Selection of writings by Steve Reich, from *Writings on Music 1965–2000* (Oxford University Press, 2002)

Music as a Gradual Process (1968)

> Music as a Gradual Process—first published in the catalogue to the exhibition *AntiIllusion: Procedures/Materials*, Marcia Tucker and James Monte, Whitney Museum of American Art, New York, 1969.

I do not mean the process of composition but rather pieces of music that are, literally, processes.

The distinctive thing about musical processes is that they determine all the note-to-note (sound-to-sound) details and the overall form simultaneously. (Think of a round or infinite canon.)

I am interested in perceptible processes. I want to be able to hear the process happening throughout the sounding music.

To facilitate closely detailed listening a musical process should happen extremely gradually.

Performing and listening to a gradual musical process resembles:

> pulling back a swing, releasing it, and observing it gradually come to rest; turning over an hour glass and watching the sand slowly run through to the bottom;
>
> placing your feet in the sand by the ocean's edge and watching, feeling, and listening to the waves gradually bury them.

Although I may have the pleasure of discovering musical processes and composing the musical material to run through them, once the process is set up and loaded it runs by itself.

Material may suggest what sort of process it should be run through (content suggests form), and processes may suggest what sort of material should be run through them (form suggests content). If the shoe fits, wear it.

As to whether a musical process is realized through live human performance or through some electromechanical means is not finally the main issue. One of the most beautiful concerts I ever heard consisted of four composers playing their tapes in a dark hall. (A tape is interesting when it's an interesting tape.)

It is quite natural to think about musical processes if one is frequently working with electromechanical sound equipment. All music turns out to be ethnic music.

Musical processes can give one a direct contact with the impersonal and also a kind of complete control, and one doesn't always think of the impersonal and complete control as

going together. By "a kind" of complete control, I mean that by running this material through this process I completely control all that results, but also that I accept all that results without changes.

John Cage has used processes and has certainly accepted their results, but the processes he used were compositional ones that could not be heard when the piece was performed. The process of using the 1 Ching or imperfections in a sheet of paper to determine musical parameters can't be heard when listening to music composed that way. The compositional processes and the sounding music have no audible connection. Similarly, in serial music, the series itself is seldom audible. (This is a basic difference between serial-basically European-music, and serial-basically American-art, where the perceived series is usually the focal point of the work.)

What I'm interested in is a compositional process and a sounding music that are one and the same thing.

James Tenney said in conversation, "Then the composer isn't privy to anything." I don't know any secrets of structure that you can't hear. We all listen to the process together since it's quite audible, and one of the reasons it's quite audible is because it's happening extremely gradually.

The use of hidden structural devices in music never appealed to me. Even when all the cards are on the table and everyone hears what is gradually happening in a musical process, there are still enough mysteries to satisfy all. These mysteries are the impersonal, unintended, psychoacoustic by-products of the intended process. These might include submelodies heard within repeated melodic patterns, stereophonic effects due to listener location, slight irregularities in performance, harmonics, difference tones, and so on.

Listening to an extremely gradual musical process opens my ears to it, but it always extends farther than I can hear, and that makes it interesting to listen to that musical process again. That area of every gradual (completely controlled) musical process, where one hears the details of the sound moving out away from intentions, occuring for their own acoustic reasons, is it.

I begin to perceive these minute details when I can sustain close attention and a gradual process invites my sustained attention. By "gradual" I mean extremely gradual; a process happening so slowly and gradually that listening to it resembles watching a minute hand on a watch-you can perceive it moving after you stay with it a little while.

Several currently popular modal musics like Indian classical and drug-oriented rock and roll may make us aware of minute sound details because in being modal (constant key center, hypnotically droning and repetitious) they naturally focus on these details rather than on key modulation, counterpoint, and other peculiarly Western devices. Nevertheless, these modal musics remain more or less strict frameworks for improvisation. They are not processes.

The distinctive thing about musical processes is that they determine all the noteto-note details and the overall form simultaneously. One can't improvise in a musical process-the concepts are mutually exclusive.

While performing and listening to gradual musical processes, one can participate in a particular liberating and impersonal kind of ritual. Focusing in on the musical process makes possible that shift of attention away from he and she and you and me outward toward it.

Four Organs –Program Note

Four Organs is composed exclusively of the gradual augmentation (lengthening) of individual tones within a single (dominant 11th) chord. The tones within the chord gradually extend out like a sort of horizontal bar graph in time. As the chord stretches out, slowly resolving to the tonic A and then gradually changing back to the dominant E, a sort of slow-motion music is created. The maracas lay down a steady time grid of even eighth-notes throughout, enabling the performers to play together while mentally counting up to as much as 256 beats on a given cycle of sustained tones.

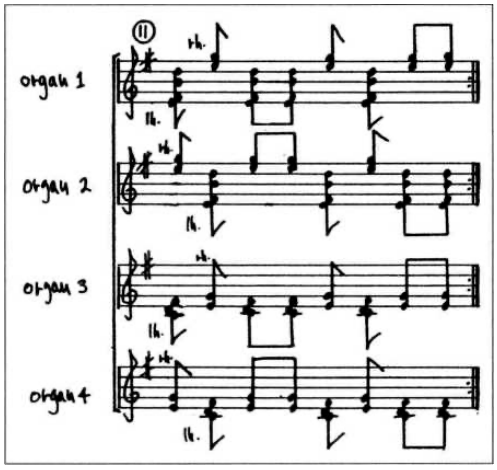
Four Organs is the only piece I am aware of that is composed exclusively of the gradual augmentation of individual tones within a single chord. From the beginning to the end there are no changes of pitch or timbre; all changes are rhythmic and simply consist of gradually increasing durations. This process of augmentation was suggested by the enormous elongation of individual tenor notes in Organum as composed by Perotin and others in the twelfth and thirteenth centuries in Paris at Notre Dame Cathedral. Tenor notes that in the original chant may have been equivalent to our quarter- or half-notes can take several pages of tied whole-notes when augmented by Perotin or Leonin.

Four Organs was composed in January 1970. It was first performed at the Guggenheim Museum in New York City by myself and members of my own ensemble later that same year. It also turned out to be one of my first pieces to be heard by a large concert-going public when Michael Tilson Thomas invited me to perform it with him and members of the Boston Symphony Orchestra in Boston in 1971 and at Carnegie Hall in 1973, where it provoked a riot.

Phase Patterns

Almost immediately after the completion of *Four Organs*, I composed another piece for four electric organs, *Phase Patterns*. In this piece, the performers are drumming on their keyboards. Each hand plays certain notes throughout the piece without change, only alternating up and down, left, right, left, left, right, left, right, right, which, in Western rudimental drumming, is called a paradiddle. The idea of drumming on the keyboard comes out of my limitations as a keyboard player, together with my studies of rudimental drumming as a teenager. Although the cause here is one of physical limitation, the effect is of a new approach to the

keyboard. I now look at all keyboard instruments as extraordinary sets of tuned drums (see ex. 4-4).



Example 4-4. Phase Patterns. COPYRIGHT © 1980 BY UNIVERSAL EDITION (LONDON)

Drumming (1971)

> *Drumming* was composed during the period of over a year between Reich's return from Africa and the premiere in December 1971. Reich composed by taping patterns and playing against them, then rehearsing with members of his ensemble, now expanded to twelve musicians. Three premiere performances were given. The first was in the Museum of Modern Art Film Theater, the second was at the Brooklyn Academy of Music, and the third in New York's Town Hall. The third performance was recorded and published together with full score in 1972, in a signed and numbered special edition of 500, by John Gibson and Multiples, Inc.

For one year, between the fall of 1970 and the fall of 1971, I worked on what turned out to be the longest continuous piece I have ever composed. *Drumming* lasts from 55 to 75 minutes (depending on the number of repeats played) and is divided into four parts that are performed without pause. The first part is for four pair of tuned bongo drums stand-mounted and played with sticks, the second for three marimbas played by nine players together with two women's voices, the third for three glockenspiels played by four players together with whistling and piccolo, and the fourth section is for all these instruments and voices combined.

While first playing the drums during the process of composition, I found myself sometimes singing with them, using my voice to imitate the sounds they made. This involved using syllables like "tuk," "tok," "duk," and so on. I found that if I used a microphone to make the volume of my voice almost as loud as the drums, but no louder, I could then make some of the resulting patterns very much as if my voice were another set of drums, gradually bringing out one pattern after another.' I began to understand that this might also be possible for the marimbas and glockenspiels as well. Thus, the basic assumption about the voices in

Drumming was that they would not sing words but would precisely imitate the sound of the instruments.

The problem then was to find out what sort of sounds were needed to best imitate these instruments. For the marimbas, the female voice was needed using consonants like "b" and "d" with a more or less "u" as in "you" vowel sound. In the case of the glockenspiels, the extremely high range of the instrument precluded any use of the voice and necessitated whistling. Even this form of vocal production proved impossible when the instrument was played in its higher ranges, and this created the need for a more sophisticated form of whistle; in this case, the piccolo. In the last section of the piece, these techniques are combined simultaneously with each imitating its particular instrument.

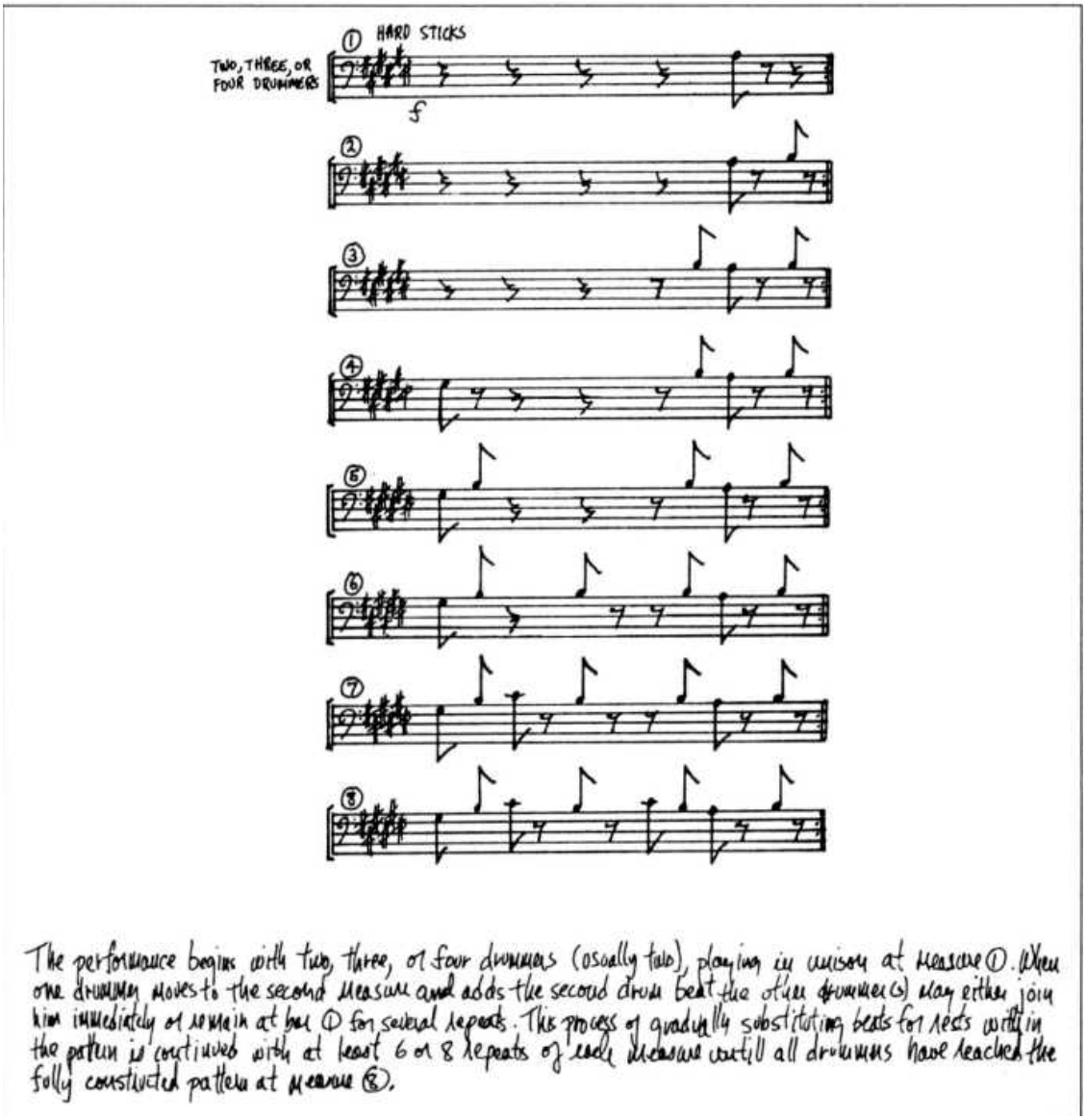
The women's voices sing patterns resulting from the combination of two or more marimbas playing the identical repeating pattern one or more quarter-notes out of phase with each other. By exactly imitating the sound of the instruments, and by gradually fading the patterns in and out, the singers cause them to slowly rise to the surface of the music and then to fade back into it allowing the listener to hear these patterns, along with many others, actually sounding in the instruments.

In the context of my own music, *Drumming* is the final expansion and refinement of the phasing process,2 as well as the first use of four new techniques: (1) the process of gradually substituting beats for rests (or rests for beats); (2) the gradual changing of timbre while rhythm and pitch remain constant; (3) the simultaneous combination of instruments of different timbre; and (4) the use of the human voice to become part of the musical ensemble by imitating the exact sound of the instruments.

The very beginning of *Drumming* starts with two drummers constructing the basic rhythmic pattern of the entire hour and a quarter long piece from a single drum beat, played in a cycle of 12 beats with rests on all the other beats (see ex. 8-1). Gradually, additional drum beats are substituted for rests, one at a time, until the pattern is constructed. The reduction process is simply the reverse, where rests are subsitituted for beats, one at a time, until only a single beat remains (see ex. 8-2).

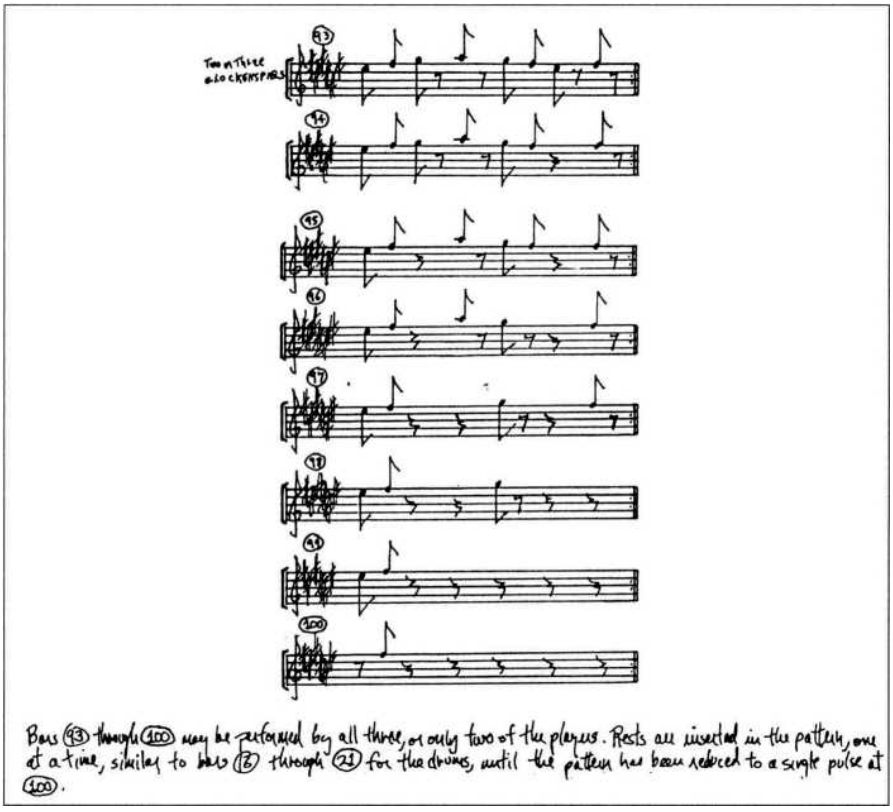
The sections are joined together by the new instruments doubling the exact pattern of the instruments already playing. At the end of the drum section, three drummers play the same pattern two quarter-notes out of phase with each other. Three marimba players enter softly with the same pattern also played two quarter-notes out of phase. The drummers gradually fade out so that the same rhythm and pitches are maintained with a gradual change of timbre. At the end of the marimba section, three marimbas played in their highest range are doubled by three glockenspiels in their lowest range so that the process of maintaining rhythm and pitch while gradually changing timbre is repeated. The sections are not set off

from each other by changes in key, the traditional means of gaining extended length in Western music. *Drumming* shows that it is possible to keep going in the same key for quite a while if there are instead considerable rhythmic developments, together with occasional, but complete, changes of timbre to supply variety.



Example 8-1. *Drumming*. COPYRIGHT © 1973 BY HENDON MUSIC, INC., A BOOSEY & HAWKES COMPANY. REPRINTED BY PERMISSION.

One of the most noticeable aspects of my music has been that it is written for ensembles of two or more identical instruments. Starting with *It's Gonna Rain* for identical tape loops moving out of phase with each other, through the other tape pieces *Come Out* and *Melodica*, and into the instrumental pieces, *Piano Phase* for two pianos, *Violin Phase* for four violins, *Phase Patterns* for four electric organs, and the first three sections of *Drumming*, this was necessary because the phasing process is only clearly audible when the two or more voices moving against each other are identical in timbre, and therefore combine to form one complete resulting pattern in the ear. To play *Piano Phase* on one piano and one harpsichord would just not work, but to play it on two harpsichords might be very interesting. Because of this necessary matching of timbres, a unique body of work has been written for multiples of the same instrument. In the last section of *Drumming*, however, the drums, marimbas, and glockenspiels are combined simultaneously for the first time in my music. All the instruments play the same rhythmic pattern, but the drums play it with one set of notes, the marimbas with a second, and the glockenspiels with a third. When one marimba phases against another, they create an overall marimba pattern that is clearly distinguishable from the drums and glockenspiels. It is a similar situation when one drummer phases against the other drummers, or when one glockenspiel player moves ahead of another. The overall sound, of course, becomes considerably richer.



Example 8-2. *Drumming*.

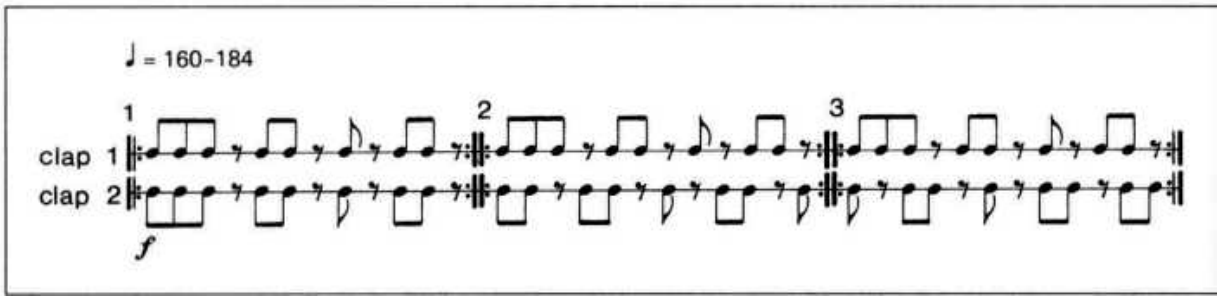
The question often arises as to what influence my visit to Africa in the summer of 1970 had on *Drumming*? The answer is confirmation. It confirmed my intuition that acoustic instruments could be used to produce music that was genuinely richer in sound than that produced with electronic instruments, as well as confirming my natural inclination toward percussion. I chose instruments that are all now commonly available in Western countries, (although the history of bongo drums leads back to Latin America, that of the marimba goes back to Africa, and the glockenspiel ultimately derives from Indonesia), tuned to our own tempered diatonic scale, and used them within the context created by my own previous compositions (fig. 8-1).

CLAPPING MUSIC (1972)

In 1972, I composed *Clapping Music* out of a desire to create a piece of music that would need no instruments at all beyond the human body. At first I thought it would be a phase piece, but this turned out to be rather inappropriate, since it introduces a difficulty in musical process (phasing) that is out of place with such a simple way of producing sound. The solution was to have one performer remain fixed, repeating the same basic pattern throughout, while the second moves abruptly, after a number of repeats, from unison to one beat ahead, and so on, until he is back in unison with the first performer. The basic difference between these sudden changes and the gradual changes of phase in other pieces is that, when phasing, one can hear the same pattern moving away from itself with the downbeats of both parts separating further and further apart, while the sudden changes here create the sensation of a series of variations of two different patterns with their downbeats coinciding. In *Clapping Music*, it can be difficult to hear that the second performer is in fact always playing the same original pattern as the first performer, although starting in different places (see ex. 9-1).

Clapping Music marks the end of my use of the gradual phase shifting process. First discovered in *It's Gonna Rain* in 1965, this process was then used in every piece from 1965 through *Drumming* in 1971, with the exception of *Four Organs*. Starting with *Clapping Music*, I felt a need to find new techniques. *Six Pianos*, *Music for Mallet Instruments*, *Voices and Organ*, and *Music for Pieces of Wood*, all composed in 1973, use the process of rhythmic construction, or substitution of beats for rests, first used in *Drumming*, as well as the process of augmentation similar to that in *Four Organs*.

The gradual phase shifting process was extremely useful from 1965 through 1971, but I do not have thoughts of ever using it again. By late 1972, it was time for something new.



Example 9-1. *Clapping Music*. COPYRIGHT © 1980 BY UNIVERSAL EDITION (LONDON) LTD., LONDON. REPRODUCED BY KIND PERMISSION.

MUSIC FOR 18 MUSICIANS (1976)

> Written as a program note for the first performance at New York Town Hall on April 24, 1976.

Music for 18 Musicians is approximately 55 minutes long. The first sketches were made for it in May 1974 and it was completed in March 1976. Although its steady pulse and rhythmic energy relate to many of my earlier works, its instrumentation, harmony, and structure are new.

As to instrumentation, *Music for 18 Musicians* is new in the number and distribution of instruments: violin, cello, two clarinets doubling bass clarinet, four women's voices, four pianos, three marimbas, two xylophones, and metallophone (vibraphone with no motor). All instruments are acoustical. The use of electronics is limited to microphones for the voices and some of the instruments, in order to obtain a balance in the overall sound.

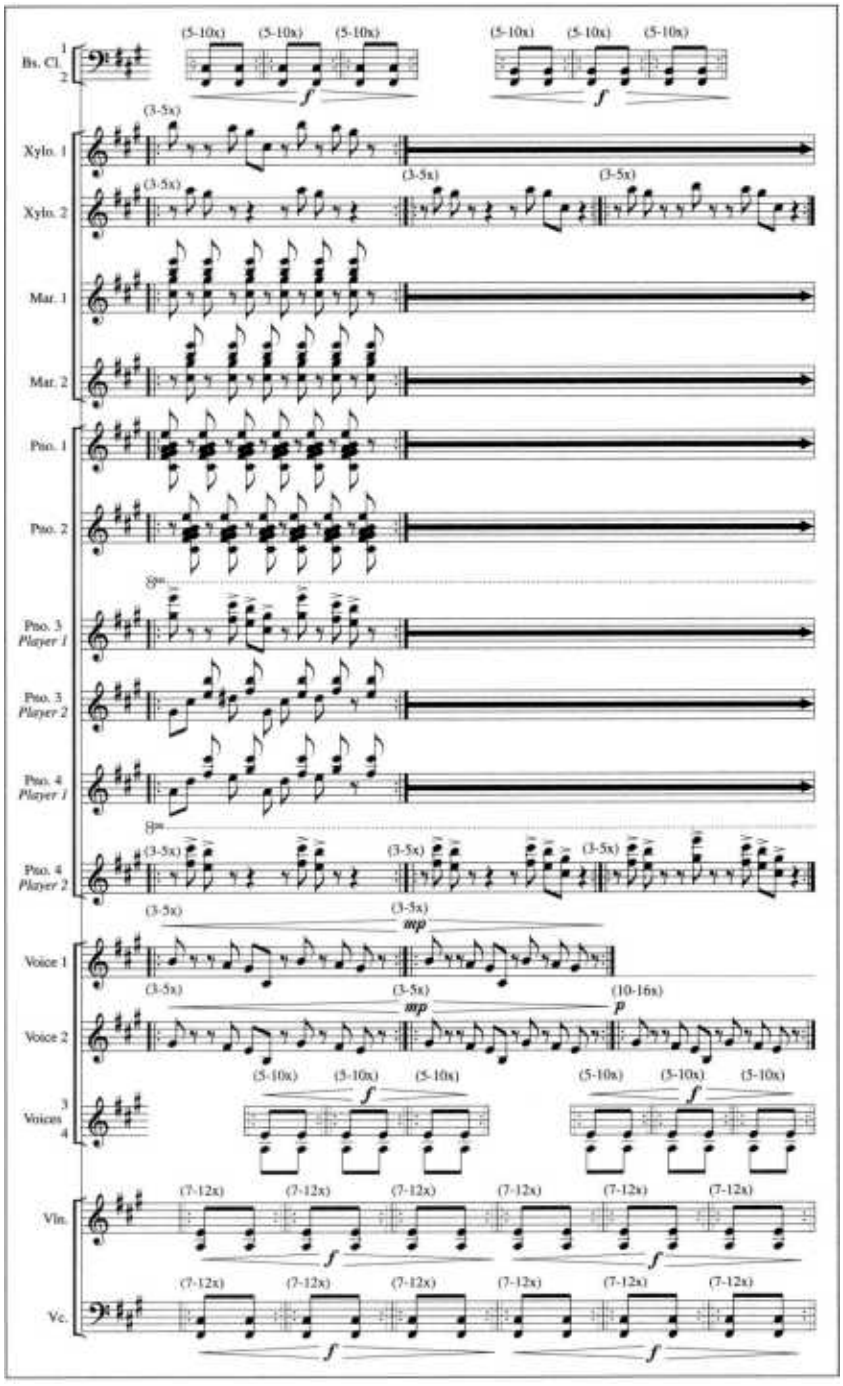
There is more harmonic movement in the first five minutes of *Music for 18 Musicians* than in any other complete work of mine to this date. Although the movement from chord to chord is often just a revoicing, inversion, or relative minor or major of a previous chord, usually staying within the key signature of three sharps at all times, nevertheless, within these limits, harmonic movement plays a more important role here than in any of my earlier pieces.

Rhythmically, there are two basically different kinds of time occurring simultaneously in *Music for 18 Musicians*. The first is that of a regular rhythmic pulse in the pianos and mallet instruments that continues throughout the piece. The second is the rhythm of the human breath in the voices and wind instruments. The entire opening and closing sections plus part of all sections in between contain pulses by the voices and winds. They take a full breath and sing or play pulses of particular notes for as long as their breath will comfortably sustain them. The breath is the measure of the duration of their pulsing. This combination of one

breath after another gradually washing up like waves against the constant rhythm of the pianos and mallet instruments is something I have not heard before and would like to investigate further (see ex. 18-1).1

The structure of *Music for 18 Musicians* is based on a cycle of 11 chords played at the very beginning of the piece and repeated at the end (see ex. 18-2). All the instruments and voices play or sing pulsing notes within each chord. Instruments like the strings that do not have to breathe nevertheless follow the rise and fall of the breath by following the breath patterns of the bass clarinet. Each chord is field for the duration of two breaths, and the next chord is gradually introduced, and so on, until all 11 are played and the ensemble returns to the first chord. This first pulsing chord is then maintained by two pianos and two marimbas. While this pulsing chord is held for about five minutes a small piece is constructed on it. When this piece is completed there is a sudden change to the second chord, and a second small piece or section is constructed. This means that each chord that might have taken 15 or 20 seconds to play in the opening section is then stretched out as the basic pulsing harmony for a five-minute piece, very much as a single note in a cantus firmus or chant melody of a twelfth-century organum by Perotin might be stretched out for several minutes as the harmonic center for a section of the organum. The opening 11-chord cycle of *Music for 18 Musicians* is a kind of pulsing cantus for the entire piece.

On each pulsing chord one or, on the third chord, two small pieces are built. These pieces or sections are basically either in the form of an arch (ABCDCBA), or in the form of a musical process, like that of substituting beats for rests, working itself out from beginning to end.

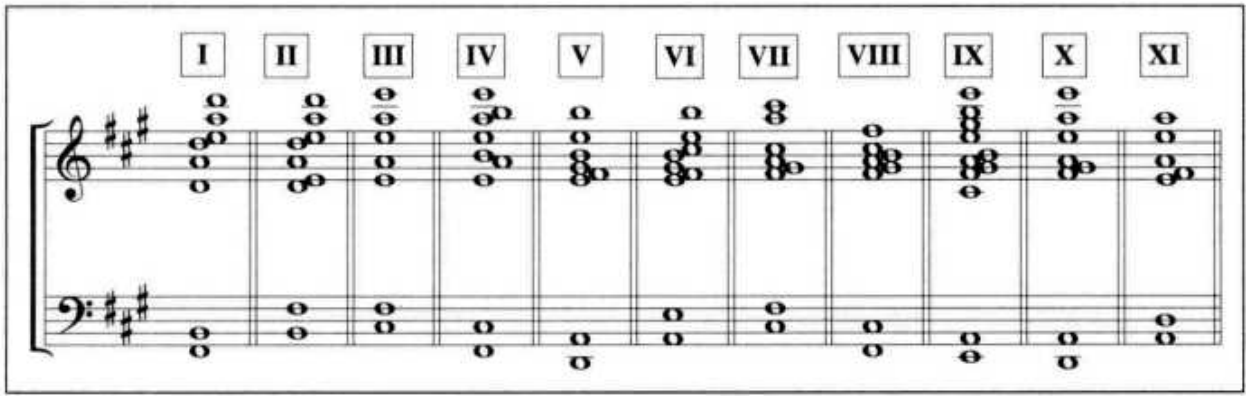


Example 18-1. *Music for 18 Musicians*, mm. 624-25. COPYRIGHT © BY HENDON MUSIC, INC., A BOOSEY & HAWKES COMPANY. REPRINTED BY PERMISSION.

Elements appearing in one section will appear in another but surrounded by different harmony and instrumentation. For instance, the pulse in pianos and marimbas in sections 1 and 2 changes to marimbas and xylophones and two pianos in section 3A, and to

xylophones and maracas in sections 6 and 7. The low piano pulsing harmonies of section 3A reappear in section 6 supporting a different melody played by different instruments. The process of building up a canon, or phase relation, between two xylophones and two pianos, which first occurs in section 2, occurs again in section 9, but building up to another overall pattern in a different harmonic context. The relationship between the different sections is thus best understood in terms of resemblances between members of a family. Certain characteristics will be shared, but others will be unique.2

One of the basic means of change or development in many sections of this piece is to be found in the rhythmic relationship of harmony to melody. Specifically, a melodic pattern may be repeated over and over again, but by introducing a two- or four-chord cadence underneath it, first beginning on one beat of the pattern, and then beginning on a different beat, a sense of changing accent in the melody will be heard. This play of changing harmonic rhythm against constant melodic pattern is one of the basic techniques of this piece, and one that I had never used before. Its effect, by change of accent, is to vary that which is in fact unchanging.



Example 18-2. Music for 18 Musicians, cycle of chords.

Changes from one section to the next, as well as changes within each section, are cued by the metallophone, whose patterns are played once only to call for movements to the next bar-much as in a Balinese Gamelan a drummer will audibly call for changes of pattern, or as the master drummer will call for changes of pattern in West African music. This is in contrast to the visual nods of the head used in earlier pieces of mine to call for changes and in contrast also to the general Western practice of having a nonperforming conductor for large ensembles (fig. 18-1). Audible cues become a part of the music and allow the musicians to keep listening.

PH: How was *Music for 18 Musicians* composed—I think you told me there was a lot of collaboration in putting it together?

SR: It was composed during 1974-75 and at that point there were more regular rehearsals with the ensemble than at any other time. In those days I wasn't commissioned, but there was a clear understanding that there were concerts available. It was first done as a work-in-progress in 1975.

PH: Did the musicians work for free during the rehearsals?

SR: Yes, basically-they were mostly then students—Russ Hartenberger and Bob Becker were studying non-Western music at Wesleyan University [about a two-hour drive north of New York City in Middletown, Connecticut], and I paid the bus fare. I lived across the street from here in a loft and I rented four spinets for the rehearsals, which took place every two to four weeks. I would write a lot in my notebook in shorthand and then transfer it to individual parts for the musicians, just adding occasional notes in the parts. Then there was a lot of discussion in rehearsal: "No, no, you come in here," and the musician would just write it on his part. So this oral tradition grew and the notation shrunk; the parts had everything on them that the musicians needed to play the piece, but no bar numbers common to all players. There are 11 sections with Roman numerals that mark off the sections, but once you're into a section there's no number to call out. We just continued working that way and the piece was going well, and when the piece was done, that's what there was. I started to make a score. I got to section 2 and I began realizing I wasn't even sure how to notate everything, and there were hundreds of pages to go, so I stopped. Basically there were 22 years without a score: between 1976 and 1998, when Marc Mellits finally made the score (in conjunction with me) for Boosey & Hawkes.

-From a discussion with the editor.