Choir
ge- ther to-
VI
V I
ge- ther
V II
Vla
Vcl
pizz
Bass

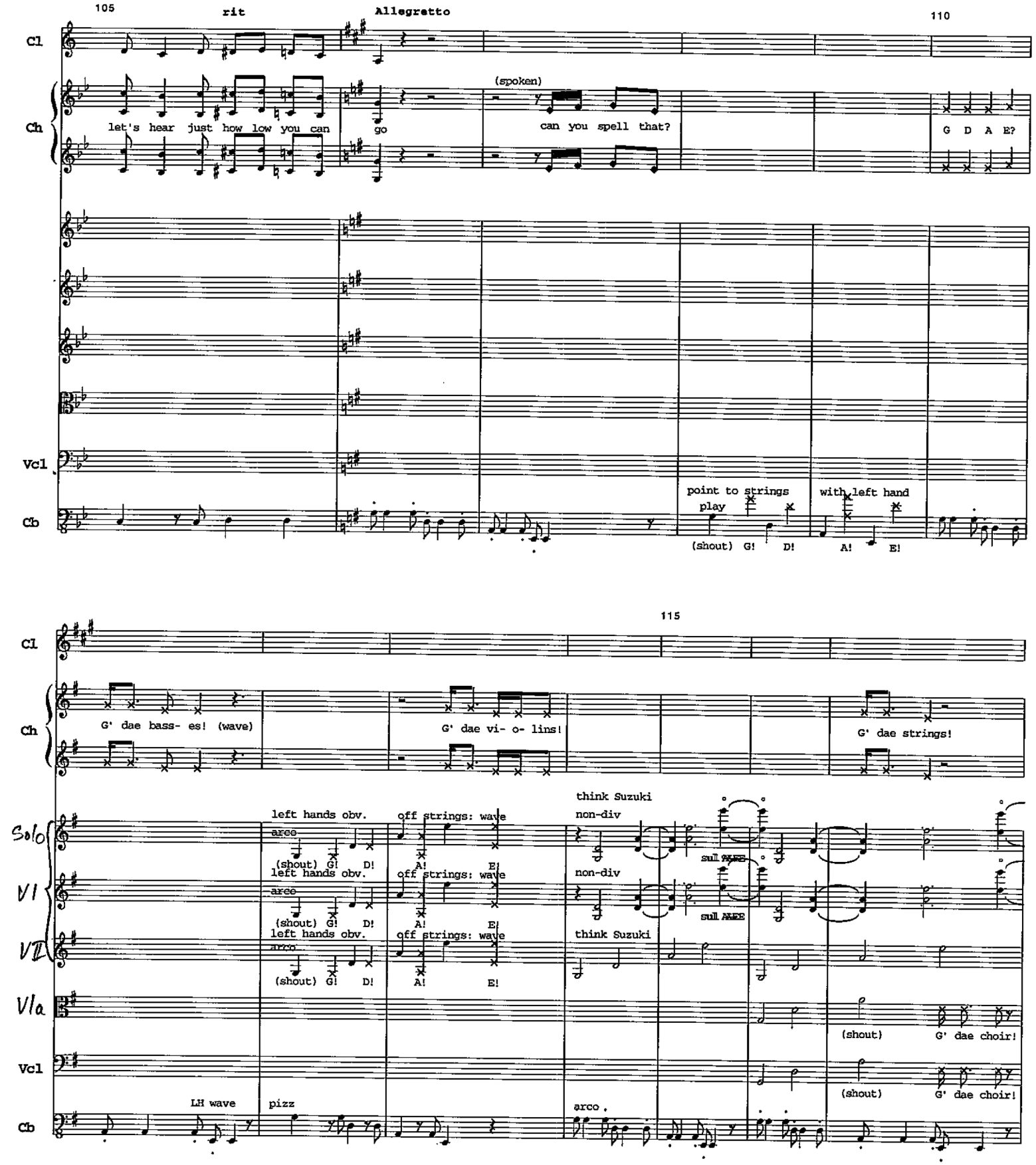

60
Allegretto
65
Clarinets
Ch
one.
Let us hear a vi- o- lin
Allegretto
senza sord
solo VI
gliss
Solo Vln
VI
VII
Vla
Vcl
Cb
tap tailpiece
with bow
con sord
senza sord
solo VII
70
Cl
The fidd- ler plays
a sim- ple phrase
Lots and lots of vi- o- lins
Solo
sub p
tutti
tutti senza sord
sub p

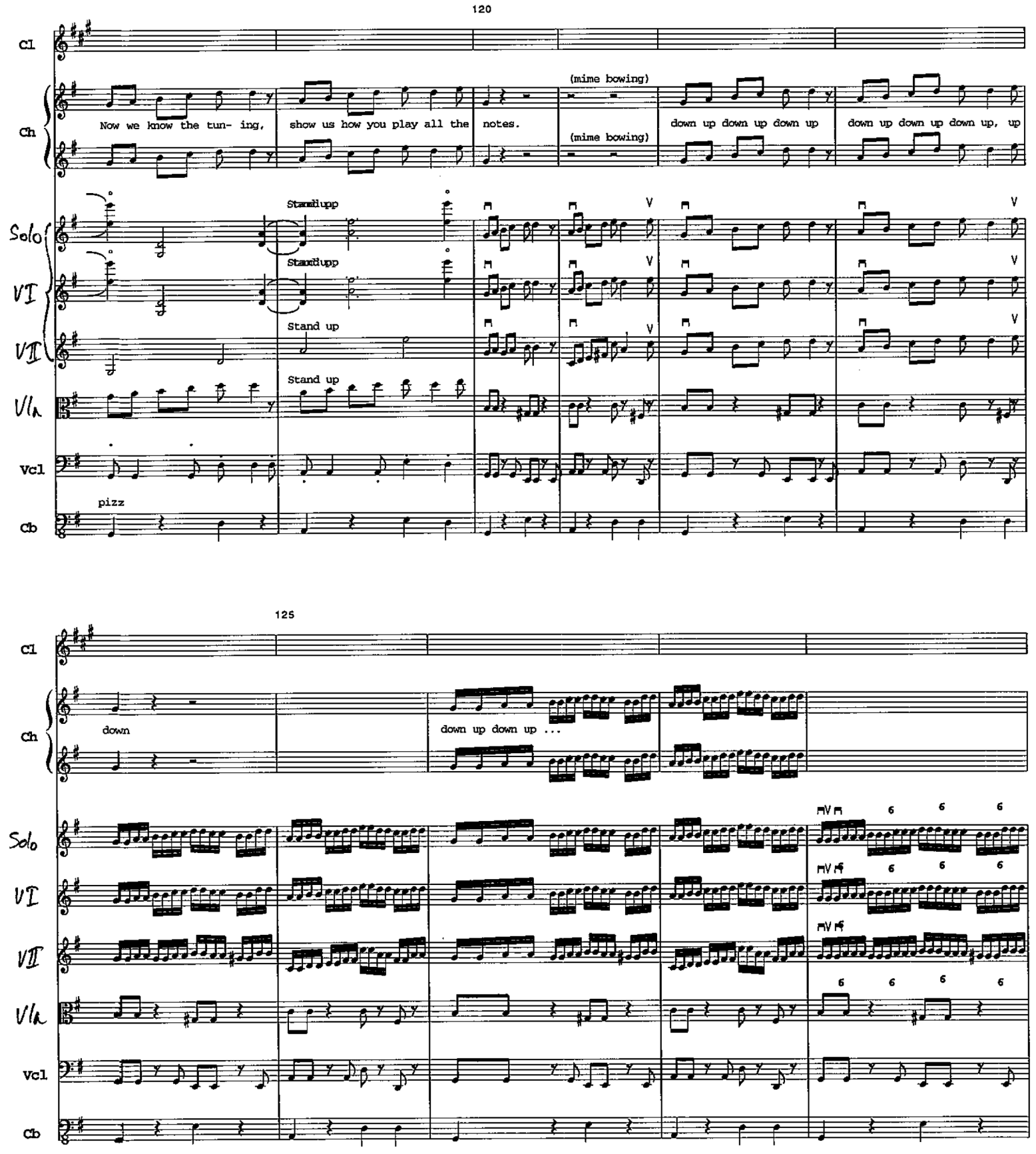

Cl
Ch
The mus- sic flows
just watch the bows
fly- ing! Fly- ing.
The mus- sic flows
the bows go
fly- ing! Fly- ing.
Solo
VI
VII
Vla
Vcl
Cb
mf
ff
f
75
Andante
mf
tre- mo- lo! watch the bow!
tre- mo- lo!
The vi-
subito piano
mp
p
senza sord
sul C


80
85
Cl
Ch
o- la is mel- low and low- er
Play us a plain- tive
Solo Vla II
solo vla II
V II
pizz
Vla/ Solo Vla I
solo vla I
altrii
sul C
Vcl
Cb
90
song.
Take a desk of cel- los
watch the ros- sin fly- ing
round
vla solo I
Allegretto
solo vla II
solo vcl 1
solo vcl 2
vcl 2
vcl 3
vcl 4
mf
mp
mp

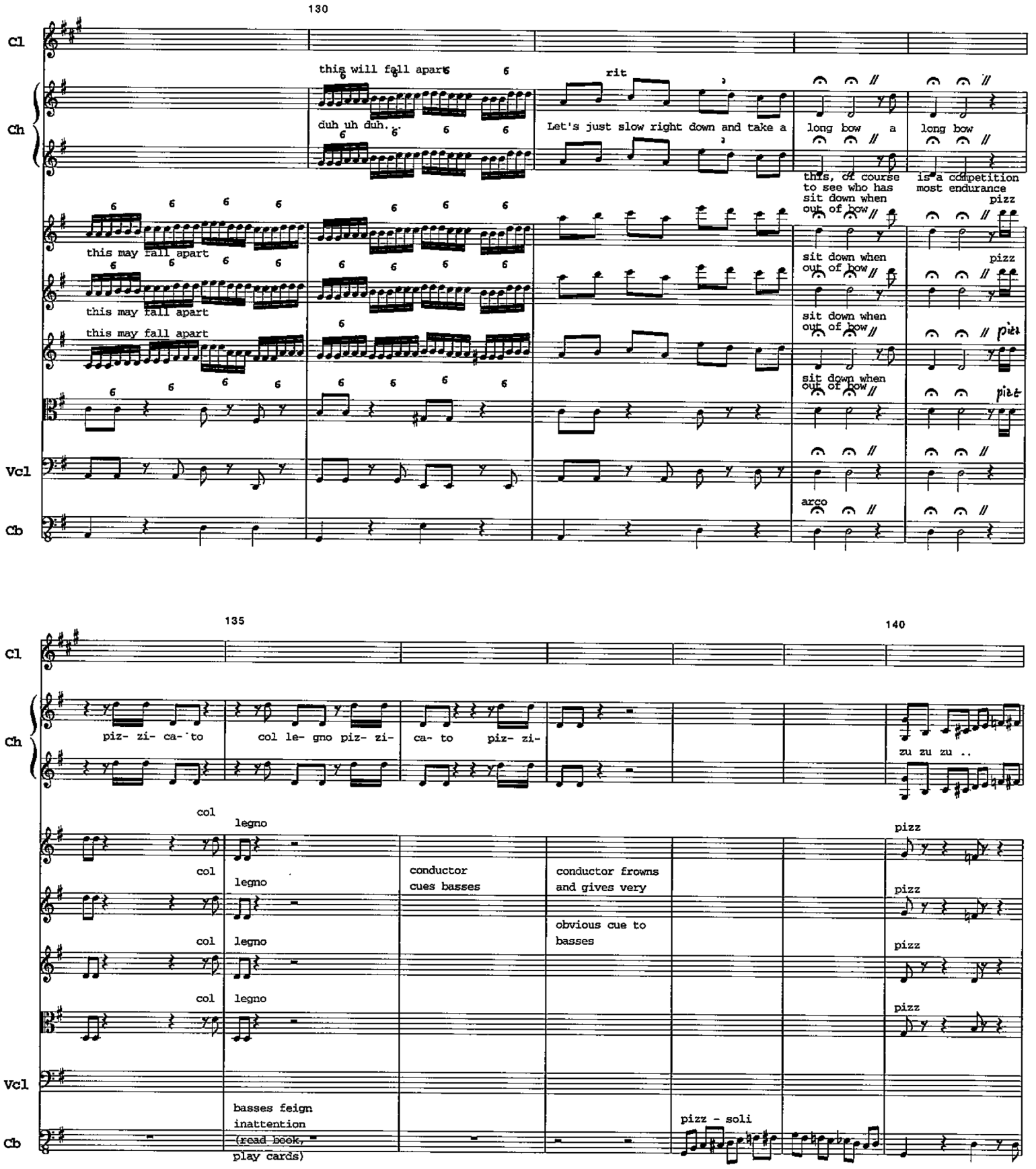


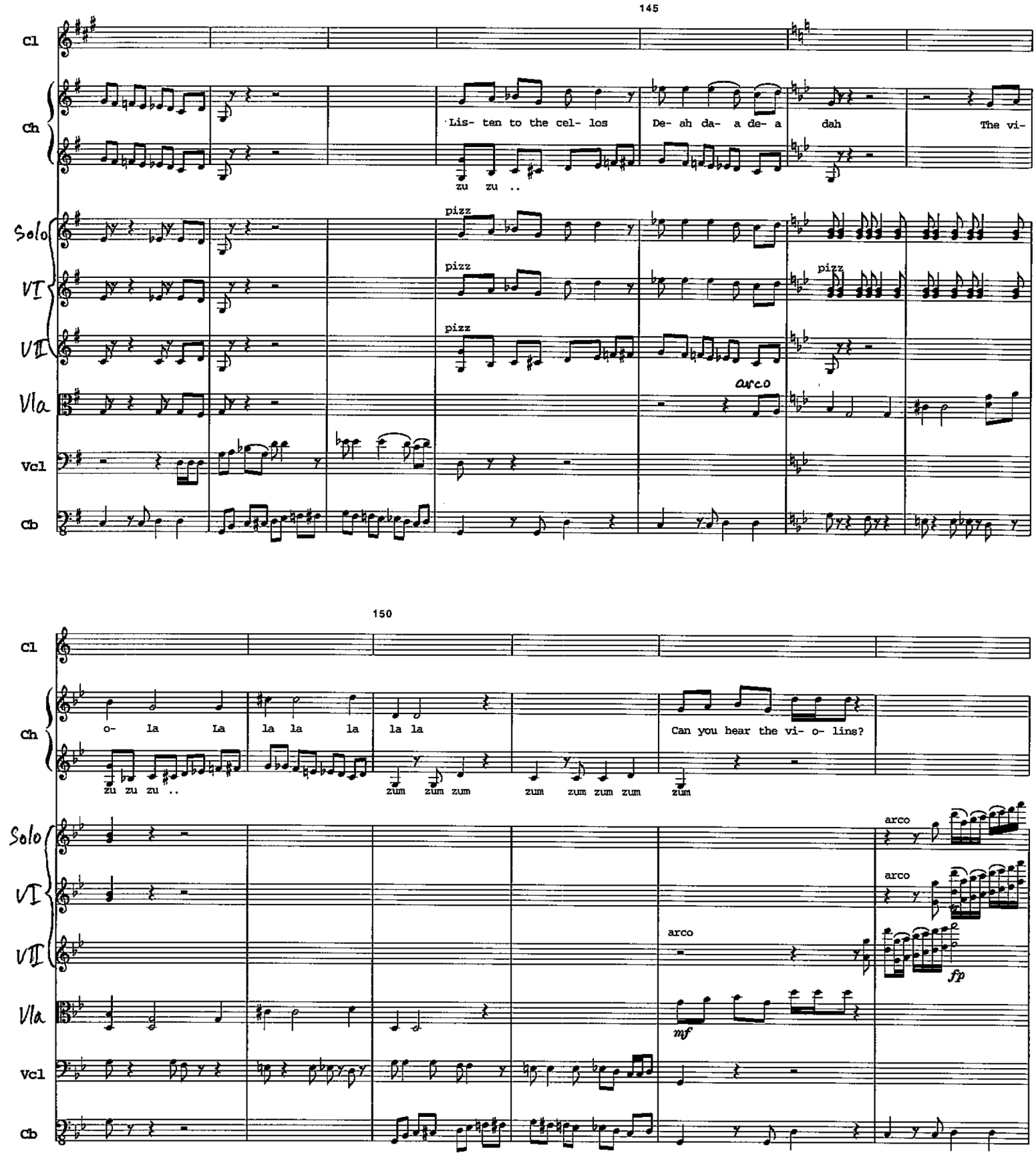
Celli parts should be divided thus: outside front play 1, inside front play 2, outside back play 3, inside back play 4. When the number of celli is not a multiple of four, there should be more players on the lower parts than on the higher.


105
rit
Allegretto
110
Cl
Ch
let's hear just how low you can
go
(spoken)
can you spell that?
G D A E?
Vcl
Cb
point to strings
play
with left hand
(shout) G! D!
A! E!
115
Cl
Ch
G' dae bass- es! (wave)
G' dae vi- o- lins!
G' dae strings!
Solo
Vl I
Vl II
Vla
Vcl
Cb
left hands obv.
arco
(shout) G! D!
A! E!
off strings: wave
think Suzuki
non-div
sul AEE
LH wave
pizz
arco
(shout)
G' dae choir!

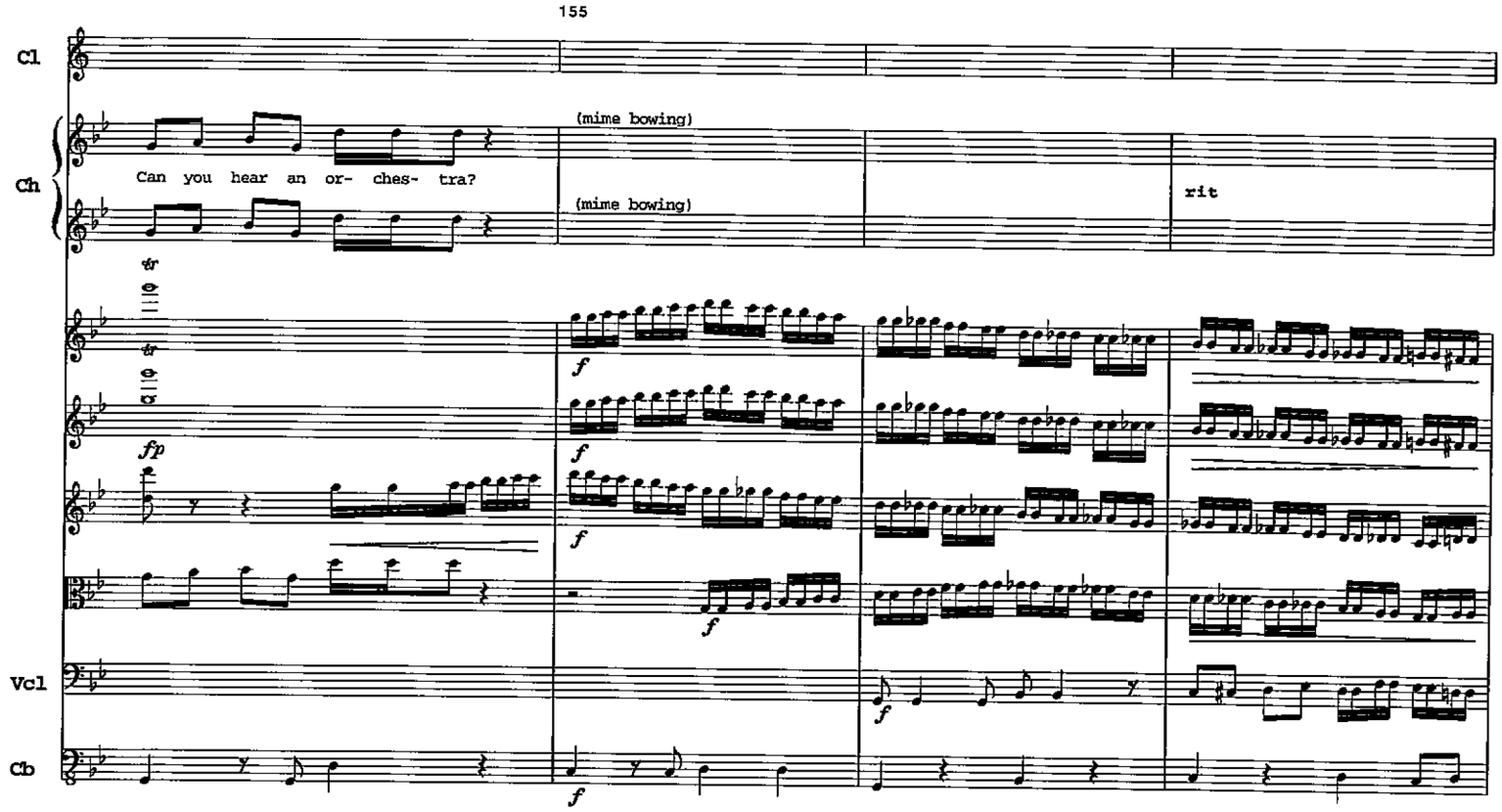


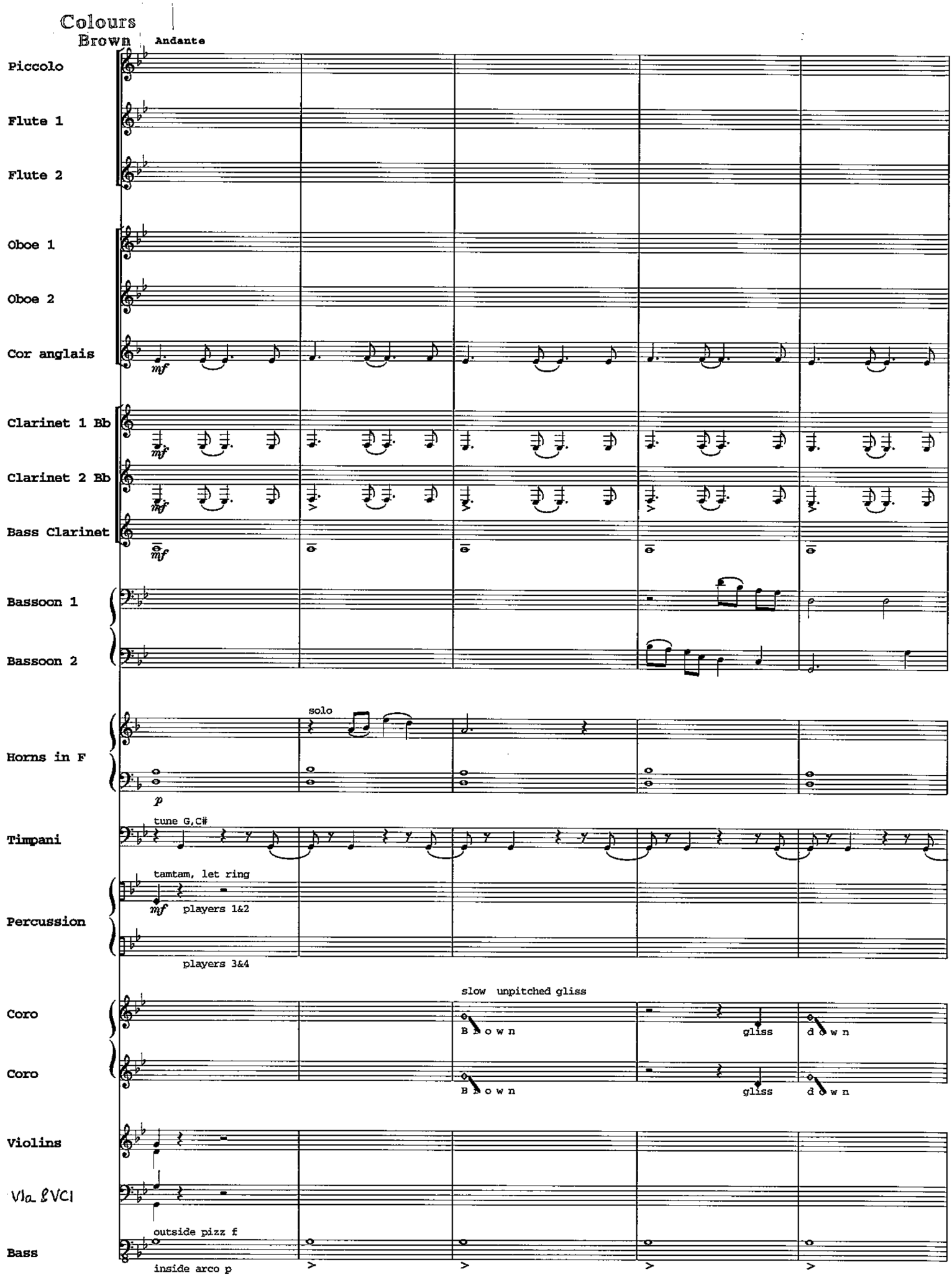
The sextuplet semiquavers are probably almost possible. It does not matter too much whether I have misjudged this or not: this is an articulation competition with the choir and part of the game is to push each side to (or past) the limit.

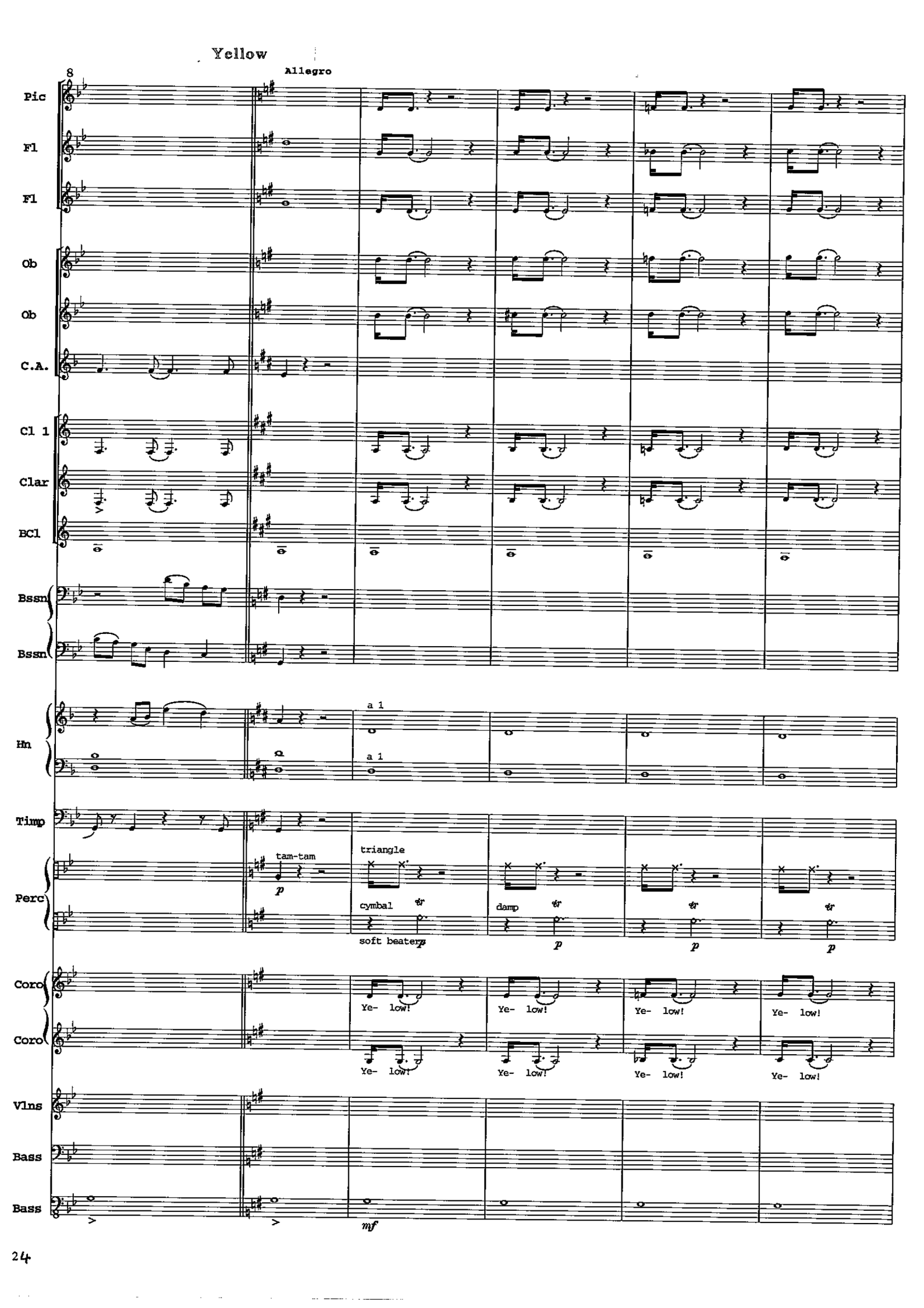

130
Cl
Ch
Vcl
Cb
this will fall apart
duh uh duh.
rit
Let's just slow right down and take a
long bow a
long bow
this, of course
to see who has
sit down when
out of bow
is a competition
most endurance
pizz
this may fall apart
this may fall apart
this may fall apart
arco
135
140
piz- zi- ca- to
col le- gno piz- zi-
ca- to
piz- zi-
zu zu zu ..
col
legno
conductor
cues basses
conductor frowns
and gives very
obvious cue to
basses
basses feign
inattention
(read book,
play cards)
pizz - soli

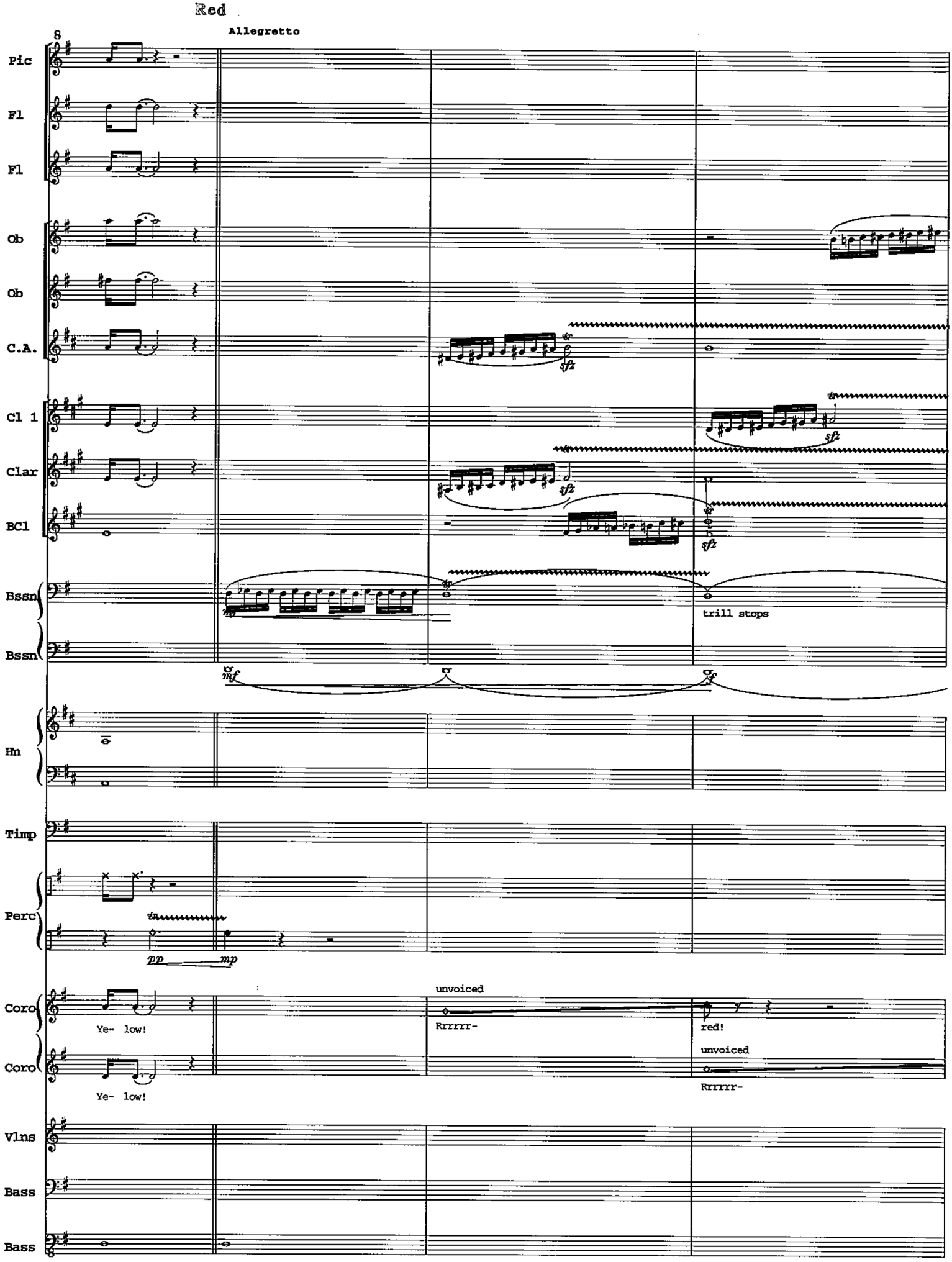

145
Cl
Ch
Lis- ten to the cel- los
De- ah da- a de- a
dah
The vi-
zu zu ..
Solo
VI
VII
Vla
Vcl
Cb
pizz
arco

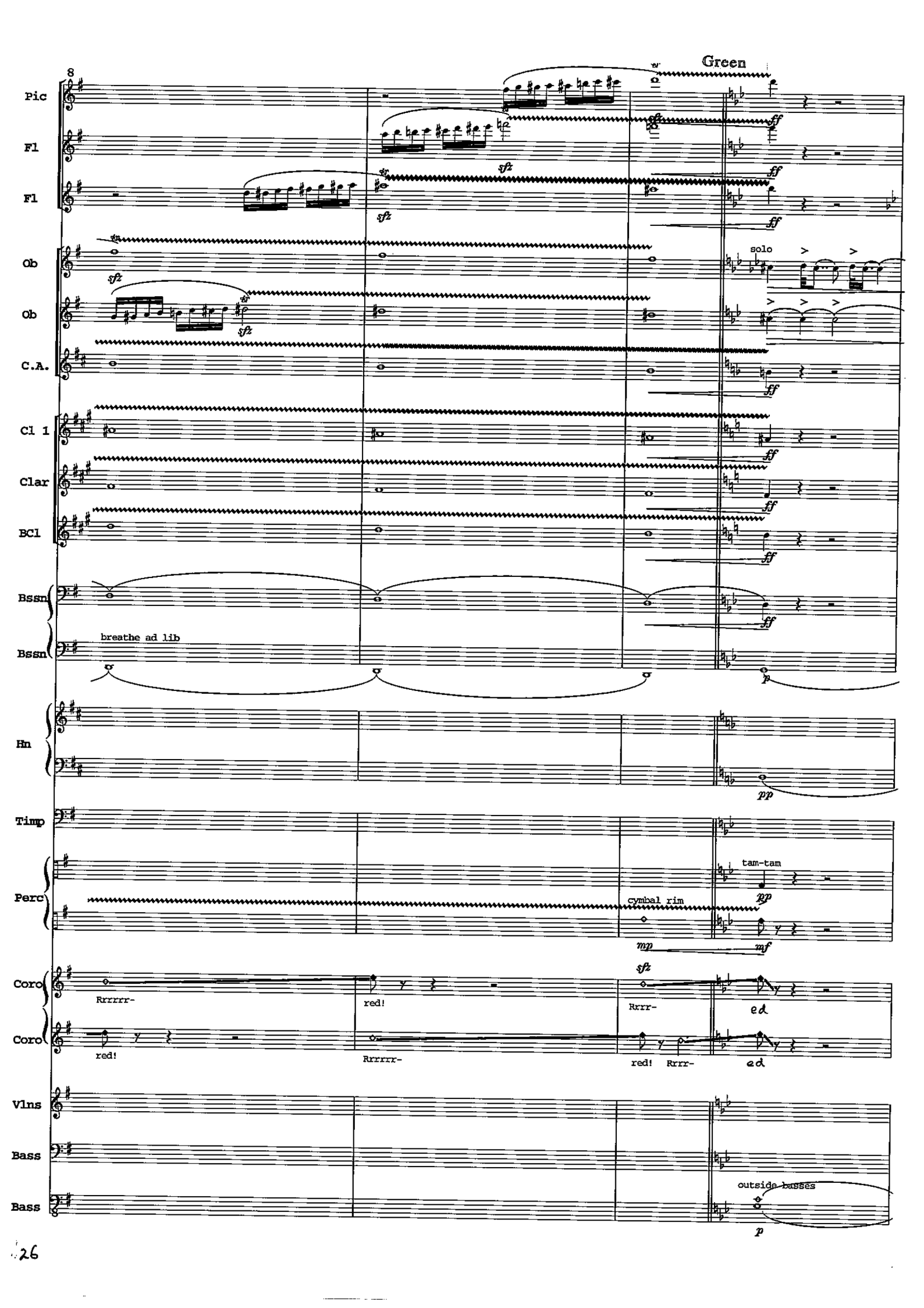
150
Cl
Ch
o- la La
la la la
la la
Can you hear the vi- o- lins?
zu zu zu ..
zum zum zum
zum zum zum zum
zum
Solo
VI
VII
Vla
Vcl
Cb
arco
mf
fp

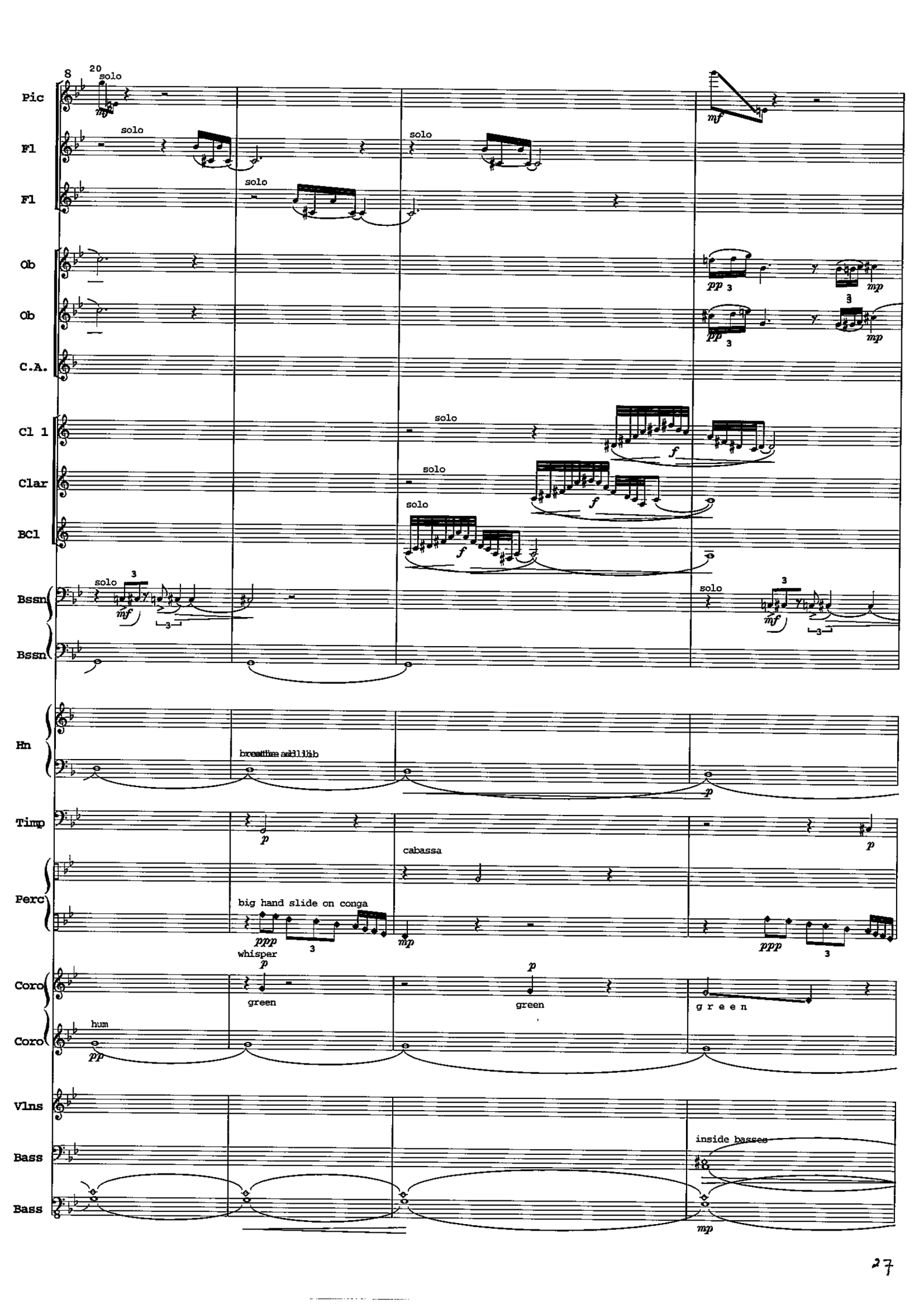

155
Cl
Ch
Vcl
Cb
Can you hear an or- ches- tra?
(mime bowing)
(mime bowing)
rit
tr
fp
f

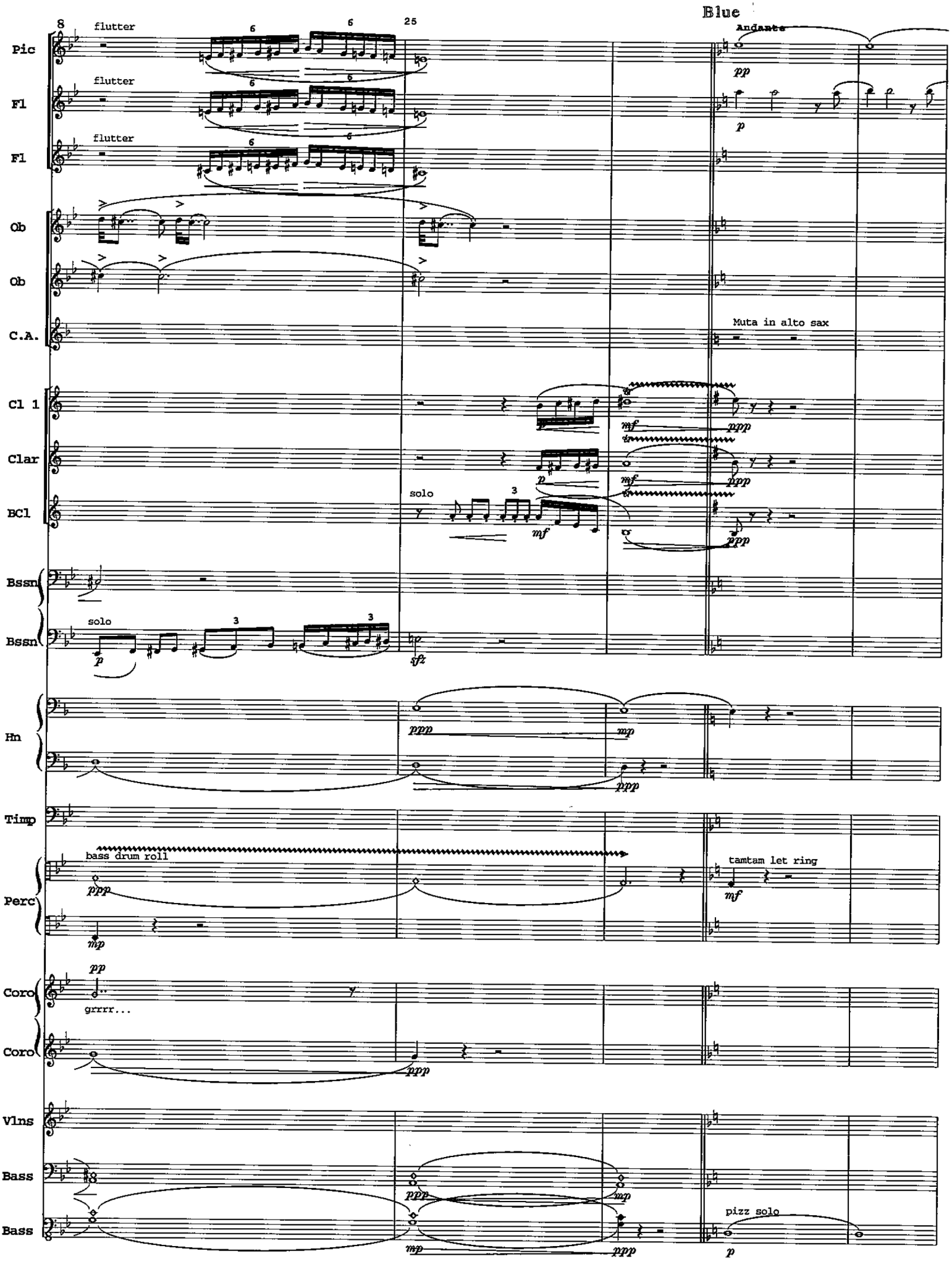

Colours
Brown
Andante
Piccolo
Flute 1
Flute 2
Oboe 1
Oboe 2
Cor anglais
mf
Clarinet 1 Bb
Clarinet 2 Bb
Bass Clarinet
Bassoon 1
Bassoon 2
solo
p
Horns in F
tune G,C#
Timpani
tamtam, let ring
mf
players 1&2
Percussion
players 3&4
slow unpitched gliss
B r o w n
gliss
d o w n
Coro
Coro
Violins
Vla & Vc
outside pizz f
Bass
inside arco p

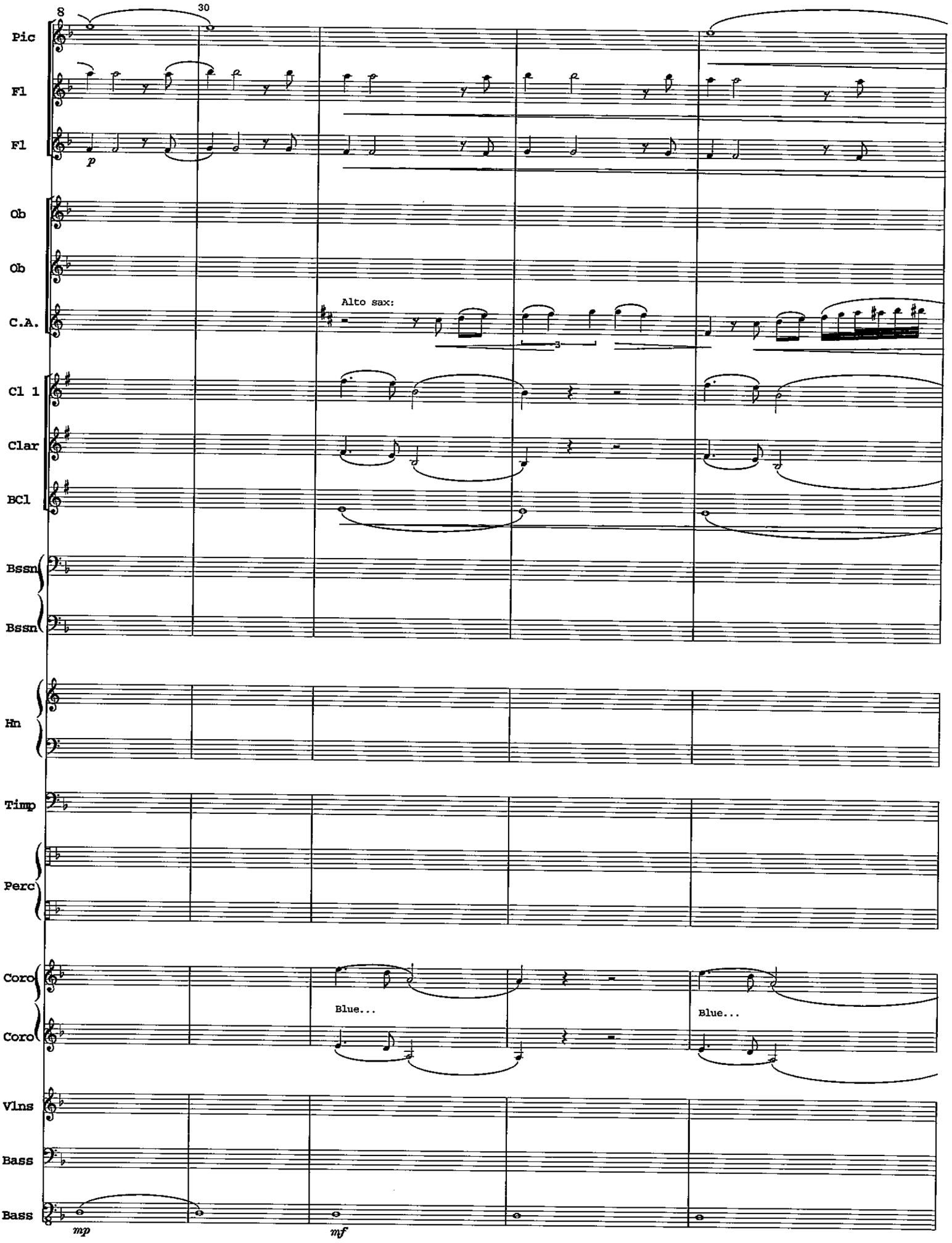

Yellow
8
Allegro
Pic
Fl
Fl
Ob
Ob
C.A.
Cl 1
Clar
BCl
Bssn
Bssn
Hn
a 1
a 1
Timp
Perc
tam-tam
p
triangle
cymbal
soft beaters
p
damp
p
p
p
Coro
Coro
Ye- low!
Ye- low!
Ye- low!
Ye- low!
Ye- low!
Ye- low!
Ye- low!
Ye- low!
Vlns
Bass
Bass
mf

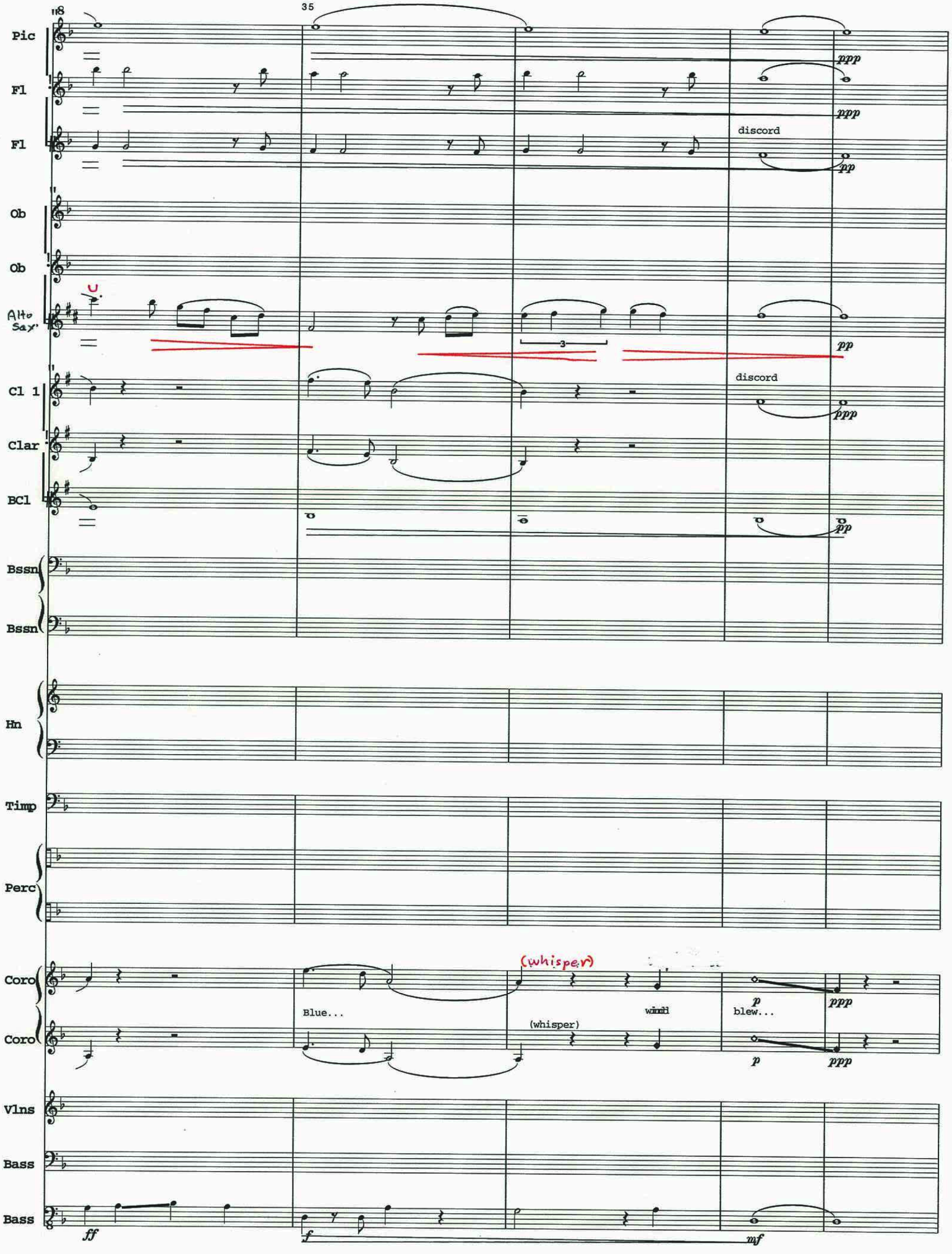

Red
8
Allegretto
Pic
Fl
Fl
Ob
Ob
C.A.
Cl 1
Clar
BCl
Bssn
Bssn
trill stops
Hn
Timp
Perc
Coro
Ye- low!
unvoiced
Rrrrrr-
red!
Coro
Ye- low!
unvoiced
Rrrrrr-
Vlns
Bass
Bass

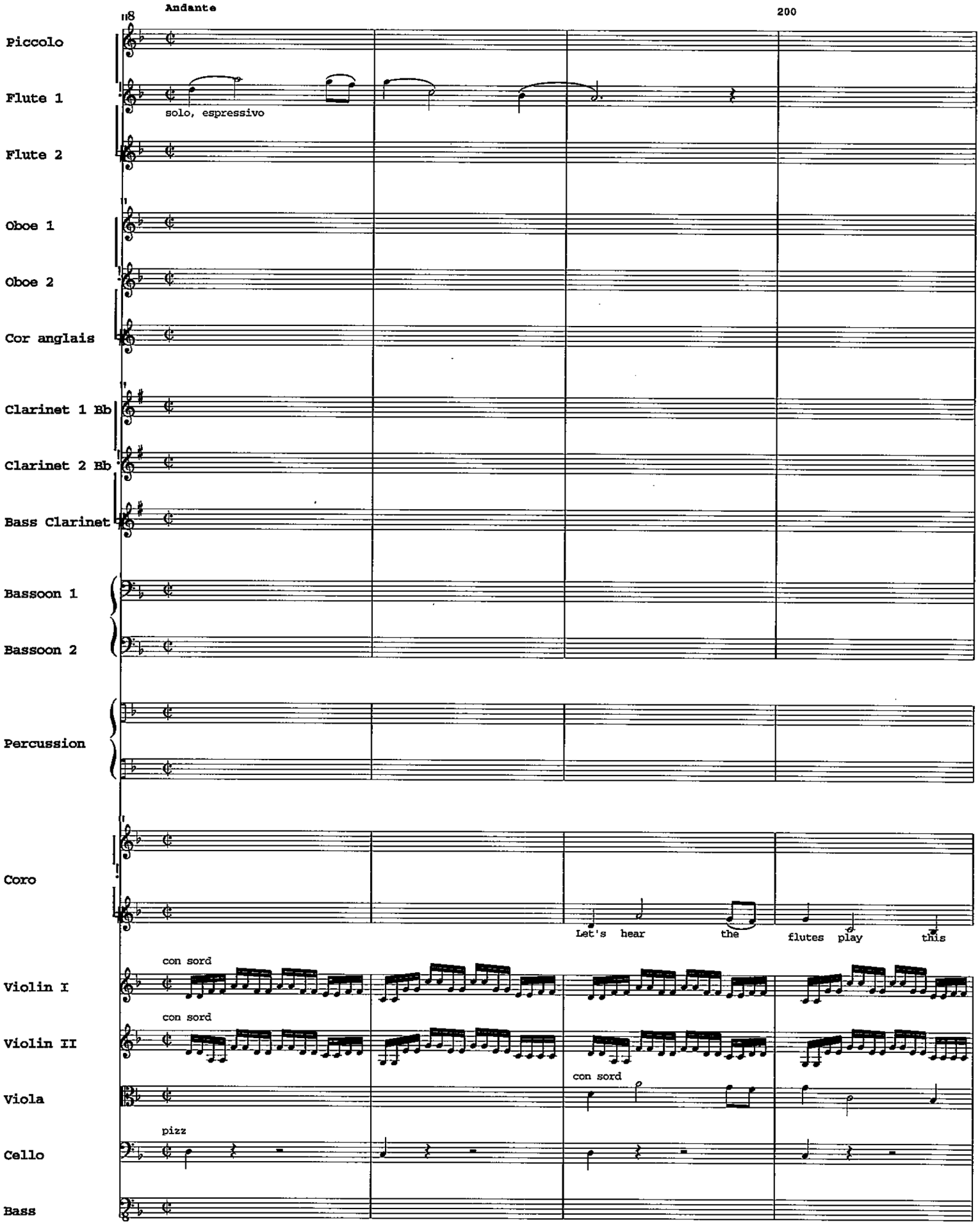

8
Green
Pic
Fl
Fl
Ob
Ob
C.A.
Cl 1
Clar
BCl
Bssn
Bssn
breathe ad lib
Hn
Timp
Perc
tam-tam
cymbal rim
Coro
Rrrrrr-
red!
Rrrr-
Coro
red!
Rrrrrr-
red!
Rrrr-
Vlns
Bass
Bass
outside basses
solo
sfz
ff
mp
mf
pp
p
ppp

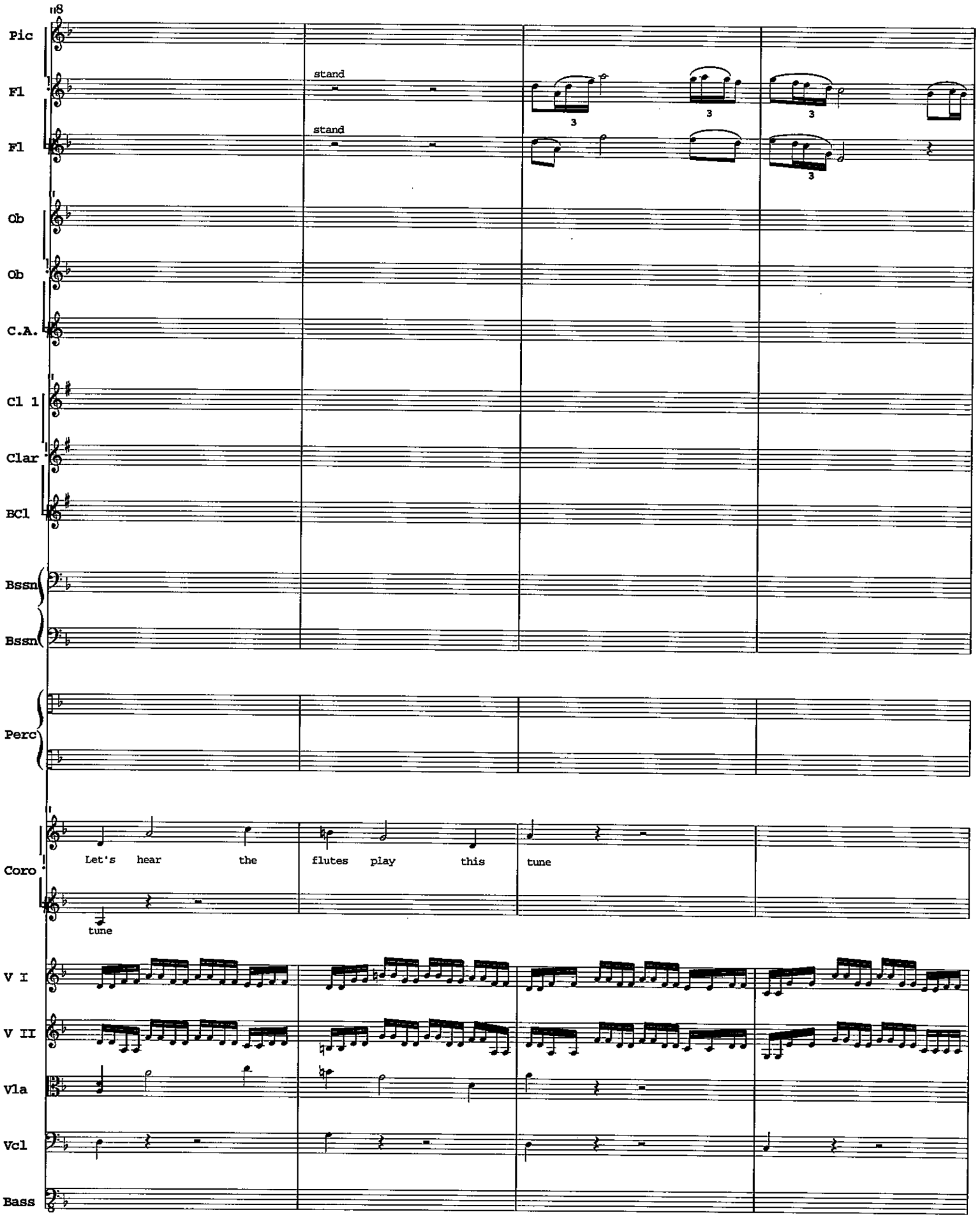

8
20
Pic
Fl
Fl
Ob
Ob
C.A.
Cl 1
Clar
BCl
Bssn
Bssn
Hn
Timp
Perc
Coro
Coro
Vlns
Bass
Bass
solo
mf
mp
pp
f
p
ppp
breathe ad lib
cabassa
big hand slide on conga
whisper
green
hum
inside basses

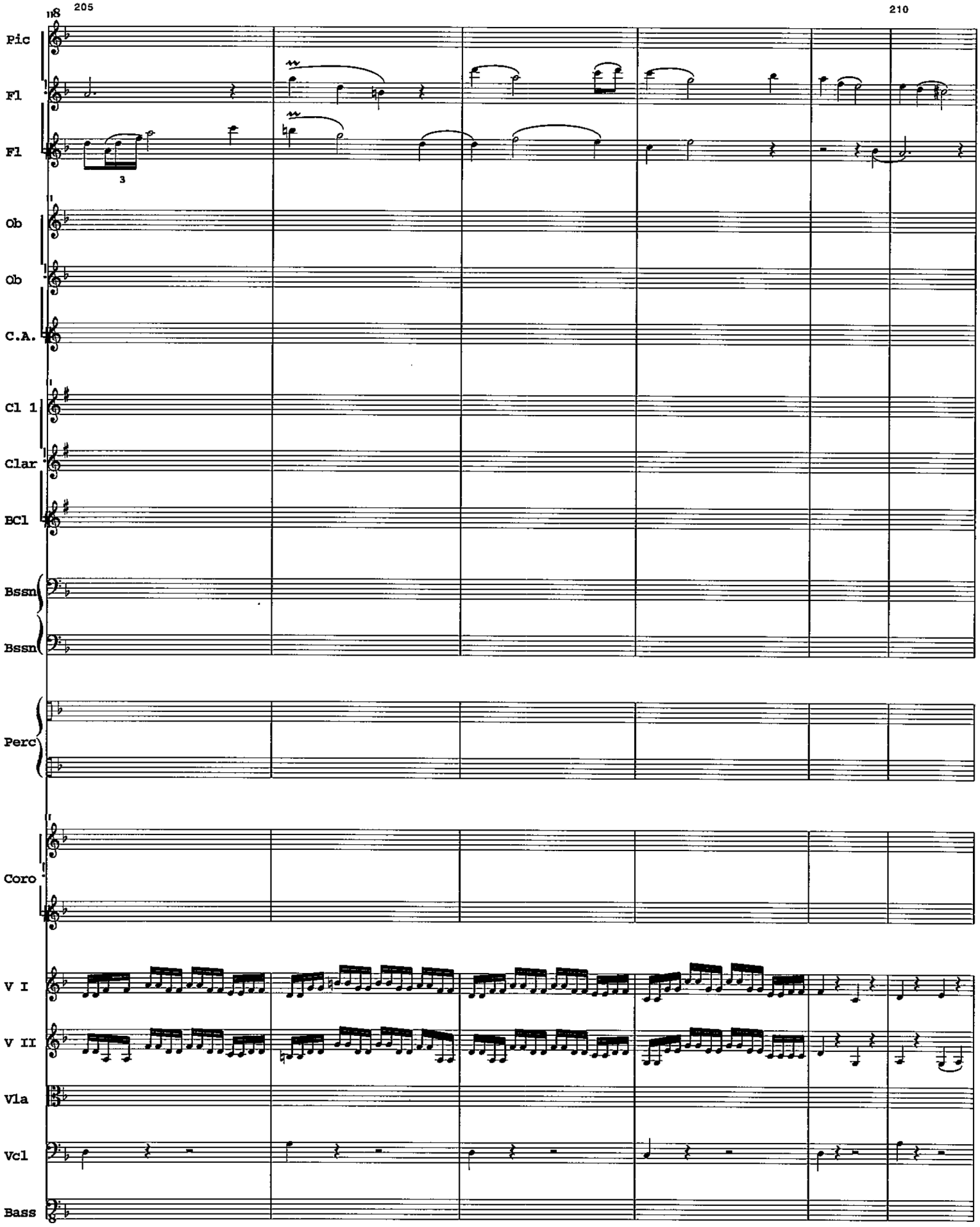

Blue
8
25
Andante
Pic
Fl
Fl
Ob
Ob
C.A.
Cl 1
Clar
BCl
Bssn
Bssn
Hn
Timp
Perc
Coro
Coro
Vlns
Bass
Bass
flutter
flutter
flutter
Muta in alto sax
solo
solo
bass drum roll
tamtam let ring
grrrr...
pizz solo

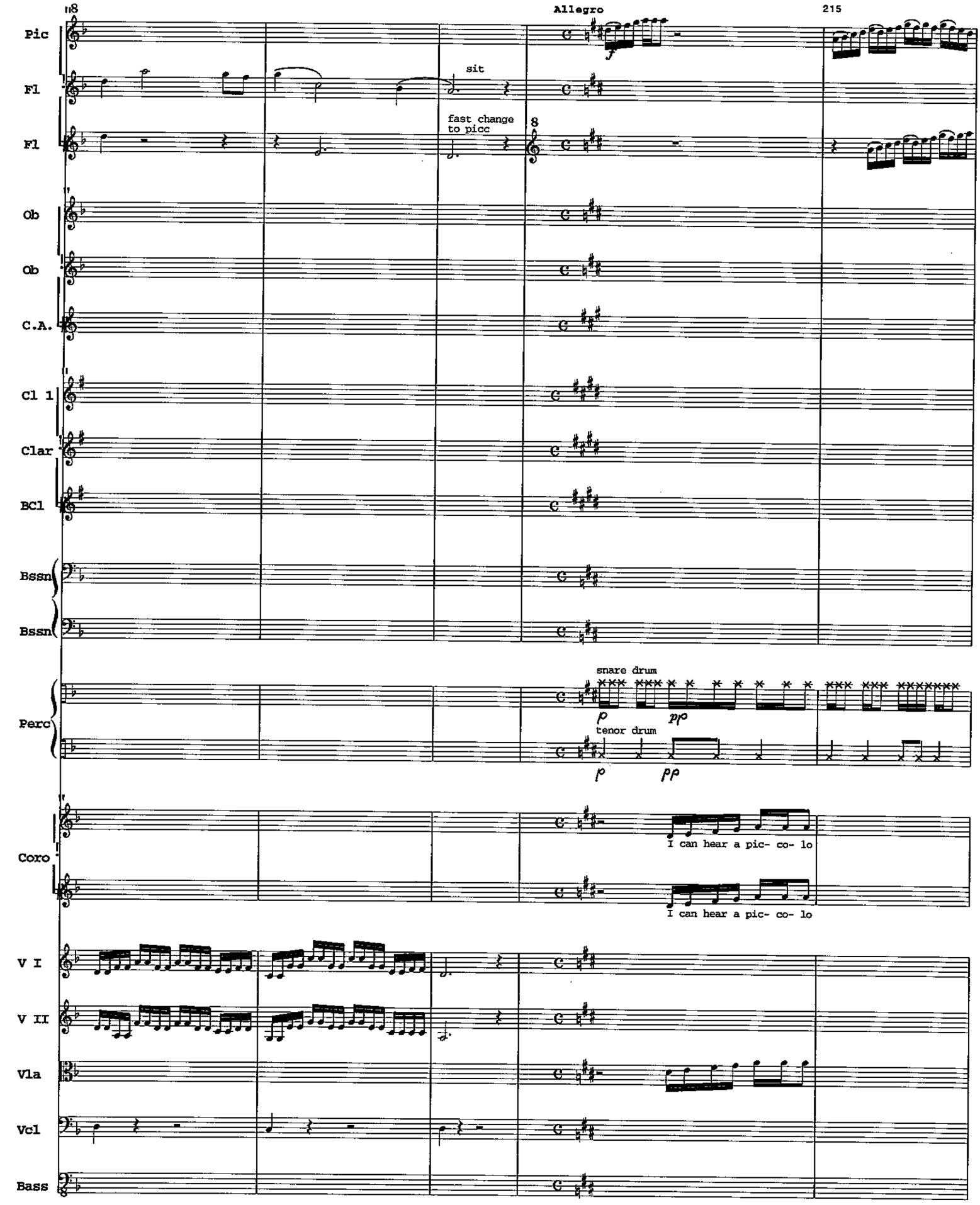

8
30
Pic
Fl
Fl
p
Ob
Ob
C.A.
Alto sax:
3
Cl 1
Clar
BCl
Bssn
Bssn
Hn
Timp
Perc
Coro
Coro
Blue...
Blue...
Vlns
Bass
Bass
mp
mf

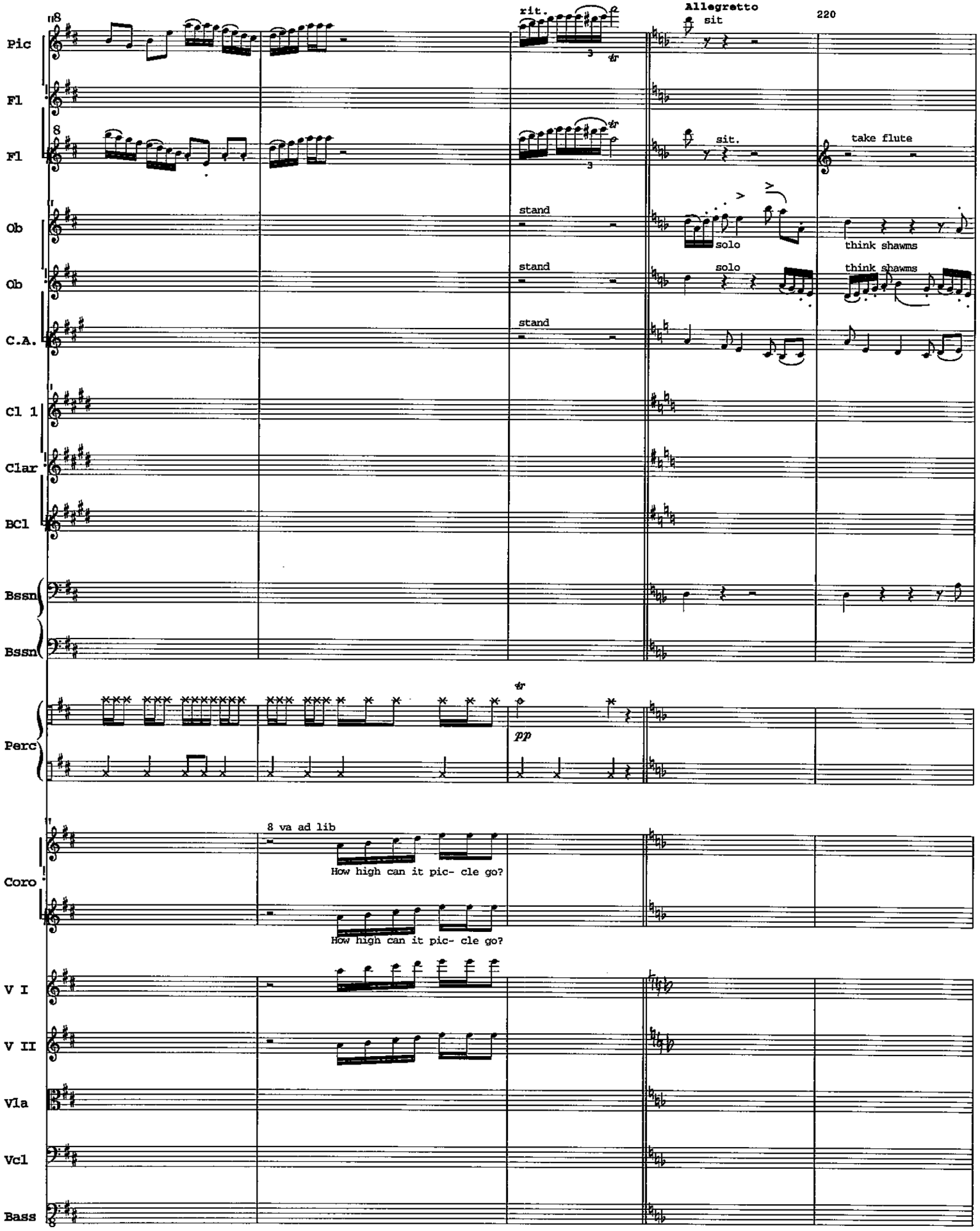

118
35
Pic
Fl
Fl
Ob
Ob
Alto Sax
Cl 1
Clar
BCl
Bssn
Bssn
Hn
Timp
Perc
Coro
Coro
Vlns
Bass
Bass
ppp
ppp
discord
pp
pp
discord
ppp
pp
3
(whisper)
Blue...
(whisper)
wind
p
blew...
ppp
p
ppp
ff
f
mf

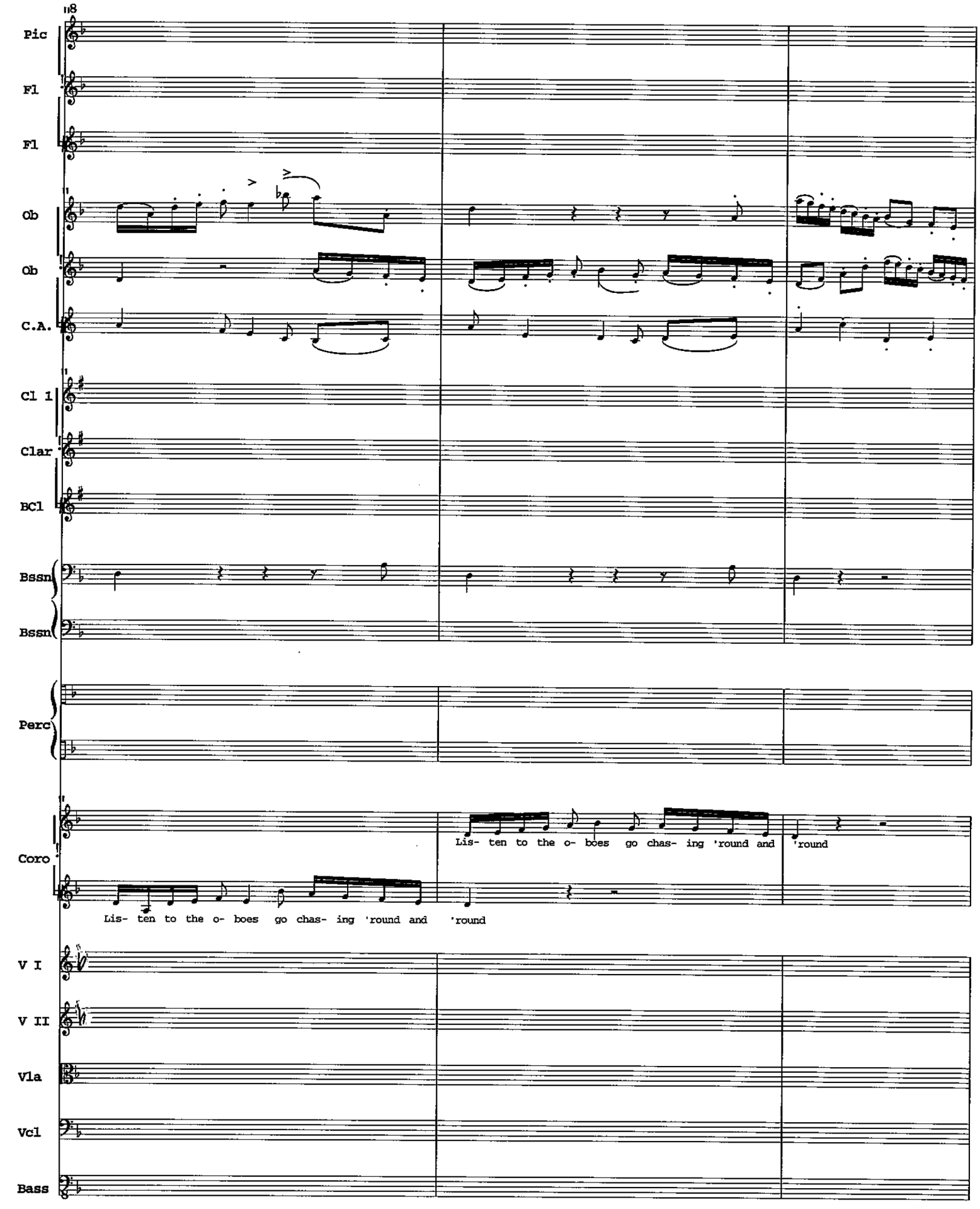

Andante
118
200
Piccolo
Flute 1
solo, espressivo
Flute 2
Oboe 1
Oboe 2
Cor anglais
Clarinet 1 Bb
Clarinet 2 Bb
Bass Clarinet
Bassoon 1
Bassoon 2
Percussion
Coro
Let's hear the flutes play this
Violin I
con sord
Violin II
con sord
Viola
con sord
Cello
pizz
Bass

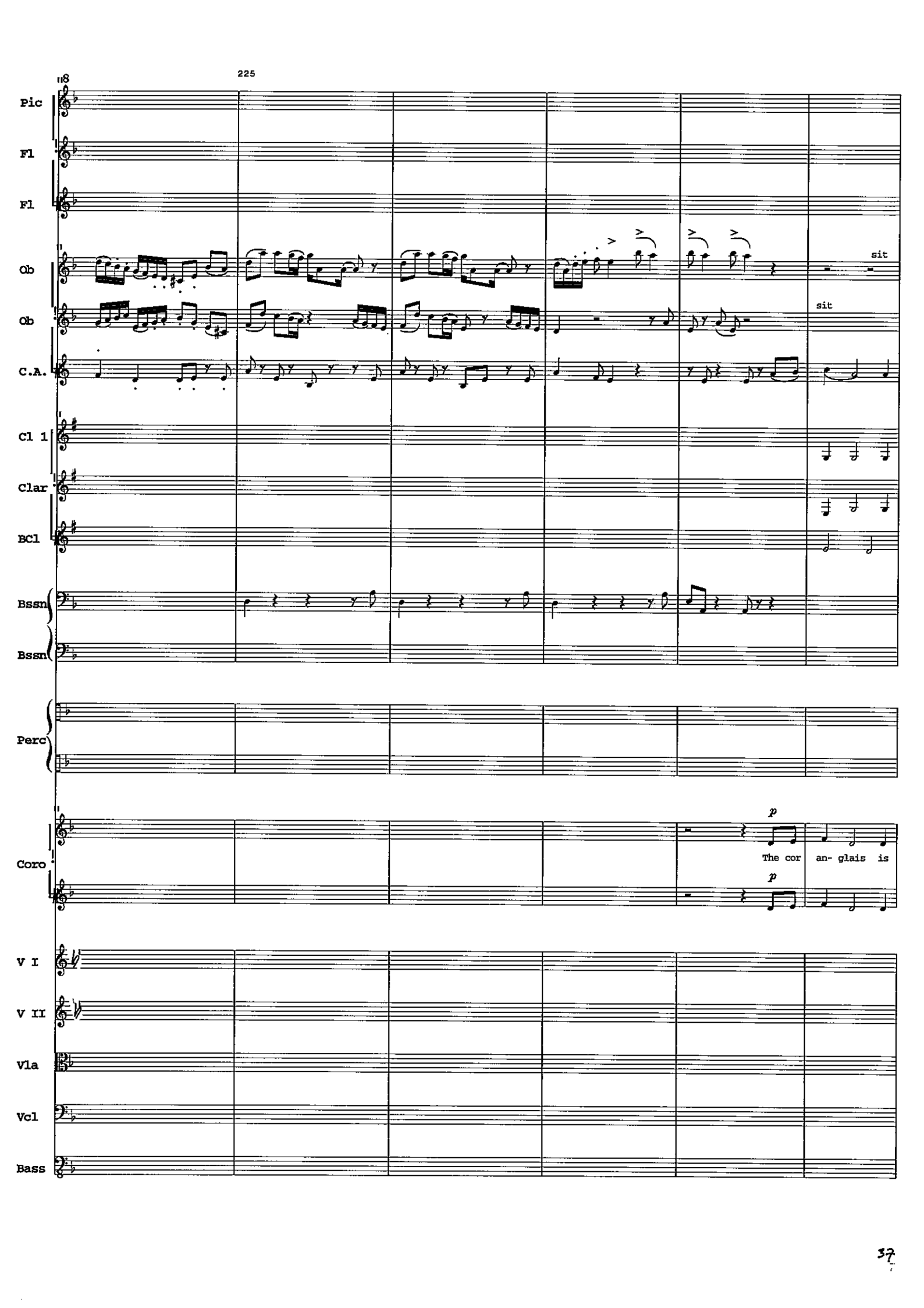

118
Pic
Fl
stand
Fl
stand
Ob
Ob
C.A.
Cl 1
Clar
BCl
Bssn
Bssn
Perc
Coro
Let's hear the flutes play this tune
tune
V I
V II
Vla
Vcl
Bass

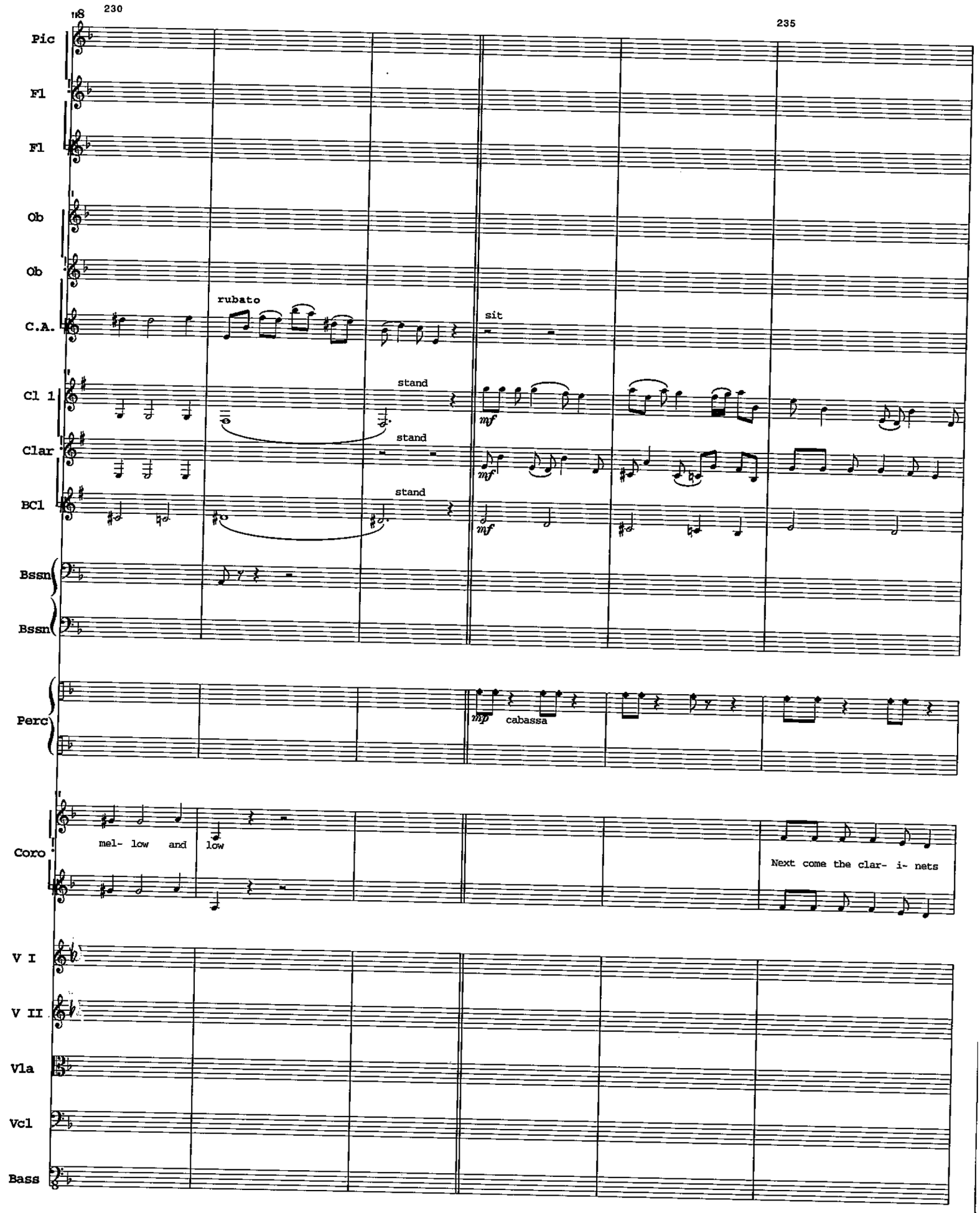

205
210
Pic
Fl
Fl
Ob
Ob
C.A.
Cl 1
Clar
BCl
Bssn
Bssn
Perc
Coro
V I
V II
Vla
Vcl
Bass

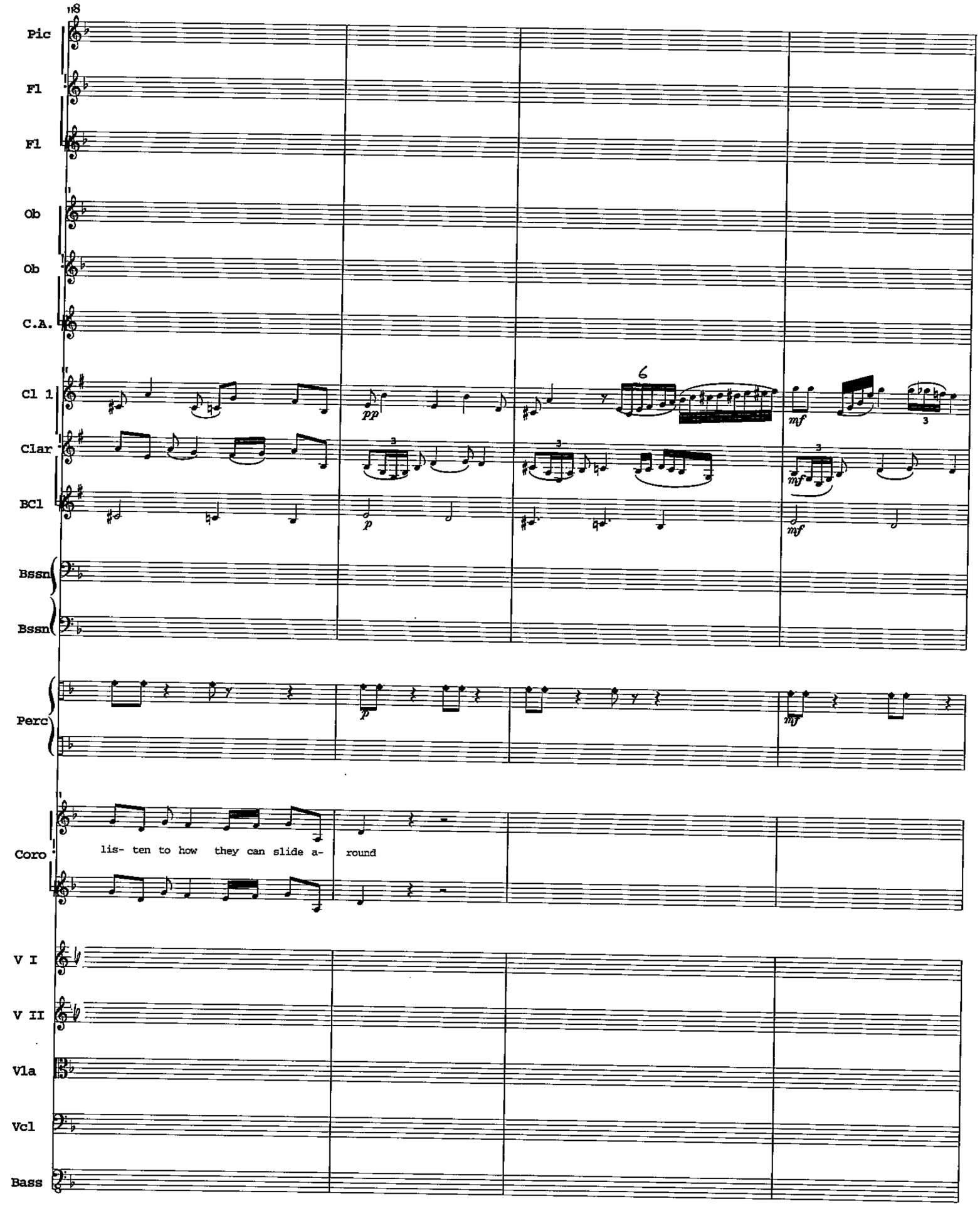

118
Allegro
215
Pic
Fl
Fl
sit
fast change to picc
8
Ob
Ob
C.A.
Cl 1
Clar
BCl
Bssn
Bssn
snare drum
p
pp
Perc
tenor drum
p
pp
Coro
I can hear a pic- co- lo
I can hear a pic- co- lo
V I
V II
Vla
Vcl
Bass

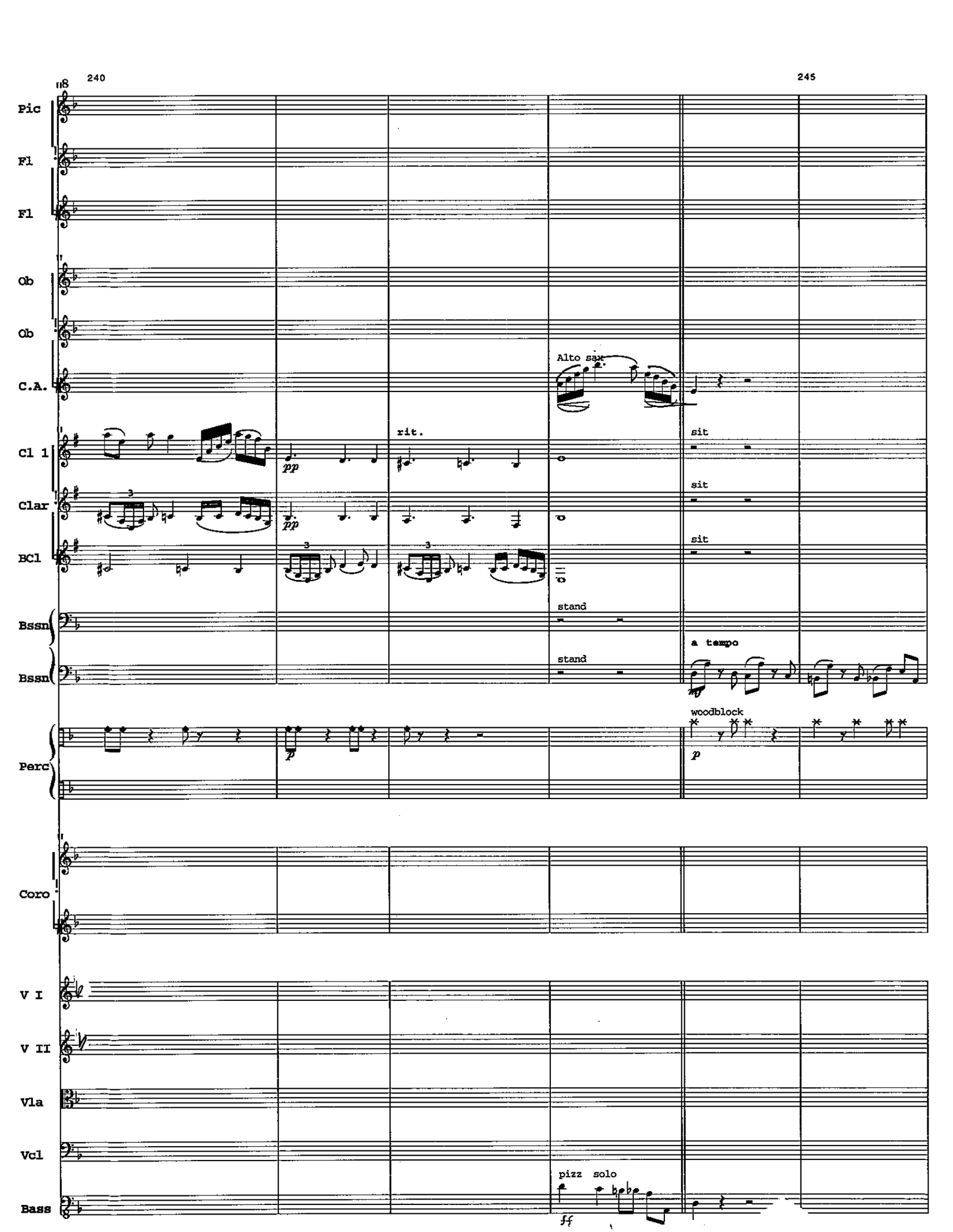

Pic
Fl
Fl
Ob
Ob
C.A.
Cl 1
Clar
BCl
Bssn
Bssn
Perc
Coro
V I
V II
Vla
Vcl
Bass
rit.
Allegretto
sit
220
sit.
take flute
stand
solo
think shawms
pp
8 va ad lib
How high can it pic- cle go?
How high can it pic- cle go?

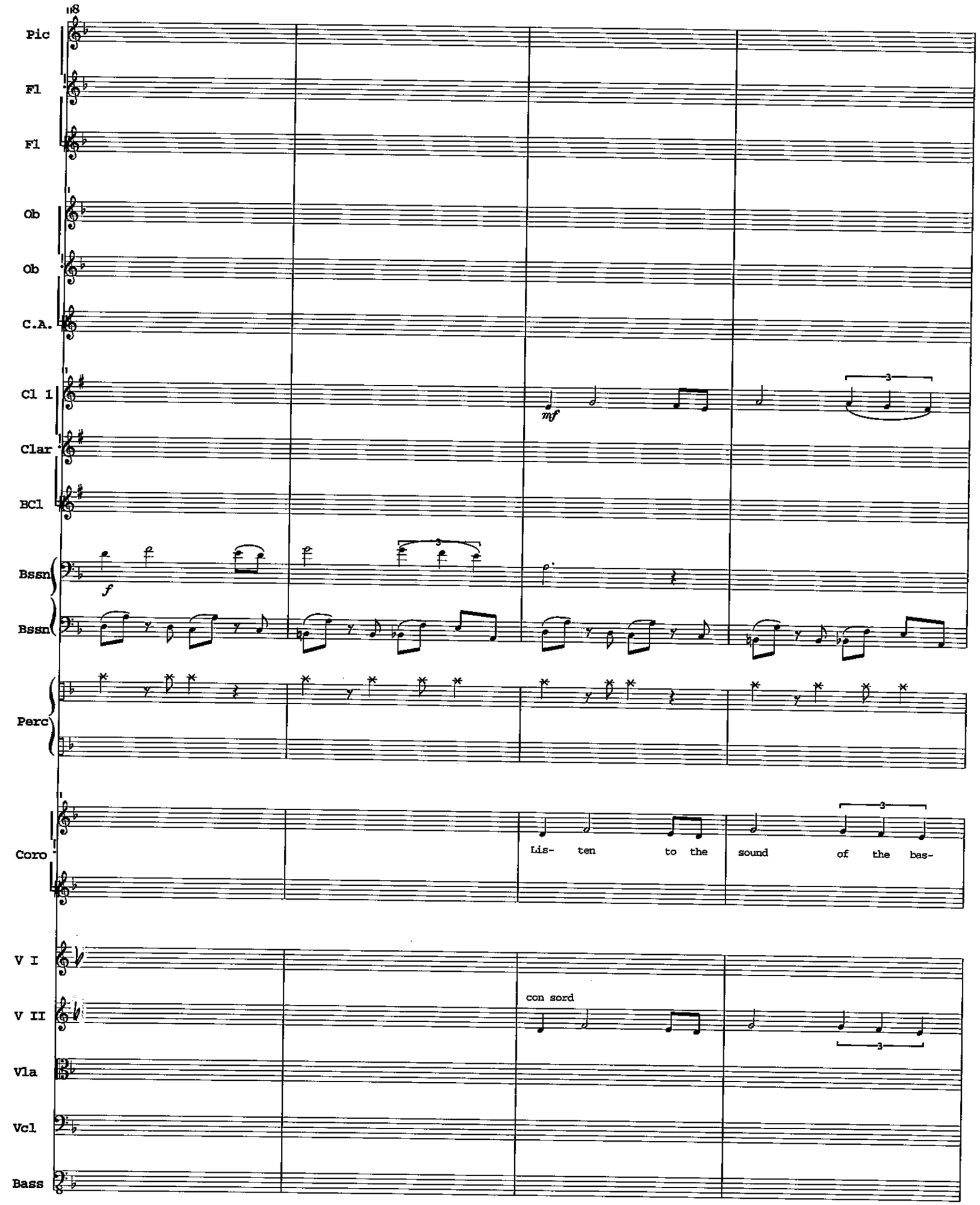

118
Pic
Fl
Fl
Ob
Ob
C.A.
Cl 1
Clar
BCl
Bssn
Bssn
Perc
Coro
Lis- ten to the o- boes go chas- ing 'round and 'round
Lis- ten to the o- boes go chas- ing 'round and 'round
V I
V II
Vla
Vcl
Bass

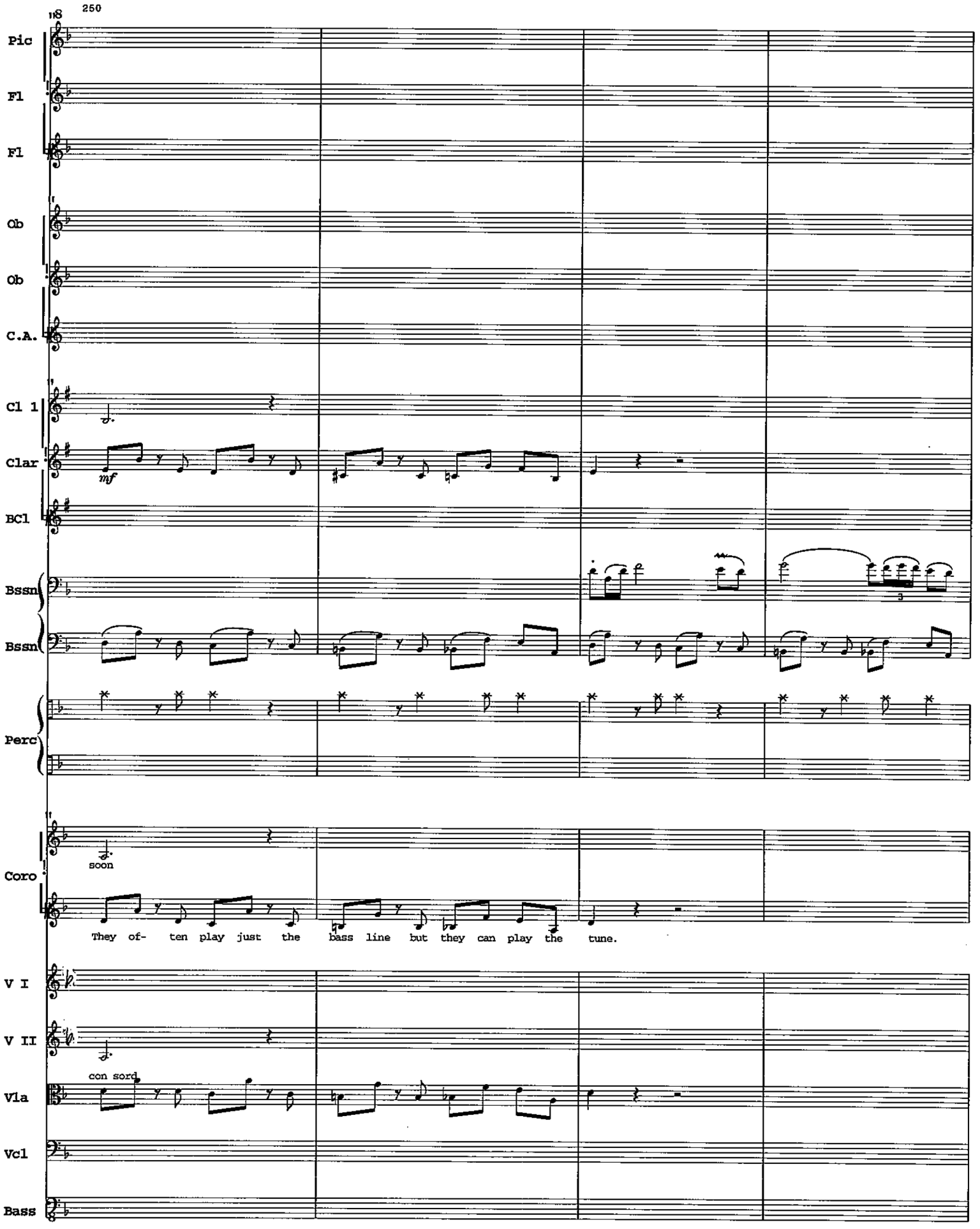

225
Pic
Fl
Fl
Ob
Ob
C.A.
sit
sit
Cl 1
Clar
BCl
Bssn
Bssn
Perc
Coro
p
The cor an- glais is
p
V I
V II
Vla
Vcl
Bass

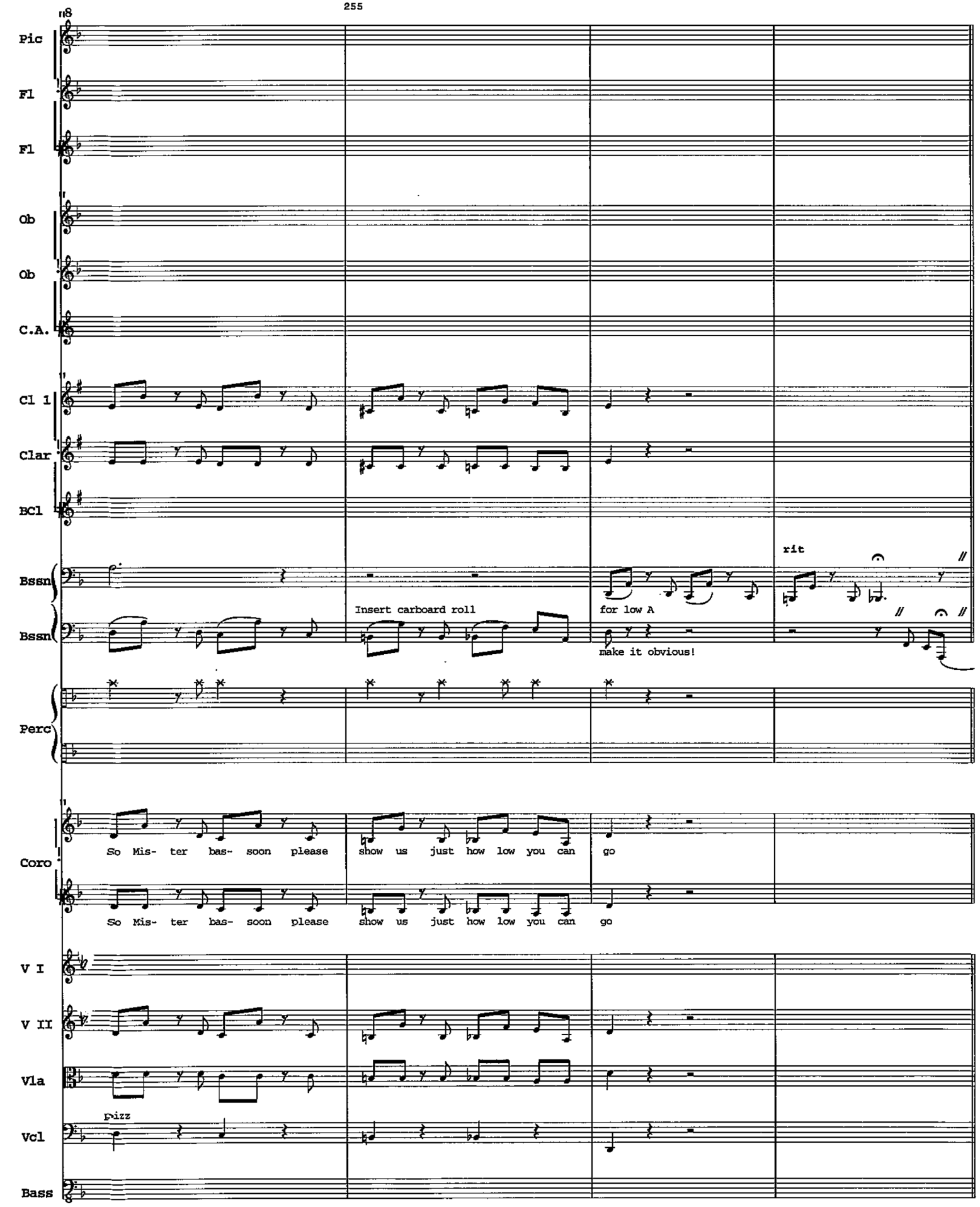

118
230
235
Pic
Fl
Fl
Ob
Ob
C.A.
rubato
sit
Cl 1
Clar
BCl
stand
stand
stand
mf
mf
mf
Bssn
Bssn
Perc
mp
cabassa
Coro
mel- low and
low
Next come the clar- i- nets
V I
V II
Vla
Vcl
Bass


18
Pic
Fl
Fl
Ob
Ob
C.A.
Cl 1
Clar
BCl
Bssn
Bssn
Perc
Coro
lis- ten to how they can slide a- round
V I
V II
Vla
Vcl
Bass
pp
p
mf
6
3

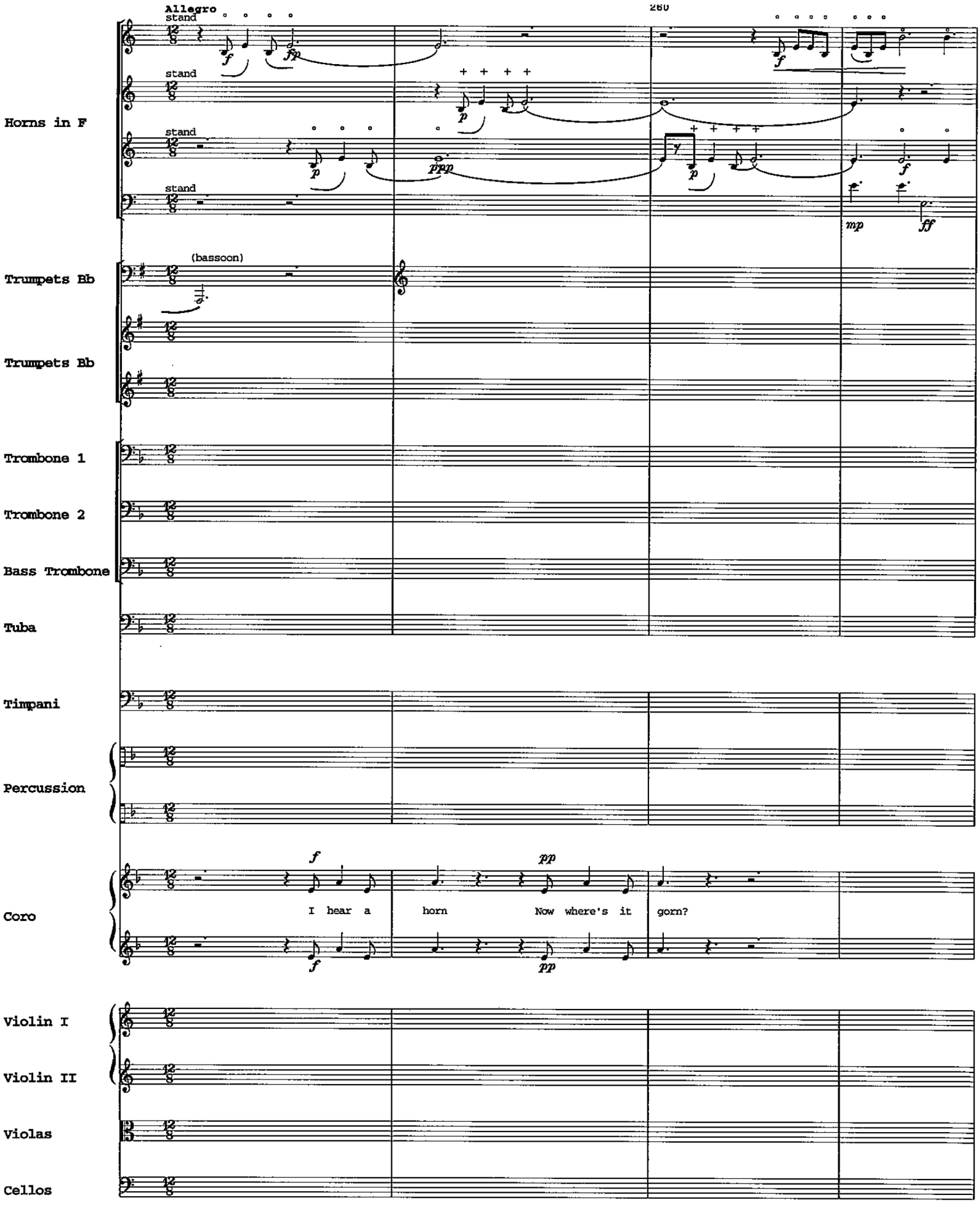

240
245
Pic
Fl
Fl
Ob
Ob
C.A.
Alto sax
Cl 1
Clar
BCl
rit.
pp
sit
sit
sit
Bssn
Bssn
stand
stand
a tempo
Perc
woodblock
p
Coro
V I
V II
Vla
Vcl
Bass
pizz solo
ff

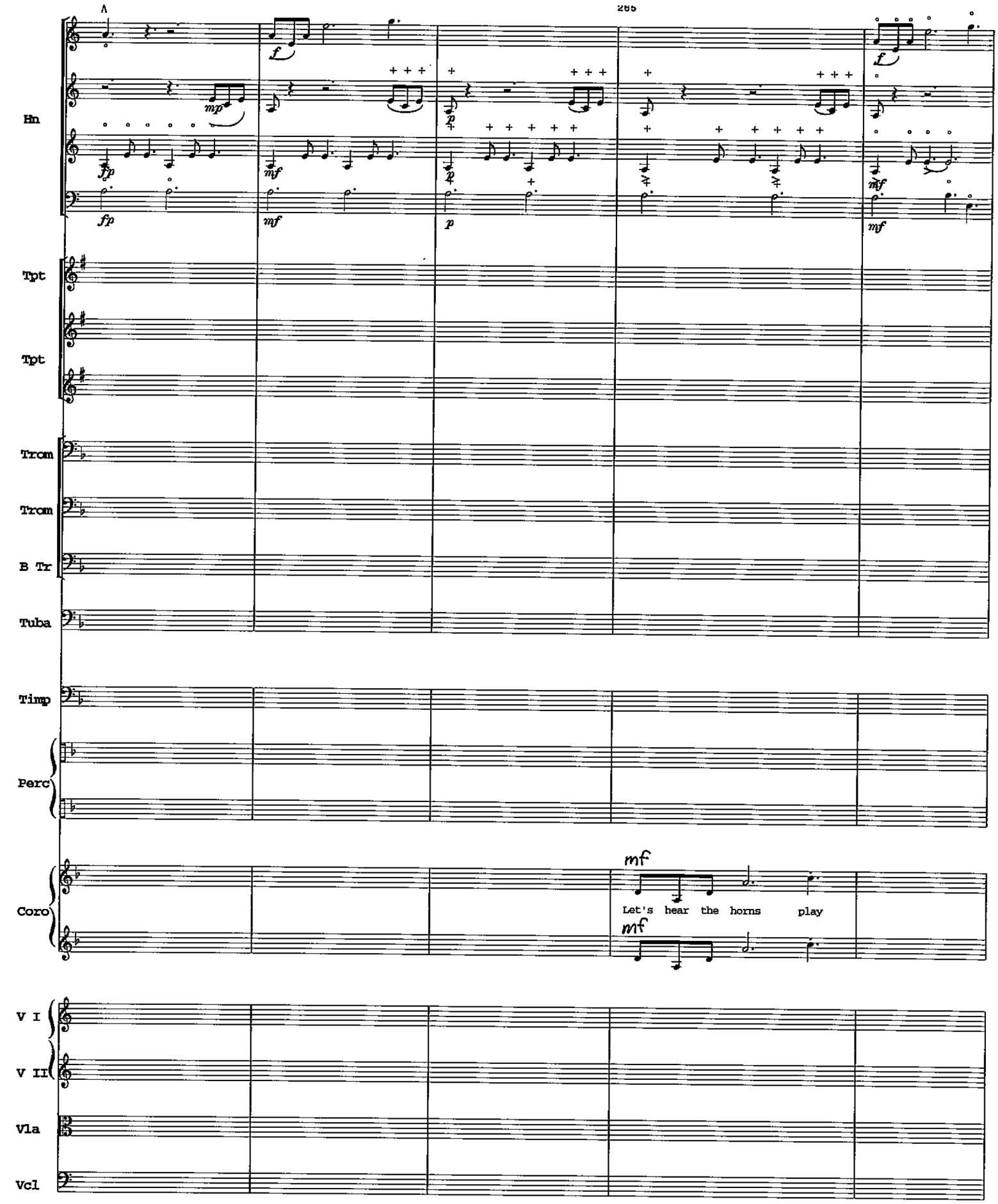

118
Pic
Fl
Fl
Ob
Ob
C.A.
Cl 1
Clar
BCl
Bssn
Bssn
Perc
Coro
V I
V II
Vla
Vcl
Bass
mf
f
Lis- ten to the sound of the bas-
con sord

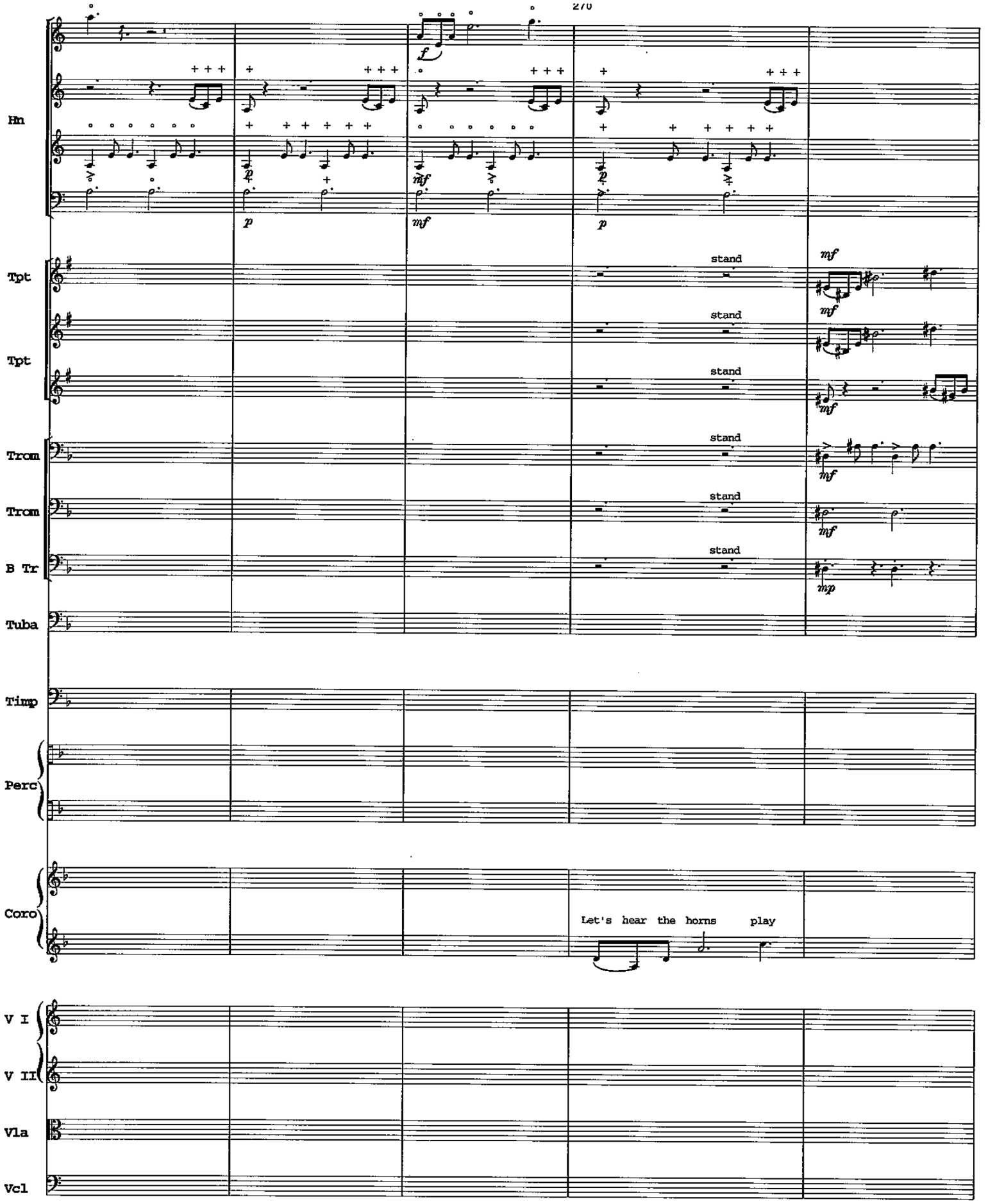

250
Pic
Fl
Fl
Ob
Ob
C.A.
Cl 1
Clar
mf
BCl
Bssn
Bssn
Perc
soon
Coro
They of- ten play just the bass line but they can play the tune.
V I
V II
con sord
Vla
Vcl
Bass

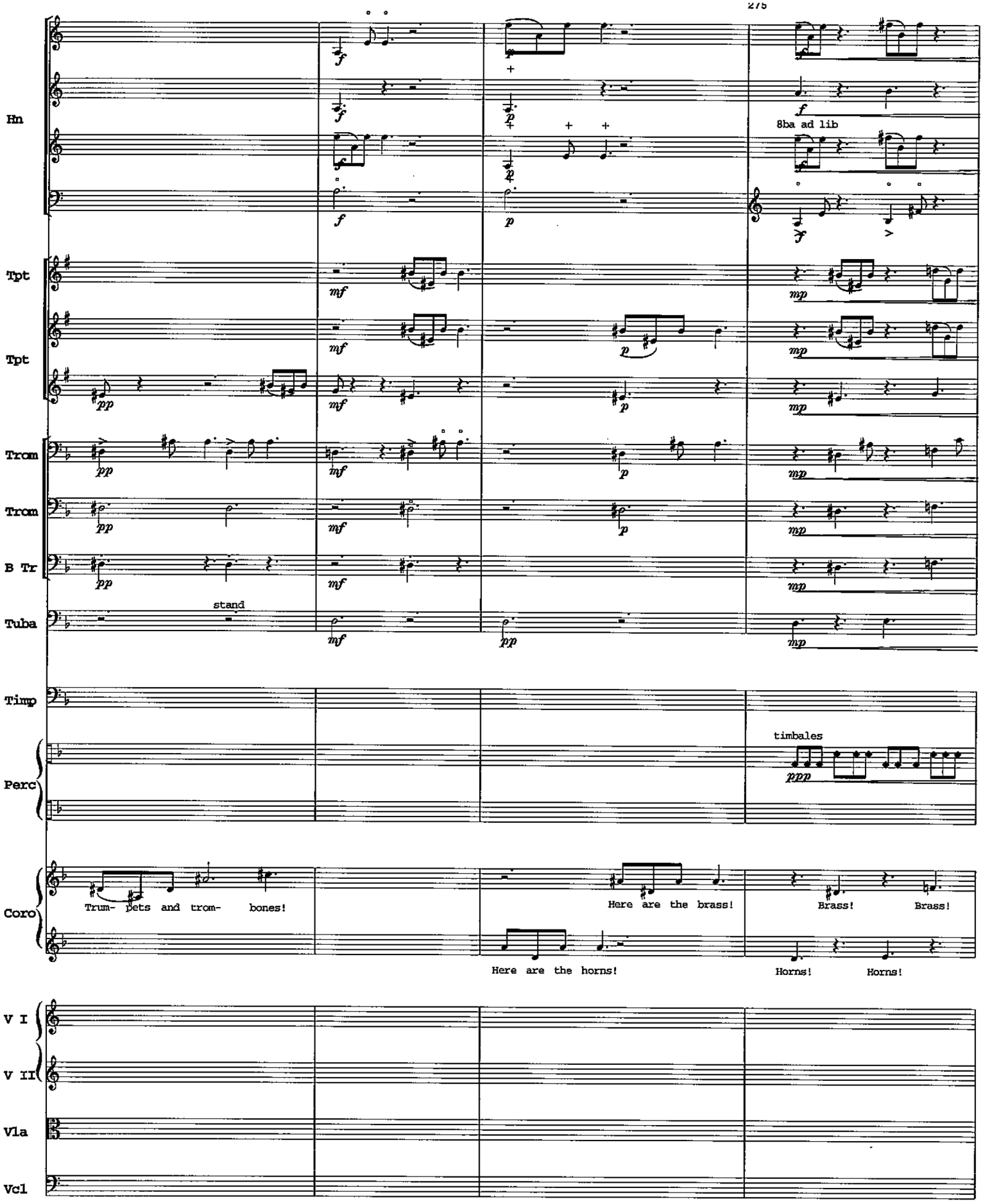


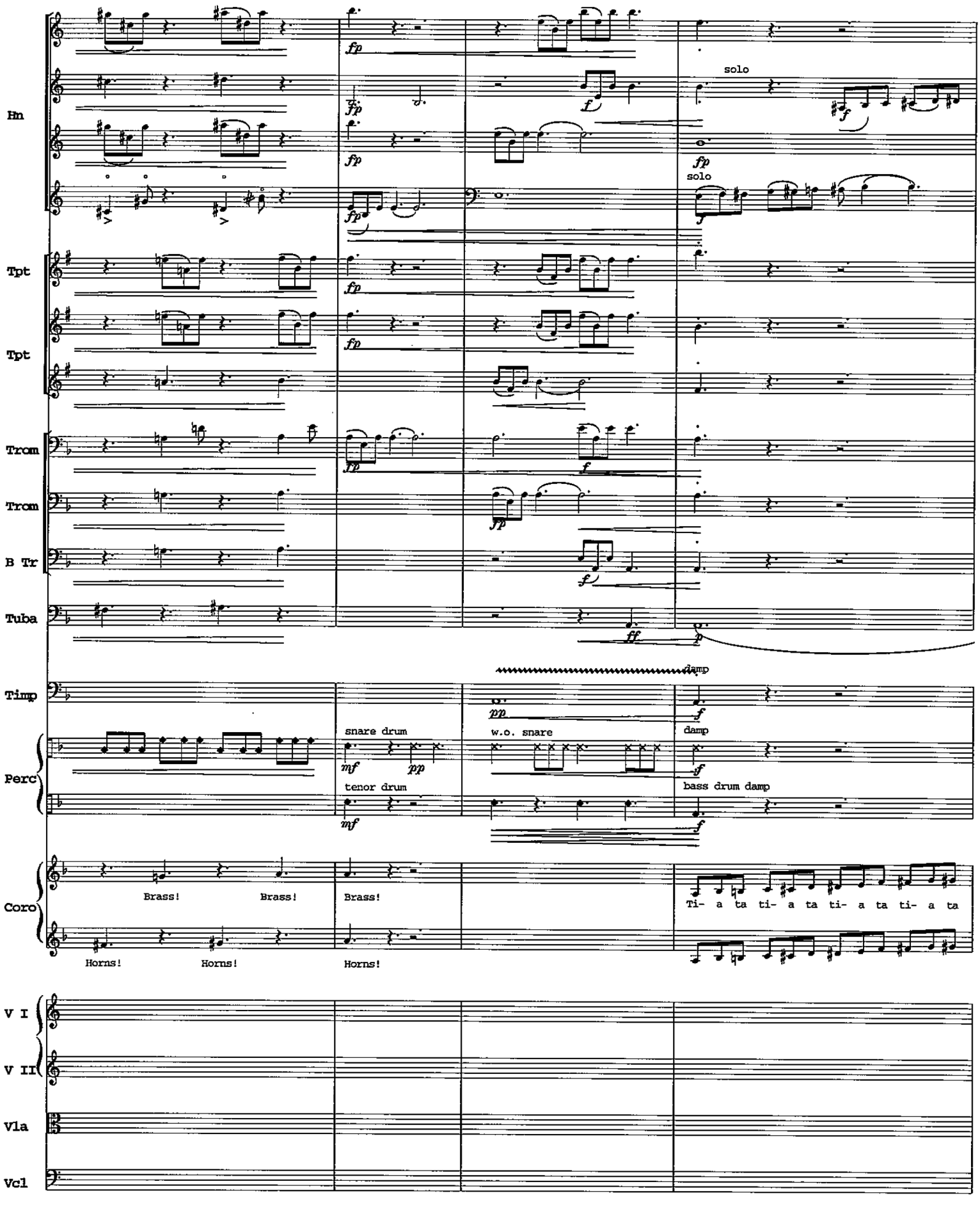
The bassoon low A requires an informal Wagner bell. A roll of thin cardboard will suffice. It could be made from an Australia Post packaging cylinder, reduced in diameter to make a neat fit, or something else which is *obviously* cardboard. A "scrunchy" (elasticised hair binder) around the cylinder may be positioned to tune it. The player should make an obvious fuss installing it.

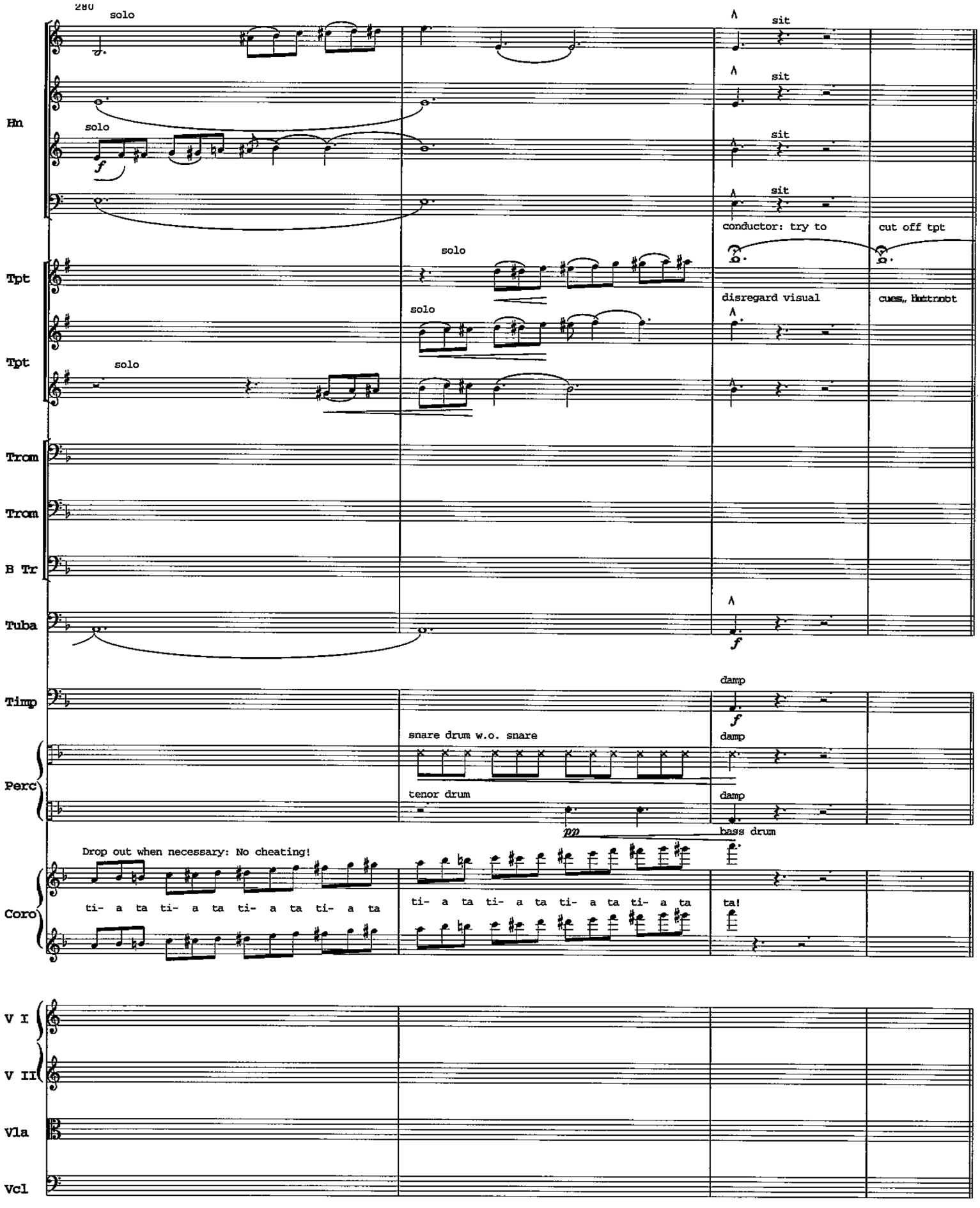

Allegro
stand
stand
stand
stand
Horns in F
(bassoon)
Trumpets Bb
Trumpets Bb
Trombone 1
Trombone 2
Bass Trombone
Tuba
Timpani
Percussion
Coro
I hear a
horn
Now where's it
gorn?
Violin I
Violin II
Violas
Cellos

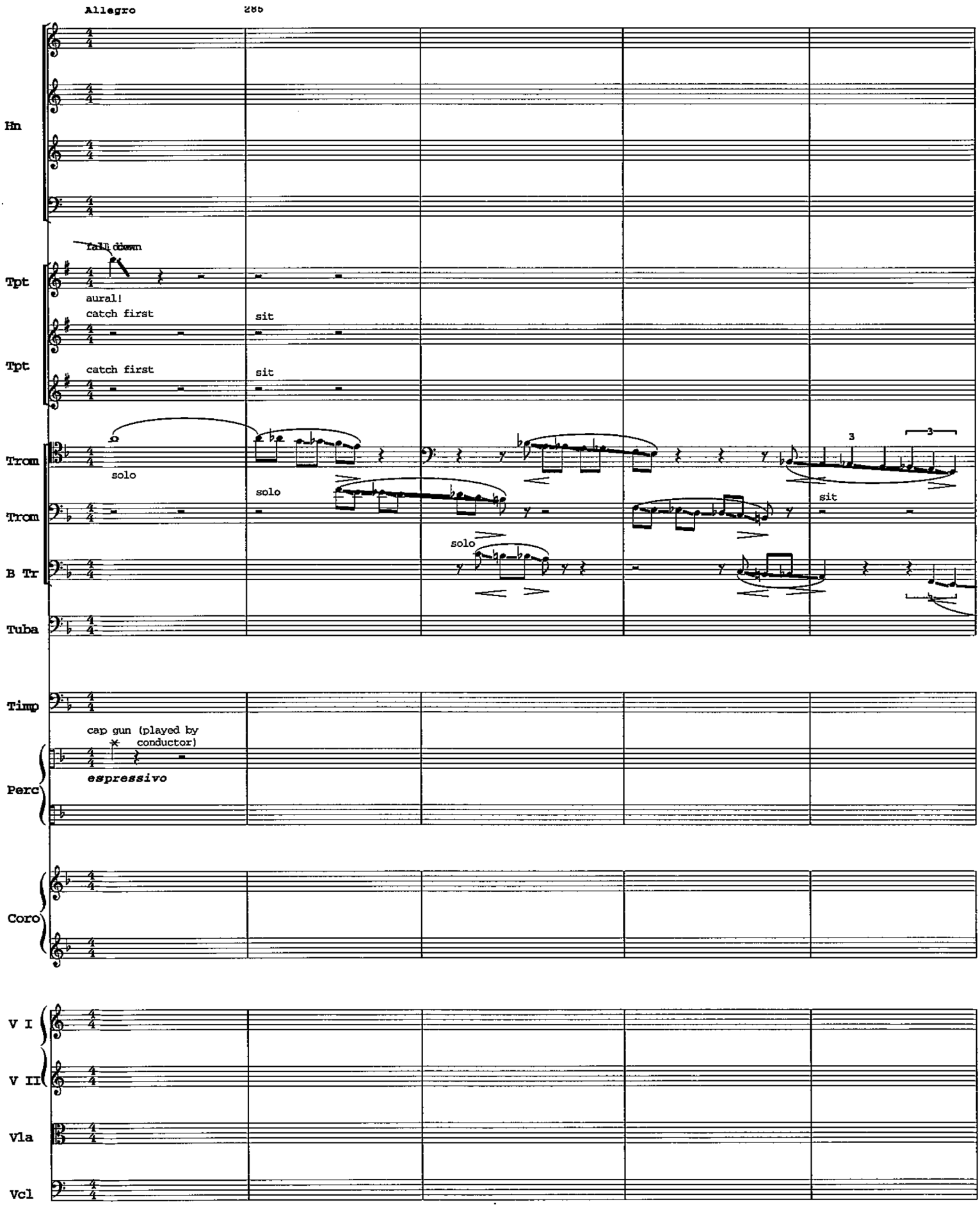

A
285
Hn
Tpt
Tpt
Trom
Trom
B Tr
Tuba
Timp
Perc
Coro
mf
Let's hear the horns play
mf
V I
V II
Vla
Vcl


270
Hn
Tpt
Tpt
Trom
Trom
B Tr
Tuba
Timp
Perc
Coro
V I
V II
Vla
Vcl
stand
Let's hear the horns play

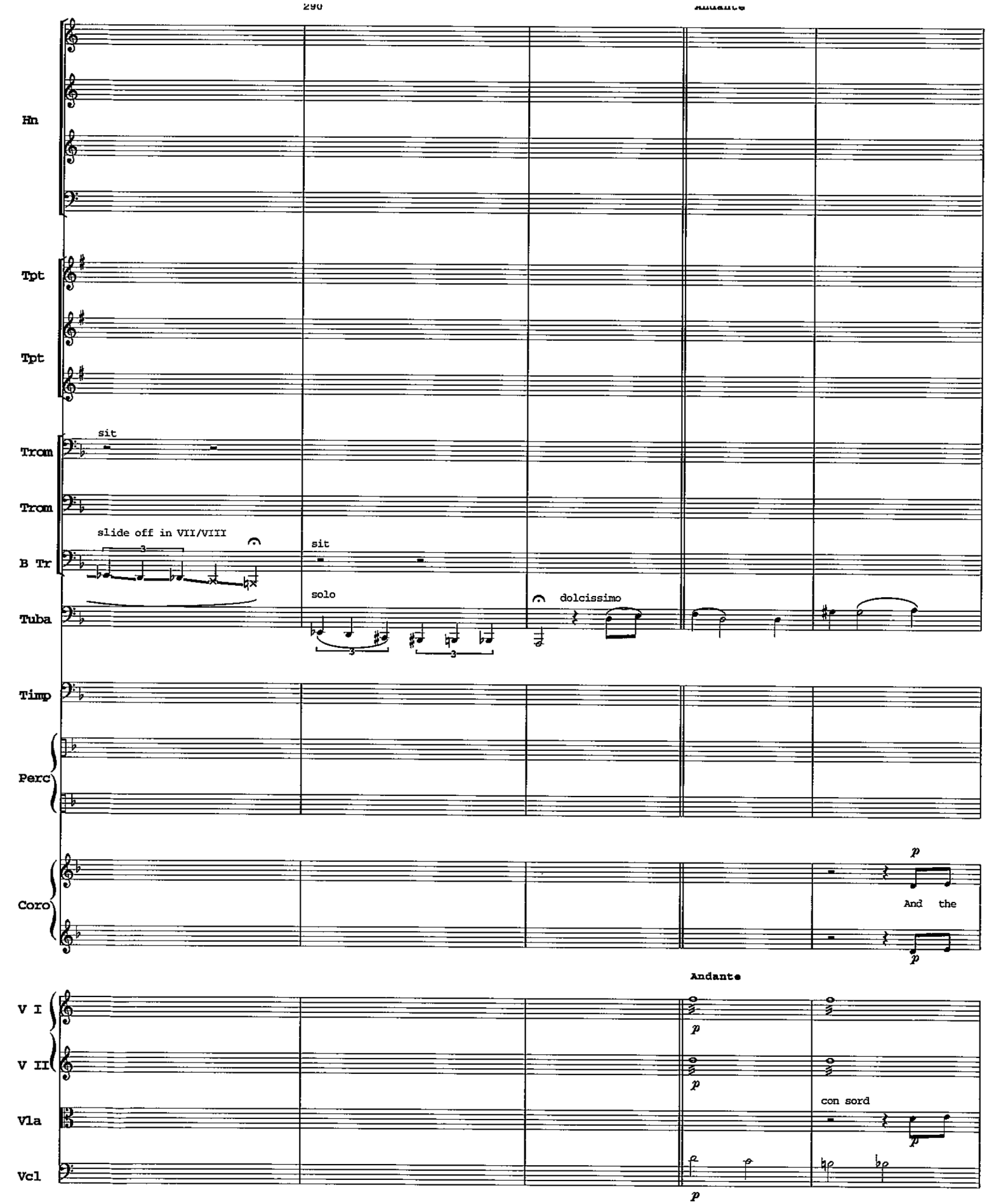

Hn
8ba ad lib
Tpt
Tpt
Trom
Trom
B Tr
stand
Tuba
Timp
timbales
Perc
Coro
Trum- pets and trom- bones!
Here are the brass!
Brass! Brass!
Here are the horns!
Horns! Horns!
V I
V II
Vla
Vcl


Hn
Tpt
Tpt
Trom
Trom
B Tr
Tuba
Timp
Perc
Coro
V I
V II
Vla
Vcl
solo
solo
damp
snare drum
w.o. snare
damp
tenor drum
bass drum damp
Brass!
Brass!
Brass!
Ti- a ta ti- a ta ti- a ta ti- a ta
Horns!
Horns!
Horns!

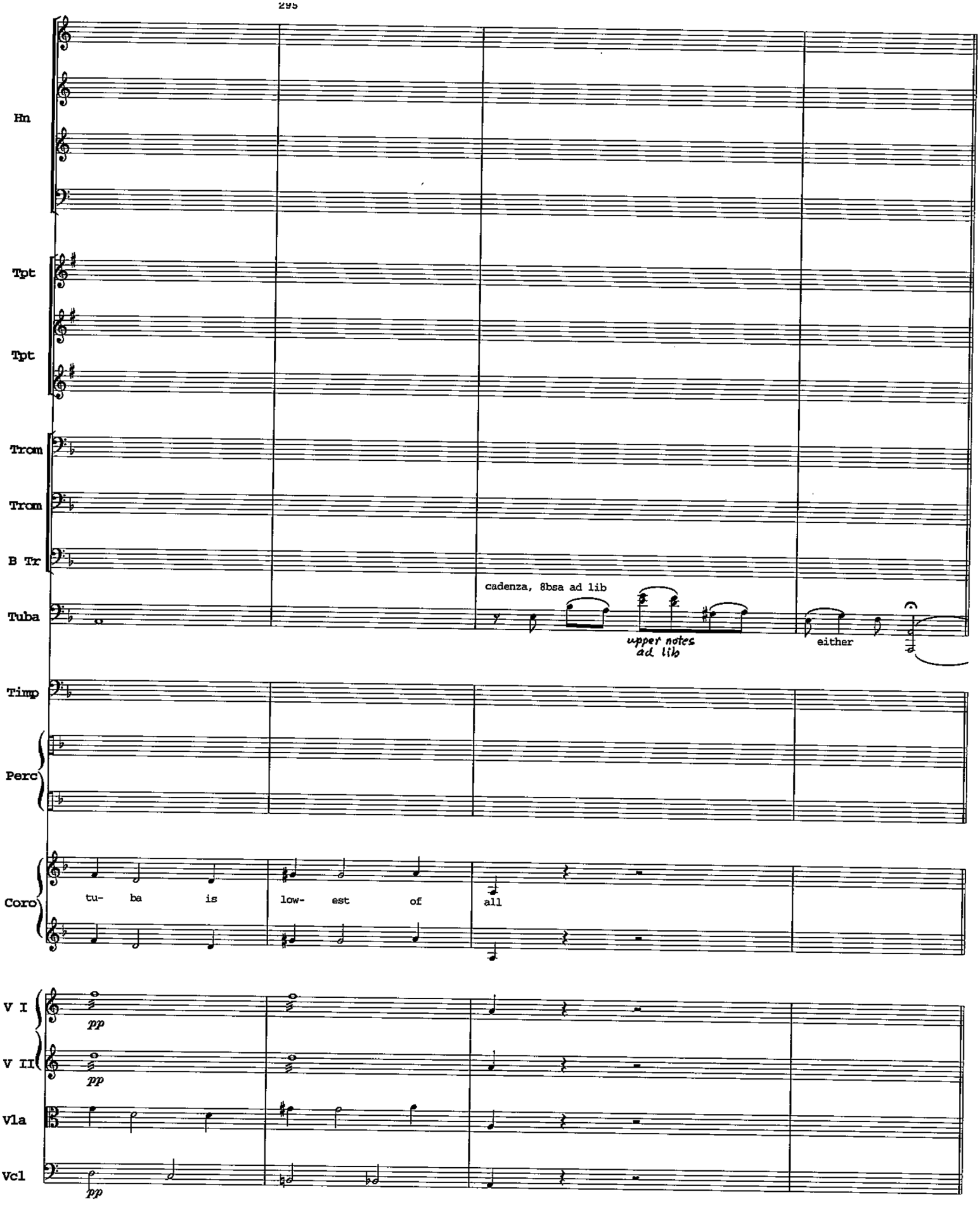

280
solo
sit
Hn
solo
f
conductor: try to
cut off tpt
Tpt
solo
disregard visual
cues, but not
Tpt
solo
Trom
Trom
B Tr
Tuba
f
Timp
damp
f
snare drum w.o. snare
Perc
damp
tenor drum
damp
pp
bass drum
Drop out when necessary: No cheating!
Coro
ti- a ta ti- a ta ti- a ta ti- a ta
ti- a ta ti- a ta ti- a ta ti- a ta
ta!
V I
V II
Vla
Vcl

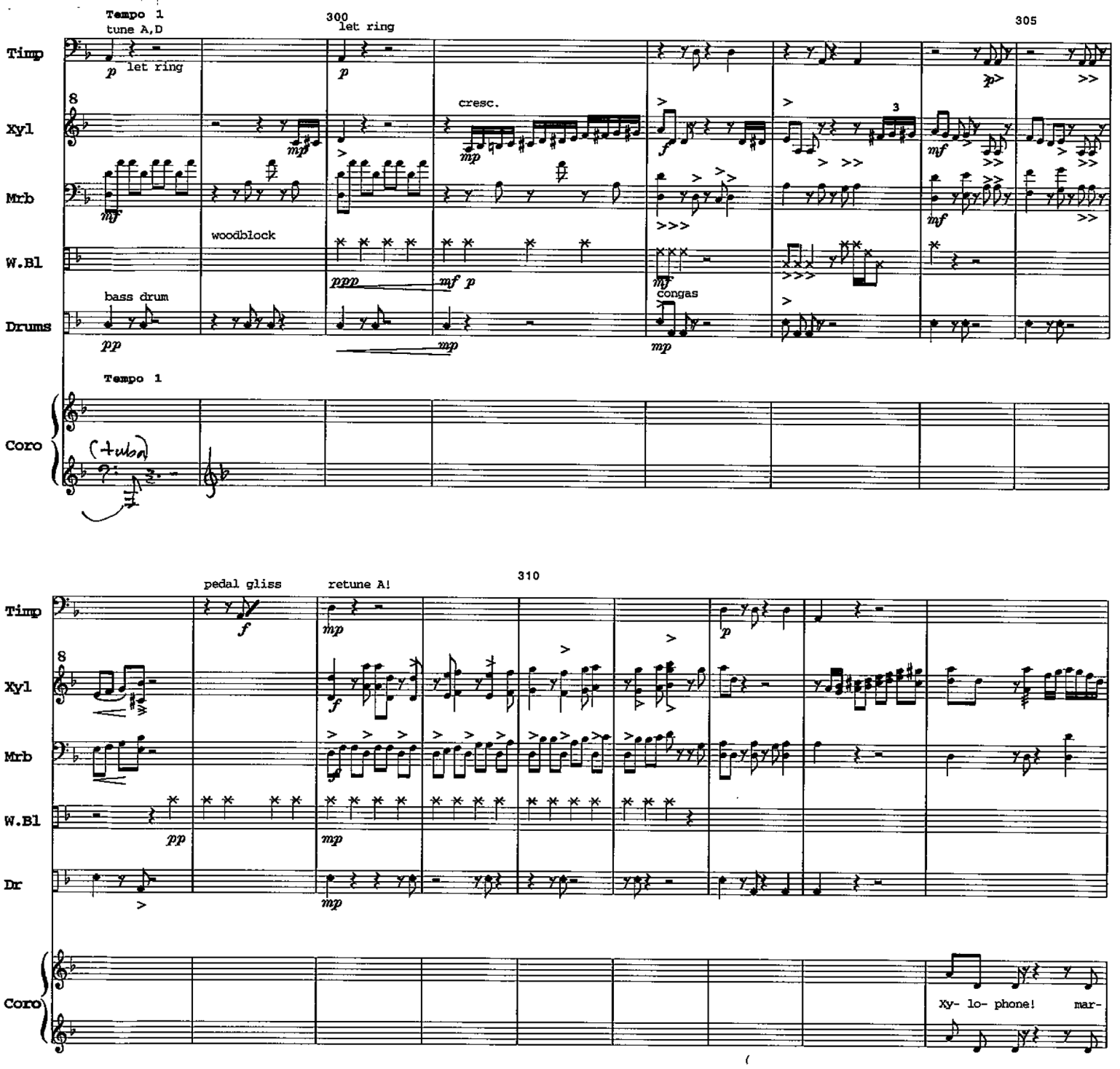


It is likely that the piece will be performed more than once with the same choir: a rehearsal then a performance, for instance. Or the final section (starting from the horn entry) might be repeated once the audience found its voice. In either case, the stage business in the score would need to be modified for the second run. Here are some suggestions: the trumpeter could fail to "die" when "shot" by the conductor, and could, while playing, draw a gun and "shoot" the conductor. *For the rehearsal tape, bar 283 should be cut and the percussion effect in 284 should be omitted,* so as not to give away the gag.

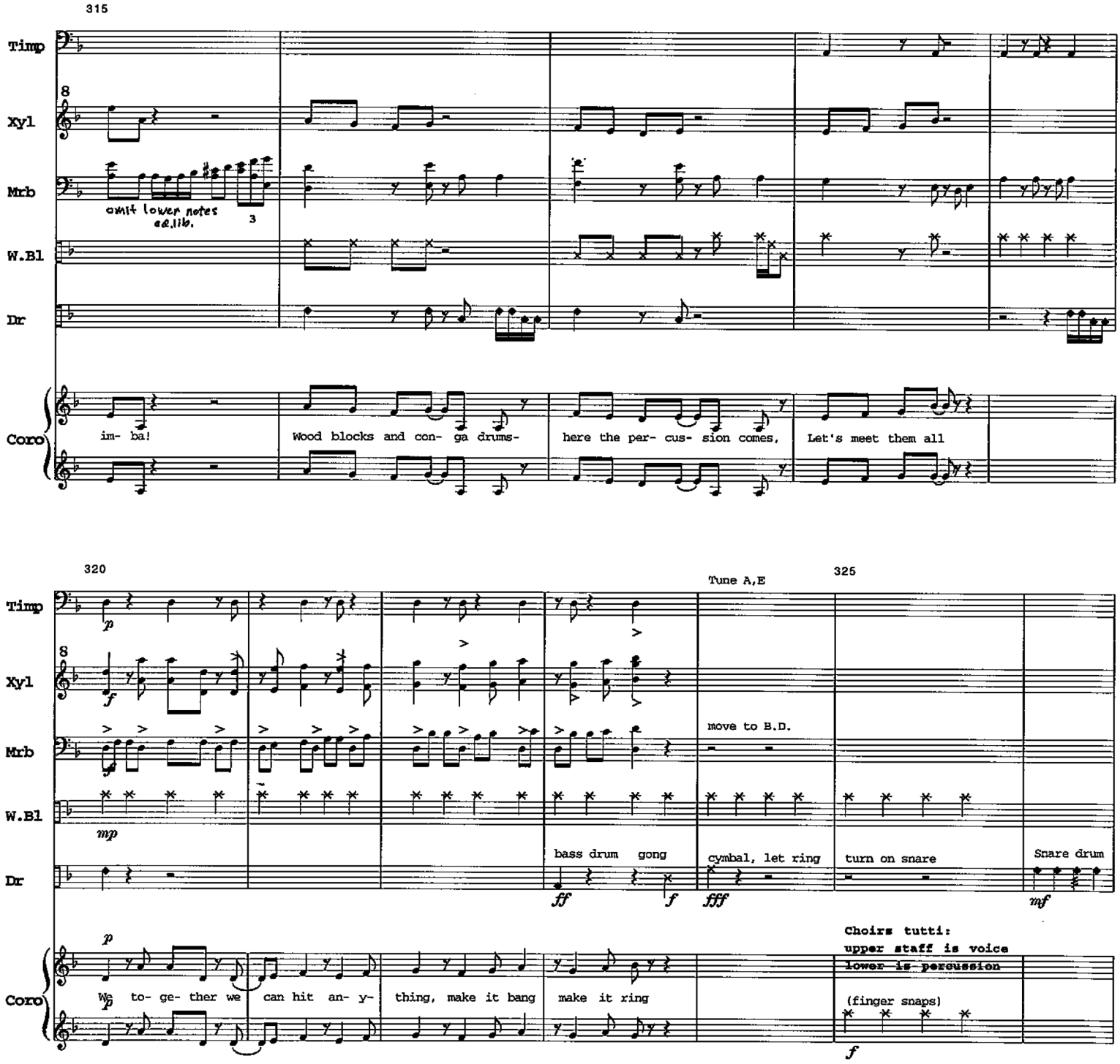


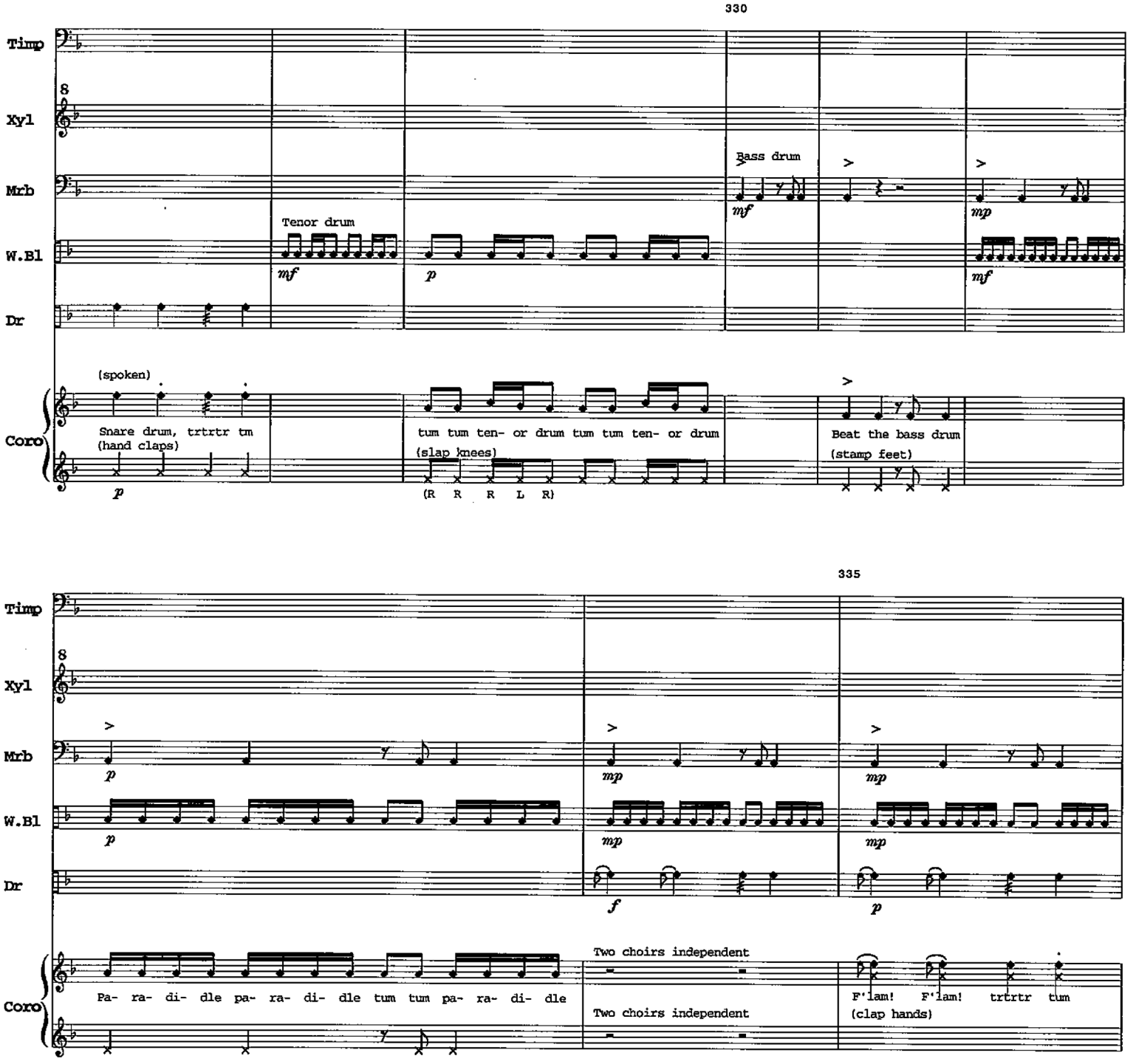
The gliss is continuous, with the baton changed (as it were) among the three trombones over the whole range. I have written the semitones explicitly to show where one should be during each gliss to facilitate the baton changes. It is probably worthwhile rehearsing it a few times as a semitone legato passage so that the players get used to changing the baton at the right time, and only then trying to do it as a glissando. The last notes in bar 289 are blurts played with the slide off the end (as though attempting to reach the imaginary VII and VIIIth positions). If the player's arms are not long enough to do this, then a small handle (working like that used on G trombones, but improvised for the occasion) could be prepared - just make sure that it is firmly tied to the crosspiece of the slide so that the latter doesn't fall to the ground.

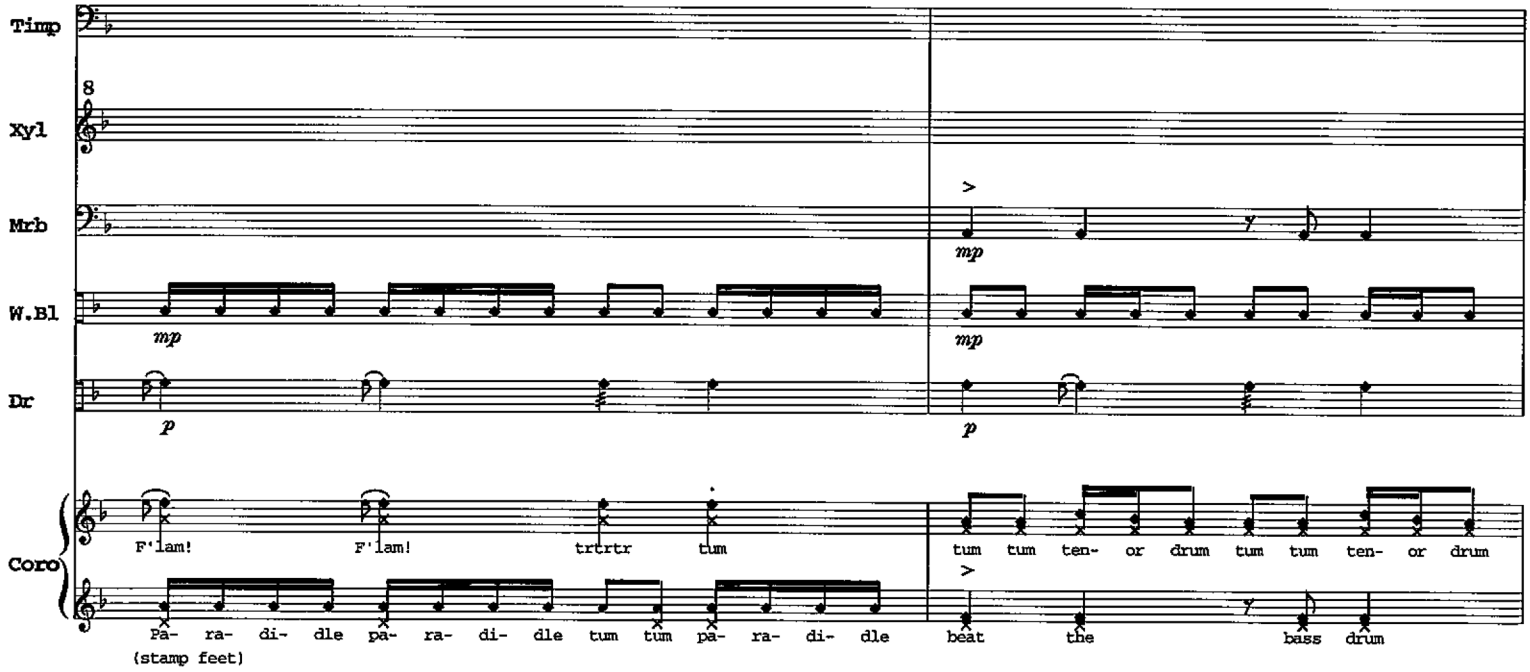

Hn
Tpt
Tpt
Trom
Trom
B Tr
Tuba
cadenza, 8bsa ad lib
upper notes ad lib
either
Timp
Perc
Coro
tu- ba is low- est of all
V I
pp
V II
pp
Vla
Vcl
pp

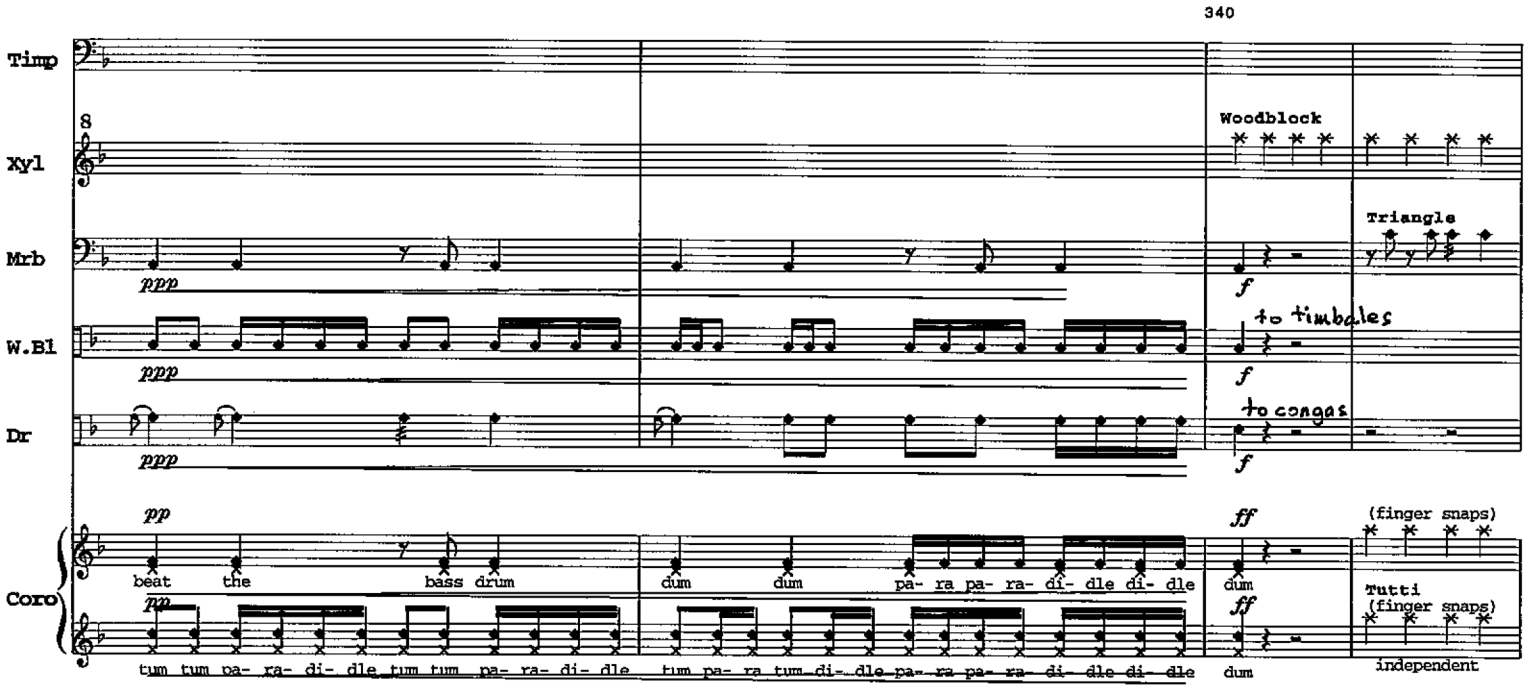


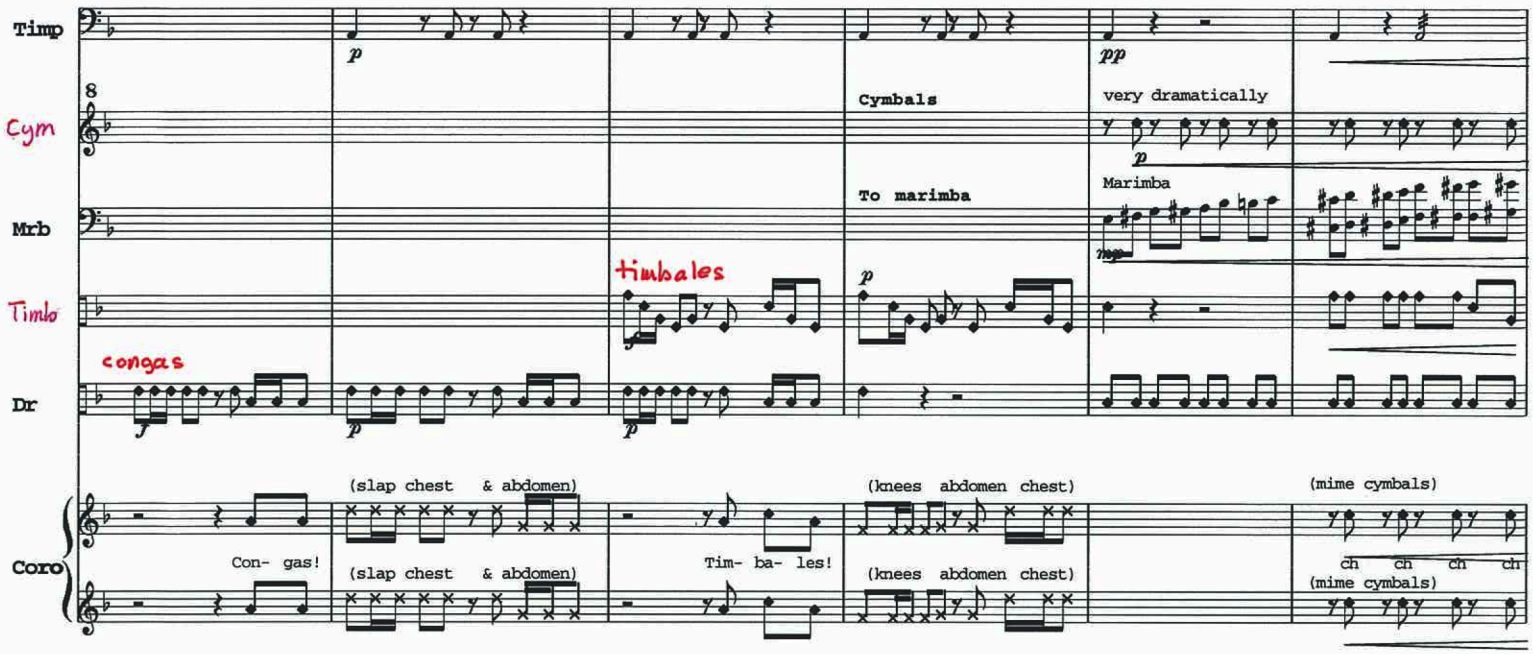
The marimba octave tremolo is alternating. Conventional notation in this syncopated context made it look very awkward.

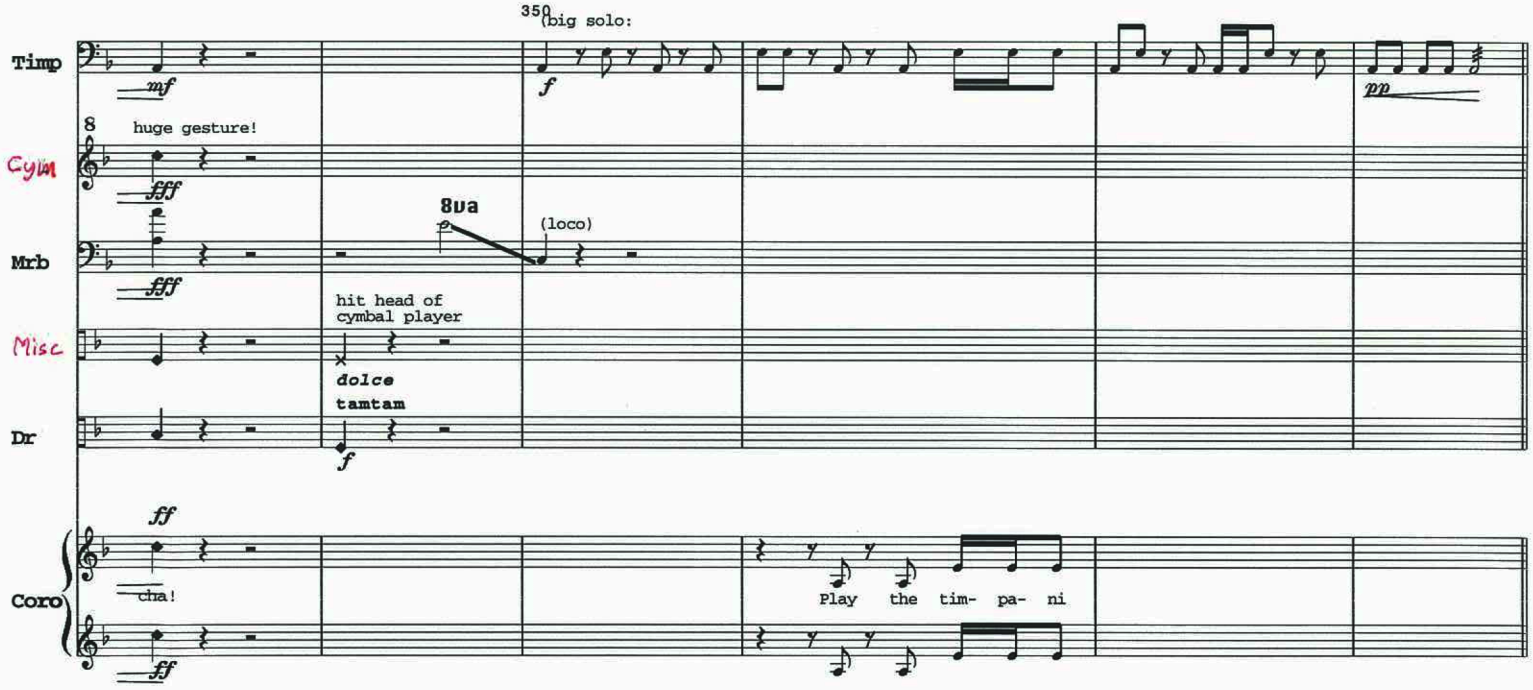

315
Timp
Xyl
Mrb
omit lower notes ad.lib.
3
W.Bl
Dr
Coro
im- ba!
Wood blocks and con- ga drums-
here the per- cus- sion comes,
Let's meet them all
320
325
Tune A,E
move to B.D.
bass drum gong
cymbal, let ring
turn on snare
Snare drum
We to- ge- ther we can hit an- y- thing, make it bang make it ring
Choirs tutti:
upper staff is voice
lower is percussion
(finger snaps)


330
Timp
Xyl
Mrb
W.Bl
Dr
Coro
Tenor drum
Bass drum
(spoken)
Snare drum, trtrtr tm
(hand claps)
tum tum ten- or drum tum tum ten- or drum
(slap knees)
(R R R L R)
Beat the bass drum
(stamp feet)
335
Two choirs independent
Pa- ra- di- dle pa- ra- di- dle tum tum pa- ra- di- dle
Two choirs independent
F'lam! F'lam! trtrtr tum
(clap hands)

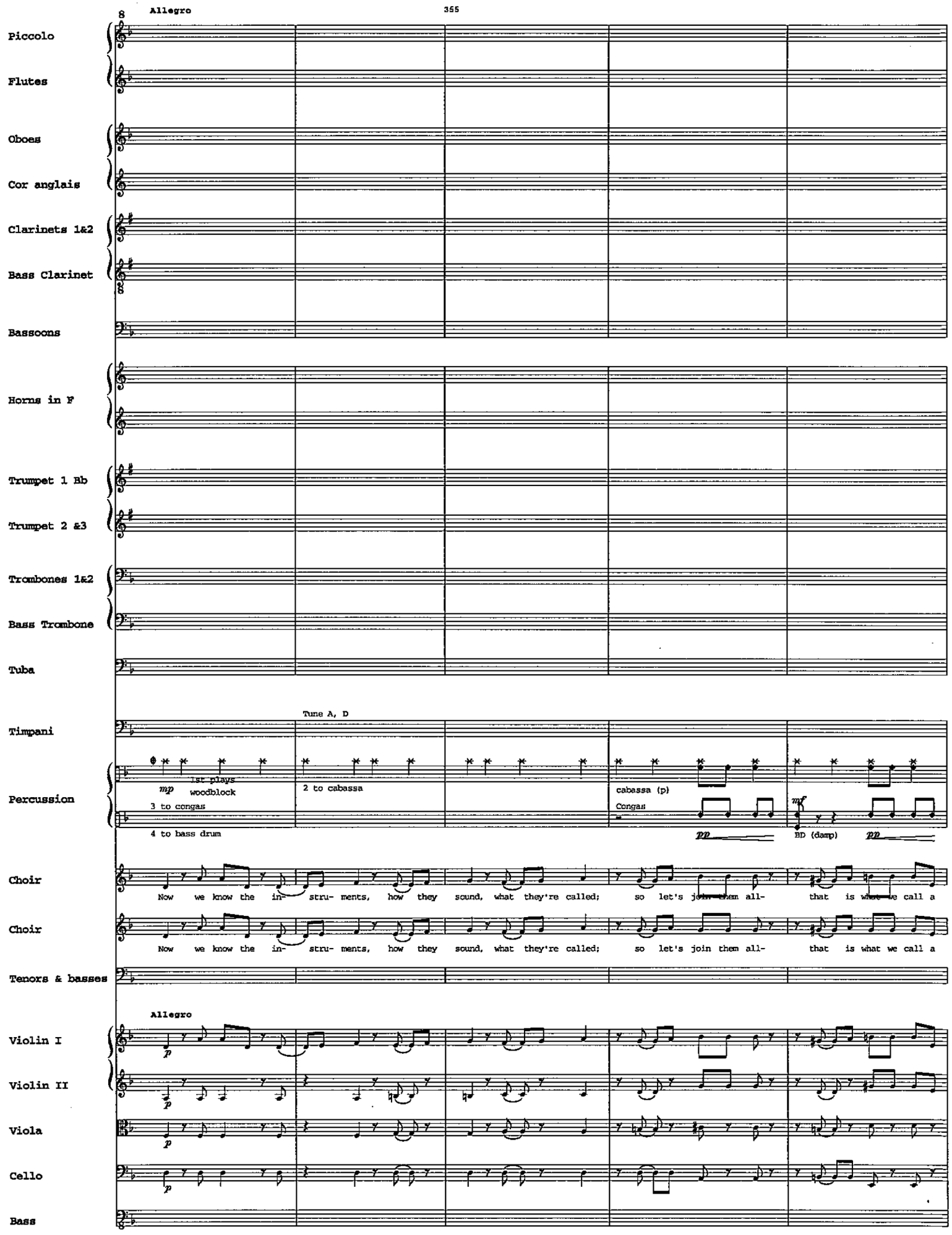

Timp
Xyl
Mrb
W.Bl
Dr
Coro
mp
p
F'lam!
F'lam!
trtrtr
tum
tum tum ten- or drum tum tum ten- or drum
Pa- ra- di- dle pa- ra- di- dle tum tum pa- ra- di- dle
(stamp feet)
beat the bass drum

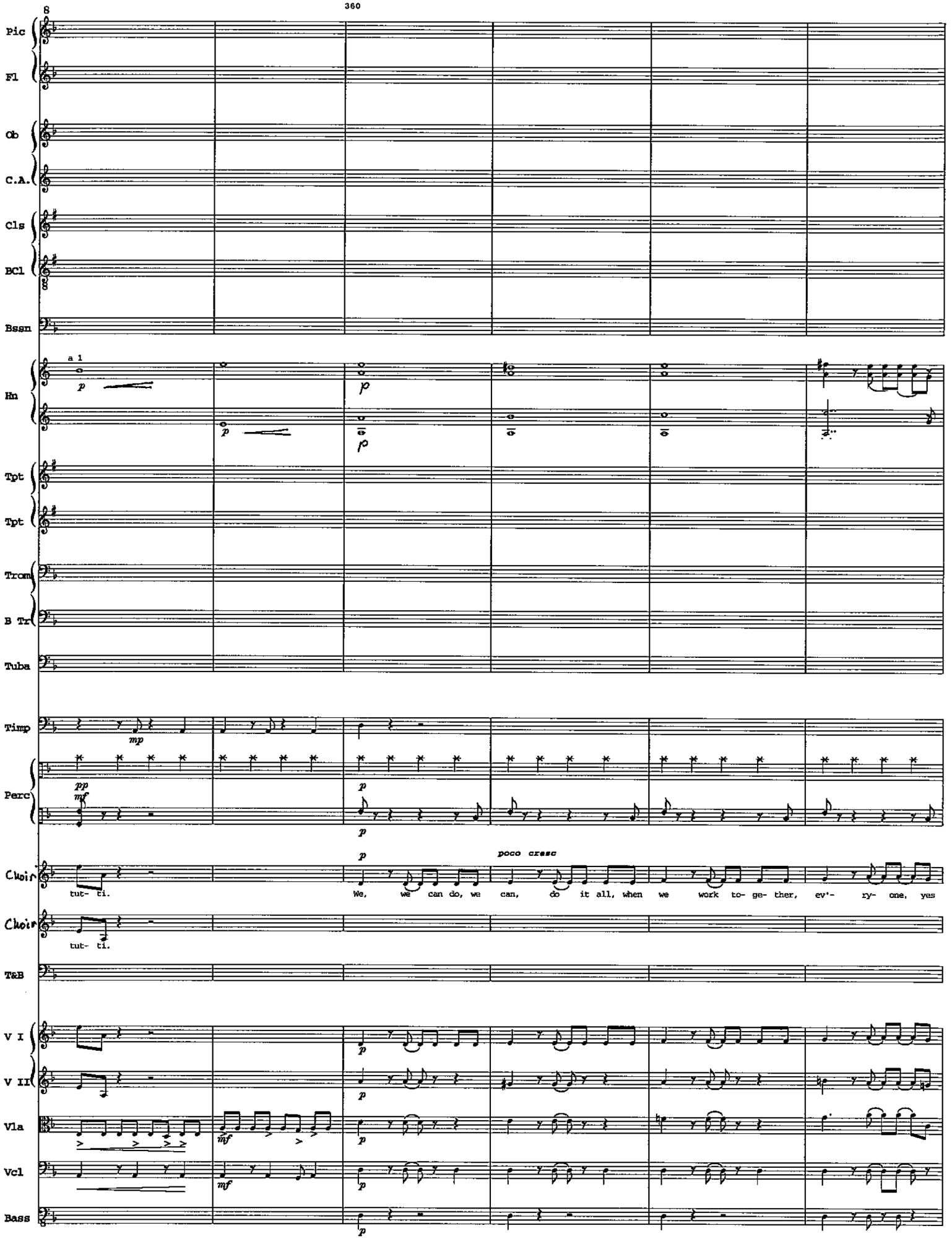

340
Timp
Xyl
Mrb
W.Bl
Dr
Coro
Woodblock
Triangle
to timbales
to congas
ppp
f
pp
ff
beat the bass drum
dum dum pa- ra pa- ra- di- dle di- dle
dum
(finger snaps)
Tutti
(finger snaps)
tum tum pa- ra- di- dle tum tum pa- ra- di- dle
tum pa- ra tum di- dle pa- ra pa- ra- di- dle di- dle
dum
independent

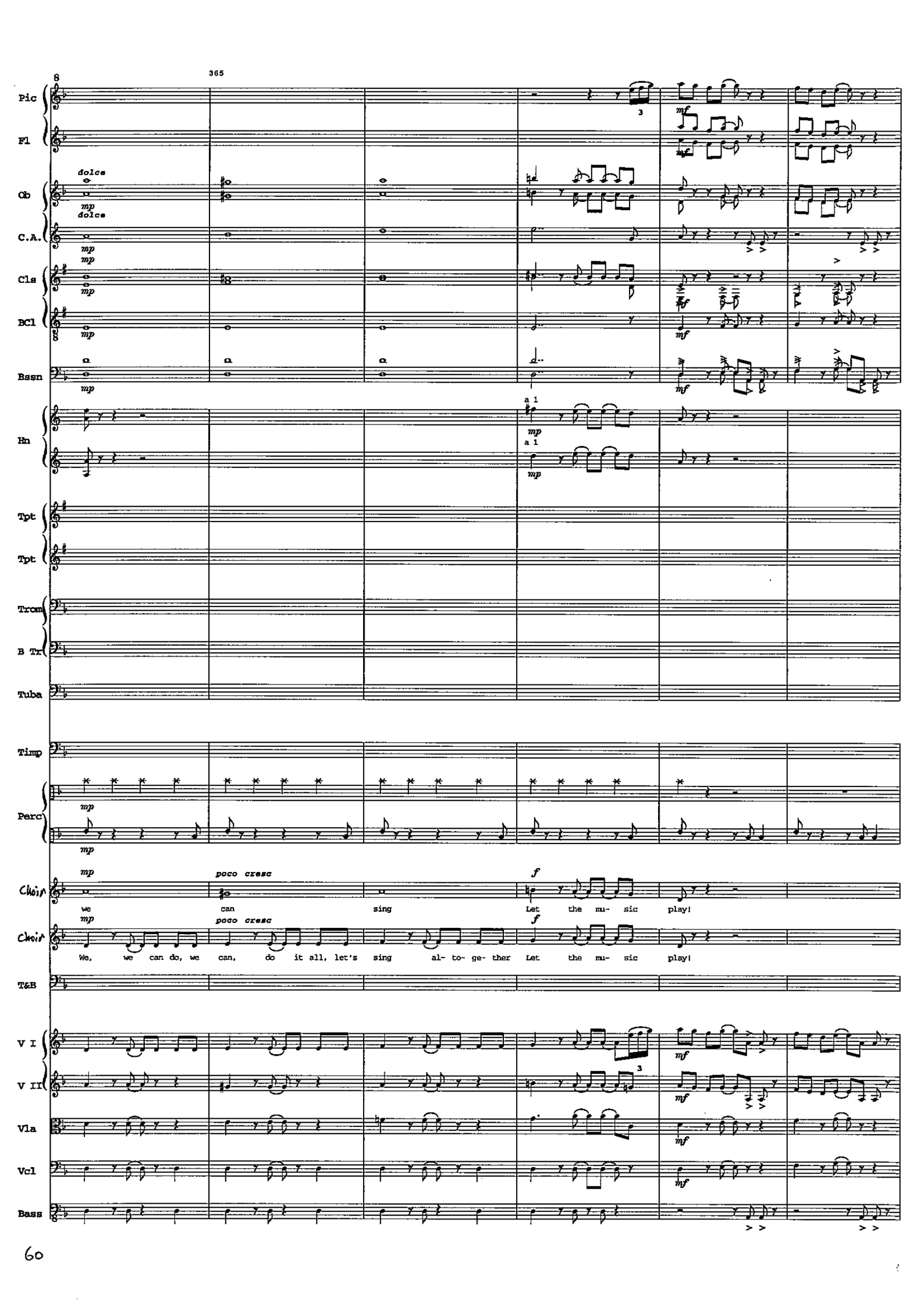


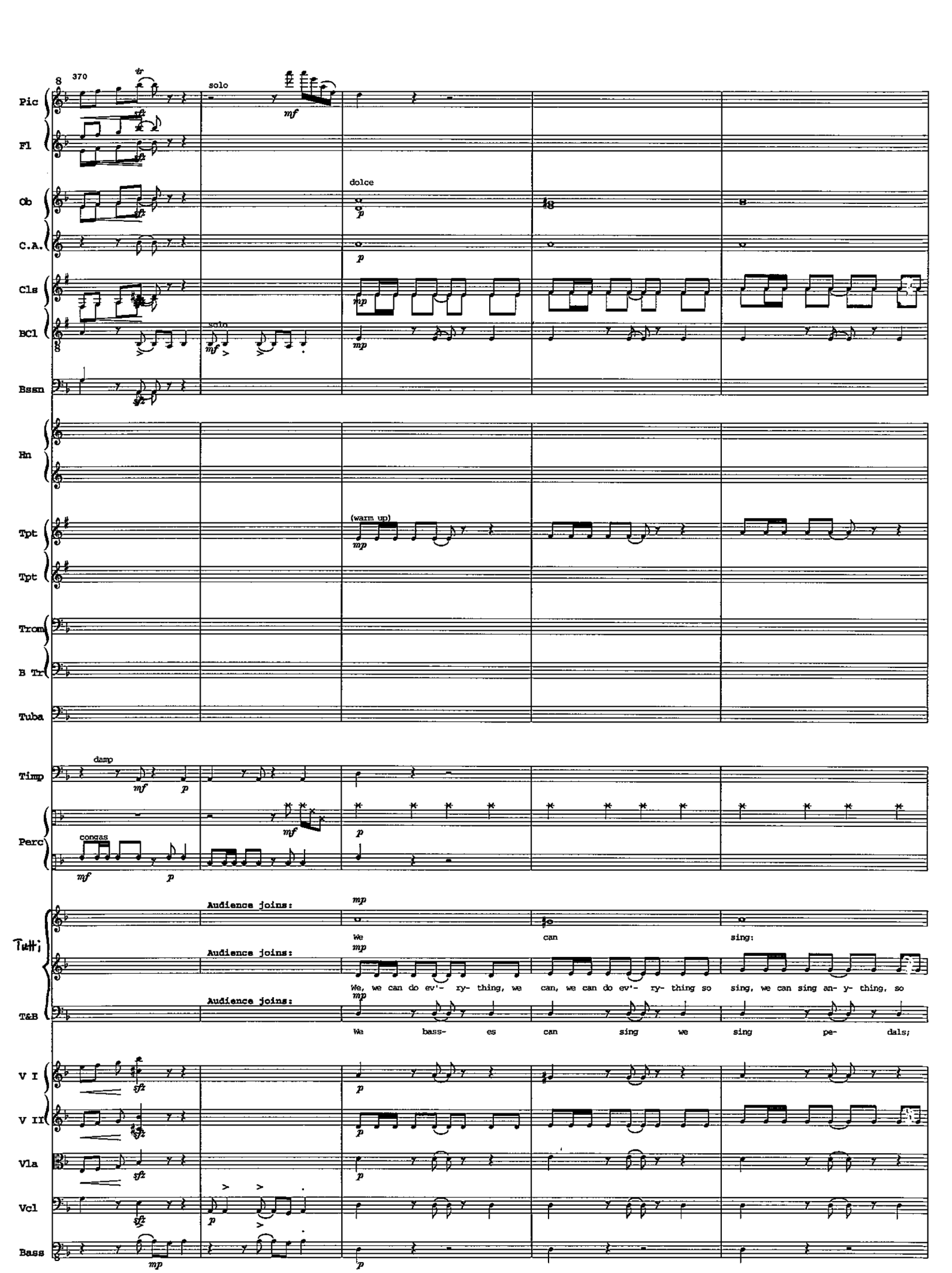


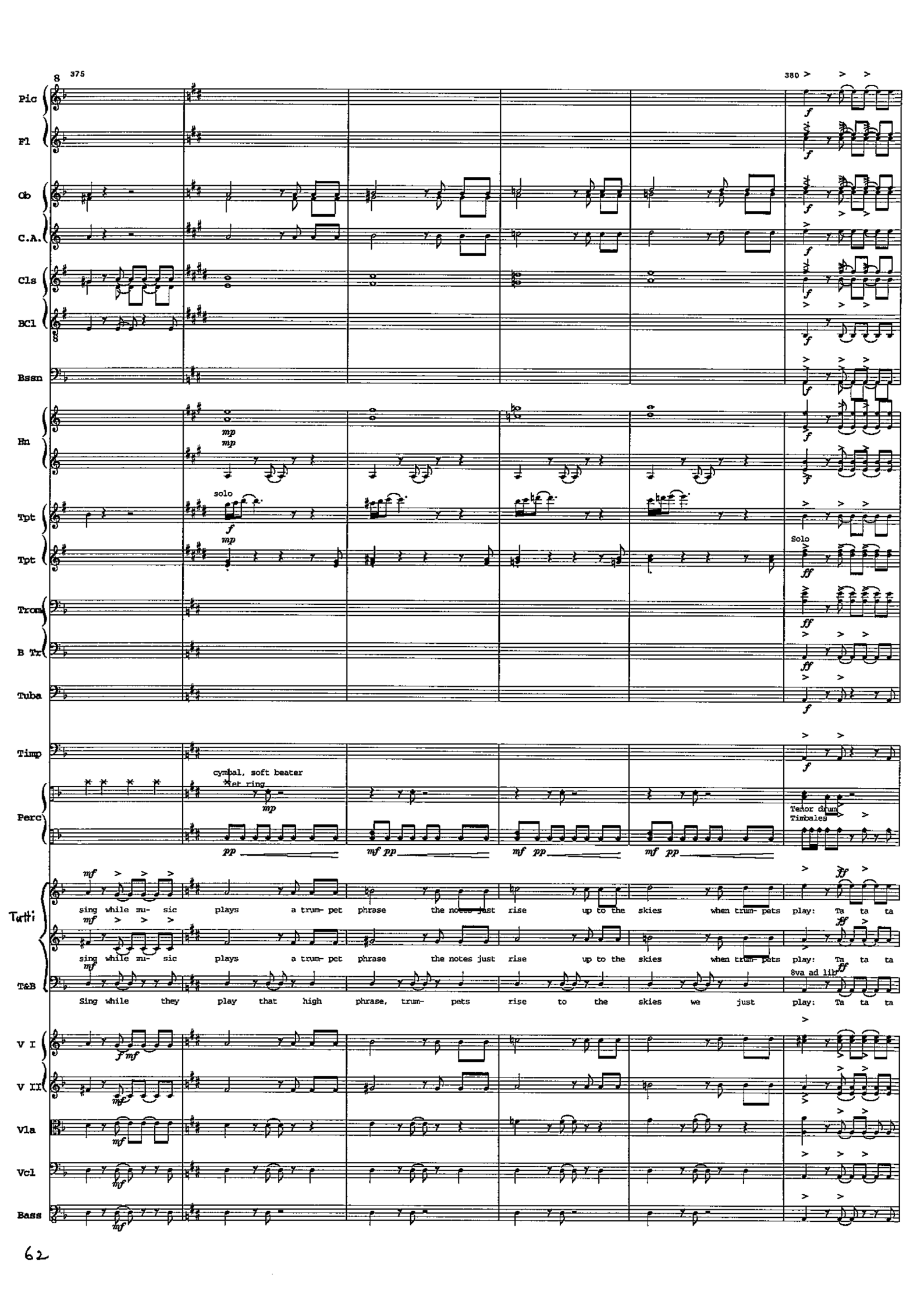
I hope that this bit of stage business is clear: the cymbal player should draw attention to him/herself and overact the part to such an extent that the unemployed players look on with disgust. One of them can no longer stand it and *pretends* to strike the cymbal player (be careful!) on the head with a beater. At the supposed moment of contact, the tamtam sounds. *For the rehearsal tape, bar 349 should be cut,* so as not to give away the gag. If the piece is performed twice with the same choir, the second performance should use a low trombone blurt (cued in the part) instead of the tamtam.

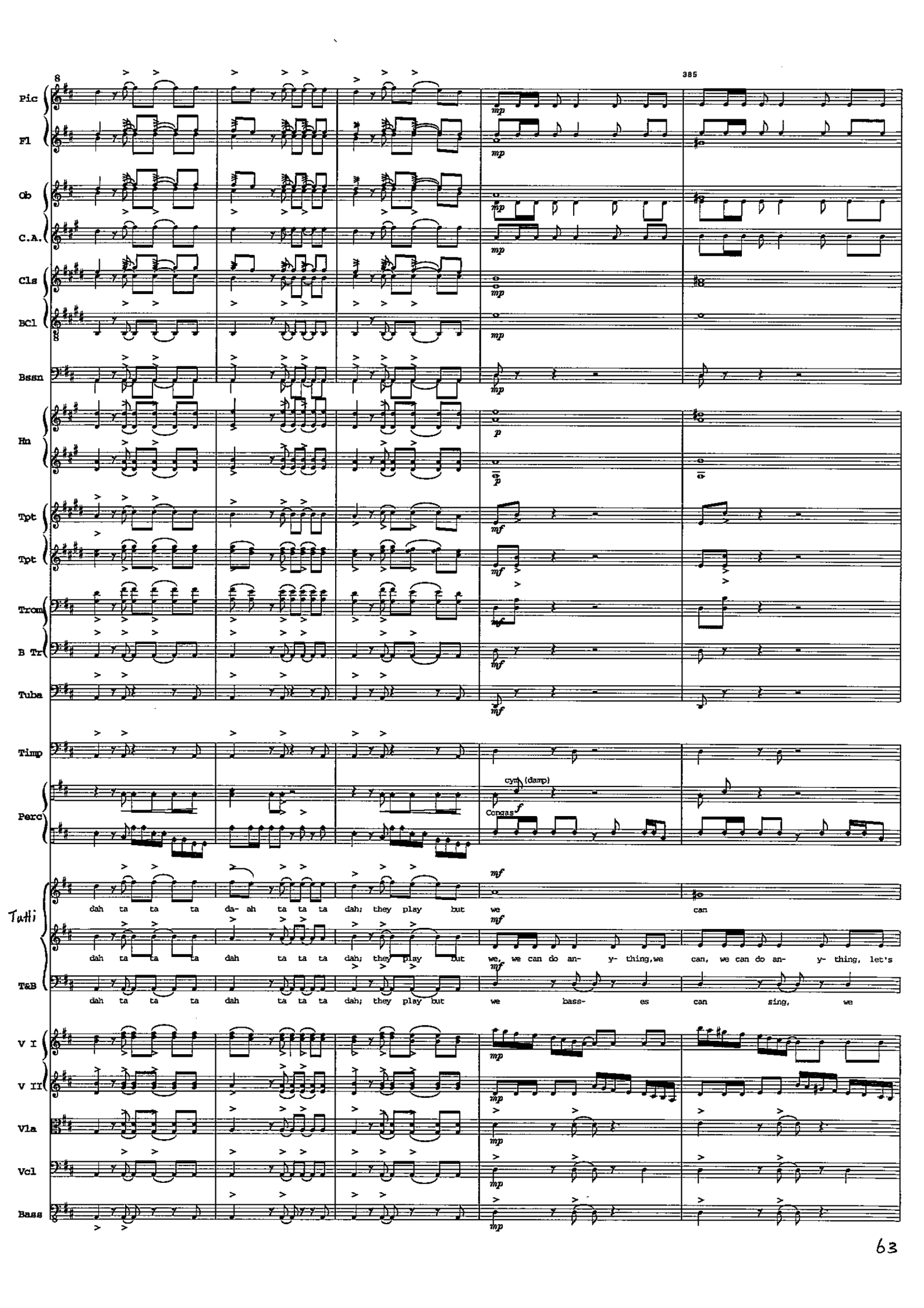

8
Allegro
355
Piccolo
Flutes
Oboes
Cor anglais
Clarinets 1&2
Bass Clarinet
Bassoons
Horns in F
Trumpet 1 Bb
Trumpet 2 &3
Trombones 1&2
Bass Trombone
Tuba
Timpani
Tune A, D
Percussion
mp
1st plays
woodblock
3 to congas
4 to bass drum
2 to cabassa
cabassa (p)
Congas
pp
mf
BD (damp)
pp
Choir
Now we know the in- stru- ments, how they sound, what they're called; so let's join them all- that is what we call a
Choir
Now we know the in- stru- ments, how they sound, what they're called; so let's join them all- that is what we call a
Tenors & basses
Allegro
Violin I
Violin II
Viola
Cello
Bass
p

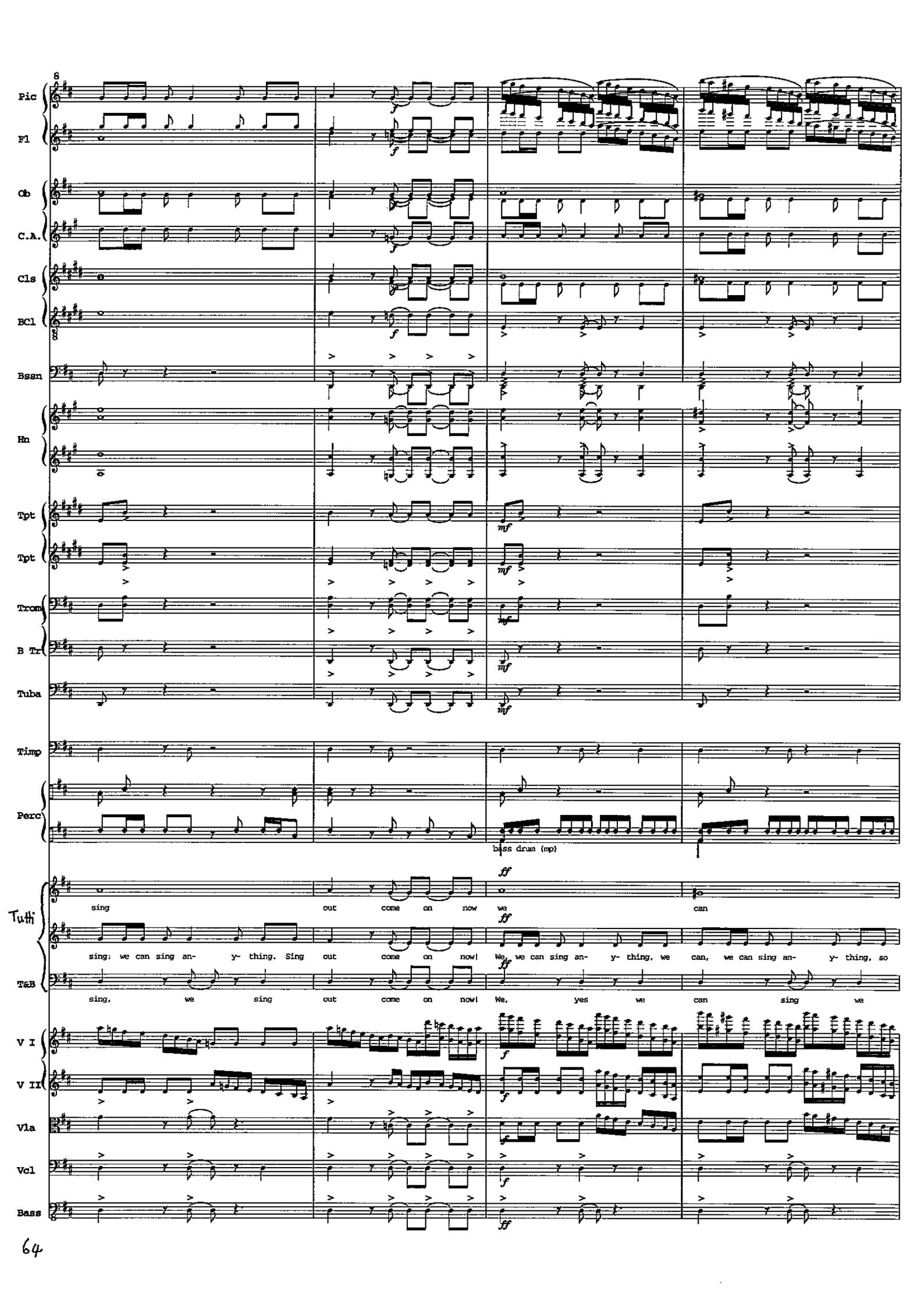

8
360
Pic
Fl
Ob
C.A.
Cls
BCl
Bssn
a 1
Hn
Tpt
Tpt
Trom
B Tr
Tuba
Timp
Perc
Choir
tut- ti.
We, we can do, we can, do it all, when we work to- ge- ther, ev'- ry- one, yes
poco cresc
Choir
tut- ti.
T&B
V I
V II
Vla
Vcl
Bass

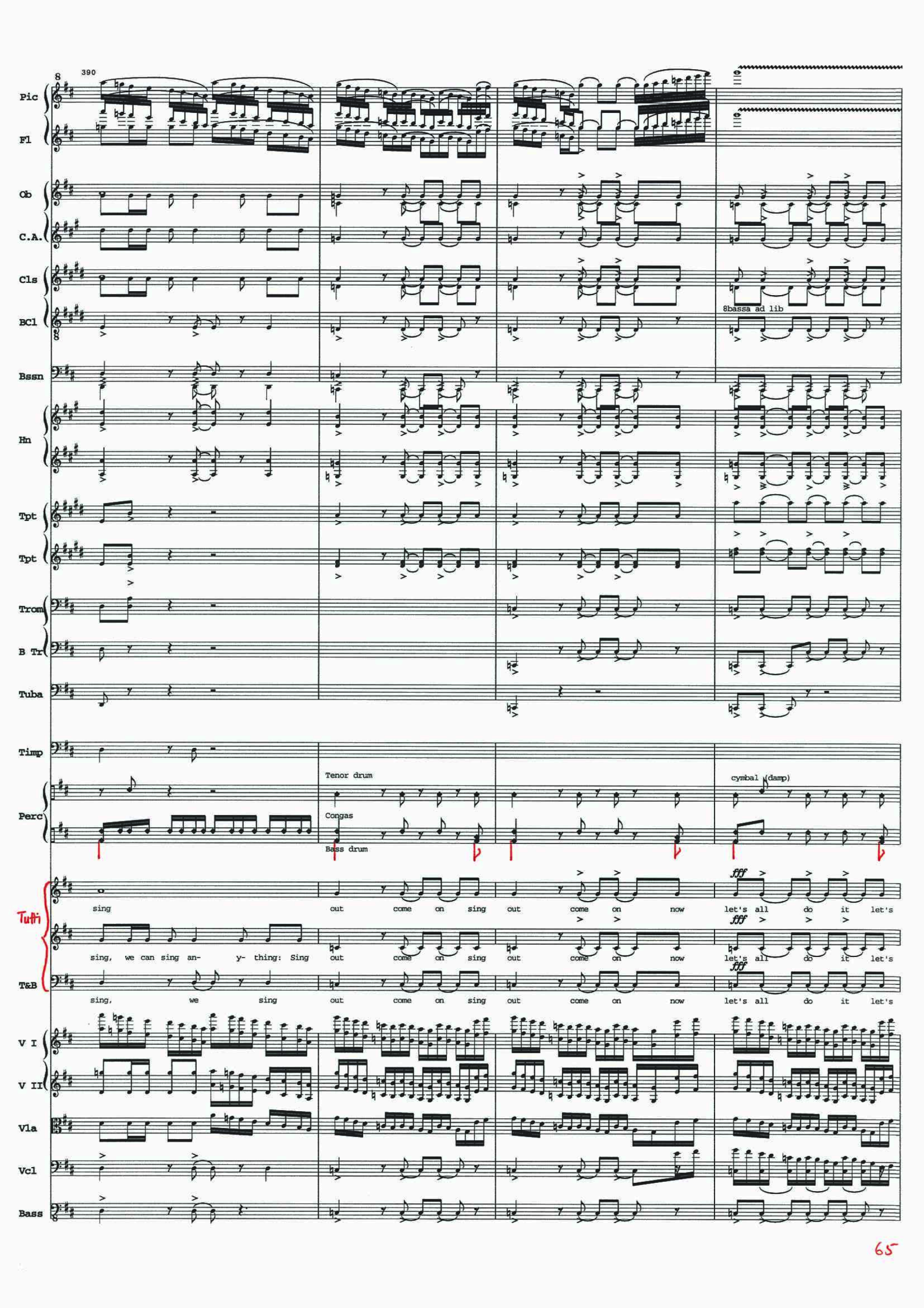

8
365
Pic
Fl
Ob
dolce
mp
dolce
C.A.
mp
Cls
mp
BCl
mp
Bssn
mp
mf
Hn
a 1
mp
a 1
mp
Tpt
Tpt
Trom
B Tr
Tuba
Timp
Perc
mp
mp
Choir
mp
poco cresc
we
can
sing
f
Let
the
mu-
sic
play!
Choir
mp
poco cresc
f
We,
we
can do, we
can,
do
it all, let's
sing
al- to- ge- ther
Let
the
mu-
sic
play!
T&B
V I
V II
Vla
Vcl
Bass
mf

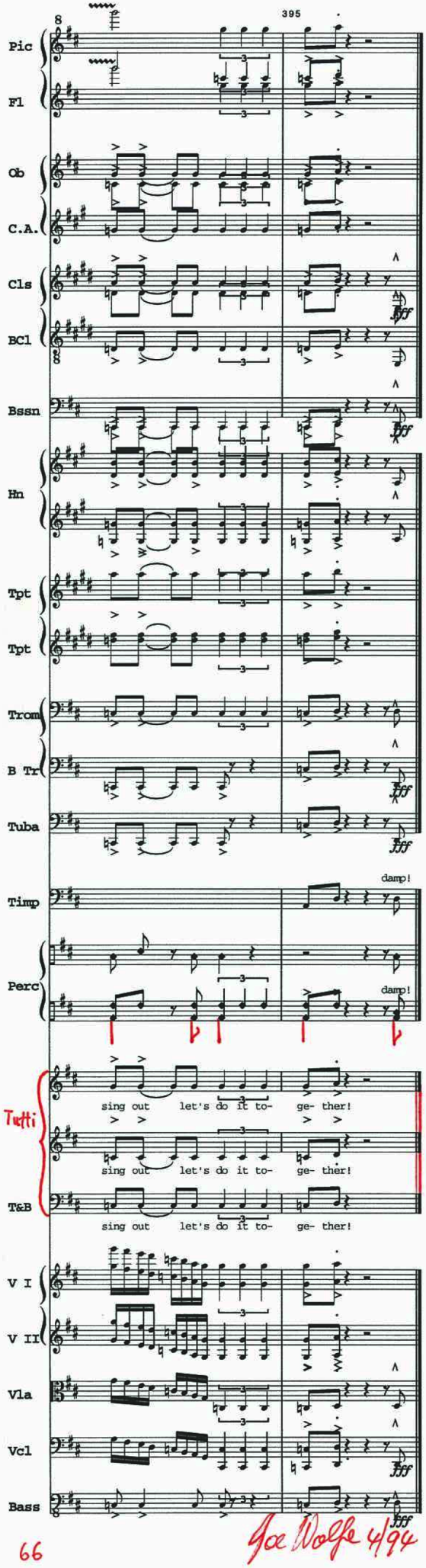

370
Pic
Fl
Ob
C.A.
Cls
BCl
Bssn
Hn
Tpt
Tpt
Trom
B Tr
Tuba
Timp
Perc
Tutti
T&B
V I
V II
Vla
Vcl
Bass
solo
dolce
(warm up)
damp
congas
Audience joins:
We can sing:
We, we can do ev'- ry- thing, we can, we can do ev'- ry- thing so sing, we can sing an- y- thing, so
We bass- es can sing we sing pe- dals;


8
375
380
Pic
Fl
Ob
C.A.
Cls
BCl
Bssn
Hn
Tpt
Tpt
Trom
B Tr
Tuba
Timp
Perc
Tutti
T&B
V I
V II
Vla
Vcl
Bass
solo
Solo
cymbal, soft beater
let ring
Tenor drum
Timbales
sing while mu- sic plays a trum- pet phrase the notes just rise up to the skies when trum- pets play: Ta ta ta
Sing while they play that high phrase, trum- pets rise to the skies we just play: Ta ta ta
8va ad lib


8
385
Pic
Fl
Ob
C.A.
Cls
BCl
Bssn
Hn
Tpt
Tpt
Trom
B Tr
Tuba
Timp
Perc
cym (damp)
Congas
Tutti
T&B
dah ta ta ta da- ah ta ta ta dah; they play but we can
dah ta ta ta dah ta ta ta dah; they play but we, we can do an- y- thing,we can, we can do an- y- thing, let's
dah ta ta ta dah ta ta ta dah; they play but we bass- es can sing, we
V I
V II
Vla
Vcl
Bass


8
Pic
Fl
Ob
C.A.
Cls
BCl
Bssn
Hn
Tpt
Tpt
Trom
B Tr
Tuba
Timp
Perc
bass drum (mp)
Tutti
sing out come on now we can
sing: we can sing an- y- thing. Sing out come on now! We, we can sing an- y- thing, we can, we can sing an- y- thing, so
T&B
sing, we sing out come on now! We, yes we can sing we
V I
V II
Vla
Vcl
Bass


8
390
Pic
Fl
Ob
C.A.
Cls
BCl
8bassa ad lib
Bssn
Hn
Tpt
Tpt
Trom
B Tr
Tuba
Timp
Perc
Tenor drum
Congas
Bass drum
cymbal (damp)
Tutti
T&B
sing out come on sing out come on now let's all do it let's
sing, we can sing an- y- thing: Sing out come on sing out come on now let's all do it let's
sing, we sing out come on sing out come on now let's all do it let's
V I
V II
Vla
Vcl
Bass


8
395
Pic
Fl
Ob
C.A.
Cls
BCl
Bssn
Hn
Tpt
Tpt
Trom
B Tr
Tuba
Timp
damp!
Perc
damp!
Tutti
sing out let's do it to- ge- ther!
sing out let's do it to- ge- ther!
T&B
sing out let's do it to- ge- ther!
V I
V II
Vla
Vcl
Bass
fff
Joe Wolfe 4/94

Teachers' notes for "Conjunction"

1. Performance and rehearsal

Rehearsal tape. The rehearsal tape is very important for this piece. The orchestra will record its part in advance and the choirs will do (at least some of) their rehearsal with the tape. As a result, they will hear instrument X or orchestral effect Y while they are singing about them. Because of the repetition in rehearsal, and because words of songs are more easily remembered than most other text, I hope that the students will learn the names and the sounds of instruments and effects. The vocal score has a two line reduction of the orchestral score: it may be played on piano, but of course this by-passes the important educational function. For this reason, I have not taken the time to make a good piano reduction.

Choirs. For most of the piece there are two choral parts. The two parts are nominally soprano and mezzo soprano, but they both stay mainly in the mezzo range. According to the sessions we did with St Anthony's School, this should be a comfortable range. (Further, if it were desired in a particular performance, adult women in the audience would be able to sing along throughout, and most adult men would be able to sing along at the octave.) Where the G below middle C occurs, it is there as a deliberately low note (to emphasise that the bass instruments are low). Children for whom this is out of range should "sing" or pronounce it unvoiced - this is what they will probably do anyway for notes which are too low. This G should only be transposed up an octave in those occasions where it is so marked. The A below middle C should only be a problem for a small number of children. It is usually an unaccented note, and if some of the singers do it unvoiced, that will be no problem.

Where the canon occurs, the voices are split in three parts (all with the same intermediate range). About one third of choir one (call them 1*) and one third of choir two (2*) should form choir 3 for just this section. For the benefit of the conductor they should therefore be seated 1, 1*, 2* and 2.

The choral parts are written so that they may be sung by the whole class, rather than by competent choirs. *Therefore there is little part singing.* For bar 35 in the introduction, however, some effort should be made to ensure that all parts are sung confidently and in tune - the reasons are obvious. There is also a little part singing in the finale, but here the parts are introduced separately, move slowly and will, I think, be easy to hold.

There is also a pedal part in the last 24 bars which is there to allow tenors and basses in the audience to join in. Like most pedal parts, it is very easy to sing. When the pedal part joins, the sopranos and altos in the audience should join the school choirs, whose parts are also fairly easy at that stage.

"Choreography". In the instrumental introductions, I imagined that the students would mime playing the instruments while they were singing. In the "colours" section, I thought that one could use some simple choreography using coloured objects. I am not good at such things and have left them to the imagination of you, the teachers organising the choirs.

2. Teaching notes

These notes are designed to expand the educational possibilities of "Conjunction - an Introduction for school choirs and audience to orchestra". My consultant about school children and singing had many valuable suggestions, of which one was that a package of educational material would be useful for teachers whose classes are rehearsing the work. I wrote it with didactic intent, and in these notes I point out some obvious features, explain why they are there, and discuss some musical questions that arise naturally out of a rehearsal of the piece. Musical instruments are mechanical devices whose operation is a fascinating topic in physics. I have therefore give some notes about how the instruments work in the hope that rehearsing the piece can contribute to more than one part of the syllabus..

Structure and orchestration.

Compared to most choral and orchestral works, this piece is unusual in some respects: one of the most obvious is the large number of occasions when the orchestra plays a phrase which is then repeated by the choir. It also spends a lot of time in the same key. These features, of course, are just to make the piece easy to sing. Another odd feature is the sequential use of instruments - ordinarily a composer would be unlikely to do this, just as a painter would be unlikely to start with red in the top left and finish with violet in the bottom right. The work is self-referent and often silly - these features too distinguish it from the standard repertoire! These oddities notwithstanding, I have used many standard techniques and clichés so that the piece can teach a little about orchestration and orchestral composition as well as about the instruments. This are discussed below in order of appearance in the score.

The overall structure is: introduction & tutti; strings; colours & winds; horns & brass; percussion; final tutti. This structure is unusual and was imposed by the conception of the piece. There are however some similarities with recognised forms. The four movements of a "usual" symphony could be described as Serious, Soppy, Silly and Stroppy. I have chosen these words for memorable rhyme and alliteration rather than for accuracy, but you know what I mean. The second movement is usually the slow emotional one; the third is often a ***scherzo***, which is Italian for "joke"; the last is usually the most bombastic. In this work the introduction and string section are mainly serious, the colour and wind section are mainly gooey and sentimental, the brass and percussion sections are fun and sillier than the rest, the finale is loud and boisterous.

Introduction. The first instruments we hear are the basses who play syncopated notes over a note sustained by horns. Horns often hold long notes or chords in orchestral works. The beat is a little ambiguous until regular beat of the wood-block enters. In the first four bars, half of the basses play ***pizzicato*** (plucked) and half play ***arco*** (with the bow) - this combination gives a note of clear duration, but with the strong attack of the plucked string. The trumpet glissando is a cliché borrowed from the jazz tradition. You will probably notice the xylophone, marimba and trumpet much more than the strings playing similar parts. The strings are the work-horses of the orchestra, and they play so much and we are so used to them that we notice mainly the other instruments. For example, if a wind instrument doubles (i.e. plays the same part as) a string instrument, the wind instrument part will usually be marked "solo". Listen to some of your favourite "solos" in orchestral works of the 18th and 19th centuries and you will find that many are doubled by violins, violas or cellos. Listen again to the horns in bars 1-4: who else is playing?

The first orchestral ***tutti*** (bars 7-10) adds all the woodwinds to the strings but does not use the horns or brass - they are held in reserve till the tutti at 41 for a more dramatic entry.

There is a vocal ***crescendo*** (33-35) which leads to the first (and only really important) bit of part singing: the triumphant chords in bar 35. The sections each have a one bar introduction (37-40) which takes us to the full orchestral tutti (in a new key) at 41. The orchestra visits some the remote key of Db briefly before returning home to D minor. Again the horns are used to hold the long notes which establish the harmony. Who doubles them this time?

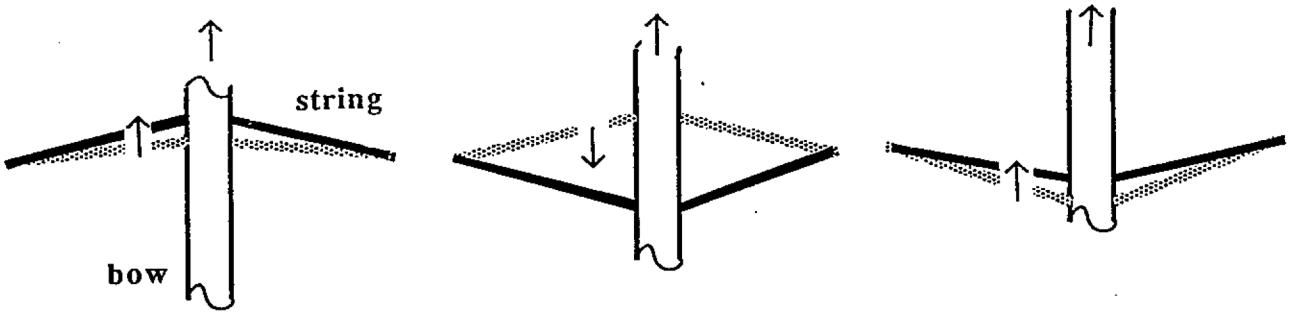
The three parts of the little canon are doubled by violas, second and first violins. This is a standard way of introducing a canon or fugue in an orchestral work. Actually the canon is there primarily because the young people of St Anthony's school really liked polyphony, provided that it was reasonably easy to learn. (It is also one of two obscure references for the UNSW Orchestra who commissioned the work.)

Strings.

In the time of Vivaldi, the strings *were* the orchestra, and they are still the most important part[1]. Here we repeat the opening four bars using just strings. A solo violin replaces the trumpet or the glissando and the wood-block part is played by the first violins tapping the tailpiece of the instrument with the bow. While we are introducing the **violins**, the violas play in ***unison*** with the choir. They are playing ***con sordino*** (with a mute). The mute is just a clip which fits on the bridge of the instrument. The purpose of the ***bridge*** (ponticello) is to transmit and to transform[2] the big vibrations of the small string to small vibrations of the large belly of the instrument. The mute increases the mass of the bridge and reduces its effectiveness, especially at high frequencies. The resultant sound is thus more mellow and less loud. In this piece, the strings are usually *con sord.* when they play *unis.* with the choir.

* *Many of the most useful features of the orchestral strings result from their use of* ***bows****. The part that touches the strings is made of horsehair (or a synthetic substitute). The wooden support for it is bent towards the hair - not away from it like an archery bow, or the violin bows of the eighteenth century. The advantage of this is that when the player presses hard on the strings, the wood straightens and pulls the hair tighter. This gives the modern bow a greater range of loudness.*

The action of the bow which drives the strings is a regular cycle of stick-slip-stick-slip. Let's talk about friction, the force that makes things difficult to slide. If you have ever tried to slide a heavy object such as a piece of furniture, you will know that it is easier to keep it moving than it is to get it moving in the first place. In this case static friction (sticking) is greater than kinetic friction (sliding). This is true for most dry surfaces. It is also true of the string and the bow, and the player puts rosin on the bow to give a big difference between the two conditions.



string travels with bow | **string slips in opposite direction** | **string sticks again**

So the bow tends to stick to the string and for a little while it drags the string along with it. When the string has been pulled sideways far enough, it breaks free of the bow and slides past it easily (with very little friction, thanks to the rosin). The string doesn't stop when it gets to the straight position because its momentum carries it on until eventually it stops and reverses direction. When it is going at about the same speed and in the same direction as the bow it catches on the bow, static friction reigns, and the cycle begins again.

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[1] This is why we meet them first. On an orchestral score, they are actually at the bottom of the page. For the other families, I retain score order which is woodwind, brass, percussion, keyboards (if any) and strings.

[2] Acousticians call it an impedance transformer because the string has high acoustic impedance and the belly low.

In this way the player can put energy into the vibrating string and play long sustained notes - more about that later.

The violins play more notes than anyone else and they get most of the melodies. They are crucial to an orchestra. The leader of the first violins is called the ***leader*** of the orchestra, and s/he plays the solo violin part. This section has a second violin solo (65-66) which answers the first and which will be played by the leader of the second violins. I hope that the violin is sufficiently well known that I need say little about it. Music books will have pictures and the class may well include a violin student or two.

Note the extra fullness and richness when the whole violin sections (first and second) come in at 66. The effect is quite different from what one would obtain by amplifying one violin. The effect is called ***chorus***, and it is the same for a chorus of voices: each individual has a slightly different vibrato and tone and pitch and the complex tone of the mixture is richer than that of the individual. With a string section, as with a vocal chorus, the difficulty is in ensuring that these are the only differences: the notes must all start and stop together.

There are two sections of violins in an orchestra: the first violins and second violins. They have the same instruments but play different parts. There are several different ways of seating the strings of an orchestra, but the UNSW Orchestra has the first on the conductor's left and the seconds on his right. (The other common way has the cellos on the conductor's right.) As well as giving a stereo effect which is easier to hear in a live performance, this does make the two sections sound slightly different. The violin is held on the left shoulder and arm, so the first violins point the belly of their instruments towards the audience, while the seconds point the side and back towards the audience. String instruments sound a little brighter when the belly is pointed towards you, and this suits the higher parts which they usually play. Can you notice the difference when similar two-beat phrases are repeated in 65 and 70, or in 384-386?

At 75 we slow down to ***andante*** (Italian for going, ∴ walking pace) and the violins demonstrate the effect of ***tremolo***. For orchestral musicians, tremolo means a rapid repeating of notes, achieved on the string instruments by rapidly moving the bow back and forth. ***Vibrato***, on the other hand (pun intended) means a variation in pitch, achieved in string instruments by a slight and usually slow motion of the finger on the left hand which stops the string. This terminology is not observed by some musicians. Electric organs, for instance, often have a "tremolo" control[3] which varies the pitch up and down - what violinists call vibrato.

The **violas** enter at 80, ***senza sordino*** ("*senza*" means "without"). The viola is pitched only five notes lower than the violin, but its work is concentrated more towards the lower range than is that of its little sister. The viola is tuned CGDA so three of its strings have the same pitch as three of the violin strings (GDAE). All of this section is notated ***sul C***, which means that they are to play it on the lowest string, even when it goes high enough to play more comfortably on another string. The thicker, lower strings on any instrument are more mellow than the thinner, higher ones (they do not support high frequencies so easily), and this marking emphasises the difference between viola and violin. In this piece the two players in the front desk of the violas have a solo each (83-87).

Violas probably need a little introduction. Every year we have several famous violinists and cellists who tour the country doing concertos, but only rarely does this happen for the viola. The viola has an image problem - which includes being the butt of many musicians' jokes. Part of this is because the viola parts in much of the common repertoire[4] are boring and not especially difficult. The problem is that the cello can do the equivalent off both the tenor and bass voice, the violins can almost cover the alto range as well as the soprano and above, and so many composers neglect the viola. Just like the altos in choirs, their parts often look as though they got the left-over note in the chord once the soprano, bass and tenor parts were written. There is also a physical problem with the viola. There is no standard size for the instrument, and most players maintain that the larger instruments in general

[3]This effect is used a lot on electric organs because, unlike pipe organs, electric organs usually use equal temperament which sounds ugly on sustained chords. Vibrato disguises the temperament.

[4] For this evil, *inter alia*, I hold German and Austrian composers of the 19th century chiefly responsible. There are great viola parts in the contemporary repertoire and of course all of Bach's parts are interesting: listen to Brandenburg VI and see whether violas have to have boring parts.

sound better than the smaller. Physical arguments about scaling support this. The extra leverage of larger, longer instruments make these harder to play ***da braccio*** (on the arm), and so some players compromise on tone for an instrument that is less tiring to play. My revelation about violas occurred when I came to work at UNSW, which is home of the Australia Ensemble[5]. Hearing Irena Morozova play I realised for the first time that the viola really is the equal of the violin and cello.

The ***cello*** (short for violoncello) is the second most important instrument in an orchestra - it plays most of the important lower parts. If the violin is the orchestra's right hand, then the cello is its left. In this piece the cello is introduced at 88 by a duet for the front desk. If the strings are an orchestra within an orchestra, then the cellos are the potential orchestra within the strings. I say this because of their extremely useful range. The cello is a full octave below the violas, and its strings are tuned CGDA starting two octaves below middle C. Thus it goes lower than most human basses. In the hands of a good player, it can also go up to and even beyond the high region of the soprano voice. Further, the instrument is extremely agile, despite its large size. If one had to write for an orchestra of instruments of just one type, the cello would be an obvious choice[6]. To illustrate this briefly there is a section (93-98) where they cellos are ***divisi*** in four parts. Watch for the bows which move in different directions at first, but which come to unanimity as the music becomes homophonic.

Basses are often called double basses. Some people argue that this is a silly name because the cello is the tenor and so the instrument below that is logically the bass, whereas double bass should be lower again. On the other hand the cello is also a bass instrument, and the name double bass also avoids confusion with the low-voiced singers who are also basses. While the basses are introduced, the clarinets are used to play along with the choir so that the bass is the only string colour present. Basses are tuned GDAE, but in the descending sense, so their strings are only four notes apart whereas violins are GDAE ascending and thus five notes apart. This difference is practical. The strings of the instrument are so long that it would be difficult to play scales on a bass tuned in fifths[7].

GDAE is not only a possible spelling of the traditional Australian greeting, but also the "tune" that most of the strings play when the orchestra tunes up. The players first tune the A string (listening to the oboe play that note) and then play strings in pairs to tune the others. This effect is borrowed in the piece (114-117).

Bowing is an important (and endlessly discussed!) issue in string sections. If the player keeps the bow moving in the same direction and does not lift it from the string, the sound is continuous. If the fingering of the left hand changes while the bow is moving, we get a smooth or ***legato*** transition between two notes. String players call this playing the notes *on the same bow*, and it is indicated simply by putting a slur mark over the phrase which is to be played on the same bow. When the bow changes direction, the sound stops for the moment when it is stationary and so we get two distinct notes. This little exercise in the piece, which was inspired by the exercises in the Suzuki violin method, uses non-legato bowing. **Up-bows** are different from **down-bows** because the player's hand is at the bottom end. It is easy to get a strong accent on the start of a note if it is played down-bow. The choir learn how good this articulation technique is by having a competition with the violins (124-130). The bow has a finite length and this, together with the speed of its motion and the loudness of the note, determine how long a single note can be. Another competition (132-133).

The violins and violas demonstrate ***pizzicato*** (plucking the string with the fingers) and ***col legno*** (literally "with the wood", i.e. striking the string with the back of the bow). Check the pronunciation: the "g" in col legno is not pronounced as an English "g" but has the effect of softening the "n". "Coll lay'nyo", with the second word having two syllables, is close. Check with an Italian!

Time to recapitulate and to check that we can tell all those string instruments apart. Previously we started at the top of the string section and worked down; we now put the section back together starting with the basses, *pizzicato* (138). Towards the end we use the instruments (almost) homophonically (155-158). Notice now the similarities in tone and in playing style. The great

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[5] Let me tell you a wonderful secret: this outstanding internationally acclaimed chamber group gives 12 free lunchtime concerts and workshops each year on campus at UNSW, as well as a series of Saturday evening concerts. There are always spare seats at the lunchtime concerts! Details from the UNSW Music Department 385-4874.

[6] The bass clarinet would be another, for similar reasons of range and agility.

[7] The jazz bassist Charlie Mingus is unusual in that he tunes his bass in fifths, but then he has huge hands.

homogeneity of the string section (as well as its flexibility and endurance) is one of the reasons why it is used so much. The homogeneity of the strings contrasts with the diversity of the woodwinds, whom we meet next.

Colours

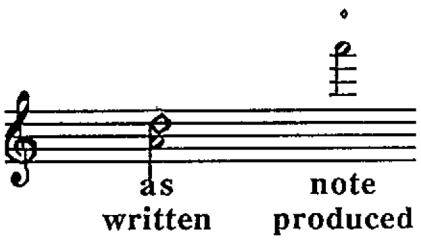
Orchestral colours refers to the combination of different instrumental ***timbres*** or tone qualities. It is a good way to introduce the woodwinds with their splendid variety of timbres. It serves two other purposes: it gives us some slow and expressive orchestration (like the soppy movement in a symphony), and it also allows the wind players to get some warm, moist air into the instruments and some water into the reeds before they have their solos in the next section.

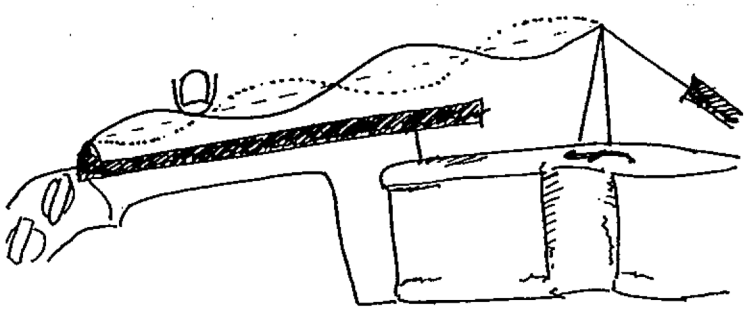
The composer or orchestrator does not, of course, make the wonderful sounds of an orchestra - the musicians and their instruments do that. All a composer has to do, for example, is to draw a little football with a few lines under it on the cello part and the result is a flurry of bows, a cloud of rosin dust and a beautiful, exciting sound. The composer or orchestra can have fun mixing the sounds together, as I did here. The mixtures in this section are a little complicated to describe. If you are interested in how the particular "colours" are achieved, take a look at the orchestral score.

Then there is the question of what they mean. The French composer Olivier Messiaen claimed to have a simple correlation between colours and chords claimed a correspondence between colours and chords, and the Australian painter Roy de Maistre claimed a correspondence between colours and pitches. I do not sympathise with either, and suspect that any associations depend on personal tastes and connotations. These colours are my associations. For the record, I have tried to explain why I make these connections:

For me, brown lurks between rich and muddy, as do these chords, with their dangerously close harmonies in the low register and the rich wind orchestration. Yellow is open and clear, like these simple open major chords. Red is exciting and a bit dangerous, as is this chord. The green is that of a Queensland rain forest, with all sorts of animals and plants to be found in the undergrowth if you look/listen closely enough. The blue is that of a sunny winter sky in Sydney - transparent and pure, but a bit cold if the wind comes, and blue in the other sense if things have gone the wrong way.

There is an interesting detail to point out before we go on to woodwinds: the high notes that are sustained during the "green" section are played by the basses. They are playing ***harmonics***. On any string instrument, these can be produced by touching the string very lightly at a point 1/2, 1/3, 1/4, 1/5 etc of the way along its length, and then bowing or plucking[8]. If you touch the string at 1/N of its length, it can vibrate in N separate sections, and this produces a frequency N times higher than that of the note produced by the whole string. Halfway along you double the frequency and get a note one octave higher. One quarter of the way gives four times the frequency which is two octaves (two doublings of frequency). A third of the length gives a musical twelfth, a fifth gives a musical seventeenth - but that would take a while to explain.





[8] If you pluck, as you generally do on a guitar, the finger that does the light touching must be withdrawn as soon as the string is plucked so that it does not stop the vibration. The position of the touching finger is also critical.

Winds

"Winds" is the orchestral shorthand for woodwinds, a family that includes flutes, oboes, clarinets and bassoons, and relatives of these. Originally these instruments were made of wood, although flutes, some piccolos and the lowest clarinets are made of metals. They are alike in that they all consist of a thin tube with "tone holes" along its length which are closed or opened to change the effective length of the tube.

In the eighteenth century, wind instruments usually came in pairs: two oboes, two bassoons and two horns, sometimes two flutes or two trumpets as well. (The clarinets came along towards the end of that century.) During the nineteenth century the sections grew: a piccolo was added to the flutes, a cor anglais to the oboes, a bass clarinet to its smaller cousins, sometimes a contrabassoon to extend the lowest range of the orchestra. This work uses such a scheme, without contrabassoon (I wanted it to be played and few orchestras have contrabassoons!). Late nineteenth and some twentieth century composers call for huge sections: Stravinsky's "Le sacré du printemps" has five players in each section including alto flutes, two cors anglais and two contrabassoons.

The two **flutes** are introduced with a simple tune (197-213). Except in the upper registers, the flute is a relatively quiet instrument, and a flute solo (or duet) should be rather lightly accompanied. Here we have a suitably sentimental string accompaniment - we are in the soppy movement after all. The **piccolo**[9] is a close relative of the fife, and so it is often given military parts to play. It is thus conscripted on this occasion, where it serves alongside the snare drum and the tenor drum (214-218).

* *How does a flute work? I expect that everyone has played a musical note by blowing over the top of a bottle. The air in the bottle is, in a way, springy or elastic, and so it can vibrate, just like a spring. When you compress a spring, the energy that you put in to compress it is stored in the spring, ready to bounce out when you release it. You release it and it expands, and then the inertia of its motion causes it to expand past its original position. It then starts to contract, overshoots the original position: it is oscillating or vibrating - sproinnng! When you compress a gas, the pressure goes up and it tends to expand, so it can oscillate just like a spring - indeed some motor vehicles use pneumatic suspension instead of springs. Anyhow, the air in the bottle can vibrate (expand, contract, expand etc) at a frequency that depends on the size of the bottle and of the neck. You can raise the frequency and pitch by reducing the volume of air (pour some water in). You can low the frequency a little by reducing the size of the hole.*

When you blow across the top of the bottle, the stream of air can be deflected up or down by the expanding and contracting air in the bottle. When the stream is deflected down, some of it goes into the bottle, increasing the compression. Thus the power in the stream of air can sustain the vibration in the bottle. The mouthpiece of the flute (and of that of the recorder) works on the same principle - a jet of air passing a volume of air (the tube of the instrument) which can vibrate. The frequency of vibration of the air in a long thin tube depends mainly on how long it is. In woodwind instruments, the effective length is changed by opening and closing finger-holes or keyholes along the side.

In an **oboe** the sound is produced by a reed - in fact a double reed (see the diagram below). Oboists spend much of their lives making reeds (finding the right cane, binding it on to metal pipes and carving and scraping at it with sharp knives) and much of the rest of their lives complaining about them. This leaves very little time to play or to practise. Fortunately this does not cause much of a problem because once an oboist has a good reed, all s/he has to do to play the instrument is to blow into it and to move the fingers. This, relatively speaking, is a simple task.

The oboe and bassoon have the unusual property that they are loudest at the bottom of their range. The reason why this is odd is mainly to do with human hearing: our ears become more sensitive with increasing pitch up till about two or three octaves above middle C. To sound equally loud at low, pitch, one normally has to do more work. This strong, low register of the oboe reminds me of their ancestors, the shawms, and this duet attempts to evoke them (219-228).

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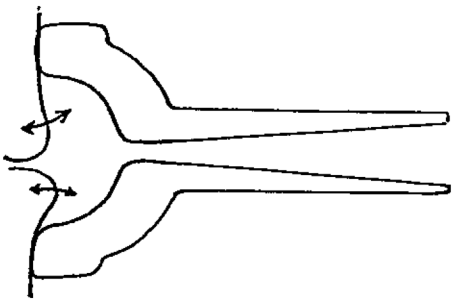
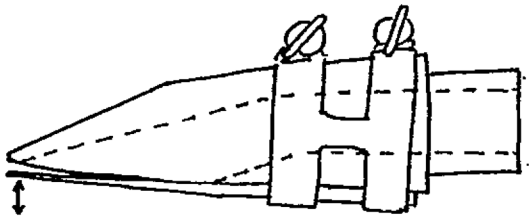
[9] In an orchestral score, the piccolo appears at the top of the page, followed by flutes, oboes etc. With the exceptions of reversing flute and piccolo for musical reasons, and presenting the strings first because of their importance, this piece presents the instruments in their score order.

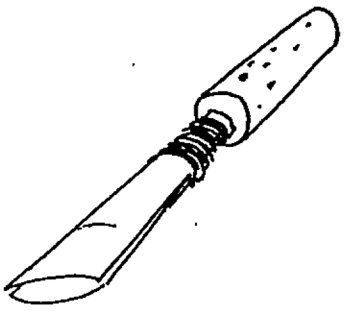


typical brass mouthpiece

airjet (flute, recorder)



single reed (clarinet, saxophone)



double reed (oboe, bassoon)

* *The oboe is the first reed instrument that we have met. Like the cor anglais and bassoon, it has a double reed - two pieces of cane bound together. These pieces of cane are springy and can vibrate on their own (the reeds make a high quacky sound called "crowing" when they are played without the instrument). Attached to the instrument, they are usually forced to vibrate at the natural frequency of the air in the tube. When the pressure falls, the reed tends to close and to let less air in, when the pressure goes up the reed opens a little and lets more air in. Once again the power in the air stream from the player's lungs is used to sustain the vibration in the in the air in the instrument. You can make a double reed out of a plastic drinking straw. Cut a V shaped point on the end of the straw like this:*

Put the cut end in your mouth, squeeze slightly with you lips and blow. The sound probably resembles that of a beginning oboist! You can "tune" it by cutting pieces off the other end, and with fast scissor work you can even play a little tune - provided that the notes go only upwards!

The **cor anglais** is a lower-pitched version of the oboe. It looks rather different because it has an egg-shaped bell, instead of the little flared bell of the oboe and clarinet. (This bell has relatively little acoustic effect and removing it does not much affect the instrument, except on the lowest notes.) The name, which is French for "English horn" is misleading because it is not of English origin and it is not a horn in the musical sense of the word. It is usually speculated that the name comes from *cor anglé* (bent horn) because earlier versions had a bend in the middle to make the long instrument easier to hold. These days the bend is up near the reed and not so noticeable.

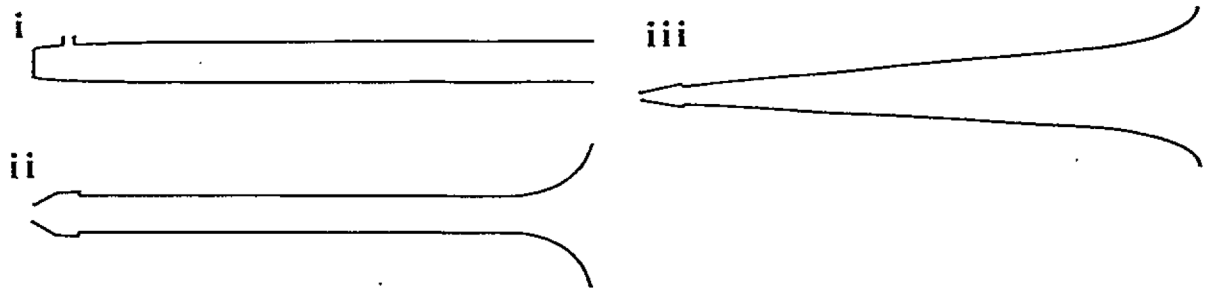
Here I have given the cor the same melody as the violas (229-232). There are reasons for this. The cor and the viola are very often associated in orchestras: either they double the same melody, or else the theme is presented on one and repeated on the other. Further, both are most interesting in their lowest registers, which approximately coincide.

Among the orchestral woodwinds, the oboes, cor anglais and bassoons (which we shall meet soon) are the closest analogy of the homogeneous family made by the strings. The two oboes may be used

like first and second violins, the cor like violas, and bassoons, in octaves, take the rôles of cello and bass. Quite often they are doubled like this in orchestrations.

The **clarinet** has a single reed, which is mounted on the flat face of a mouthpiece (see the previous diagram). It swings in and out, cutting off and opening the stream of air as the pressure in the tube goes up and down, so in principle the operation is much like that of the double reeds.

A strange thing about the clarinet is its range. Think about the flute, the oboe and the tenor recorder: all of these are approximately the same length and their lowest notes are all (approximately) the same at middle C - (actually a tone lower on the oboe and a semitone lower on some flutes). Now the clarinet, which is also about the same length, can play almost an octave lower (it would be almost exactly an octave if it didn't flare out into a bell at the bottom). The explanation of this is a bit involved, and it involves the observations that the flute is open at both ends while the clarinet and oboe are closed at the end in the player's mouth, and that the flute and clarinet are nearly cylindrical whereas the oboe is nearly conical. I give a complete explanation in my book "The Science of Music" of which I shall send a copy to the music teachers in the participating schools.



The bores of wind instruments. The diameters are exaggerated compared to the lengths. The flute (i) and the clarinet (ii) are nearly cylinders. The oboe, saxophone and bassoon are nearly conical (iii).

The clarinet has a large range of pitch and is a particularly useful instrument because it can play from very very softly to quite loudly over almost all of its pitch range. It is also very agile. For these reasons the clarinet is to the wind band what the violin is to the orchestra.

Clarinets come in a range of sizes, from sopranos that are 3/4 the size of the normal one, to contrabass clarinets which look like a plumber's nightmare. Apart from the normal clarinets in Bb and A, the one most commonly used in orchestras is the **bass clarinet** which is pitched an octave or more below the standard clarinet[10]. This gives it much the same range as the cello and, like the cello, it has an enormous range in pitch. Because it is at least twice as long as an ordinary clarinet, it is bent near the mouthpiece and near the bell so as to bring the keys into convenient reach of the players hands. The bass clarinet is almost as agile as its smaller cousins. In this piece the three clarinets take turns in frolicking around a simple two bar phrase. Note difference between the timbres of the different registers of the clarinet. The low range is called the chalumeau register after the ancestor of the clarinet - it is very dark and "woody" sounding. The high register is called the clarino register, which is the same name as the high register of the older (quieter) trumpets - in this range the clarinet is clear and bright.

The **saxophone** has a mouthpiece and reed much like that of a clarinet, but it is a conical tube (like the oboe and bassoon) rather than a cylinder (like the clarinet). It has a wider diameter than any of the other woodwinds, it is also made out of metal, like most flutes and the biggest clarinets. Like clarinets, saxophones come in a large family from tiny sopraninos to huge contrabasses and, also like clarinets, they have a huge dynamic range from tiny pianississimo to a loud that challenges the trombones. They are also very agile and expressive. In this piece the saxophone makes only a brief

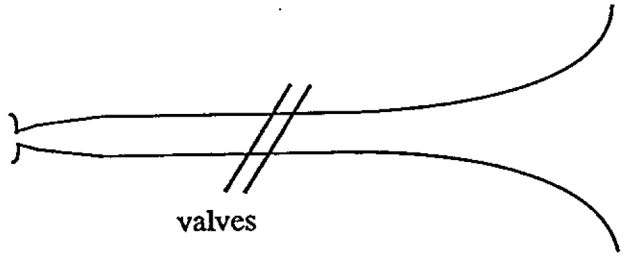
[10] I am deliberately imprecise here because the lowest note varies from instrument to instrument and, as is usually the case, the highest note varies from player to player.

appearance. This is, I am sorry to say, quite consistent with the frequency of their use in the traditional orchestral repertoire.

The **bassoon** is the bass of the woodwind family - a long, folded conical tube reamed and mandrilled into four pieces of maple. The bassoon can play down to the Bb below the range of the cello[11] and there is also a contrabassoon which goes an octave lower than this (not used in this piece because of their rarity). The bassoon is especially useful at the bottom end of the orchestra because it can be quite loud in this range and it also has a bright attack - that is the note starts quickly. It also blends well with the strings, indeed its initial rôle in the orchestra was to double and to strengthen the cellos. The bassoon is so useful as a bass in more than one section that its versatility and lyrical qualities are sometimes overlooked. The bassoon introduction in this piece shows both[12].

Horns and Brass

These instruments all have a mouthpiece of generally similar shape to that shown in the mouthpiece figure - although those of the horns are more conical and those of the brass more cup-shaped. They also have a large brass tube (sometimes silver plated) which is cylindrical in parts (where the valves and slides are), conical in others and which connects to a prominent bell.



The bore of a brass instrument. The ratio of diameter to length is exaggerated.

* *The bell is what makes the instruments both brassy and loud. Like the violin's bridge, the bell serves to match the vibration of a small thing to a large - in this case from the small tube inside to the air outside. This impedance matching, as it is called, works better for high frequencies than for low (it works best for sound waves which are not much bigger than the bell). As a result a note from a brass instrument has lots of power in the high frequency end of its sound, and this is one of the things that makes us recognise the sound as "brassy". When this matching effect of the bell is reduced by the player's hand in the bell of the horn, or a mute in the bell of the other instruments, the result is a sound which is a little like a woodwind sound in both quality and loudness.*

The mouthpiece uses the lips of the player as reeds, and hence the family is sometimes called the lip-reeds. The player holds his/her lips together and under a little tension, much as one does when preparing to say the letter "m". If you do this and blow a steady stream between them you will probably be able to produce a buzzing sound. Brass players do this a lot in various contexts, including musical ones. What happens is this: the pressure in your mouth forces the lips apart, and that allows some air to escape. The moving air between the lips has a lower pressure than stationary air (a consequence of the conservation of energy called the Bernoulli effect) and this plus muscular tension draws the lips together again. The air is now stationary so its pressure goes up and the same sequence repeats. Hence we get a regular vibration.

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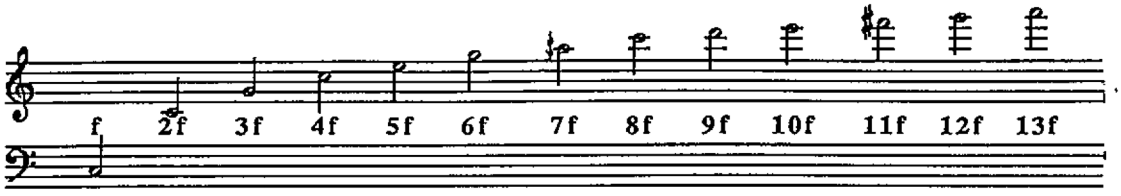
[11] Wagner, however, requires bassoons to go a semitone lower than this. This piece requires one of the bassoonists to use an informal "Wagner bell" to achieve the low A in 257-8.

[12] No sexism is implied in the address "Mr. Bassoon" - UNSWO has always had at least one woman bassoonist, but the range of the instrument makes it a basso profundo. "Comrade bassoon" would scan in its place, but this address is no longer fashionable.

As with the woodwinds, the tube of air has its own natural frequencies of vibration and these usually control to some extent the vibration of the lips. The player can choose among different natural frequencies by changing the tension of the lips, thus a bugler can play a tune on this limited series of notes without the help of any slides or valves. (Much more on this in the "Science of Music" book.)

To be able to play the notes which are not in the natural series for the pipe - the notes between those of the bugle - the length of the pipe must be changed. Some early lip-reed instruments had tone holes and keys like the woodwinds: examples are the keyed bugle, the ophicleide and the serpent. The success of this system is attested by the popularity of these instruments today.



The harmonic series for a pipe or string whose lowest note is C in the bass clef and whose frequency (about 131 vibrations per second) we shall call f. Bugle calls usually use the second to the sixth harmonics. Old horn and trumpet parts use harmonics up to the sixteenth, where scales are possible.

Horns. The early horns "solved" the problem of the missing notes in two ways. The first way was to take advantage of the fact that the natural series of notes become closer together in the high part of the series. The horn is a very long pipe which plays in the high part of the series where the notes are close together. A horn player can play scales without using the valves, though modern players are only occasionally asked to do so. The other trick was to have several horns of different length, which was achieved in practice by having different bits of tubing called crooks which slid into the horn to change the length. This gave a series of horns **in** (i.e. suited for playing in) different keys. In music written in the eighteenth and early nineteenth centuries (and strangely even later), horn parts are transposed into different keys to allow the player to use a different horn and read the part as though it were in C major or A minor.

The horns (sometimes called French horns) are the most used lip-reed instruments in the orchestra, and they are honorary members of the woodwinds because the wind quintet has one (along with a flute, oboe, clarinet and bassoon) and the octet two (along with two oboes, two clarinets and two bassoons). In an orchestra, horns usually are used in pairs with the odd numbered players being those with "high chops" and specialising in the high end of the instrument's large range, and the even numbered players with "low chops" specialising in the bass end[13].

In this piece the horns are introduced playing an arpeggiated tune (from 258) such as one would have written for the old horns which had no valves. As a result it sounds a bit like a hunting call. Some of the phrases are played "open" - i.e. with the bell only slightly occluded by the player's right hand - and some "closed" with the bell almost closed off by the player's hand[14]. Note the difference in timbre as well as in loudness.

The **horns** sit on the conductor's left, the **trumpets, trombones and tuba** on his/her right. This gives a stereophonic effect which is best appreciated in a live performance. This piece demonstrates it by using them in alternation and in a friendly (and chromatic) competition (270-276).

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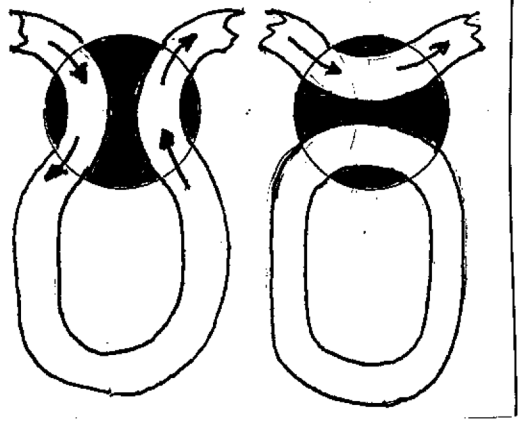
[13] The very lowest end of the horn's range is hard to play well. A version of the horn which has a larger diameter tube and a more gradual bell is the Wagner tuba - it is more suited to this range. Such instruments are rare, but Stravinsky calls for two in "Le sacré du printemps".

[14] I apologise for the appalling rhyme in this section. What is worse is that it is not even original, but borrowed from Flanders and Swann.



Horns and trumpets solve the problem of changing the instrument's length by using valves which are little taps which either include or exclude an extra length of tubing. In the left diagram the valve includes the loop of tube shown in the instruments length. Turn the valve 90° (right diagram) and the air goes straight through. There is one for one semitone's worth of length, and others for two, three and four. These can be used in combinations, although the proportional change in length is not the same when a valve is used on lengthened and unlengthened tubes, and this poses some tuning problems. We demonstrate the chromaticity of the modern horns and brass with an ascent that begins in bar 279.

Trombe is Italian for trumpet and **trombone** means large trumpet. Like trumpets they are long narrow tubes with a sharply flared bell and a cup-shaped mouthpiece. The early trombones (called sackbuts) solved the problem of variable length by sliding a U-shaped tube in and out of an elbow in the cylindrical part of the tube. This system is an excellent one because it allows all possible pitches and therefore the tuning of the instrument is as good as the players ears[15], as is the case with the strings. It has the disadvantage that it makes it difficult to play *legato* without also playing *glissando*, but good players can overcome this almost completely.

The slide allows a smooth glissando that is a cliché for the trombone. The slide gives a range of an augmented fourth (six semitones from "in" to "out") and this is usually the range of glissando possible. In this piece we try to overcome that limitation by using the **bass trombone** and tenor trombones in such a way that the gaps in the glissandi of one are filled by another instrument (284-289). The older bass trombones were simply larger versions of the tenor trombone (the most common one). They had a handle to extend the reach of the player on the long slide. These days most bass trombones have a standard length slide and a valve switches in the extra length of pipe when necessary.

The **tuba** serves as the bass for the brass - and also quite effectively for the horns. Although it is a long tube, its diameter is proportionally even larger than those of the other lip-reeds. It may be considered as the bass of the bugle or cornet family rather than the It has a big, full sound even towards the low end of the range and is great in filling the bottom of sustained chords. As one can imagine, it takes a lot of air to play and so the phrases have to be kept short. Now, where have we heard that tuba cadenza before?

Percussion

Percussion instruments are, by strict definition, those that one hits. In practice, the sporadically busy folk up at the back of the orchestra get to play everything that is not covered already which may include whistles, car horns and even such things as rustled paper, baby cries and noses. All of the instruments discussed above (except for *pizzicato* and *col legno* strings) used two vibrating elements, one as a resonator (the string and the column of air) and the other as a control mechanism (the bow). In most of the percussion instruments, an object is hit and it then vibrates at all or some of its natural frequencies of vibration. This difference is crucial. The action of the bow and the reeds and lip-reeds ensures that the sound produced is made up of frequencies from the **harmonic series** (i.e. frequencies in the ratios of the natural numbers 1:2:3:4 etc. - refer to the previous diagram). Notes with this property have a clear pitch. In general objects have frequencies of vibration that are not in this series and they do not have a clear pitch. When you pluck a guitar string, the sound is made up of harmonic vibrations, we recognise it as a musical note - an E, say. When you tap the desk in front

[15] In fact trumpets use the slide principle too: they usually have a little finger-operated slide on their longest valve to avoid the tuning problems referred to above.

of you, it vibrates briefly and makes a sound, but the vibrations are not in the harmonic ratios and, for most desks, you will probably not be able to determine a musical pitch for the sound.

* *Find a piece of even-grained, dry timber about 50 cm long and 2 cm thick. The exact dimensions are not important. Hold it between your thumb and forefinger in such a way that the distance between thumb and forefinger is the smallest dimension of the wood. Hold it fairly loosely at a point about one fifth of its length from one end, and let it hand downwards. Now take a soft-headed drumstick (a bass drum beater would be fine, or improvise one) and hit it firmly in the middle. You should hear a note with a reasonably clear pitch - if you don't try varying your holding position a little. This note has the lowest frequency of vibration of the block of wood. Now hold it exactly in the middle and hit it at approximately the position where you were previously holding it. You should hear a fainter, higher note which has the second frequency of vibration of the block. This musical interval is a little more than eleven notes. The ratios of the frequencies are not harmonic.*

It is easy to change the interval between these two: if one makes the wood a little thinner in the middle, the lower note becomes lower but the higher note is hardly changed. I used maple as a compromise between springiness and ease of cutting, but this is not very important. Real instruments are often made out of rosewood.

If you use a piece of wood that is relatively short and thick, you may not recognise the musical pitch. You then have a ***wood-block*** *which we have already met several times in this piece. Note that wood-blocks of different sizes have relative pitch, of which I take advantage in the little phrase that appears in 6, 18 and elsewhere.*

The **xylophone** is a series of wooden bars[16] each of which is slightly thinned in the middle to make the first two frequencies of vibration have the ratio 3:1 (a musical twelfth). The lengths are varied so that the different bars play the notes of a chromatic scale and they are arranged something like a piano keyboard. It is a very high pitched instrument with a bright sound that fades away very quickly.

The bars of the **marimba** are thinned more than those of its little cousin so that the ratio of the first two frequencies is 4:1 (two octaves). This thinning makes the pitch much lower so that, it is feasible for the marimba to cover the bass range. Its sound is much more mellow than that of the xylophone, and it lasts rather longer thanks to resonating pipes placed below the bars. Some manufactures like to make these pipes look symmetrical and so put long pipes with false bottoms under the high pitched bars. The marimba is the most important melodic percussion instrument and percussion ensembles[17] usually have more than one, sometimes including a huge bass marimba.

Because they cannot sustain a note, the marimba and xylophone are best when playing reasonably fast melodies with short notes, and this is how they are used here (298-323). They are also useful to give extra attack and brightness to the sustained notes of other instruments, and that is how I used them in the introduction (5-10 & 19-21).

Drum skins are stretched tightly enough to be able to vibrate and make a sound when hit. The simplest vibration, and the one with the lowest frequency, is one in which the whole head of the drum moves up and down together. This one however is not very important in drums. Most drums have an enclosed volume of air and a little hole somewhere in the side of the drum, or underneath in the case of the timpani. The lowest vibration pushes air in and out of the drum and the friction of the air through this little hole quickly removes the energy from this vibration. The next mode of vibration is one in which one side of the head goes up while the other goes down, and this is the most important to most drums. Percussionists usually strike the drum head about halfway between the centre and the perimeter - this favours the second type of vibration. The other types of vibration are

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[16] The glockenspiel is made of metal bars. Toy instruments with metal bars are mistakenly called xylophones - I expect that this is because the language has so few words beginning with "x".

[17] If you want to discover more about percussion, try a concert of the percussion ensemble "Synergy". The music is always superbly played, and the visual side is much more interesting than in most concerts: there are strange and beautiful instruments everywhere and one appreciates the coordination of the players in getting to and playing the right instrument at the right time.

beautiful and successively more complicated: they are known to mathematicians and physicists as Bessel functions.

The **snare drum** is a shallow cylindrical drum named for its "snare", a collection of wires or nylon strings across the lower skin which rattle when the drum skins vibrate. The drum skin vibrates when any moderately loud sound is made. For this reason the snare can be "turned off" using a lever that lowers it away from the skin. The third beat of 326 is a **roll**, a rapid series of strokes to the drum head. (I ask the singers imitate this with a roll of the tongue which I have transliterated as "trtr".

The **tenor drum** has a little larger diameter than that of the snare drum, and it is much deeper. It has no snare. Like the snare drum it is usually used for military style rhythms, which is its fate here (328). Both snare and tenor drum are usually played with hard wooden beaters, though soft beaters may be used. The **bass drum** is of course the largest and loudest. A big bass drum is in fact the loudest instrument in the orchestra, so you will certainly notice its loud notes (e.g. 323) and you will see it easily at the back of an orchestra.

Percussionists have their own strange, slightly onomatopœic language. A **paradiddle** (played on tenor drum in 332) is four equally spaced strokes (usually semiquavers). A **flam** (played here on the snare drum, 334) is two strokes of which the second is stronger and on the beat and the first only very slightly before. I have written it in the choir part as "f'lam" which should almost be two syllables.

The **triangle** (341) is a metal bar bent to form an equilateral triangle with one corner open. This bending has three effects. It raises the frequencies of vibration and gives the instrument its high bright sound. It also facilitates a roll (third beat of 341) played either across one corner or by whirling the metal beater round in a path that hits all three sides. Finally it is less awkward to transport and to mount, and these are non-trivial considerations for percussionists!

Conga drums (342) are deep, narrow drums with only one head. They (there are usually two with different size) are played with the hands. **Timbales** (344) also have only one head, but they are relatively shallow and their diameter is larger than that of the congas.

One **cymbal** is mounted on a stand and can be played with a stick, which is convenient for playing in busy section work (324). Quite a variety of sound is possible on this instrument: they can be struck on the rim, on the mound in the centre or in between. As with most percussion instruments, they can be played with hard or soft beaters to give respectively brighter and darker sounds, and they can be damped with the hand for a short note or let ring. They are also available in pairs. These cymbals have hand straps so that they can be played by touching the rims together in a glancing stroke or a big crash (346-8). After a ***fortissimo*** crash the cymbal player usually holds them aloft so that they radiate sound towards the audience - it also looks impressive.

The **timpani** or kettle drums are large bowl shaped drums with a head whose tension can be rapidly changed during a performance. The friction and inertia of air in the drum has the effect of shifting the frequencies of the second and third lowest frequencies of vibration so that they are almost in the ratio of 3:2, and this gives the timpani definite pitch. They are tuned by a pedal which, via a system of levers, pulls the rim down and changes the pitch. The glissando in 307 is played by striking the drum and pushing the pedal down immediately.

Normally the timpani are tuned to the tonic (key note) and dominant (fifth note) of the piece, and this is the case in the introduction and finale of this piece. For the solo here (350-353) I ask the timpanist to tune to dominant and supertonic (fifth and second) to allow a perfect cadence (dominant chord to tonic chord) into the finale. There is a little musical joke here. The ***cadenza*** of a concerto is an unaccompanied passage which decorates a cadence (whence the name). Originally it was just a flourish on a perfect cadence towards the end of the piece, and it was usually improvised by the performer as is still is in jazz and in authentic performance of music of the classical period. It became more and more elaborate and long to display the virtuosity of soloists and during the nineteenth century composers started re-exerting their influence by writing it down. Some cadenzas now run for several minutes. The position in the piece and the lack of other instrumental accompaniment make this section (298-353) a cadenza for percussion (both orchestral and choral percussion) and the timpani roll (which is often written as a trill) on the dominant is the traditional cue for the conductor to bring in the orchestra for the finale.

Finale

A tutti - everybody playing and singing - is the most common way of ending a musical work involving orchestra and choir. In a piece called "Conjunction" the ***tutti*** should involve everyone, including the audience. This section uses some repeated melodic and harmonic patterns (a piece using repeated patterns is called a ***passacaglia*** by some musicians and a **riff** by others) to make it easy for the audience to join in. Further it has a **pedal**, a bass part which uses the same note for several bars at a time, which makes it easy for the tenors and basses to sing the part with no help from the choirs. (I regret to say that this will annoy the cellos, who usually double the bass vocal part in choral tuttis, but one cannot please everybody). The main theme appears both in original form and in a modified form[18] which allows the pedal note. There are a few educational points to make along the way:

Again the section begins with the strings. Woodwinds are added next because, with the exception of the piccolo, we shall not hear much of them once the brass come in.

The high trumpet part (376-379) is up high in what was called the ***clarino*** range in Bach's time. Trumpet players are not always fond of such parts, but they sound exciting over the top of a choral tutti. The trumpet is one of several instruments about whose upper limit there is little agreement. This part is very high, but it is more considerately written than some clarino parts: the high notes are all approached step-wise from below, like a high jump bar being raised one centimetre at a time. Note too that the player, like an athlete on the field, is allowed to warm up first (372-375).

Then there is the "Tivoli finish". There are big tall chords with everyone playing. There are cascades of strings: the bowing is frantic and looks good, but its contribution to the sound is mainly as texture rather than as structure. There are lots of percussion and the piccolo and flutes streak up into the stratosphere - or rather into the frequency range where the human ear is most sensitive. Finally there is the power, both acoustic and emotional, of a large orchestra and choir when, in the end, everyone does it together.

The composer. Joe Wolfe began playing music in jazz and fusion groups, and has written music for such groups as well as incidental music for plays and films. This is his third orchestral work. The first, a peculiar work commissioned by the UNSW Orchestra, consists of a suite of versions of the pop song "Stairway to Heaven" in the styles of Schubert, Holst, Miller, Mahler, Bizet and Beethoven. The second, "Sydney Sketches", is four movements of light-hearted programme music.

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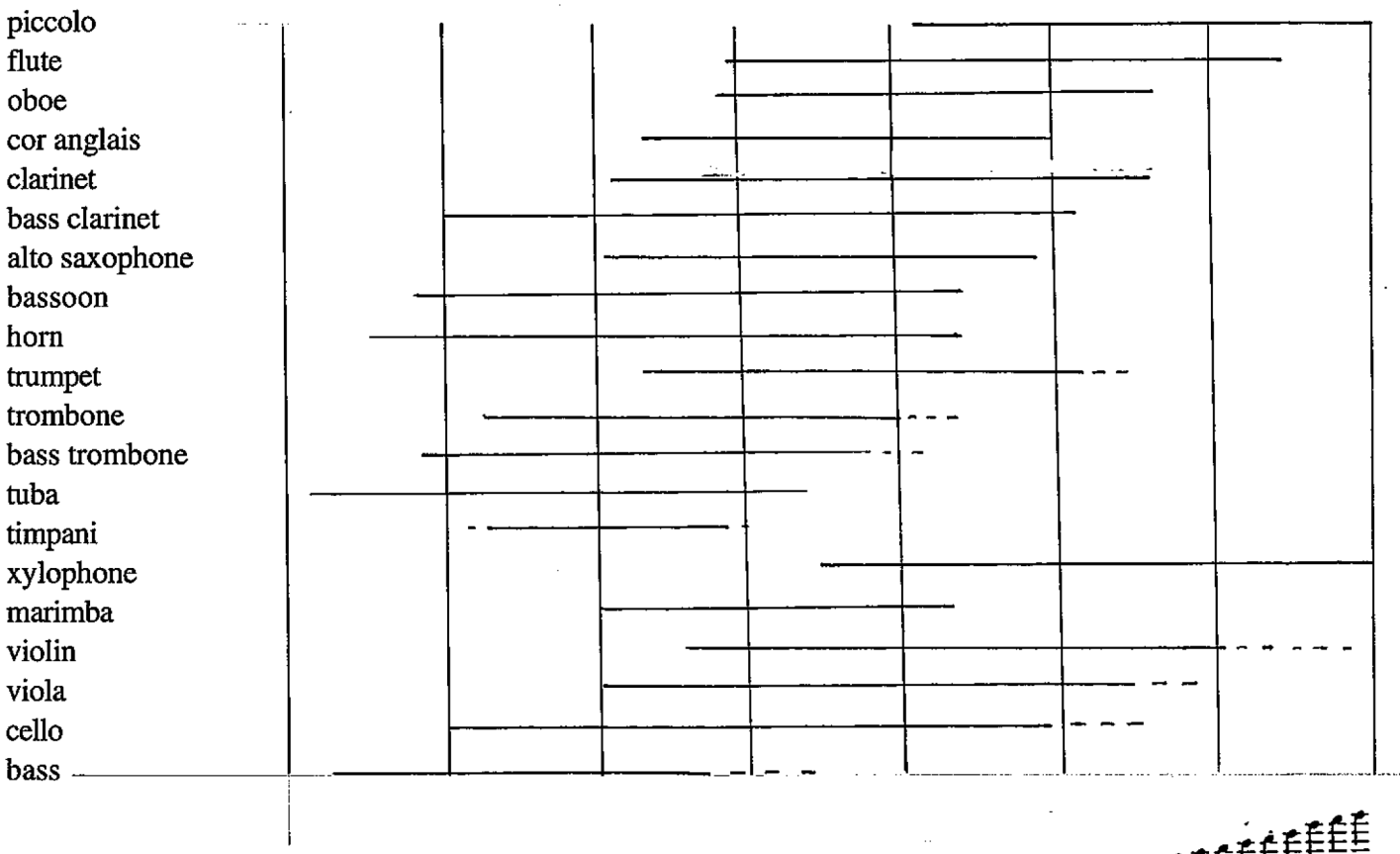
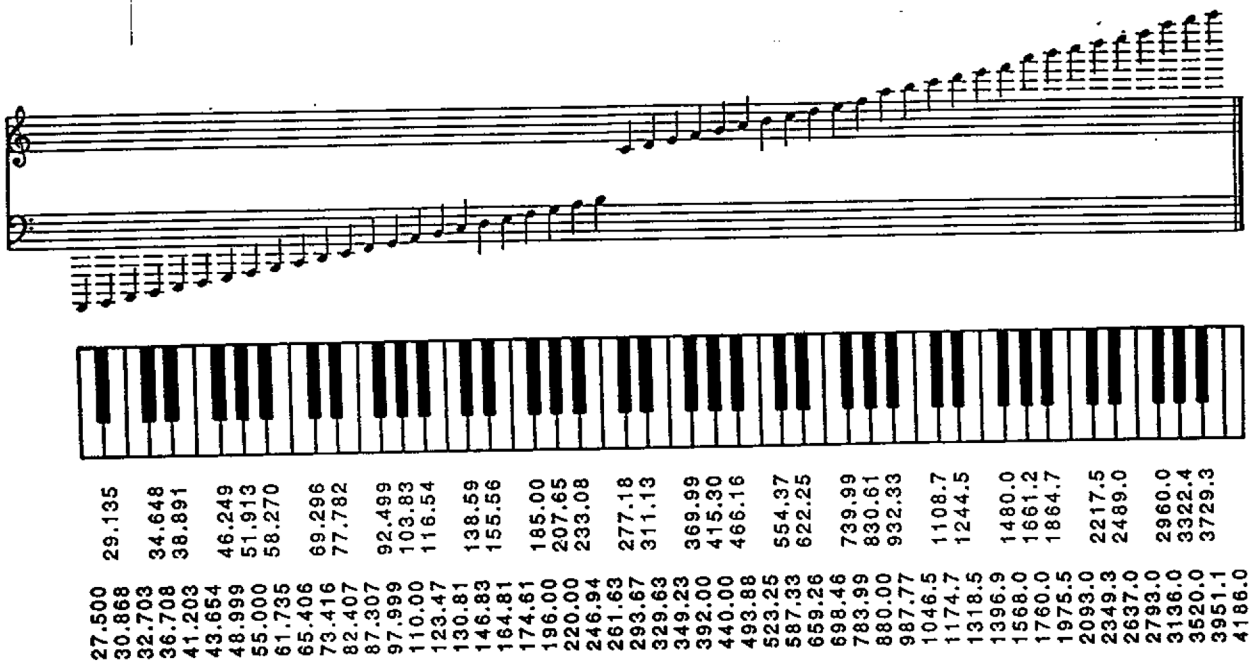
This music and text was written and published by Joe Wolfe. search "Conjunction"

[18] Musicologists like to talk about how themes are transformed. Many of the tunes used to introduce the instruments in this piece are related to the main theme in the sense that they stress the interval from tonic to dominant and back again, and the first three scale steps. One might argue that this gives a little unity to a work that, by its very conception, tends to disunity. One might also argue that these features also make the tunes rather easy to sing. Or one might not argue at all and just listen to the music.

The ranges of orchestral instruments





The frequencies, in Hertz, of notes on an equal tempered keyboard