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The Percussive Arts Society is a worldwide organization founded in 1961 and incorporated in 1969 as a not-for-profit corporation under the laws of the State of Indiana and the State of Illinois. Its purpose is educational, promoting through its activities a wide range of musical knowledge, encompassing the young percussion student, the teacher and the performer. Its mission is to facilitate communication between all areas of the percussive arts. PAS accomplishes its goals through six annual issues of *Percussive Notes,* its worldwide network of chapters, and its annual International Convention (PASIC). Annual membership begins with the month in which dues are received and applications processed. Eighty percent ($12) of dues are designated for subscription to *Percussive Notes.*

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The PAS NOTATION RESEARCH COMMITTEE, co-chaired by Sylvia Smith and Professor Jean-Charles Francois, requests your help in identifying notation examples in the percussion repertoire that raise interesting issues or present difficult problems for the interpreter-performer. The broadest possible definition of notation should be addressed and repertoire from the orchestral, percussion ensemble, solo, chamber music, jazz, popular, ethnic, and/or aural folk music traditions should be considered.

Please send examples with your particular comments and/or concerns to:
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Back Cover Photo

Diamond Marimba was designed and built by Harry Partch in 1946 at Madison, Wisconsin. The 36 bars are made from Brazilian rosewood and Pernambuco, mounted on thin foam rubber, with a range of three octaves. Photo: Danlee Mitchell selected by Tom Siwe.

An Interview with Morton Feldman

by Jan Williams

JAN WILLIAMS: Morton, since the *The King of Denmark* is undeniably one of the most important pieces for solo percussion, a repertoire piece if you will, how about leading us up to 1964, the date of composition.

MORTON FELDMAN: Well, let's say that everything before 1950 was essentially student pieces and even in those student pieces I didn't hear percussion. I don't remember one of those pieces that used percussion. The first time I used percussion was in one of the first orchestral graph pieces called *Marginal Intersection,* which I wrote in 1951. But here I used the percussion as categories – in a big battery of instruments – those categories were divided into metal, glass, and wooden sounds. It wasn't clear then, and it's not clear now, what really categorized the make-up of all this. I don't think I wanted conventional instruments. Now that I'm reflecting on it after all these years. I'm sure I didn't want conventional instruments. I wanted instruments for those categories that sounded like metal and sounded like glass and wood to the ear. Later on, for example, in *The King,* I would naturally bring in a solo instrument even though it would still be involved with categories. I would use "skin" sounds, but I was using conventional skin instruments in *The King.* I remember bringing in, for the first concert of *Marginal Intersection* at Cooper Union, plastic dishes and those old heavy aluminum pots and pans that I borrowed from

my mother. My models for percussion at that time were from the Gamelon Orchestra, John Cage's early forties pieces, and Varese's work, where the instruments were used en masse, not soloistically. I used that aspect as a model in *Marginal Intersection*, except I remember wanting the percussion to sound more like noise. I used "found objects" for sound sources. *The King* was a very special situation. I actually remember writing *The King* – on the beach on the south shore of Long Island and I wrote it in a few hours, just sitting comfortably on the beach. I wrote the whole piece on the beach. And I can actually conjure up the memory of doing it – that kind of muffled sound of kids in the distance and transistor radios and drifts of conversation from other pockets of inhabitants on blankets, and I remember that it did come into the piece. By that I mean these kinds of wisps. I was very impressed with the wisp, that things don't last, and that became an image of the piece: what was happening around me. To

fortify that, I got the idea of using the fingers and the arms and doing away with all mallets, where sounds are only fleetingly there and disappear and don't last very long. Everybody always asks me about the title, *The King of Denmark,* and the title really came *after* the piece. There was something about the wistfulness of things not lasting, of impermanence, and of being absolutely quiet. How it led to the metaphor, *The King of Denmark,* which is on a much more serious level, I don't know. The King of Denmark, if one will remember, went out into the streets of Copenhagen wearing the star of Israel that the Jews had to wear around their arm and it *was* a silent protest. He just walked around and didn't say anything. How I made the leap from the beach to this other thing I don't know, but there was a very strong connection in my mind at that time.

JW: I met you for the first time, I think, at a concert at Town Hall where Max Neuhaus played *The King of Denmark.* I remember distinctly when I actually met you. It was at the intermission of that concert. Could that have been the first performance? Do you remember?

MF: I don't remember, Jan. I don't remember the first performance. I do remember one or two performances. I remember standing with Lukas Foss in a crowded small hall but I don't know who was playing the percussion. It could very well have been Max. It was around that period. I was standing with Lukas at the back of the hall and, in that I knew the piece, I could hear it. Lukas couldn't hear it. He said it looked very elegant and occasionally he would hear something, but he couldn't hear it. And then I was very concerned about this because, you know, it was considered at the time as an "Emperor's new clothes" piece – do you hear it or don't you hear it? And I asked three friends of mine who were sitting up close at the same concert if they heard the piece, and what was very curious was that the youngest person heard everything. The next one in line, in terms of age, heard just a little bit, and the oldest didn't hear anything. So, there might be a kind of age thing either in concentration or such. People seem to hear it now. The most glamorous performance that was ever given (I don't know if it was Michael Ranta or Max Neuhaus) was at a concert in Venice. Ezra Pound was in the audience and someone told me that they took Ezra Pound and put him on a seat right next to the performer and he *heard* it and liked the piece very much. I love that idea of bringing in this famous poet almost on his deathbed to listen to *The King of Denmark.* But now, everybody plays it – some people play it in a capsule version.

JW: How do you mean, capsule?

MF: Like a pocket *King of Denmark.*

JW: In terms of instruments?

MF: Yes, in terms of instruments.

JW: That's the way I do it.

MF: Yes. I once saw a performance in Berlin – I don't know who played it – but he got hold of every instrument imaginable.

JW: I think over the years people have traditionally done it with large setups. Actually, I didn't do the piece for years and years because of the many terrific performances of the piece by other people, but when I did decide to do it, I decided to do this capsule version – in one sense, as a kind of reaction to the "big band" version.

MF: I once saw someone who cheated a little bit: had some kind of metal things on his finger tips.

JW: It's certainly not necessary. The grid, Morton. You were one of the first to work with that particular type of notation. Would you care to talk a little about how that evolved? After all, you're very important in terms of that type of notation.

MF: I still use a grid. But now the grid encompasses conventional notation. But the initial concept of the grid – Oh, it's like one of those things that you don't know is going to have significance afterwards. I have no idea how it came about. Actually, I was living in the same building as John Cage and he invited me to dinner. And it wasn't ready yet. John was making wild rice the way most people don't know how it should be made. That is, just waiting for boiling water and then putting new boiling water into the rice and then having another pot boiling and then draining the rice, etc., etc., so we were waiting a long time for the wild rice to be ready.

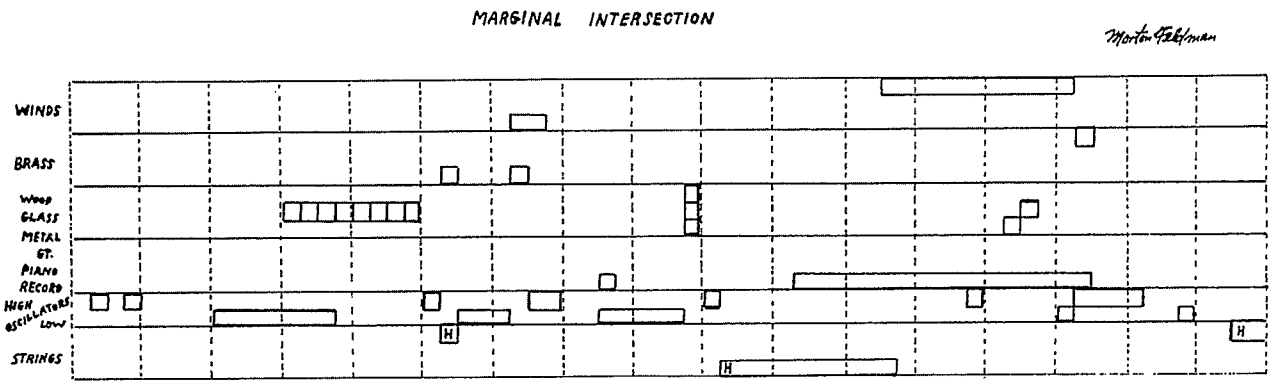
It was while waiting for the wild rice that I just sat down at his desk and picked up a piece of note paper and started to doodle. And what I doodled was a freely drawn page of graph paper – and what emerged were high, middle and low categories. It was just automatic – I never had any conversation about it heretofore, you know – never discussed it.

JW: What was actually the first graph piece?

MF: The first piece was *Projection I for Solo Cello,* which I wrote for the marvelous cellist Seymour Barab. I brought it over and showed him this very primitive notation. It was just again categories of pizzicato sounds, harmonics, and arco and aspects of arco-like ponticello. And then I gave high, middle and low and each box corresponded to a metronome beat. At that time it was 72 which was very slow then. It was endless, the ictus being 72. And then I started to write these pieces. John Cage got every excited, but aesthetically they looked very primitive, as you can see. What John did was to actually sit down for about a week and recopy two scores – two piano *Intersections* and the *Projection for Violin and Piano.* If you look at these scores of mine, you will recognize John Cage's handwriting and the pen he used at that time. And that was how it came about. Actually I didn't have any kind of theory and I had no idea what was going to emerge, but if I wasn't waiting for that wild rice, I wouldn't have had those wild ideas.

JW: So, you still use the grid but it is not overt in its presence.

MF: It's still there. One of the problems that I had with the early grid is that there was a tendency for it to be too design-oriented. It was very easy to make wonderful designs on the page, which I did. But, it was wonderful for percussion. The percussion just made the balance between being specific and, at the same time, to some degree, general. But I'd like to talk a little bit about percussion instruments themselves. I would say that out of all the instruments, it's perhaps the group of instruments that I have to think about most – and I think that many composers might agree with me on this. In other words, there's a relation to one's ideas and a relation to style – however you want to phrase it – composers, you know, know how they want to use the woodwinds, how they want to use strings, but essentially how to use percussion becomes a big problem – there are not that many examples for an elegant – really elegant – use of percussion in an integrated way. In other words, it's not like...it doesn't help a young composer picking up, say, Berio or



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Boulez, looking at how they use percussion because percussion, in a sense, is so idiomatic to their style. It's not like taking a look at a Schoenberg string quartet, at a marvelous page that shows how he uses harmonics, which could be independent of one's style. But it's a kind of skill of the instrument that could be employed for another kind of music. So, that is what usually happens with instruments per se of other composers. You take a look at how Stravinsky would use it and you know it could make a metamorphis. With percussion, it seems to be stuck exactly just in that instrument and how to use it. I recently heard a concert of *Ionization* and the quintuplet on the various drums was just so Varesian – the use of the quintuplet on those drums was just so clean and right that I just can't see them being employed for that particular rhythm and those particular instruments in any other piece except *Ionization*. It establishes its signature in relation to the composer too quickly, to readily. I mean, you don't need Varese. The timpani lick in the *Ninth* is so characteristic of the timpani and of the Beethoven style, you see, that no matter what kind of pitches you want to use, the minute you would have the timpani interject those kinds of periodic moments, it's Beethoven. You see?

JW: Yes, I do – what an interesting idea.

MF: But at the same time, if you really think about Beethoven in relation to any other kind of striking imagery, its hard to really say this is the way to use the violin, or this is the way he uses the flute. So, percussion, in a sense because of these factors, becomes the most derivative aspect of a composer's instrumental usage – one that you really have to watch out for. And then there is another very important fact; when I mentioned the early models of the Gamelon, Varese, and Cage, they were never used cosmetically and they were never used soloistically. They were used as a complete entity or incorporated as an entity with other instruments as Varese does, say, in *Integrals*. So, how do you use percussion instruments so they don't become cliché? A very important problem.

JW: Certainly many composers do have that problem.

MF: Very good composers. There is another problem. Let's not call these problems. Let's just say it seems to be self-evident that percussion instruments are supposed to be used ostensibly for very serious situations but in themselves are not expensively made, you know, like a good violin, or a good piano. Instruments that are made as almost a disposable. I mean, any professional composer knows how difficult it is even in the most professional situations, say, to find a good celeste in a major orchestra. The first notes, the C, D – the first three notes usually don't sound, they're usually broken. They're never kept in tune, they're not considered important to be kept in tune. The percussionists themselves seem not to be that finicky, although I'm sure there are a lot of percussionists who are.

JW: There are a lot who are extremely finicky. But the sheer number of instruments involved sometimes causes a problem in terms of maintenance and development. Also, many of the instruments come from a folk idiom where the instruments themselves are rather primitive to start with.

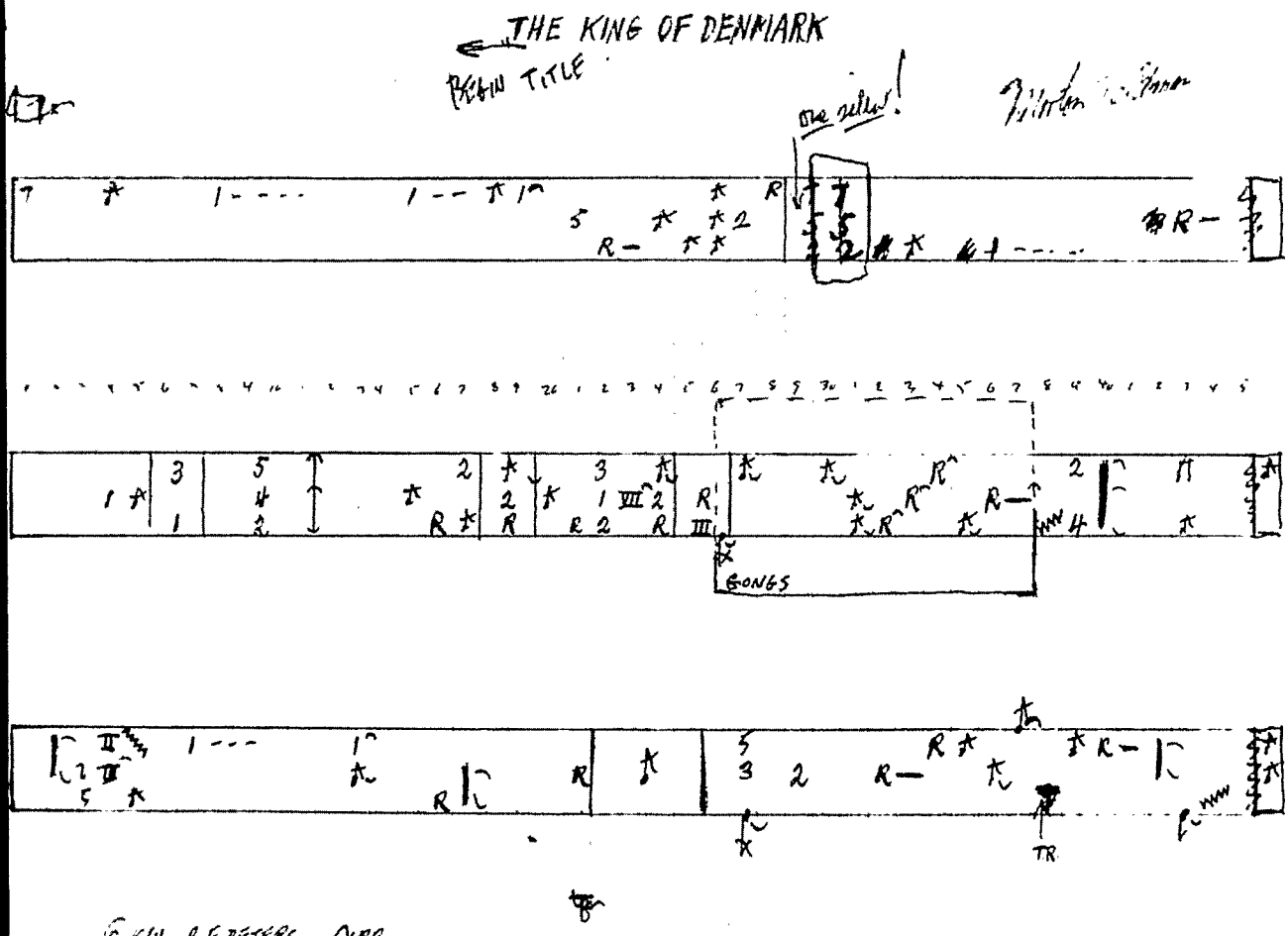
MF: And that's part of their sound and charm.

JW: Exactly.

MF: You wouldn't want that overperfection – it wouldn't make them sound real.

JW: Right.

MF: However, I know that in the work of mine I wrote some years ago for oboe and orchestra in which there are just three percussionists – one's playing a high and one's playing a middle and another is playing a low cymbal, and it is just three cymbals going all the time – the spray. I just know that they did use their best cymbals, they matched them and they discussed them and, when I went to the concert during one of the Holland festivals, I wasn't disappointed. They were just beautiful cymbals. So, percussionists are, by and large, conscientious, but it's very difficult for a performer to understand the style and kind of mallet that sometimes we find, so it's usually just inexperience with a certain type of contemporary music. So, how do you handle instruments that just have inherent problems of not *sounding* expensive? And that whole business of sounding expensive is part of the image of professional music as we know it.



The expensive violin – the expensive bow, you see. Well, my approach to an instrument is finding instruments where terms like "perfection" and "imperfection" of construction are not important. The whole idea of going in tune and out of tune with more precise acoustical instruments is taken into consideration. It was actually with my interest in nomadic oriental rugs that really made me start to use "imperfect" percussion with considerably more security. I'll tell you how. In older oriental rugs the dyes are made in small amounts and so what happens is that there is an imperfection throughout the rug of changing colors of these dyes. Most people feel that they are imperfections. Actually it is the refraction of the light on these small dye batches that makes the rugs wonderful. I interpreted this as going in and out of tune. There is a name for that in rugs – it's called abrash – a change of colors that leads us into pieces like *Instruments III* which was the beginning of my rug idea. I wouldn't say I actually made a literal juxtaposition between rugs and the use of instruments in *Instruments III*, but it made me not worry about it. I like the imperfection and it added to the color. It enriched the

color, this out of tune quality. Just like I like my piano out of tune a little bit. It's warmer. So that was very interesting. It reached its height in *Why Patterns?* where I didn't have to be ashamed to make a "lady," so to speak, out of the glockenspiel. It's the only piece I know of that treats the glockenspiel as a very serious instrument. It was a big psychological decision – it wasn't a choice of a novelty.

JW: Right. I remember you wrestling with that problem – the instrumentation.

MF: Yes, and it's beautiful. It's finding the right kind of language. It's just that you need a lot of imagination, a lot of thought. For example, a very beautiful piece by Bunita Marcus, called *Music for Japan,* in which she uses the xylophone in a very original way, where most composers would have models, you see. Maybe what I'm really talking about in this interview is that we're more dependent on percussion for models than we are on other instruments and that's why so much percussion music is in the realm of cliché. Her piece sounds startling because you don't hear the marimba solo, you don't hear the vibraphone solo, you hear an extended xylophone solo with material that could only be for the xylophone, but there is no model for it, you see. Jo Kondo is another example; he fell madly in love with the cowbells, and uses them very hauntingly and very rightly in his piece which gives the music a lot of distinction. I have no rapport with a cowbell so it's very, very interesting. This leads us back to 1951 and *Marginal Intersection,* though I'm now much more specific for my battery of percussion. But I'm back to using, say, a lot of gongs when I use a gong, a lot of triangles and three glocks. One glock in an orchestra is cosmetic. Three glocks is orchestral. Where a few triangles is nothing, but 15!

JW: I remember a stunning performance in Saarbrücken of *Flute and Orchestra* which used a large group of percussion.

MF: It is now very difficult in an orchestral piece for me to have one cymbal, or just one gong – or even chimes. I find myself using three sets of chimes and it's a very interesting thing. As you use more of these instruments, you begin to see the illusion some people have about percussion speaking in a hall or even in a recording session. I remember somebody in a recording session, putting a mike right in front of a celeste.

JW: For a piece of yours?

MF: Yes. And I said "Why are you doing that?" And he said, "Well, you know it's a soft instrument." We played it back and he heard it's not a soft instrument. On the other hand, three chimes, three sets of chimes playing clusters from that left-handed backstage area still doesn't have the acoustical presence of, say, one flute playing very softly from the woodwinds on the right. It doesn't. So, there's this kind of illusion that because you're striking something, you're going to hear it.

JW: I'm sure everybody would be interested in knowing whether there is another solo percussion piece from Morton Feldman anywhere in the realm of possibility.

MF: I'm glad you asked that question.

JW: And, if so, what kind of piece could it be?

MF: I don't know what a new solo piece could be – I'm very surprised, for example, when in writing a piece like *Flute and Orchestra* I start hearing a few dozen triangles which I never heard before. I'm glad you mentioned it and I'm going to think about it. I think the reason I didn't write one was I was just too busy making a metamorphosis of how percussion is used in a chamber orchestra and then how it's used in an orchestra. I think I'm a very open person, and I would like to get to a point artistically and psychologically where I think I could write a serious piece for triangle and string quartet. That sounds a little bit far out, but why not? Rather than having a thing like *Tubby the Tuba,* which I enjoy and Kleinsinger is a very nice man, there is still this whole idea of *Tubby the Tuba* as opposed to Ludwig the Tuba. Yes, why not a piece for triangle and string quartet? But I'm not at that artistic or psychological freedom yet. I think you have to be open. I'm very convinced now after *Why Patterns?,* which is one of my favorite pieces...

JW: Which is scored for piano, glockenspiel, and the flute family.

MF: Yes, the flute family – one player. It is one

of my favorite pieces and I never dreamt to write one of my most important pieces with that combination. John Cage was with me last month at a festival when he heard it and he really liked it. Harrison Birtwhistle and I had a concert together in Toronto where it was played and Harry was just very surprised that the glock could sound like that and sound serious. That's what they are surprised about, you see. But at the same time – here I'm making the complaint that the instrument is not perfected enough, but, again, if it was perfected, it wouldn't have that kind of sad blending – that kind of sad elegant blending and little bit out of tune, going in to tune and out of tune with the rest of the instruments is again very beautiful.

JW: Was not – and correct me if I'm wrong – *Why Patterns?* one of the first pieces of your current output of rather lengthy pieces?

MF: Not really. I think it's a little over thirty minutes – that's all. No, not *Why Patterns?*

JW: The recent works are, however, much more extended.

MF: I would say the average length is an hour and a half now.

JW: Your recent *Three Voices* is...

MF: An hour and a half. And I'm having a string quartet performed next season on the Toronto New Music series, *String Quartet No. 2,* which I think is about two hours and twenty minutes – easy. I'm giving the maximum on that. It's just an educated guess. Definitely two hours, but it might be longer. I have a whole repeat structure there and because of it, the repeats could add up to about twenty minutes more.

JW: But the overall frame is established early – the overall scope and size of the piece.

MF: Well, I think it's going to be...actually, it's a very interesting type of preparation – you know, it's not like planning a trip across the Atlantic and I know I have to take certain types of supplies and the boat has to be seaworthy. It's not a perilous journey; the journey just depends on my own stamina. That's the only thing I have to bring to a long piece. And also the psychological – and it *is* more psychological than anything else – the psychological conditioning to keep it going as long as I feel it must go, but also to stop when I feel it's time. In other words, I need just as much guts to stop at twenty-five minutes as I do to keep it going for two hours and twenty-five minutes. So, I'm open to the possibility of stopping where I might have miscalculated. I don't know how much percussion I could hear for two hours and twenty-five minutes, but I wonder what the perception of percussion would be hearing it for a longer period of time than we are used to.

JW: Good question.

MF: A question like that is really answered to some degree with composers like Alvin Lucier – you know that piece of his, I think, for the very similar timpani? I think they are timpani or bass drums.

JW: Bass drums with ping pong balls bouncing against the heads?

MF: Yes.

JW: Activated by very low modulated audio frequencies.

MF: Yes, in a piece like that it is actually very interesting – I was facinated in terms of perception. It was very, very interesting for me.

JW: My orientation as a performer has always been towards repertoire building. Having been encouraged by my teacher, Paul Price, that's been my kind of involvement ever since college. The encouragement – active encouragement of composers to produce pieces for solo percussion or percussion in the chamber music setting. There's been a tremendous amount of activity in the past nineteen years, since *The King of Denmark,* and I'm wondering as a performer to what degree this kind of attitude is still necessary, to what degree percussionists should continue giving the benefit of the doubt to the composer – the young composer, particularly. I'm wondering if we might not perhaps be at a point now where we should be more selective and a bit tougher on composers. You're an active teacher. How do you react to this dilemma of the percussionist-performer?

MF: Well, let's talk about what's available, and then, out of what's available, what seems to be

happening. I think that since Varese we have developed various schools of percussion usage. There's the Varese-Cage school – we could lump them somewhat together – which seems to walk a very precarious tightrope between sound and noise. There's the European school that has a very big parameter, using *Zyklus* as a model – a kind of hard edge to a kind of Boulezian soft edge. And then I feel that the Japanese school of percussion – I don't think they ever knew they had a school of percussion – has something to do with (especially in the case of Takemitzu) nature and how percussion instruments were very useful metaphors of nature. If not nature, Jo Kondo's evocative cowbells, then just as an image as he does so beautifully in *Under the Umbrella*, which I think is going to be another kind of classic as the years go by. Now, if you go to a concert of, say, the various percussion groups, they would seem to juxtapose all these groups just in an improvisational way.

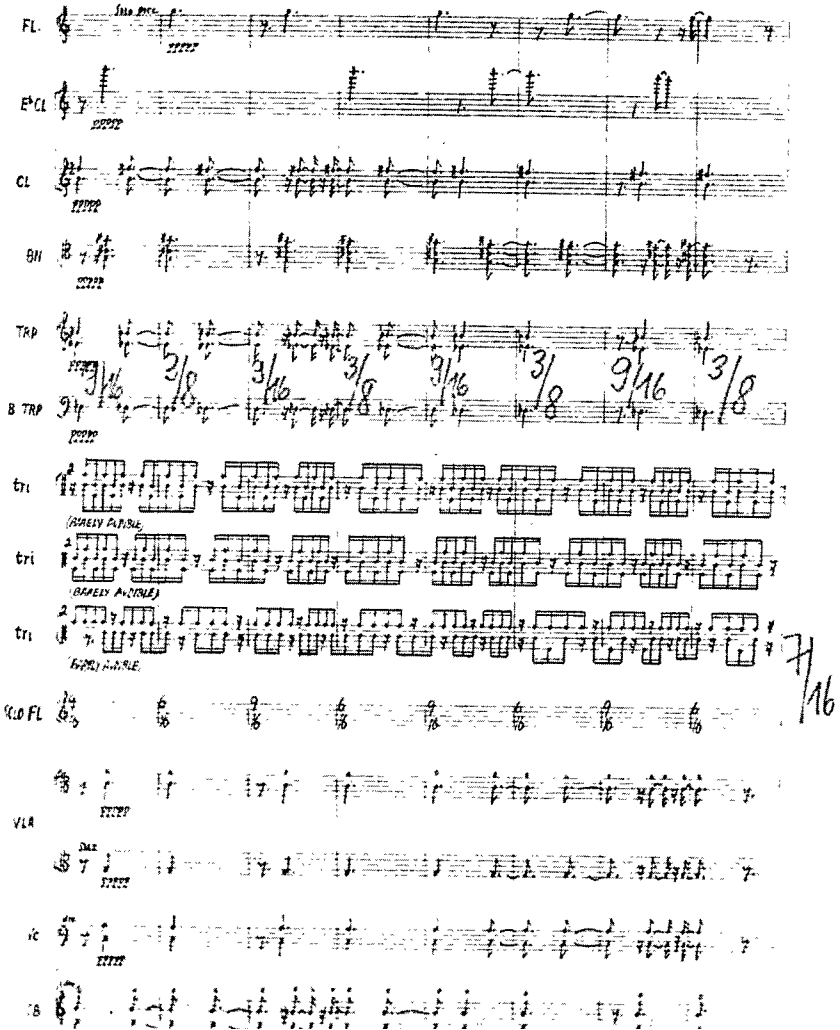
JW: In terms of the way they put programs together?

MF: Yes, in those terms.

JW: That certainly is the case very many times.

MF: It's interesting that the famous pieces of Varese, or other prototypes – there are not that many of them, whether it's *Ionization* or *The King of Denmark* or Cage's *Construction in Metal* – are one-of-a-kind pieces. Really, how many times are you going to write a piece with just cowbells? How many times am I going to

Feldman – Flute and Orchestra

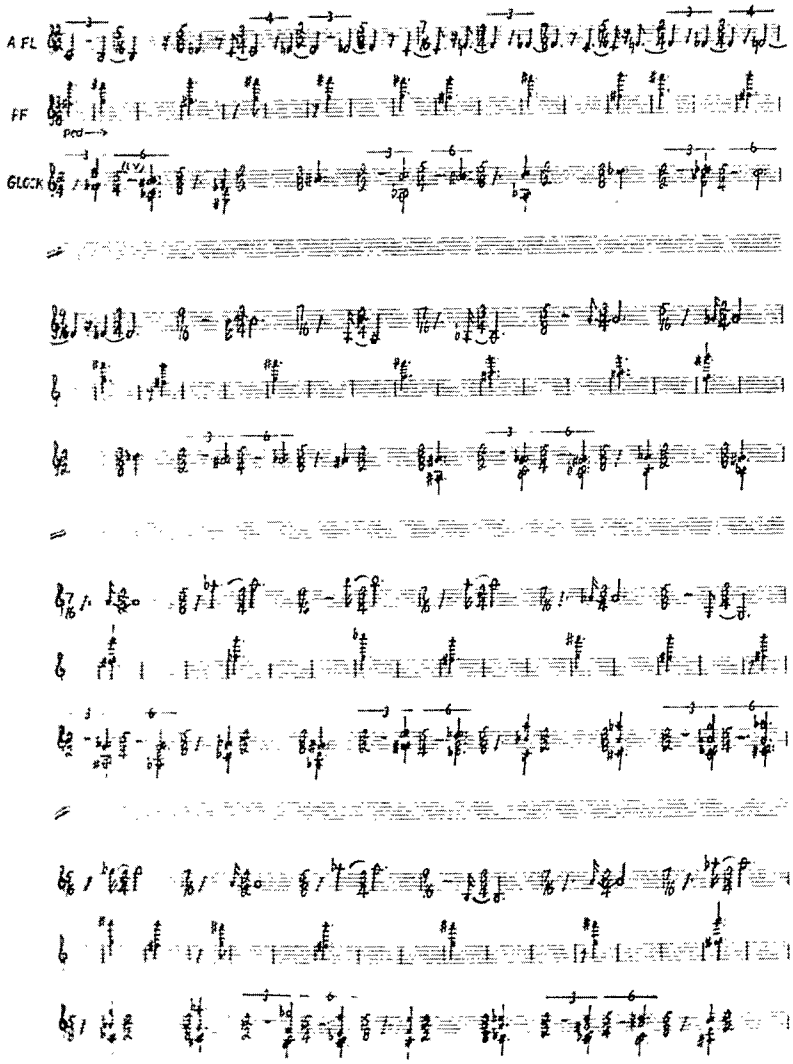


write another *Why Patterns?* with glockenspiel? So, maybe the clue to future percussion repertoire is a whole series of one-of-a-kind pieces. There's nothing wrong with it. I'm not that nuts about Elliott Carter's pieces that he wrote for you – the timpani pieces – but they're landmark ideas of actually listening to the timpani, of constructing it and structuring it over a period of time into a piece. In a sense, that's its importance. But a composer like Carter who is essentially not dramatic – you know the whole idea that he could have done that was a very interesting idea, being that the timpani have so many dramatic connotations.

JW: Right, I'd never quite thought about those pieces in that context.

MF: So, there it is – these are all one-of-a-kind pieces. In other words, the professional percussion composer has not written significant percussion pieces. They've written very idiomatic pieces. So, just as I'm loosely thinking and talking about it with you, Jan, it seems to me that the most important pieces are just the one-of-a-kind pieces. And maybe that's the nature of the "percussion" sound. I mean the sound itself of percussion doesn't seem to lend itself to the definitive prototype. In other words, if we use this, if we use that, we can make it viable, you see. Then, we have the whole problem of pitch percussion against non-pitch percussion. Making too much of a hierarchial situation out of either one or the other. That's one of the problems that

Feldman – Why Patterns?



I have about mixing, where I don't want my percussion to become absolutely "background" if it's non-pitched, and "foreground" if it is pitched. It's one of the big problems that I have in getting my instrumental balance of percussion instruments together when I start a piece.

JW: Certainly *Instruments III*, with the combination of glockenspiel, three cymbals and triangle presents a pretty formidable problem, one which you handled in a very elegant and beautiful way. It's not technically easy.

MF: But, even there, the pitch identification in the glockenspiel is not that clear. And to use that as an idea was very important, to use the other triangles, and even the cymbals, became a very interesting problem of orchestrating all these instruments together. And that's another aspect – the word "orchestrating." To what degree can percussion instruments be orchestrated? You see, it's also a very different kind of special problem, as opposed to, say, a piano piece.

JW: Yes, quite simply in terms of quantity of instruments and timbres available, this is certainly the case. But, the ambiguous nature of many of the sounds and the unpredictable qualities which vary so greatly from instrument to instrument create special problems.

MF: It's an interesting philosophy – that is, that maybe we should look for percussion's potential in those areas we originally thought of as being weak.

JW: Are you saying to look at those areas of percussion which are not naturally strong or most successful?

MF: Yes.

JW: Things like what: Legato?

MF: No, just certain instruments themselves. I mean like Jo Kondo's cowbells, you see. Or, for example, in *The King* – if you want to tie it up to *The King*. What's interesting about *The King* is that percussion was always used in the sense that what was exciting about percussion was a kind of fantastic availability of all these different kinds of attacks – and here, I take out the aspect of attack. What did I do by using the fingers in *The King*? What happened? I took out what was considered its strongest aspect. See what I mean?

JW: Yes, the tactile quality of the piece makes it very special – the fact that there are no mallets gives it a whole different feel – no pun intended. After all, a Western trained percussionist in the Sixties does not necessarily have this kind of playing in his repertoire of techniques. That is, playing with one's fingers. And then to take a diverse mixture of instruments as in *The King* and try to get that uniformity which you ask for.

MF: Yes, so just to re-articulate what we have been talking about, to use these Western instruments in the way that would have been considered the least area for "success" was the success of *The King of Denmark*. And when I am thinking about percussion – in fact, you're making me think about percussion and I'm glad we've had this conversation – I hope that maybe I would think about how paradoxically I could find a historical weak spot which is also its strength. That's what I really mean. You can't do that with any other instrument. You have to rediscover. You have to make different models for percussion. Back to earlier things in the conversation: I can't repeat it enough – to try and get away from the model in percussion. I remember when I was in your studio and I was composing *Instruments III* and you were playing certain things for me, and I noticed that just the time element – I drifted for, say, two or three minutes very naturally without any impatience, where that time would be very, very long indeed if it was just an instrumental drone going on. But the whole sense of time was different. You don't have the historical implication of harmonic rhythm or atonal rhythm and you are in another kind of time world there and that kind of time world is very, very interesting for me, especially now since I'm writing very long pieces. So maybe I will write a piece that is very long using that aspect. Or, just thinking in terms of time, and what the instrument could do in the world of time that acoustical instruments don't choose to do. Well, we'll see about that. But I want to certainly try and write an extended percussion piece.

The Shape of Sound: Music for Pure Waves, Bass Drums and Acoustic Pendulums *by Alvin Lucier*

Thomas DeLio is a composer and theorist and is currently on the faculty of the Music Department of the University of Maryland at College Park. His works are published by Dorn Publications and recorded on the Spectrum label. For the past four years, he has been working on a series of live electronic sound installations, the latest of which was performed at the Corcoran Gallery, Washington, D.C. His theoretical writings have appeared in The Musical Quarterly, The Journal of Music Theory, Perspectives of New Music, Interface, The Indiana Theory Review, Artforum, Winds Quarterly. *He is co-founder and editor of* Sonus, *a journal of music research. In addition, he is currently working on his second book, entitled* Circumscribing the Open Universe, *a collection of essays on contemporary American music.*

...that which exists through itself is called meaning.

– Charles Olson, *Casual Mythology*[1]

In the introduction to his masterpiece, *Paterson*, William Carlos Williams identified one of the central issues addressed by the avant-garde of the 20th century: "...no ideas but in things."[2] With this objectivist maxim, Williams helped set in motion a line of inquiry which has dominated the most progressive developments in literature, the visual arts and music thus far in the second half of the 20th century. In turn, this inquiry has led to a major re-evaluation of the nature of human discourse and the forms through which this discourse becomes manifest as art.

Within this body of work, the music of Alvin Lucier holds a crucial position. Continuing the pathbreaking explorations of such innovators as John Cage and Morton Feldman, Lucier became one of the first American composers to eschew all gestural aspects of traditional composition and to replace them with the pure physical presence of sound. Rather than use sound material to be shaped into some personal utterance, he presents sound in as tactile a physical manifestation as possible. The result is an art which re-creates the very conditions of reality itself.

Clearly, the notion that an artwork need not necessarily evolve from any purposeful shaping or making process has its roots in the seminal

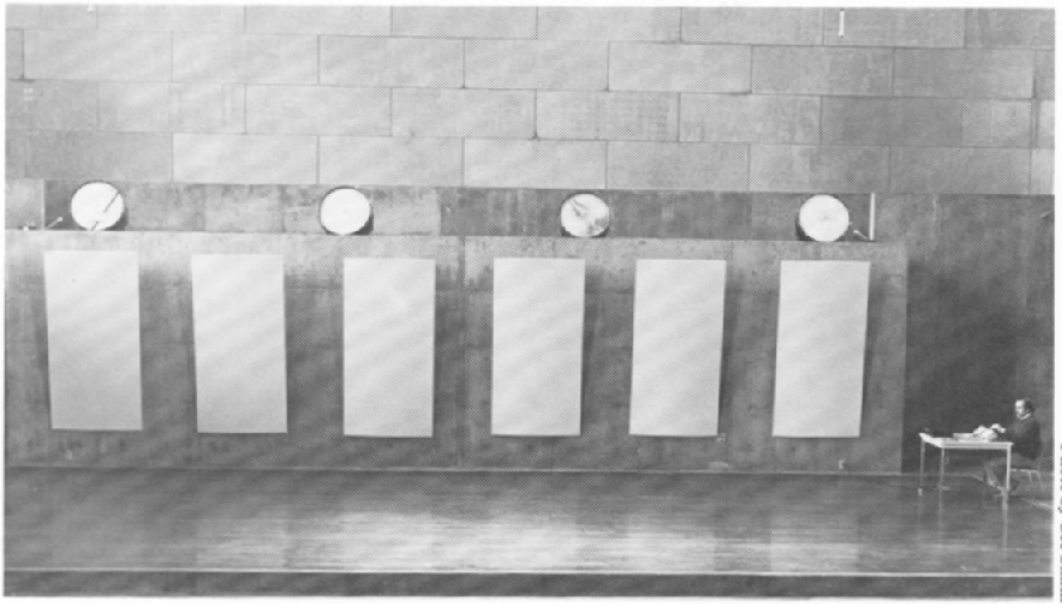


Photo by Gee Smith

works of John Cage. Cage was one of the first musicians to recognize that the purpose of art need not be the expression of its creator's personal definition of reality. Rather, Cage came to realize that art may be used to acknowledge the presence of things – the factness of life – and through this primal act to determine the very meaning of consciousness. His extensive use of chance techniques engendered structures which neither organized sound for some expressive/dramatic purpose nor fashioned it into abstract designs. Instead, Cage simply chose to present sound and, in so doing, forced the listener to become more conscious of its existence and meaning within the horizon of the physical world.

Throughout the '60s and '70s this same concern was, in one way or another, beginning to dominate the work of almost all progressive American artists, writers and composers. In reference to his early minimal paintings, for instance, the visual artist Robert Irwin once remarked: "The thing to realize was that the reduction [involved in these paintings] was a reduction of imagery to get at physicality, *a reduction of metaphor to get at presence.*"[3] For Irwin, the goal was to expurgate all *metaphors* of presence from the experience of art and replace them with a conscious awareness of perception. In the best experience of this art, the perceiver is located at the very moment his own perceptions become manifest to himself – at the very brink of his first contact with the world. This, in turn, leads to a re-evaluation of the role of the perceiver in the experience of the artwork as it forces a heightened awareness of the act of perception: "Allowing people to perceive their perceptions...to make people conscious of their consciousness."[4]

In Lucier's case, the desire to project sound as pure physical essence seems to have arisen in reaction to certain concepts of gesture and design which had dominated western art through the first half of the twentieth century. With remarkable clarity, the composer himself pinpoints the very moment in his career when this new approach to composition began to emerge. Upon leaving college in 1960, Lucier went to Italy on a Fulbright scholarship:

"My first project in Europe was to be a sonata for small trumpet and harpsichord...My intention was to write a set of variations on a theme of Monteverdi. For some time I had been attracted to the charming echo-duets between pairs of

oboes and violins which appear in the Deposuit *of the* Magnificat *of the* Vespers of 1610, *and I planned to base my sonata on this material. Perhaps it was that the disparity between the blown and plucked sounds of the trumpet and harpsichord...made the illusion of echoes impossible...but my enthusiasm for the project soon sputtered and I stopped working."*[5]

Sometime later, in one of the first works of his mature style – significantly, a work entitled *Vespers* – actual sonic echoes were used by performers to aid them in moving about a room or concert hall. With the help of special equipment, the performers were able to locate themselves in physical space using processes of echo-location not unlike those of bats or other nocturnal creatures.

"It wasn't until several years later that it struck me that this work was the finished version of the little trumpet sonata that I had begun and abandoned in Venice years before. The title should have told me sooner. Now, however, the echoes are real, not symbolic. They exist in physical space; they don't have to stand for anything else."[6]

This attitude toward composition is expressed quite brilliantly in the recent *Music for Pure Waves, Bass Drums and Acoustic Pendulums* (1980). To date, this is only one of two works which may be considered "percussion pieces" (the other being the early *Music for Solo Performer* [1968]), though it must be said that this very notion of categorization by ensemble is one of the conceits of traditional composition and performance practice which Lucier's music has always defied.

The score of *Pendulums* is reprinted in its entirety in the appendix. In addition, the composer has provided the following concise description:

"Loudspeakers, from which emanate a slowly rising pure tone, are positioned directly behind four bass drums. A ping-pong ball is suspended in front of each drum. As the pure

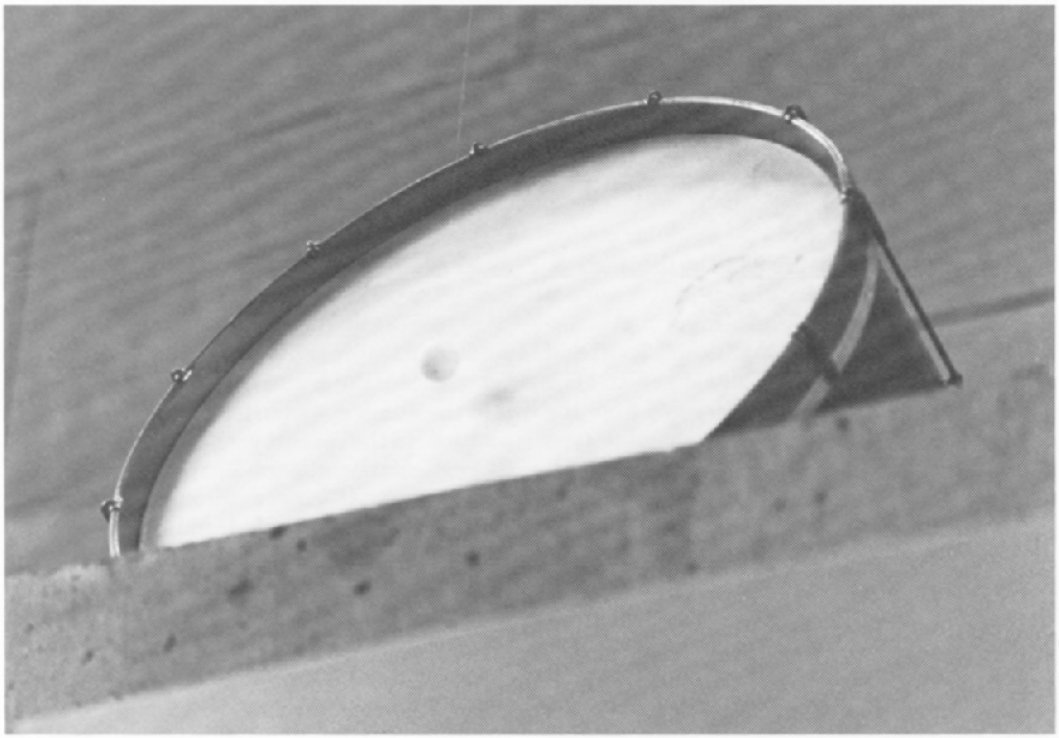


Photo by Gee Smith

sounds flow through the drumheads, causing them to vibrate, the balls bounce against the heads in ever-changing rhythmic patterns, determined by the pitches and volumes of the waves and the resonant characteristics of the drums. As the waves pass through the drums' resonant regions, the heads vibrate more violently, causing the balls to bounce farther away, sometimes up to a length of two feet. If, at the moment a ball returns to a drumhead, the head itself is on an outward phase of its vibratory cycle, the ball is again bounced outward and the size of the pendular swing is maintained or even increased. If, however, the ball meets the head on an inward or negative phase, the motion is dampened and the ball may be stopped dead."[7]

The work actually exists in two different versions, one for a traditional concert performance and the other as an installation in a museum or gallery space. The concert performance involves all four bass drums. Over a period of approximately fifteen minutes, one sine tone rises very slowly creating the sonic experience described above. The installation is, of necessity, somewhat more static. One to four bass drums may be used. The oscillator is tuned to one pitch common to the resonant frequencies of all the drums employed. Variation in the sonic result arises as changes in environmental conditions (temperature, humidity, etc.) alter the tensions of the drumheads. These changes, in turn, affect the speed of that pendular motion and the tapping sounds produced by that motion.

Central to any understanding of this work is the recognition that its form is identified exclusively with the isolation and magnification of one particular acoustical phenomenon. The unique form of *Pendulums* is derived from the internal structure of one specific sound or type of sound – in this instance, that of the sine tone. Thus, it is a form which involves neither development nor evolution but, instead, focuses upon phenomenon.

The idea of rendering sound "visible" is not one that is new to Lucier's work. In several pieces which precede *Pendulums* – *The Queen of the South* (1972), *Tyndall Orchestrations* (1977), *Ghosts* (1978), *Directions of Sounds from the Bridge* (1978), *Shapes of the Sounds from the Board* (1979-80) – he had already addressed this issue. In the first two, sound waves cause momentary, visible alterations in the shape of the various physical materials toward which they are directed. In *Ghosts*, "one performer, carrying a sound-sensitive light, searches through a pure sound wave environment for bumps of sound caused by imperfections (reflections, absorptions, etc.) in the environment, which cause the light to turn on."[8] This procedure of using sound waves to trigger lighting devices is also employed – though in somewhat different ways – in *Directions* and *Shapes* where the directional characteristics of sonic phenomena are delineated for the eye, as well as the ear.

In *Pendulums*, however, sound is made visible in a manner quite different from each of the above. The invisible waves of air pressure produced by the sine tones are "translated" into the visible movement of the ball. As the pendulum swings back and forth, it traces the vibrations emanating from the loudspeaker. Its rocking motion creates a visual correlate to the cyclic structure of the pure wave.

In addition, another kind of synesthesia is effected – this time within the world of sound itself. The sound of the sine tone is "translated" into the tapping produced by the ball striking the drumhead. Changes in the frequency of the pure tone produce changes in both the speed and volume of the tapping sound. Thus the original sound wave is rendered in two startling new ways – one sonic, the other visual.

Significantly, not only is the sine tone articulated in this manner, but also the sonic characteristics of the drums themselves are brought into the audible/visible framework of the composition. In the concert version of the work, this is particularly apparent. As the sine tone slowly rises, it passes through the various resonant regions of each drum. When this happens, it produces a rather dramatic change in the motion of the pendulums. Since, in this version, all four drums are to be used, no two of which will be identical with respect to their constituent resonance characteristics, the sonic result will consist of four distinct, though variable, rhythmic structures. In general,

then, irregularities among the four pendular motions will be the direct result of differences among the four drums.

In addition, the composer creates a visual and sonic enlargement of the sound system itself. The oscillator produces sound by creating vibrations in the speaker cone. These are translated into the larger vibrations of the drum skin, which are, in turn, translated into the most visible and, in a sense, most audible manifestations of the original vibrations – those of the bouncing ball striking the drumhead. Thus, in the perceiver's mind, sound becomes inextricably linked to its mode of production as the sound system itself is brought into the structure of the composition.

Clearly, in this work, the composer is concerned with neither the creation of some new sound structure nor the transformation of sonic materials. Rather, his goal is to project sound in such a way that the listener becomes intensely aware of the nature of the phenomenon he is perceiving. In this music, sound exists not as the means to some "formal" or "expressive" end but, rather, as an end in itself. It is an art of pure presence, devoid of all vestige of personal metaphor, an art in which sound is the object of perception but never the subject of discourse.

This change of focus forces the perceiver toward a more profound re-evaluation of his own position vis-a-vis the artwork. Through the dual synesthesia identified above, the sonic object is magnified until the listener is made conscious of its presence to him and, simultaneously, his own presence to it. The experience is circular. As the listener becomes conscious of the object of his perceptions, he also becomes aware of the act of perceiving and, finally, of himself as the perceiving being. Perception, then, becomes the ground for cognition and the source for all consicousness of presence, both of the object and the perceiver. Thus, while experiencing the work, the listener becomes aware of himself making that transcendent leap from perception to cognition – an awareness of presence. In this sense, Lucier's art may be seen as the culmination of a post-Cartesian dialectic in which perception is seen, not as the product of the thinking mind but as the source of all thought.

As with many of this composer's works, in *Music for Pure Waves, Bass Drums and Acoustic Pendulums*, the medium becomes the ground for experience. Materials are never used to fabricate dramatic scenarios nor to express abstract relational orders.

Instead, they are made present to the listener in some heightened way. In Lucier's work, the process of composition becomes a process of "presencing" through which the listener himself rises to the forefront of the aesthetic experience. His perceptions become the art – an art which seeks not to share a personal vision but, instead, leads the perceiver to recognize that the only basis for a communality of experience lies in the sheer individuality of each perception.

What is revealed through this music is the fact that an art's most vital function is to recreate the condition of being – not the experiences of one's life but that perpetual state of transcendence which is the very substance of life. "Art has no object but is an object through which realization occurs..."[9] The triumph of a work such as *Pendulums* lies in the simple, yet elegant, way it leads each listener to an awareness of those variable conditions of perception which enable him to appropriate the phenomena of the world as meaningful for himself.

"No ideas but in things."[10]

Appendix

MUSIC FOR PURE WAVES, BASS DRUMS AND ACOUSTIC PENDULUMS

for one player with electronics and percussion

Introduction

Electronically-generated sound waves excite the heads of large bass drums, setting into motion ultra-light pendulums which are suspended in front of the drums. The rhythms created as the tips of the pendulums strike the heads of the

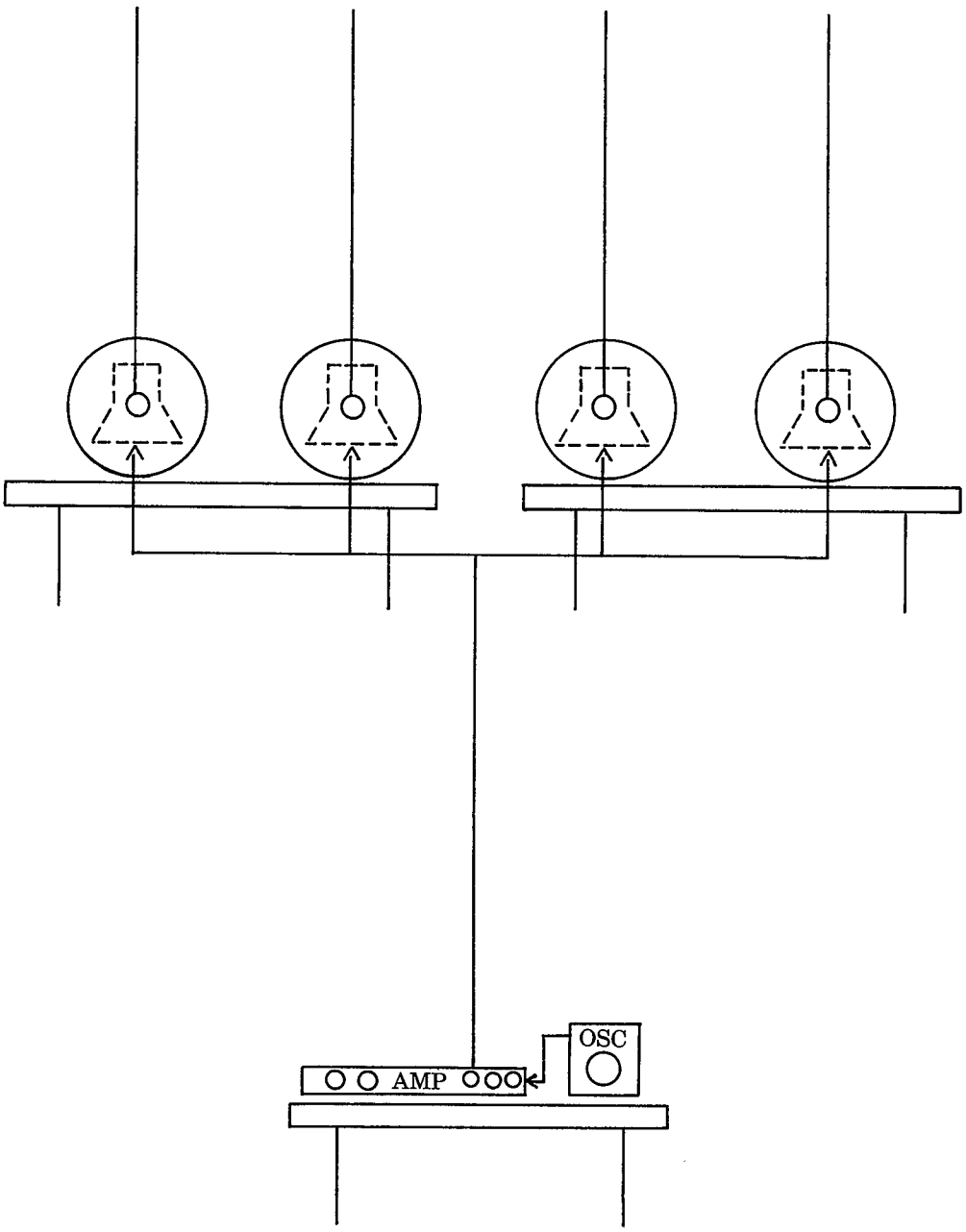


Figure 1
Setup

drums are determined by the pitch and loudness of the waves, the lengths of the pendulums and the resonant characteristics of the drums themselves.

Equipment

4 large bass drums, all the same size
4 matched loudspeakers, small enough for each to stand unseen behind a drum
1 sine wave oscillator
1 quadraphonic amplifier or equivalent amplifiers with 4 loudspeaker terminals
4 ping-pong balls
1 spool of 2 or 4 lb. test monofilament fishing line
2 8-foot tables, if necessary
1 small table

Setup

Place the drums side by side, their heads facing the audience. Elevate them on tables, if necessary, for unobstructed viewing.

Make 4 acoustic pendulums by gluing a long length of monofilament line to each ping-pong ball. Hang each ball from the ceiling in front of a drum. Raise the rim of each drum by inserting books, paper, foam or other non-resonant material between it and the table top, so that the balls rest firmly against the drumheads. Center each ball exactly in the middle of its drumhead.

Position a loudspeaker directly behind each drum. Set the oscillator and amplifiers on the small table in the middle of the room. Wire the amplifiers to the loudspeakers. Plug the oscillator into the amplifiers, routing its signal equally to all 4 loudspeakers (see Figure 1).

Switch the oscillator frequency range to F x 1, or equivalent. Find and preset the lowest frequency to which the loudspeakers respond. Lower all volume levels to Zero.

Performance

Sit at the electronics table, facing the array of drums. Slowly raise volume levels to a point at which one or more pendulums starts oscillating. Throughout the performance, manually rotate the frequency tuning dial of the oscillator in one upward sweep, causing sine waves at all frequencies within that sweep to flow through the loudspeakers, exciting the drumheads accordingly. As the heads vibrate more or less actively in response to various frequencies, the pendulums are driven away from the heads at various distances, creating continually-changing rhythmic patterns.

Sweep with microscopic slowness so as to not miss any possible pattern and with *continuous motion* so as to make an accurate mapping in time of all resonant, sympathetic, pendular, sonic, and visible phenomena.

Keep volume levels as low as possible, while still maintaining effective pendular motion.

A performance is over when a frequency region is reached in which the drums no longer respond. As that situation becomes clear, lower all volume levels to Zero. An average performance time is about 15 minutes (see Figure 2).

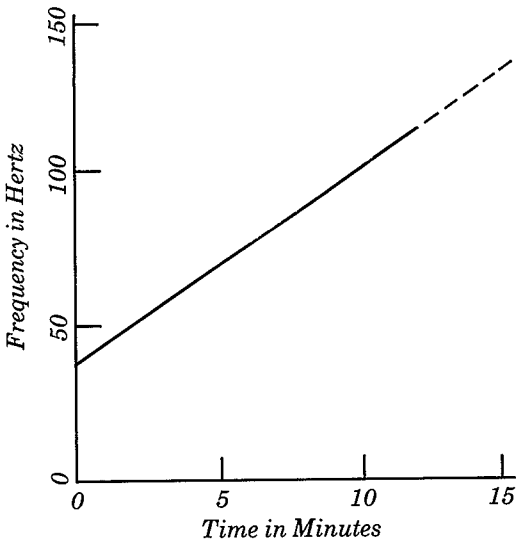


Figure 2
Sine Sweep

Installation Version

Set up from 1 to 4 drums, pendulums, and loudspeakers in the manner described above. Position the oscillator and amplifiers, however, out of view of visitors.

Tune the oscillator to a resonant frequency common to all the drums. Then, for the duration of the installation, let changes in tempera-

ture, humidity, and other environmental conditions alter the tensions of the drumheads, thereby varying the pendular motion and its resulting sonic and rhythmic manifestations.

References

1) Charles Olson, *Casual Mythology*, (The Four Seasons Foundation, San Francisco, 1969), p. 2.
2) William Carlos Williams, *Paterson*, (New Directions Paperbooks, 1963), p. ii.
3) Lawrence Weschler, *Seeing is Forgetting the Name of the Thing One Sees*, (University of California Press, Berkeley, 1982), p. 200.
4) *Ibid.*, p. 127.
5) Alvin Lucier, "The Tools of My Trade," (*Sonus*, Vol. 2, No. 1), p. 13.
6) *Ibid.*, p. 15.
7) *Ibid.*, p. 18.
8) *Ibid.*, p. 18.
9) Cid Corman, "Staying With It," (*The Act of Poetry and Two Other Essays*, Sparrow 44, Black Sparrow Press, Santa Barbara, 1976), p. 3.
10) Williams, *Op. Cit.*, p. ii.

Standard Performance Practice, Soundsculpture, and Scrapercussion

Dan Senn is lecturer in electronic music and director of the electronic music studios at the Canberra School of Music, Australia. Since taking up his present position in 1980, his work has focused on using microcomputers as a compositional aid and, more recently, as a device for controlling a specially designed analog synthesizer. Over the years he has also been involved in building and performing "scrapercussion" soundsculptures and in applying low-technology electronics to these in ways that explore performer-observer-composer relationship. As a teacher at the school of music, he has designed a four-year electronic music curriculum that emphasizes "new music survival" via the performance and production of student works and concerts by students. As studio director, he has designed a suite of modular studios which reflect the historical development of electronic music as well as a balanced and thorough approach to electronic music education.

The driving influence in my music over the last eight years has been the need to circumvent standard performance practice: to keep listeners and performers from glossing[1] at any cost, and to rid my pieces of clichés or, if I choose to use clichés, to use them grotesquely as a means of learning more about them. In this article, I will describe some of the methods I have used to achieve these objectives within the context of my scrap percussion and soundsculpture music. In general, these methods would include: using non-musicians as musicians; interrupting normal channels of feedback between performers; using indirect and unconventional methods of communicating with performers; distorting the physical performance environment; interfering with the traditional audience/performer relationship; and avoiding kit-building[2] and the adulation of craft over content.

My composition *Stak Raku* was written in 1977 at the University of Illinois and is for four-channel tape, scrap percussion instruments and four tap-dancing/acting/percussionists. Nearly all the methods mentioned for avoiding standard performance practice, and high-gloss everything else, were employed in this piece. As illustrated in Figure 1, the traditional performance environment was changed by "breaking" the proscenium stage into four platforms, as given in Figure 2, that were located over the seating area. Beneath these platforms (Figure 3), four scrap instruments were suspended from circular steel plates using ¼ inch steel rods.

When the plate on the platform was struck by the toe or heel of a tap dancer, the sound of the suspended instrument was picked up by a contact mic and amplified by a speaker at the perimeter of the seating area.

The frequency with which the plates were struck by the tap dancers was controlled in two ways: 1) by arranging the plates, as given in figure 4, in four patterns (one for each platform) that spiralled gradually from the center of the platform, the area most used by the performer, and 2) by regulating the speed in which the percussive events were performed. Percussive events tapped at a high rate tended to be performed at the center of the platform, whereas low-speed events tended to be performed over the entire platform.

The rate at which a tap dancer performed a percussive event was controlled in two ways: 1) by four continuously modulating performance modes which regulated various textural aspects of an event, and 2) by an override condition that required all events to be performed within a given time as illustrated in the raku notation given in Figure 5. Because this condition received the highest priority in *Stak Raku,* it often contradicted and interfered with the performance of other events on all media levels. For example, if a large number of attacks were to be tapped within a very short period of time, as is the case starting on beat 10.5 in Figure 5, it becomes physically impossible to give attention to any other aspect of the performance. The dancer is forced to flail away in a wild attempt to tap the required attacks. This provided the piece with a real-time and "out-of-character" quality which tended to, like the fragmented proscenium used, infringe on the territorial rules observed by a traditional audience.

Several methods of communicating with the tap dancers were used in *Stak Raku.* Some of these were designed to communicate information as clearly and redundantly as possible, meaning the same information was communicated in more than one way, while other methods were designed to communicate multiple meanings. In the first instance, as illustrated in Figure 5, whenever a new performance mode was encountered in the projected score, a new combination of flood lights would simultaneously illuminate the appropriate dancer. In the projected score, the performance modes were given redundantly using both space and color parameters. Again, these were cued redundantly in the aural score by a special sound event related to each mode, and by a click-track which was used to conduct the piece. All together, the tap dancers were cued from two visual sources and one aural source, and within each of these there were built-in redundancies. One of these, the click-track, served the multiple function of conducting the piece and of making the sound of a tap dancer's own performance and that of the other tap dancers (contiguous bursts of white noise were used). All of these methods were designed to communicate efficiently by integrating several of the mediums available to a performer. At the same time, these methods were tailored to minimize feedback in a effort to reduce cliché development. In an effort to preserve the usefulness of the language, it was considered important to reduce the time a performer had to consider the finesse of his or her performance, or that of another tap dancer. Other aspects of the visual notation are illustrated in Figure 5.

Stak Raku also controlled the dancers on a vocal and a theatrical level using methods similar to those used to control the percussive events. The entire piece was also accompanied by a four-channel *Musique Concrete* tape constructed from the basic vowel and consonant sounds of the English language. When these were recorded, they were affected by emotions, such as sensuous love, hate, and joy, and then modified to represent the timbres of different age groups (i.e., light falsetto for a child's voice). These were spliced together in certain proportions and dubbed onto several multitrack tape machines, which then served as the imput to a real-time system (using a Buchla synthesizer) used to resplice the original sounds back together into a meta-language that was emotionally volatile. This created a kind of "aural kiln" within which the tap dancers performed.

Raku for Percussion and Four-channel Tape was also written in 1977 and is scored for tape,

Photo by Tim Brook

Scrapercussion #4, "Our Broken Toys" Exhibition, March 1981, Canberra, Australia.

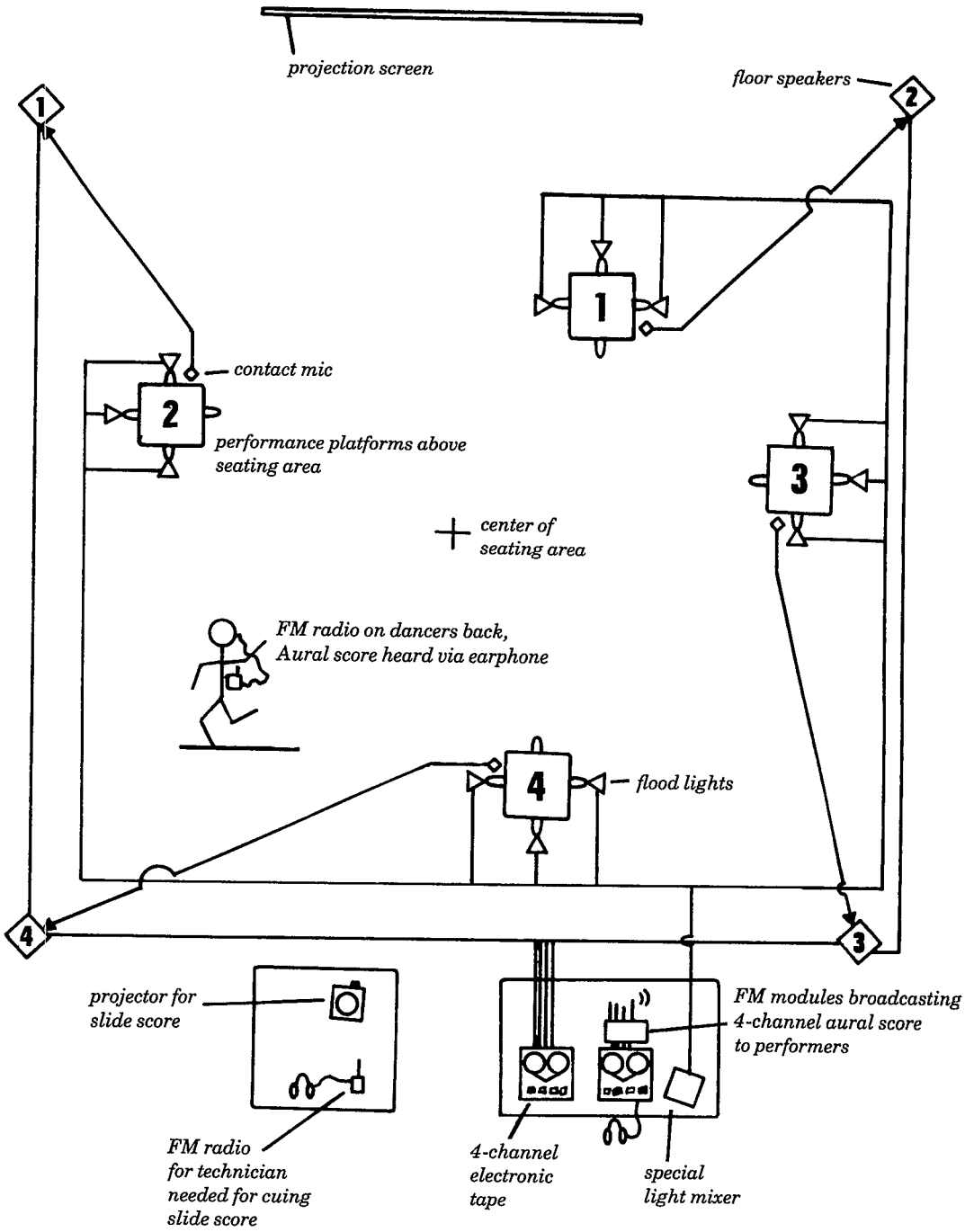


Figure 1
"Stak Raku" Performance Layout

with four trained and twelve untrained percussionists performing traditional percussion instruments. Some interesting aspects of this piece relate to its performance layout (Figure 6), and the rules governing the movement of performers across boundary lines separating the performers and the instrument groups. In this piece, the performers are encouraged to move away from their assigned territories in whatever direction is allowed by the boundary conditions. Because they are required to read only the score in their home territory, the movement of the performers and the actual sound of the piece is affected by mundane conditions, such as poor eyesight, the brightness of the lights, and the memory abilities of each performer. Areas that have unpenetrable boundaries, meaning no one can get in or out, will have highly predictable timbres coming from them and very little performer traffic. Areas encompassed by uni-directional or bi-directional boundaries will have more performers moving through them and the instrumentation will be less predictable. Using these indirect methods, *Raku for Percussion and Four-channel Tape* was orchestrated and choreographed effectively.

On the advice of Salvatore Martirano, in 1978, the first *Scrapercussion* soundsculpture was built from scrap collected for *Stak Raku,* and presented at the Northern Illinois University at a festival organized by Joe Pinzarrone. From the outset, I was interested in building a soundsculpture that would not only preserve the individual timbres of the carefully selected scrap, but also an instrument that could produce a broad range of sound colors that presented a continuum defined by this scrap. This was realized by connecting the pieces of scrap around and through a metal chassis using quarter-inch steel rods and quarter-inch bore tubing; all materials used in *Stak Raku.* By striking the rods between the connected pieces of scrap, an infinite variety of timbers were extracted that, in effect, represented the logical merge of the timbre of one piece of scrap with another. Also, because all of the scrap was connected together in a large continuum, a composite timbre was present whenever any part of the sculpture is struck. This had the effect of adding a rich overtone structure to the timbre of each piece of scrap, as well as a reverberated quality that was caused by reflected waveforms cycling through the instrument.

My first new experiences with percussionists performing the scrapercussion were not satisfying. The musicians were quite talented and affable, but I learned that even the most unconventional instrument is not a guarantee against that ubiquitous standard performance practice. At the suggestion of Sal Martirano, again, who advised me after one of these early scrapercussion performance to "get your own chops together," I wrote a piece for myself called *Chamber Cha-cha;* a piece for stereo tape, scrapercussion, live electronics and actor-performer. John Small of the Canberra Times described a performance at the Canberra School of Music in 1980 as "...a genial, irresistable exercise featuring the composer, wearing what seemed to be the dress coat of the Ruritanian Navy, as 'scrapercussionist.' To the accompaniment of taped sounds, Mr. Senn extracted a wide variety of noises from the bequiling sculpture...a kind of small tree with large sheet metal leaves and fruit in a variety of shapes round which Mr. Senn patrolled like an unusually earnest participant in some sort of modern Maypole rite."

The live electronics in *Chamber Cha-cha* involved bugging the scrapercussion with contact speakers, which were used to monitor the sounds picked up by contact microphones also located on the instrument. By fixing the contact speakers to the metal chassis of the instrument and then touching various parts of the instrument with contact microphones, feedback circuits were formed that produced electronic tones determined primarily by the resonant frequencies of the piece of scrap being touched. Other contact microphones were strategically placed in fixed positions and controlled by the performer using a microphone mixer into which all the mics were connected. This provided the performed with easy access to complex sound textures with the fixed contact mics being more adept at producing long, rich events and the mobile mics being capable of producing anything from short percussive to long extended events.

Photo by Tim Brook

Scrapercussion #1, "Our Broken Toys" Exhibition.

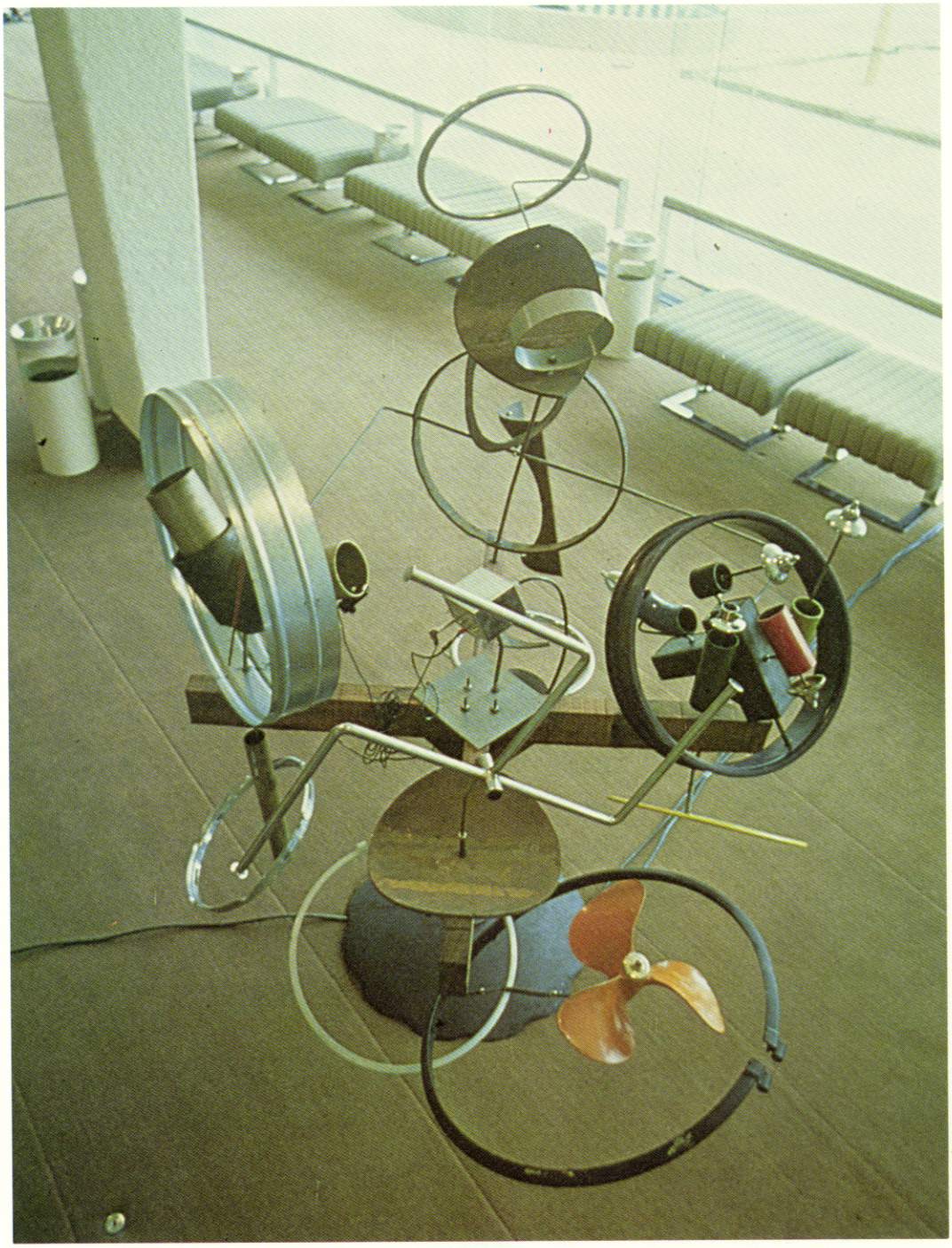


Photo by Tim Brook

Scrapercussion #6, "Our Broken Toys" Exhibition.

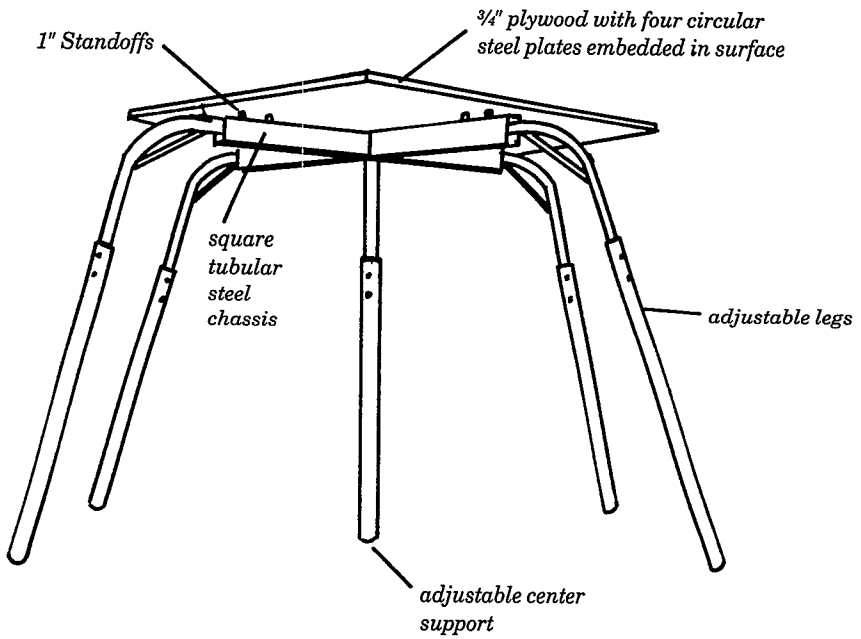


Figure 2
Performance Platform for Stak Raku

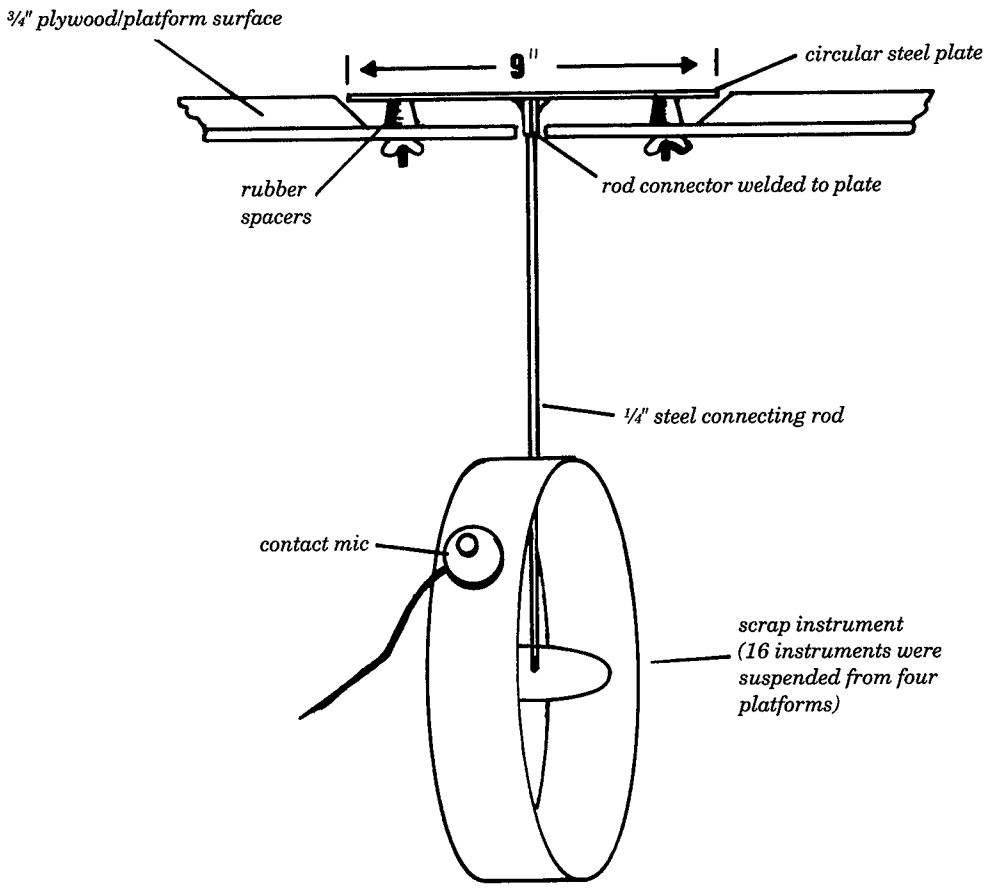


Figure 3
Scrap Percussion Assembly

Photo by Tim Brook

Scrapercussion #5, "Our Broken Toys" Exhibition.

Soundsculpture, by definition, suggests a symbiotic relationship between visual and aural mediums. An extension of this relationship into the "dance" medium was suggested when I discovered that, by turning levels way up on the feedback circuit described previously, the scrapercussion could be played electronically by just moving the contact microphones close to parts of the instrument. The resulting sounds were similar to those produced when the instrument was actually touched, but now the loudness of the sound was linked to the closeness of the performer. This led me to the idea of using the scrapercussion as a large theremin antenna which is, of course, proximity-sensitive. By attaching a theremin to the instrument, the closeness of a performer, or an observer, could be sensed and used to control the pitch or loudness of an electronic tone. So I attached a theremin to the scrapercussion and monitored the output over the contact speakers on the instrument itself. Suddenly, the intertwining media of sound, sculpture and dance became so closely knit that it was difficult to think of them separately. In effect, a scrapercussion could be performed by people moving about it in a highly organized manner or by people just observing it.

In 1980-81, on a grant from the Department of the Capital Territory in Canberra, Australia, a newly formed multi-media group called "Newsense," which included photographer-mathematician Tim Brook, musician Adrian Keenan, poet-novelist-musician-actor Rodney Hall, and me, was commissioned to build a scrapercussion installation for exhibition during the 1981 Canberra Festival in the "link" of the Canberra Theatre Centre. This is a large glassed-in foyer that links the musical and dramatic wings of the theatre complex and is often used for art exhibitions. The area is also used for ticket sales and is visited daily by a large number of people, many of whom also visit the theatre at least once a week. With this in mind, the exhibit, therefore, had to deal with observers at the "link" for reasons other than visiting the exhibit; with observers that were accustomed to just looking at art; and with observers who have had little experience being performers, unwitting or otherwise.

The installation, called "Our Broken Toys," acted as a kind of trap, though this was not originally intended. The main focus of the installation was to take full advantage of the symbiotic nature of the scrapercussion concept and to further develop methods of integrating theatrical and direct social comment within this context. The installation also acted as a musical composition that was performed acoustically and electronically by its observers. All of this was to be coordinated, in part, by an operator who was in control of the electronic connections between the six scrapercussions. The fact that many unsuspecting people were suddenly involved as performers in a musical composition was a pleasant discovery that didn't seem to bother the visitors to the theatre.

A schematic illustrating the floor plan for the "Our Broken Toys" installation and its electronic network is given in Figure 7. All the inputs and outputs of the six scrapercussions were connected to a patch bay, like a telephone switch board, in the control area where they could be easily assigned and reassigned (patched) by an operator. Each scrapercussion had its own theremin, an air speaker, at least one contact microphone and a contact speaker. At the perimeter, two omni-directional air microphones and two large speakers were situated and also connected to the patch bay. Pine beaters were placed in containers and made available to the visitors. In the control area, a small audio mixer was situated along with provisions for a tape recorder and a synthesizer. In the original plan, sound-sensitive lighting was to be used, but this proved economically unfeasible at the time.

The key to the composition level of the installation was the ability of an operator to change the interconnections of the six scrapercussions by way of the patch bay. This provided the operator with a large number of patching options which could be set up for long periods of time, or changed while observers were performing the scrapercussions. In Figure 8, a patch is given that utilizes nearly all the resources of the installation in a rather asymmetrical pattern. In Figure 9, a very symmetrical patch is

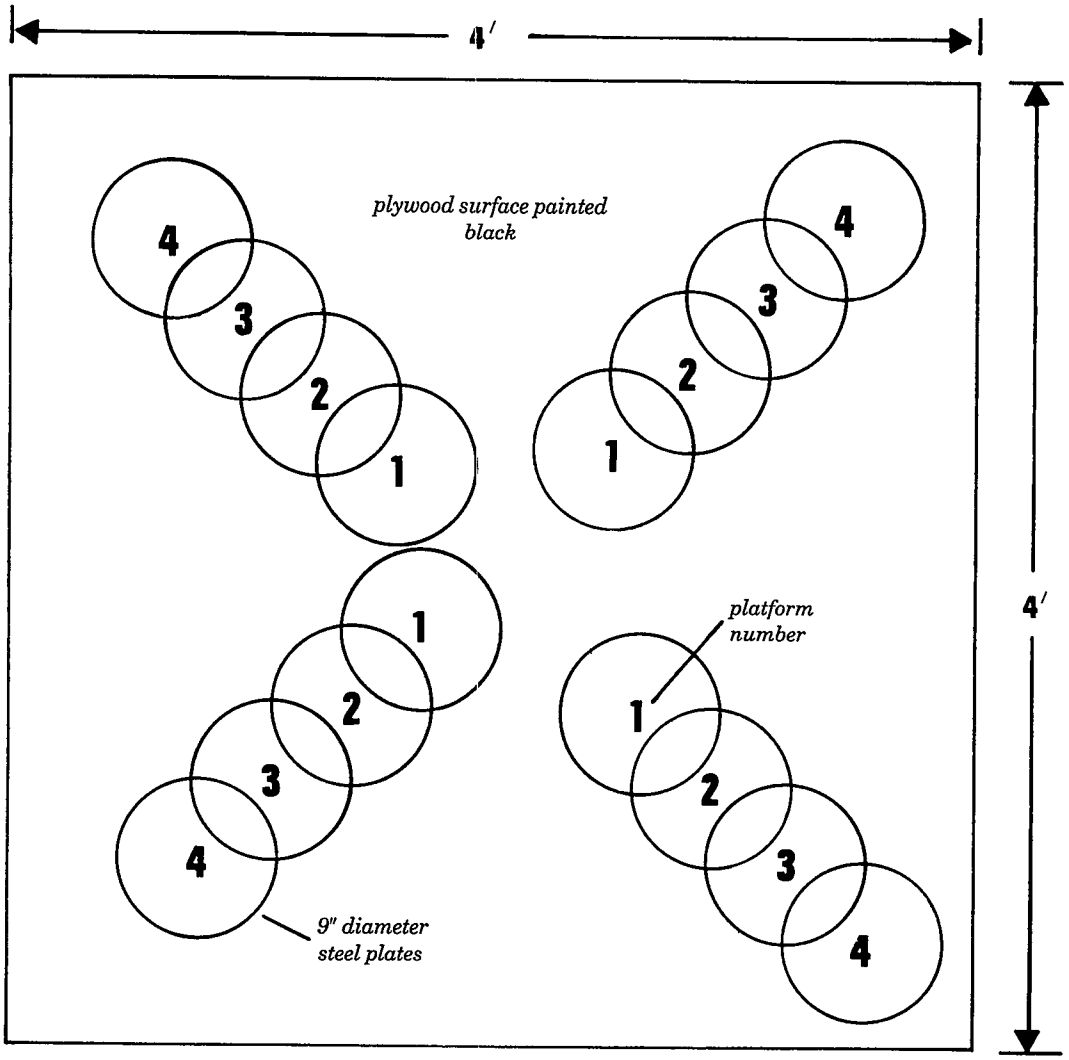


Figure 4
Plate Arrangement for Platforms 1, 2, 3, and 4

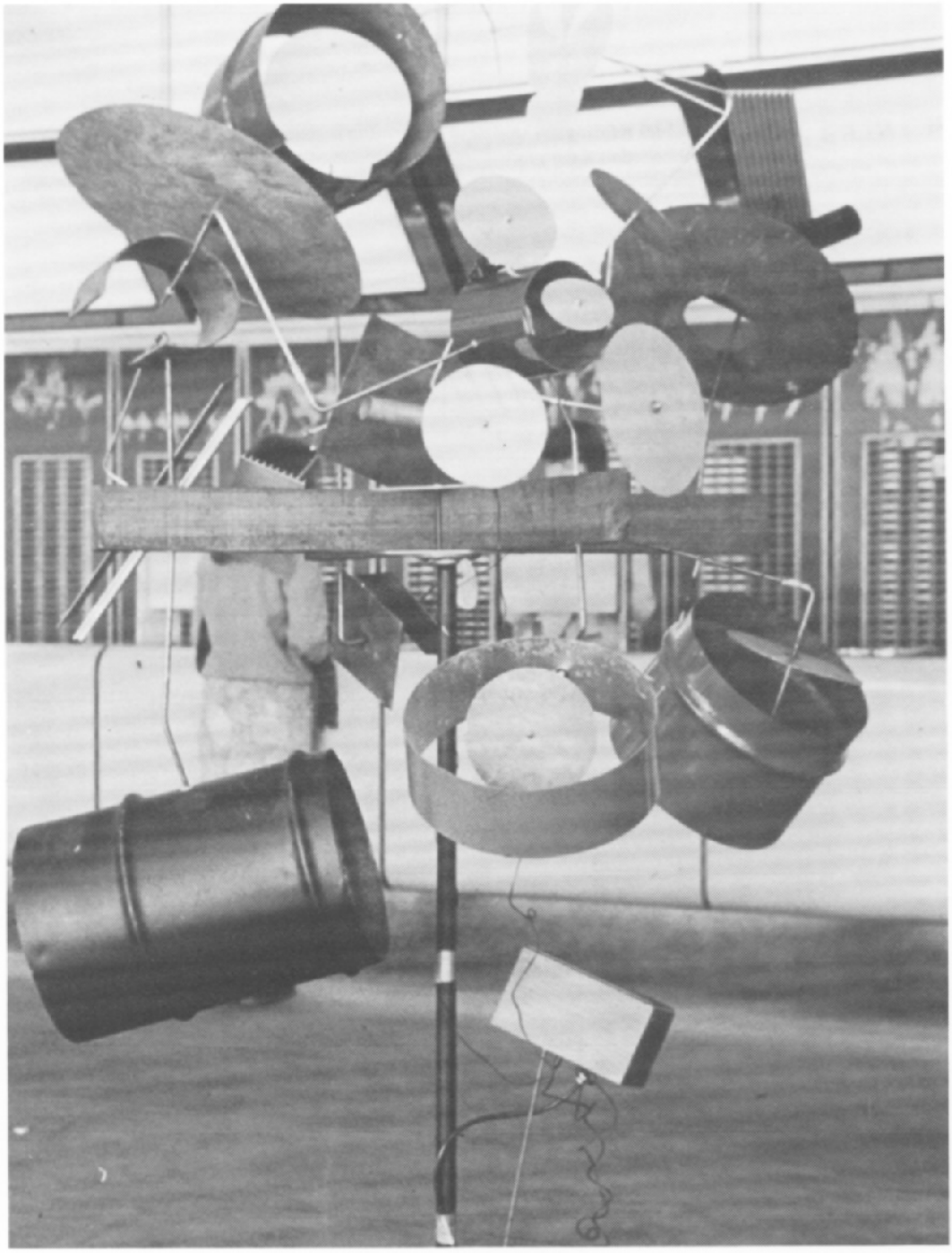


Photo by Tim Brook

Scrapercussion #2, "Our Broken Toys" Exhibition.

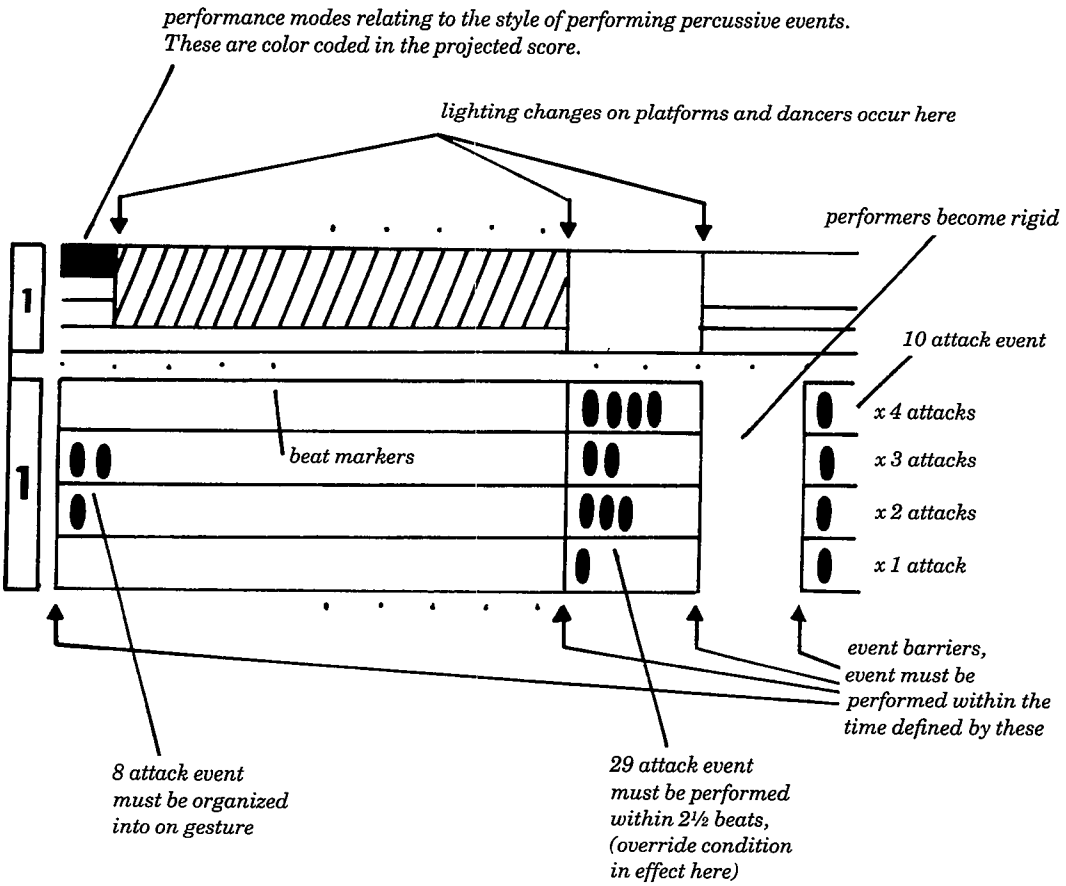


Figure 5
Visual Notation Used in "Stak Raku" and
"Raku for Percussion and Four-Channel Tape"

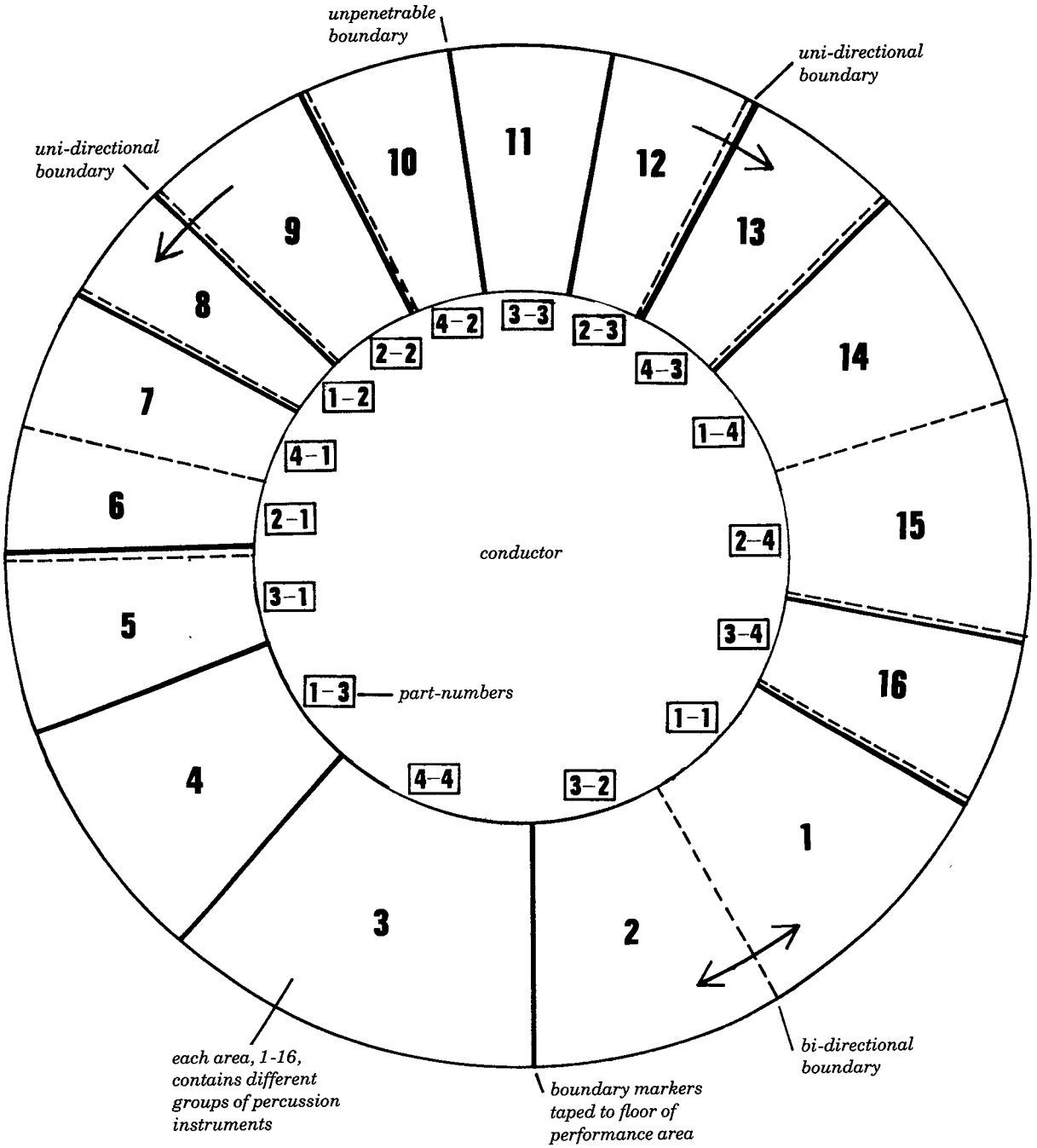


Figure 6
Raku for Percussion:
Performance set-up and boundary conditions

given. In following these schematics, bear in mind that the observer/performers will have beaters in their hands to strike the instruments; that sound entering a scrapercussion through a contact speaker, or as a result of it being struck, is in effect "processed" by the scrap before it is picked up by the contact microphone; that the air mics located at the perimet-

Photo by Tim Brook

Scrapercussion #6, the opening of the "Our Broken Toys" Exhibition.

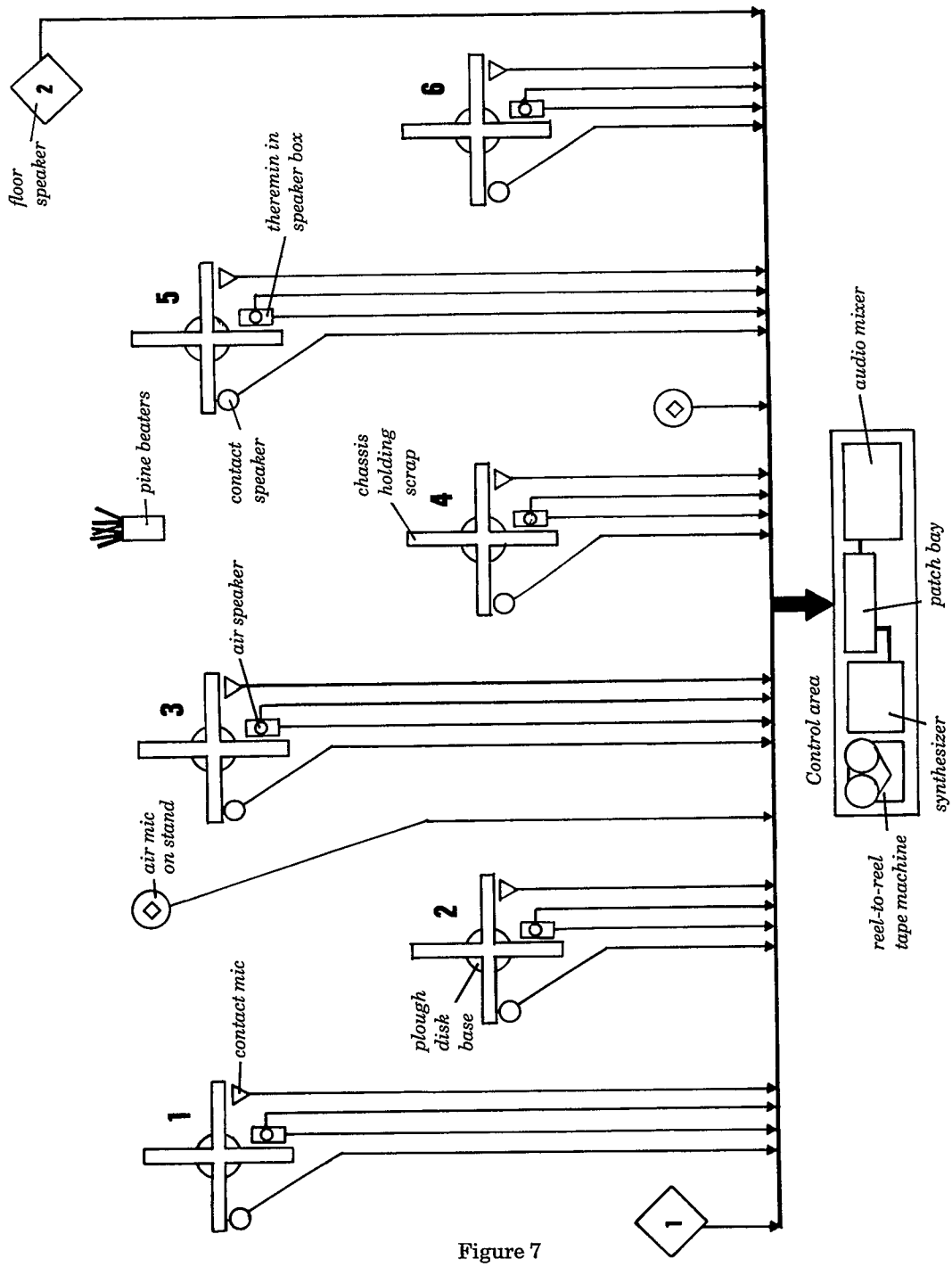


Figure 7
"Our Broken Toys" Installation

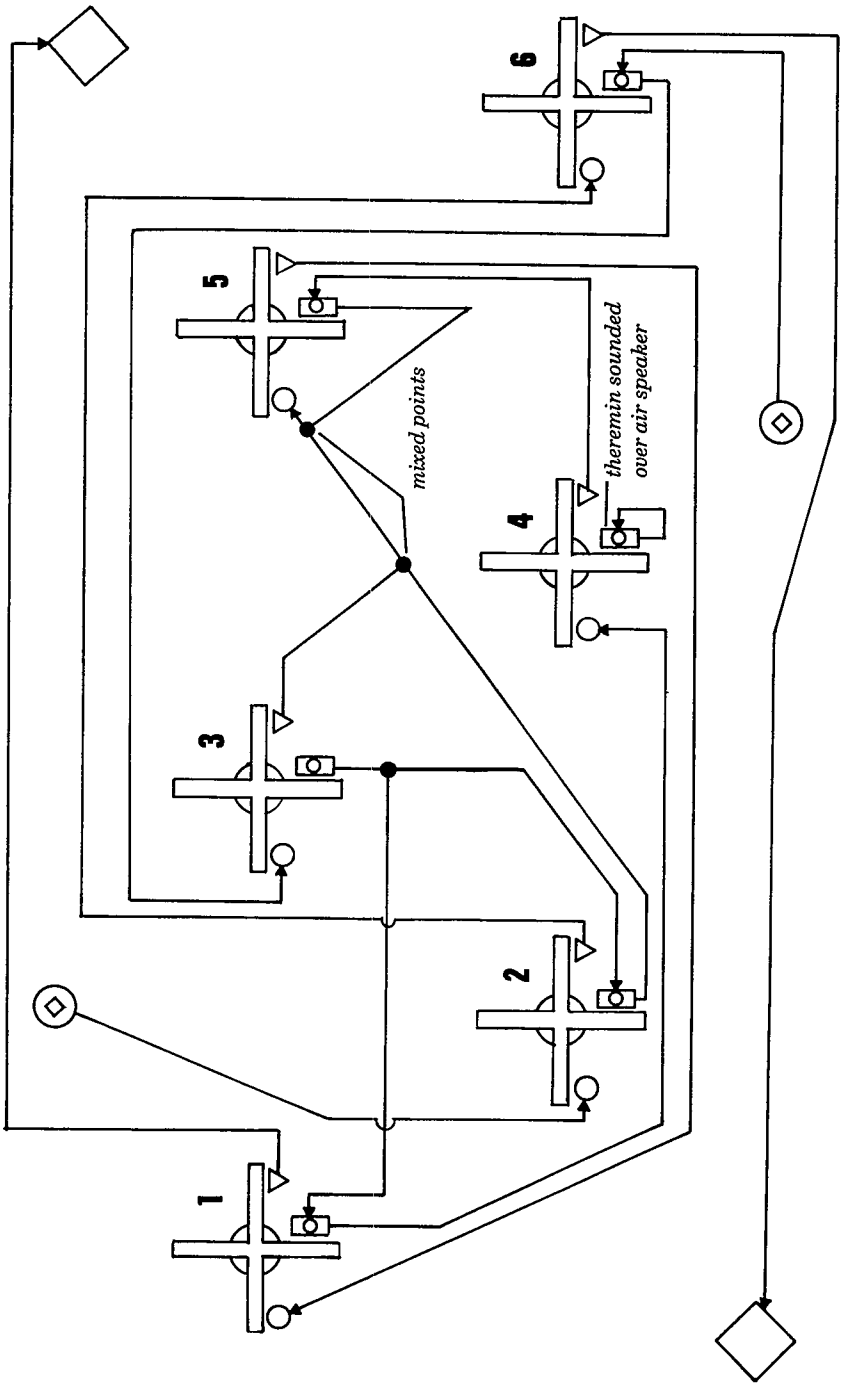


Figure 8
"Our Broken Toys" Installation: Asymmetrical Patch

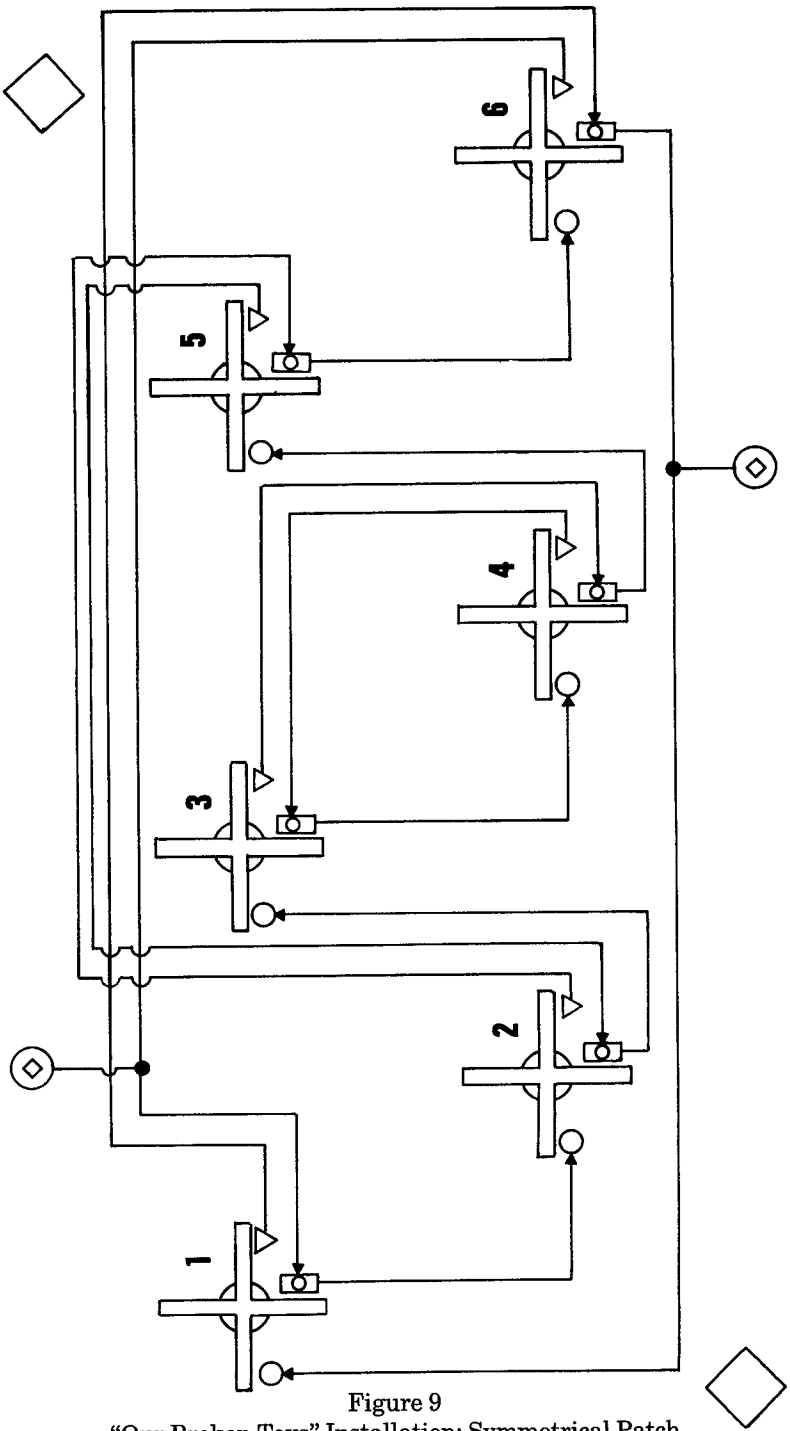


Figure 9
"Our Broken Toys" Installation: Symmetrical Patch

Photo by Tim Brook

Scrapercussion at the High Court of Australia, performance of Cacaphonic Cadenza, November 1981, Canberra, Australia.

ers will not only pick up sounds spoken directly into them, but also environment sounds; and that the theremins may be patched directly to the air speaker of the box in which they are contained.

The scrapercussions were planned on a continuum of apolitical to blatantly political materials. Resonant and beautiful scrap, another collection criterion, was gathered for a scrapercussion built out of circular saw blades that was mixed with discarded traditional instruments suggesting, among other things, an equality of scrap. Another instrument was built out of scrapped kitchen utensils and old car springs arranged to suggest a woman's traditional role in the kitchen and in the bedroom. Another was built primarily from car parts, and yet another from scrap that suggested various ideological biases such as fascism, Marxism and Christianity. Only one of the six scrapercussions consisted of materials that did not make an intended political statement.

Reactions to the exhibit were on the extremes. Most of the observers performed the installation without inhibition and were genuinely interested in taking up performance roles. At first, this worried me as a possible sign that they were being thoroughly entertained and learning absolutely nothing. However, there is something unpretentious and affable about using everyday scrap in an environment that reacts analogously and beautifully to mundane gestures, something that may just have broken through. (Quite frankly, I am not opposed to entertaining an audience, except when it takes priority to a composers first responsibility of altering the way in which they, performers and listeners solve musical problems.) Some observers preferred to stay in their cozy, traditional niche and some avoided being "trapped" altogether by looking at the installation from outside the gallery through glass. The most friendly/hostile people were the ticket sales people who were nearly driven deaf and mad by the end of the month.

Since the Link exhibition, I have continued to explore the observer-performer connection in my scrapercussion pieces such as *Cacophonic Cadenza* and *Cacaphonic Cowboy*. Both of these pieces recruit performers from audience members who have seen the instrument performed in an opening improvisation and have already been given the score instructions. In both of these pieces, sound textures and the move-

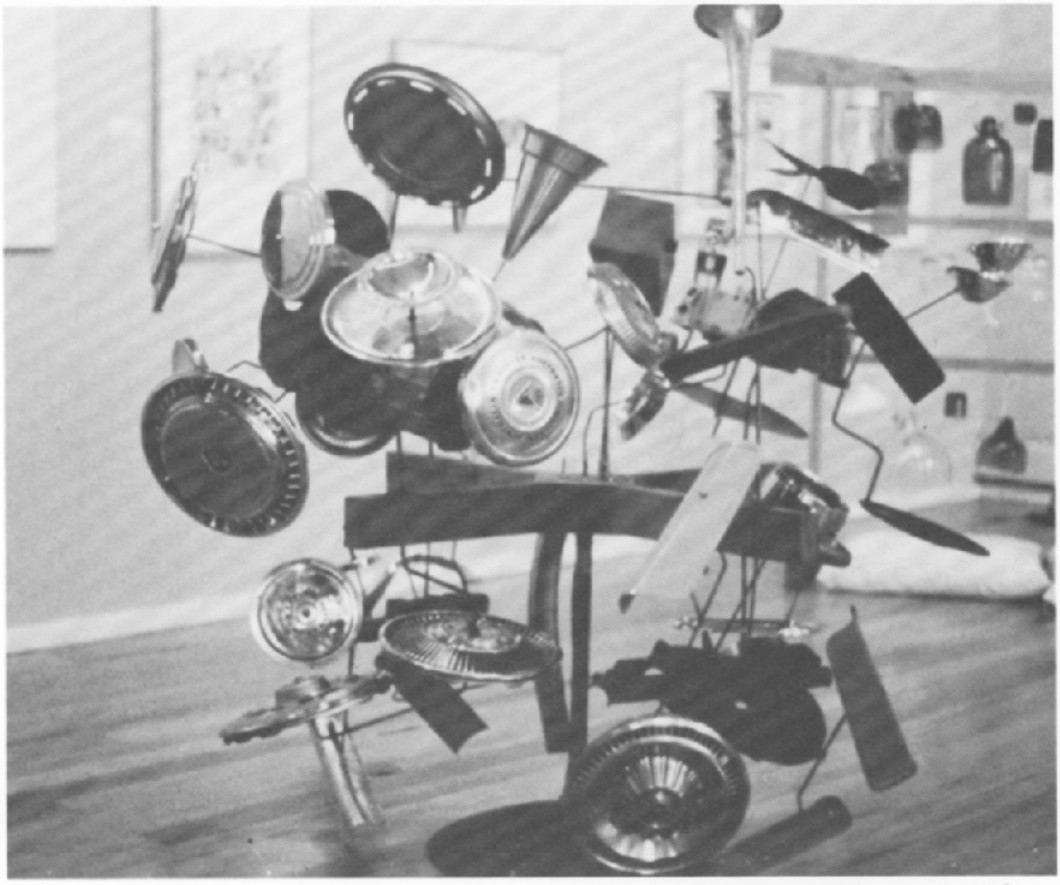


Photo by Dan Senn

Scrapercussion at the International Music and Technology Conference, University of Melbourne, Australia. Soundsculpture exhibit organized by Warren Burt.

ments of the performers are controlled by the closeness and visibility of a dancer/conductor. In *Cacaphonic Cadenza,* a player's performance is started and stopped (the players become rigid when stopped), by a tap from the dancer. In *Cacaphonic Cowboy,* the dancer/conductor is dressed in a cowboy outfit and wears a Ronald Reagan mask, and a player's performance is stopped when shot by the dancer with a cap gun (the player falls to the ground when shot). In either piece, because the audience is fully aware of the rules of the composition, the musical and political impact is strong.

In this article, within the context of my scrap percussion and soundsculpture music, I have described some of the methods I have used to discourage glossing and the use of standard performance practice in my compositions. This concern has developed out of an intuitive dislike of high-gloss art in general and, without doubt, the indulgent tendency we all have to express only what we know. John Cage explained this concern in similiar terms in his text piece, *Composition in Retrospective,* performed at the 1981 International Computer Music Conference, when he said he had never wished to express himself, only to alter himself.

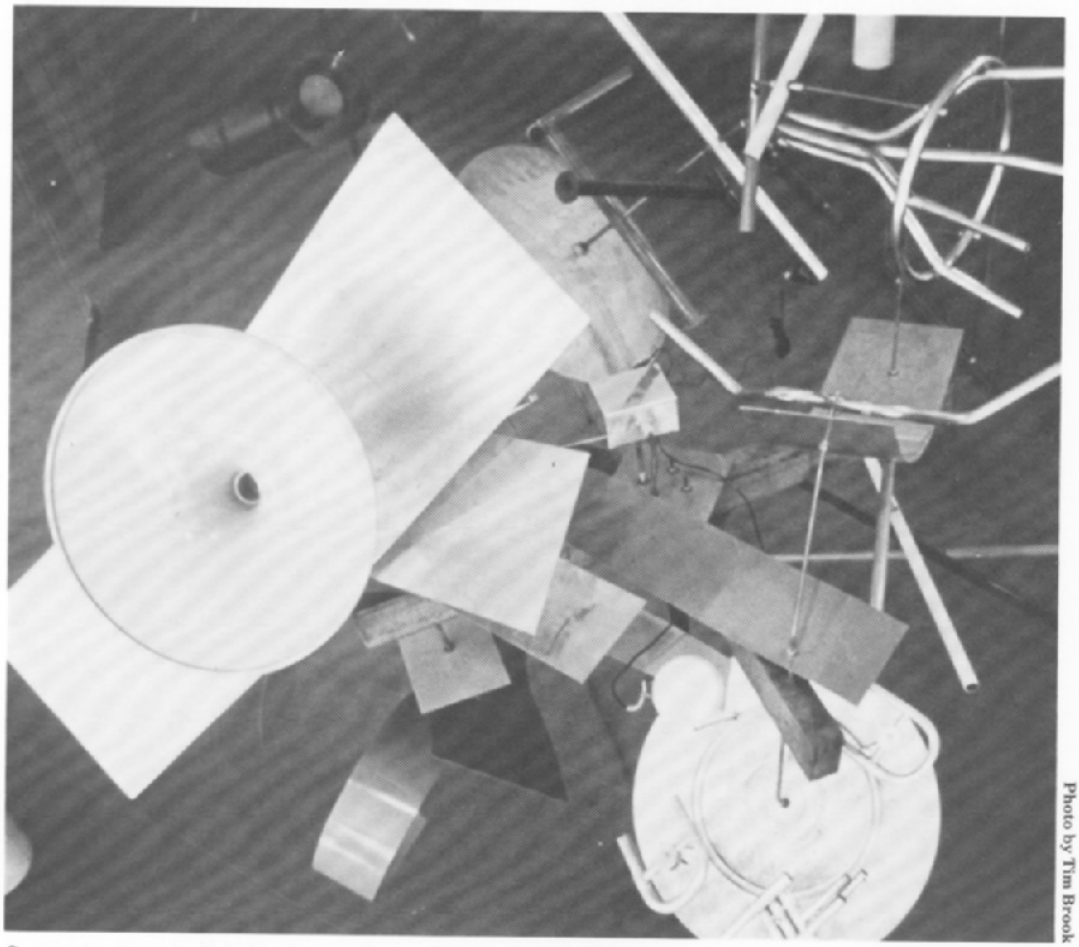


Photo by Tim Brook

Scrapercussion #1, "Our Broken Toys" Exhibition.

References

1. Gloss: (Webster) "Noun. 1. The shine of a polished surface 2. A deceptive outward show; verb. 1. To give a shiny surface to, 2. To hide (an error etc.) or make seem right or trivial." Here the word is used either metaphorically or as defined above, and has been expanded to mean the act of substituting a learned definition of a symbol for the symbol itself. When this happens we are unable to "hear" or "see" the symbol because we already "know" what it means.
2. Kit-building: To build a kit is to construct an artifact from a set of well-defined symbols, forms and procedures. To write a piece of music in the style of another composer, or school of composers, or even to re-solve the same musical problem, is to build a kit.

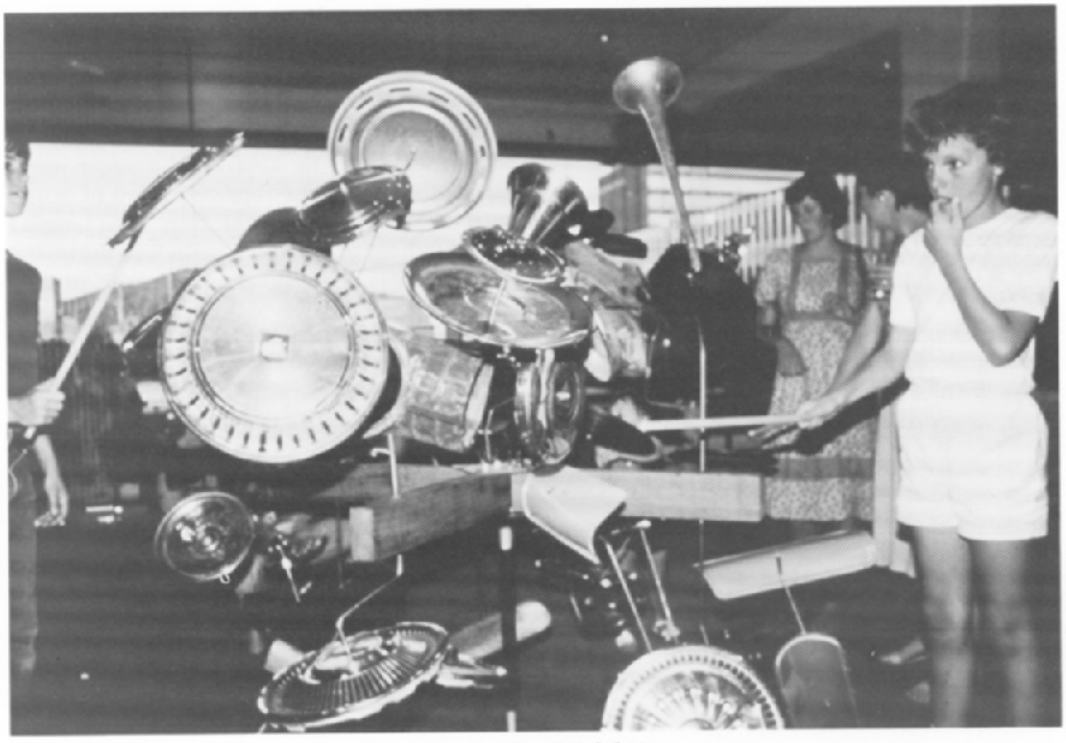


Photo by Tim Brock

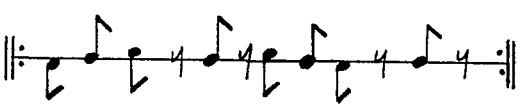
Scrapercussion #3, the opening of the "Our Broken Toys" Exhibition.

Minimalism and Constant Focus

Dennis Kam is chairman of the Theory/Composition Department at the University of Miami in Coral Gables, Florida. He is co-chairman of the American Society of University Composers, Region IV. Through a grant from The Contemporary Music Project of the Ford Foundation and MENC, Mr. Kam enjoyed a time (1970-1972) as Composer-in-Residence for Honolulu and the State of Hawaii. His recent compositional concerns involve varieties of perceptibility and focus, "experiential" time, and new tonal systems.

In percussion literature, Steve Reich's *Drumming* (1971) may be considered a major work, especially as a clear representative of music with a minimalistic orientation. This lengthy work (an hour and a half long in four parts) is a good example of the "gradual musical" process – one that is clearly evident and audible to the listener. This process, which Reich was so fond of during the late 1960s and early 1970s, has now become a prominent stylistic characteristic of most minimalistic works to date.

Drumming is scored for two to four drummers, marimbas, glockenspiels, voices, and a piccolo. Part I begins with the drummers (usually two) who gradually establish a rhythmic pattern which becomes the basis of the entire work:



Once this pattern is established, phase shifting by the performers – a technique which has been important in creating the musical process – is of primary importance in generating rhythmic as well as timbral interest.

In subsequent sections (Parts II-IV), other percussion instruments and voices are systematically added and used to explore timbral changes while the rhythmic pattern remains constant. All sections are smoothly connected

by timbral and registral blending of these instruments and voices.

From the standpoint of performance, *Drumming* could be a challenging musical experience to those unfamiliar with minimalistic works. The extreme amount of time involved for change to take place due to persistent repetition may be difficult for those expecting or desiring the faster (normal) rate of change found in most music of our Western/European tradition. Minimalistic works like *Drumming* are musical artifacts possessing a kind of perceptibility which represents a radical departure from previously established norms: *constant focus*.

This particular type of focus and others resulting from the use of repetition will be the main subject of this article. Many other interesting aspects of *Drumming* certainly deserve attention – the influence of African drumming, instrumental blending, the use of the human voice imitating instruments, or its particular musical process. However, it is the radical nature of the *constant focus* that immediately grabs and demands our attention. It is this kind of focus and its resultant musical syntax that pose some important musical questions. This type of focus sets *Drumming* apart from any other type of music in the past and may even be the most significant contribution of all music influenced by musical minimalism.

Minimalism

Minimalism in music has received increased attention through the years and has become recognized as one of the major forces among the many that contribute to compositional trends since World War II. Articles on minimalistic music now abound in a wide variety of publications ranging from books to scholarly periodicals[1] to popular newsstand magazines, and continue to proliferate as particular composers gain the spotlight with new versions of minimalism. A number of composers, such as Steve Reich, Terry Riley, Frederic Rzewski, Laurie Anderson, and Philip Glass, have captured most of the attention and are thought of as representatives of the wide variety of music possible within a general minimalistic "style." Thus, a tradition of minimalism is fast becoming as firmly established and documented as the serial tradition in the history of music.

Historically, minimalism – especially represented by Riley and Reich – emerged as a force in the late 1960s by providing a fresh compositional alternative to atonality and Post-Webern serialism. Minimalism signaled a return to a simplicity in music which contrasted the growing complexity in works influenced by serial "technology" discovered and developed during the previous decade. This simplicity was apparent in attributes which have now become trademarks for music with a minimalistic orientation: (1) tonality (often referred to as a "new tonality"), (2) rhythmic regularity, and (3) perceptible "musical" processes. The strong aural perceptibility resulting from this simplicity has given some minimalistic music an accessibility to audiences which may have found complex 20th century trends formidable. Today, much of the appeal of this music – especially that of Philip Glass and Laurie Anderson – could also be attributed to the combination of commercial musical elements with minimalism.

It can be said that attributes of minimalistic music are primarily achieved by the obvious and uncompromising use of repetition. While constant variation and change have been of central importance technically in works with a serial orientation, repetition has been the *sine qua non* of minimalism. The extreme use of repetition in minimalistic works has not only lead to a unique approach to musical unity, it has provided a fresh means of creating a musical focus unprecedented in the history of Western music. In order to understand the uniqueness of this *constant focus*, it will be important to first examine two other ways in which repetition has been used, and their resultant types of focus.

Repetition as a Unifying Factor

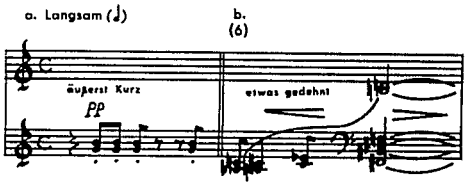
The use of repetition for purposes of unity is best seen in some traditional means of organizing music.[2] Passacaglia, chaconne, binary, ternary, variation, and sonata-allegro forms, to name a few, provide us with good examples of unity on a large scale achieved through repetition. Contributing a form of repetition, the

principle of return is the main unifying factor. Essentially, returns simply provide a means by which constituent sections in a work can be easily connected and related to each other. Unity, then, is achieved because of the exact likenesses or similarities of sections occurring at different locations in the time continuum.

On a more detailed level, unity in a work can be achieved through motivic repetitions. These repetitions range from more literal imitational and fugal ones to less literal developmental ones where motives are varied and permuted in some way while still maintaining a basic identity. While their contribution to the principle of return is in part a reason for their effectiveness, the capacity of these repetitions to produce continuity and short-termed unity is their main strength. Taken together large scale structural and smaller scale motivic repetitions can cover and unify the entire time continuum of a musical work.

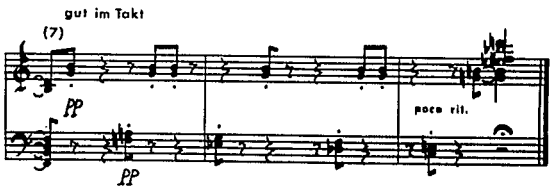
In spite of their absence in serial, aleatoric, and generally avant-garde works, the traditional uses of repetition as a unifying factor have still been present in works composed during the earlier part of the twentieth-century or in works which have had a more or less traditional orientation. Neo-classic works of Stravinsky, Hindemith, and Prokofiev would most certainly be examples cited in this regard. In addition, the use of repetition for unification can also be seen in less traditional works. Two examples will be briefly discussed here: No. 2 from *Six Short Pieces for Piano*, Op. 19 by Arnold Schoenberg and *Intégrales* for small orchestra by Edgard Varèse.

In Schoenberg's short piano piece, repetition is evident in the basically ternary structure: A (measures 1-3) B (measures 4-6) A' (measures 7-9). Although measures 7-9 are not exact repetitions of measures 1-3, the material is basically the same and differentiation is minimal when compared to measures 4-6. Measures 4-6 are clearly differentiated from surrounding measures because of more development of material and the cadences in measures 3 and 6. More obvious and perhaps more interesting, however, is the conspicuous repetition of the G-B dyad in the left hand throughout the entire piece. In measures 1-3, repetition is evident since the dyad is in a rhythmic pattern (Example 1a) which is played three times. Only until measure 6 does any real deviation from this dyad take place. At this point, development away from the G-B dyad, after very slight deviations in measures 4 and 5 (the inclusion of a C-E dyad in each measure) reaches its peak (Example 1b).



Example 1

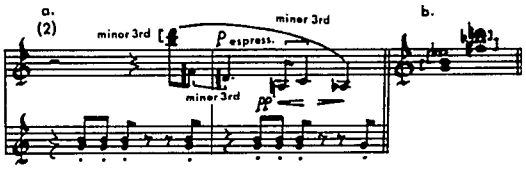
After this, the G-B dyad returns and remains until the very end of the piece – this time, however, in the right hand with a different rhythmic pattern from that found in measures 1-3 while the left hand plays a sequence of descending thirds (Example 2).



Example 2

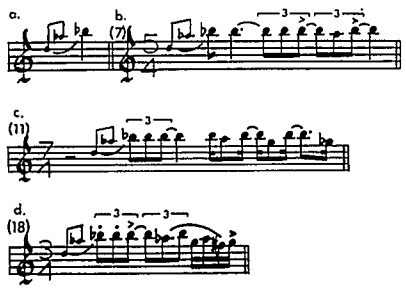
Apart from the establishment of tonal implications, it seems that the pervading presence of this dyad through mere repetition is the primary unifying force in this piece. In one sense, this presence could be considered an abstraction of the melodic "ground" of the traditional passacaglia, for it establishes a foundation for the generation of musical materials. For instance, in terms of intervallic consistency, the G-B dyad establishes the major third, if not at least thirds in general, as the primary interval in the piece. Except for the almost equally influential minor third (Example 3a), the major third seems to be the most important source from which musical materials are derived as

seen in the descending thirds in measures 7-9 (Example 2) and the last chord of the piece (Example 3b). Repetition, then, is utilized to unify details as well as the overall structure of the piece.



Example 3

In *Intégrales* by Varèse, we are able to get clear examples of repetition on a motivic level; this is readily evident in measures 1-29. Repetition is based on a motivic cell first stated by the Eb clarinet (Example 4a). This motivic cell is extended, permuted (Examples 4b, 4c, 4d), and repeated continually (12 times) in relatively close proximity to each other.

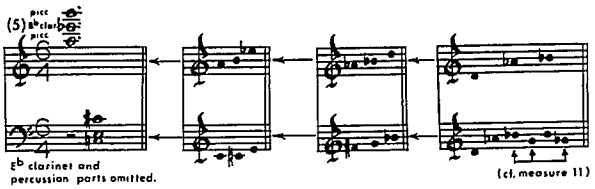


Example 4

In general, linear groups of pitches give the impression of being more or less fixed because of a minimal amount of permutations and the fact that the basic motivic cell, although permuted, is never transposed. Called "planes," these linear groups contrast as well as contribute to the "sound-masses" of which Varèse was so fond:

When new instruments will allow me to write music as I conceive it...the movement of sound-masses, of shifting planes, will be clearly perceived. When these sound-masses collide the phenomena of penetration or repulsion will seem to occur. Certain transmutations taking place on certain planes will seem to be projected onto other planes, moving at different speeds and at different angles...In the moving masses you will be conscious of their transmutations when they pass over different layers, when they penetrate certain opacities, or are dilated in cerain rarefactions.[3]

Vertical sound-masses are often derived from motivic cells or permutations as shown in Example 5:



Example 5

It can be said that sound masses have little or nothing to do with harmonic relationships and functions in the traditional sense, i.e., chord progressions. Rather, they are densities and sonorities, or "crystals," as Varèse often called them, in which texture, color, and dynamics are what matter most. Thus, unity is not so much achieved through pitch or harmonic relationships as much as through the interaction of unified planes and sound-masses which are delineated, sustained, and made more perceptible through the use of repetition. In *Intégrales*, as might be the case in other works of Varèse, then, repetition can be seen to be the foundation for unity since the existence and effectiveness of planes and sound-masses depend upon it so much.

Hence, with *Intégrales* as well as Schoenberg's piano piece, there seems to be a significant departure away from the use of repetition as represented in traditional forms. On the whole, repetition in these works becomes more prominent and noticeable. In the piano piece, repetition is more than just a traditional "ground" which moves and repeats in a fixed unit; rather, the persistence of the G-B dyad creates an almost static foundation instead. In *Intégrales*, repetitions of nearly fixed linear shapes based on the opening motivic cell in

close proximity seem to possess less movement of progression than that found in motivic repetitions governed by traditional harmonic functions. Although sound-masses are "moving" due to the rhythmic propulsion generated by planes, they maintain a kind of fixed identity because of repeated elements, and so attention is instead drawn to the interaction of sound-masses and of the elements inside of them. Thus, here too, a tendency towards more staticity seems to be evident. This tendency manifested in both of the works discussed here can be seen as representing a major step away from a relatively broad overall focus to a more concentrated form of focus.

Repetition and Temporary Focus

A concentrated *temporary focus*, less dependent on motivic elements, is best found in the Polish music which gained prominence during the 1960s. In this music, textural change and differentiation become the prominent structural features; in fact, changes are mainly noticeable on the textural level. In general, these works tend to be composed of juxtapositions of blocks or sections of sounds rather than of discrete sounds. In order to sustain textures as well as to differentiate them from each other, there is heavy reliance on stasis and on repetition of elements within a texture, often via repeated "loops." Many of the works of Krystof Penderecki and Witold Lutoslawski have exemplified this approach. The first movement of Lutoslawski's *Jeux Vénitiens*, for instance, is comprised of only nine different blocks of sounds or textures which are placed in "counterpoint" with each other.

It should be noted that the tendency to employ pitch clusters and novel instrumental sound-effects as much as normal pitches in many of these works can be related to the fact that collective textures became more important than discrete elements. For, as a result of the diminishing perceptibility and importance of these elements, the quality of texture become a primary concern, leaving room for almost anything to be included in a collective texture. Thus, it could be presumed that the fascination with new instrumental effects was a direct result of attempts to create new and interesting textures which would be more easily distinguished from each other. The use of pitch clusters in large part, instead of pointillism, seems to have been a mode of effecting clear and vivid perceptibility – clusters being more readily perceptible than the complex relationships between pointillistic elements. Clusters, in contrast to pointillism associated with micro-gestures, also seem to complement the macro-gestural tendencies in these works.

In general, like minimalistic works, Polish scores seem to reflect a concern for the effect that music can have on the listener. Lutoslawski's attitude indeed typifies this concern:

As a result of recognizing the psychological aspect of art as being paramount, I am opposed to all those who consider the existence of a work by itself, independent of its being perceived, as the main aim of its being created. The score or recording are quite certainly necessary for the existence of a piece of music. However, they are not in themselves the actual musical work but only a stage in its realization, which is experienced by the listener. I understand the process of composing above all as the creation of a definite complex of psychological experiences for my listener, the fulfillment of which is on the whole extended throughout the greater number of performances of the same work.[4]

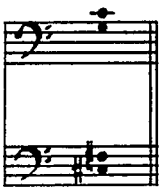
Certainly, because of their reliance on basically block-like and sectional construction, i.e., mere juxtaposition of different textures which may not even be related, these works can be criticized for their simplicity and insufficiently developed material.[5] Yet, this relative simplicity seems to be a purposeful means of affecting listeners psychologically.

Hence the use of repetition seems to be quite appropriate for the intent behind these works. In summarizing why it may have a capacity to enhance the psychological impact of these works, a threefold reason emerges. First, the rate of information flow is slowed down, making a limited number of elements more perceptible. Second, the listener is concomitantly given more time to perceive musical events. This increase in time also affects the perception of psychological time, its movement becoming

seemingly retarded or suspended. Third, as a result of the retardation of information flow, repetition contributes a substitute for the demise of tonality and thematicism. That is to say, repeated textures become entities providing a focus that replaces the focus given by tonality or thematicism.

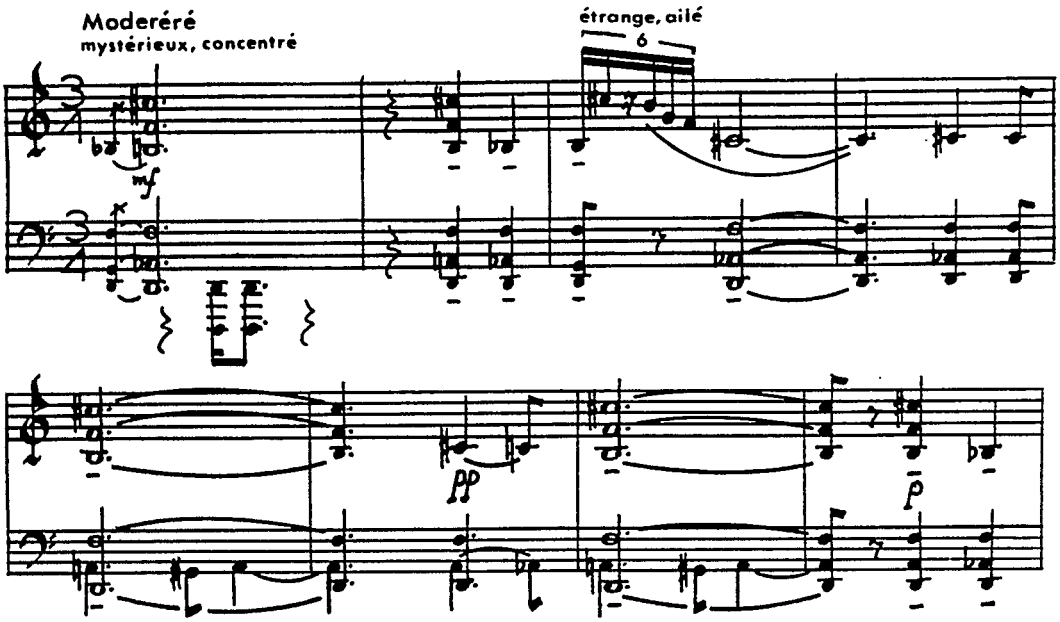
Focus, then, and its capacity to get listeners involved psychologically, seems to be the culminating product attained from the use of repetition in these Polish scores. It will be maintained here that this kind of focus can be called a *temporary focus*, i.e., it constantly moves to different elements, in this case, textures. Its function is to provide the listener with something to "hang on to" at different points in the musical continuum.

Temporary focus has also been in scores other than the Polish variety. It can, for example, be found in Karlheinz Stockhausen's *Klavierstück IX*. The existence of this focus is particularly significant in light of the fact that Stockhausen was such a prominent figure and leader during the early years of the post-Webern movement. Furthermore, among his early piano works, this one is especially distinctive because of the conspicuous use of repetition.[6] Repetition is immediately apparent in the opening 16 measures of the work where the chord comprised of two juxtaposed fourths (Example 6) is repeated consecutively a number of times in regular eighth-note rhythm. These repetitions are grouped for the most part by interrupting rests. The following is the sequence of the number of times the chord is played in each group: 139, 87, 21, (1), 8, 5, 2, 3. Groups are separated by a cessation of rhythm for a duration of a dotted-quarter value, a $\frac{42}{8}$ measure consisting of a ascending chromatic line beginning on middle C, and the following sequence of measures of rest: $\frac{2}{8}, \frac{8}{8}, \frac{3}{8}, \frac{1}{8}, \frac{13}{8}, \frac{5}{8}$.



Example 6

Focus, in a sense, is horizontally "sculptured" in order to produce a gradual disintegration of focus on the chord while more information is introduced; this is in part done by the gradual les-



Example 7

sening of repetitions.[7] Thus, focus changes gradually and is never completely stationary. In the context of the entire work, however, repetitions of the chord do give a concentrated and powerful focus to the first part of the work. For the remainder of the work, this focus is never as powerful even though remnants of it intermittently return interacting with other foci.

Temporary focus can also be found in works dating farther back than Stockhausen's. In Alexander Scriabin's rather static-like *Sonata No. 6* for piano (1911-1912), there seems to be a number of temporary foci. One instance of focus is certainly found in the opening measures where, despite rhythmic changes, a basic chord structure with slight permutations is constantly repeated (Example 7).

Slightly different from repetition in Stockhausen's work, repetition here is more subtle due to more differentiation of rhythm and pitch movement. In terms of effect and function, however, there seems to be little difference, for repetition of the limited number of pitches in a more or less fixed vertical structure causes a kind of staticity and, as a result, focus is created.

Thus, while the works of Stockhausen and Scriabin discussed in this section do not exhibit repetition of textural "loops" as do the Polish scores, they still contain the same kind of temporary focus due to very controlled short-termed repetition. Temporary focus in all these works can be seen as exhibiting a still more concentrated form of focus than that found in Schoenberg's Op. 19, No. 2 or Varèse's *Intégrales*.

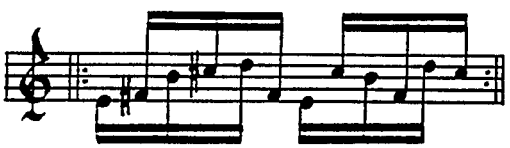
It can be assumed that this concentrated temporary focus contributes to the unity of a work – but not necessarily to the kind of unity associated with traditional formalism. That is not to say that this kind of focus is excluded from traditional forms, for works with temporary foci could be organized with overall traditional structures, e.g., ternary form. However, in these works, unity becomes dependent upon subjective as well as objective factors. That is, the fact that focus can aid a listener's perception and can possibly affect him psychologically becomes significant for unity as perceived by the listener. Unity, then, is not based solely upon formal structures but also upon a listener's involvement with the music: more specifically, whether the music is able to "carry him along."[8]

Repetition, Constant Focus, and the Expanded Present

In a way, the concept of unity is transcended and loses importance in minimalistic works. In these works, the musical process becomes a prominent feature, its perceptibility aided by an extremely concentrated focus. Unity thus becomes taken for granted since it is subsumed by the musical process, i.e., by nature, a musical process is unified. With repetition and gradual change controlling and delineating the musical process, a resultant focus literally becomes the "center of attention."

This concentrated focus seems to be just one step short of what might be termed a "singular" focus[9] or focus on just one seemingly unchanging thing. Focus is "singular" to the extent that the "present" seems to be prolonged or stretched out. Yet, changes of focus occur due to gradual and slow changes in the musical process. In contrast to the often interrupted and discontinuous foci caused by abrupt changes in works having temporary foci, this focus in minimal music which changes in a smooth and continuous fashion can be called *contant focus*. In order to see the nature of this focus more clearly, we turn to a discussion of two shorter works representative of "pattern-pulse" procedures: *Piano Phase* (1967) by Steve Reich, and *In C* (1964) by Terry Riley.

Steve Reich's *Piano Phase* is probably one of the simplest and shortest works in the pattern-pulse repertory. It is scored for two pianos and utilizes an economy of musical material, namely a 12-note pattern comprising of only five different tones (Example 8). As found in *Drumming*, a pattern is established for the entire work.



Example 8

The following are the performance instructions given by Reich:

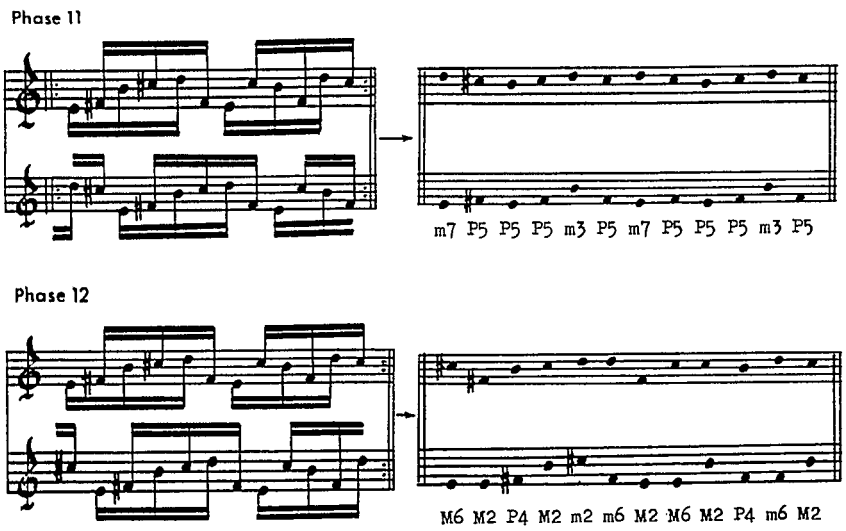
One pianist starts and the other joins him in unison...The second pianist increases his tempo very slightly and begins to move ahead of the first until (say in 30 to 60 seconds) he is one sixteenth ahead...This process is continued, with the second pianist gradually becoming an eighth, a dotted eighth, a quarter, etc., ahead of the first until he finally passes through all twelve relations and comes back in unison...again. The entire process may be repeated as many times as desired.

Either pianist may have the stable or moving role and these may be reversed if the process is played through more than once. A performer may find it easier to gradually decrease his tempo and bring about the change of phase that way. In any case, a gradual movement should be attempted – the slower the better. The tendency to move directly from one "rational" relationship of sixteenth note difference...into the next, should be resisted and performers should attempt to move smoothly and continuously, spending due time in the..."irrational" relationships.[10]

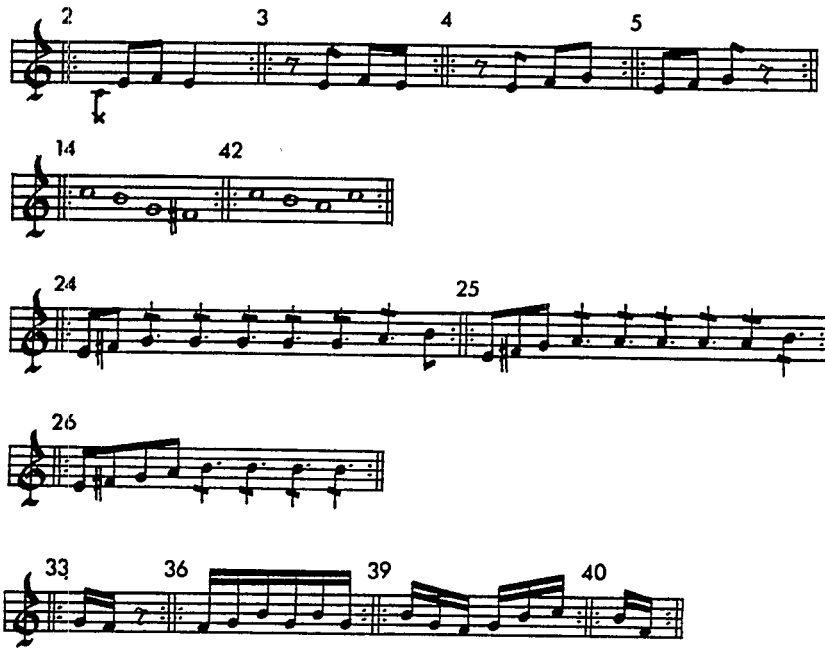
Simply stated, the musical process can be described as a gradual movement through all of the twelve possible phase relationships obtainable from the interaction of the pattern with itself. This process is extremely continuous due to the fact that there is also a very gradual movement between each phase. Further, continuity is firmly established by economy of pitches, persistent and almost unchanging rhythmic regularity, and a constant dynamic level.

In addition to being continuous, focal changes in the musical process are evenly paced and distributed. Information, of course, is extremely limited due to slow and gradual change but, moreover, because changes occur within a framework of a limited number of pitches in a fixed pattern. It is even possible, then, that a listener could merely focus on the pattern without being fully attentive to changes. However, changes exist throughout because of the rhythmic irregularities, or "irrational" rhythms as Reich calls them, that occur between phase shifts, and because differences between phases regarding lines and interval content seem to be rather noticeable, as seen when comparing the eleventh and twelfth phases reduced to resulting upper and lower lines (Example 9). Yet these changes do not affect the overall static quality of this piece.

In Terry Riley's *In C*, constant focus is



Example 9



Example 10

brought about in a different manner. This work calls for any number and type of instruments, except for a piano which provides a steady pulse of continuous octave eighth-notes (top C-octave) throughout a performance. The score is comprised of fifty-three figures (or patterns) in a fixed order, each figure differing from the other in pitch, rhythm, or length. In spite of differences, however, figures are closely related motivically. This is seen in the similarities between figures as seen in Example 10. Furthermore, figures are also related because of the tonal cohesion throughout the work: C to E to C to G.

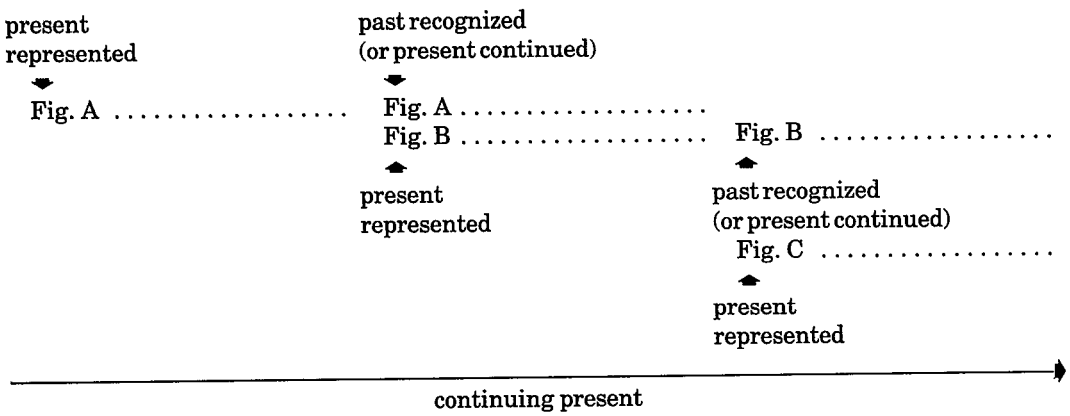
Performers, entering in staggered fashion, are instructed to play all fifty-three figures in their given order and in synchronization with the pulse provided by the piano. How long a performer plays each figure before going to the next and how long he rests between figures, if he wants to, are his choices. A performance, which should last anywhere from forty-five to ninety minutes, ends after every performer has played all fifty-three figures.

Compared to focus in *Piano Phase*, focus in *In C* obviously involves more change. In accordance with the musical process, focus on an overall level shifts from the tonal areas of C, E, C and G, respectively, in contrast to focus on one tonal area established by the pattern in *Piano Phase*. For this reason, the element of teleology is more conspicuously perceptible in *In C*. Pitch and rhythmic differentiation, let alone motivic or pattern variety, also increases focal changes. Due to these changes, continuity seems to be more apparent since changes give it more embodiment and, therefore, more tangibility than the subtle and almost static continuity in *Piano Phase*.[11]

In spite of these differences, both works are alike insofar as they generally have expanded "presents" in the time continuum due to repetition and very gradual changes. Psychological time in both cases, then, is slowed down.[12] It could be said that, due to more changes in *In C*, time would be perceived to move faster in *In C* than in *Piano Phase*. Yet, because each figure can be played very long and, because its length

or "life" is further extended due to the fact that many instruments are playing it out of phase with each other, the movement of time in *In C* can seem to be somewhat equal to that in *Piano Phase*.

There might be one small difference between *In C* and *Piano Phase* regarding time, however. In *In C*, differentiated figures become overlapped because performers are playing out of phase with each other. In effect, this overlapping could be taken as a symbolic placement of the past and present into the same locale in the time continuum. That is to say, if the "present" is identified with a newly emerged figure, then the overlapping of this figure with another newly emerged figure could be interpreted as a symbolic merging of past and present. This occurrence could be diagrammed in the following way:



This kind of occurence exists in *Piano Phase* to an extent, of course, since one piano is stationary while the other moves on; yet it is not quite so noticeable due to less differentiation of material.

Certainly, this notion of a merger of past and present approaches a level of abstraction which may be too remote from what actually (and practically) takes place in a listener's perception. Nevertheless, it does contribute another explanation as to how and why the "present" can be perceived to be expanded.

Summary

Constant focus and its "expanded present" experienced in pattern-pulse works just discussed represent a radical way of reinstating musical focus which may have become generally weakened in post-war compositional developments. It is perhaps the most significant aspect of most minimal music – the "ground" of this music. At the same time, it is also the most challenging aspect for listeners or performers.

Approaching this music requires much patience and staying power due to the very slow unfolding of details, especially in lengthy works like *Drumming*. Those desiring more change (information) may have to become involved with change of details on a microlevel – getting "inside" the music. This level of attention will probably require less attentiveness to the musical process (macrolevel). Thus, intelligent listening and performance may demand balanced or alternating attention to both levels.

Compositionally, constant focus may be looked upon as a starting point or basic ground for other varieties of focus, largely established by varying *degrees* of focus. Temporary focus already exhibits this potential and recent compositional developments seem to indicate at

least a stronger consciousness if not a commitment to focus – possibly a result of the presence of minimalism over the years. In time this music may even stimulate more specific codification. For now, an understanding of constant focus will provide a basic orientation to these developments.

References

[1]Recently, an extensive introduction to Steve Reich's music by K. Robert Schwarz ("Steve Reich: Music as a Gradual Process") appeared in Volumes 19 and 20 of *Perspectives of New Music*, the journal which has heretofore neglected minimalism in music.

[2]Tonality can be viewed as a form of repetition because of its hierarchical ordering of pitches. The tonic and returns of the tonic could be viewed as repetitions contributing to unity in music. However, for present purposes here, tonality will not be given attention.

[3]Lecture given at Mary Austin House, Sante Fe, 1936. Quoted in "Varèse: A Sketch of the Man and His Music" by Chou Wen-Chung, *The Musical Quarterly*, Vol. LII, No. 2 (April 1966), p. 157.

[4]Witold Lutoslawski, "The Composer and the Listener" in *Lutoslawski*, edited by Ove Nordwall (Stockholm: Edition Wilhelm Hansen, 1968), p. 121.

[5]Of course, these criticisms could be considered "Germanic" and therefore not be considered applicable since Polish music does not seem to have come out from that tradition. If any, Penderecki and Lutoslawski have been much more influenced by Bartok than any "Germanic" composer as evidenced in their earlier scores. It should also be noted that Penderecki's music has drawn more criticism than Lutoslawski's – probably because Lutoslawski's music in general has used more variety and relied less on cluster-type composing which has begun to sound like "formulas."

[6]Some of his later works have used quite a bit of repetition, e.g., *Mantra* (1970) for two pianists. It should also be mentioned that many of the later works of Luciano Berio have had conspicuous repetition. Most striking uses are found in *Sinfonia* for eight voices and orchestra. This trend of increasing repetition found in works of one time post-Webernites seems to indicate a definite move away from serialism.

[7]There seems to be the use of a Fibonacci series here. Although not in order, numbers belonging to the series are merely juggled around. For example, measures with events, i.e., $\frac{142}{8}, \frac{87}{8}, \frac{42}{8}, \frac{13}{8}, \frac{21}{8}, \frac{1}{8}, \frac{8}{8}, \frac{5}{8}, \frac{2}{8}, \frac{3}{8}$, can be derived from the following series and its adjustments: 1, 2, 3, 5, 8, 13, 21, and $13+42+87 = 142$. Likewise, measured rests, i.e., $\frac{2}{8}, \frac{8}{8}, \frac{1}{8}, \frac{5}{8}, \frac{2}{8}, \frac{3}{8}$, seem to originate from the series. The use of the Fibonacci series seems to indicate a concern for perception and focus, for the capacity of series to generate perceptible differences is often a reason why composers rely on it.

[8]With the inclusion of subjective factors into the definition of unity in these works, one is tempted to say that works employing temporary focus approach a kind of "romanticism" in contrast to, for example, a kind of "classicism" represented in serial works.

[9]This "singular" focus might be seen in the music of La Monte Young who has been interested in lengthy durations of single notes or intervals, where the apparent non-change sharpens one's perception by making one become aware of existent microscopic changes, whether they be in the music or oneself.

[10]From *Notations* by John Cage (New York: Something Else Press, Inc., 1969).

[11]A minor point of clarification might be necessary here. In stating that continuity is more tangible, it is not the same as stating that there is *more* continuity. For it could be said that *Piano Phase* has a higher degree of continuity due to less differentiation of musical materials. To state that continuity is more tangible in *In C* merely indicates that continuity is more perceptible.

[12]Of course, subjective evaluations enter into the picture here, which makes more specific description difficult. A listener, for instance, could find one work more interesting and, therefore, "faster moving" than the less interesting one.

Tonality in Daphne of the Dunes

Glenn Hackbarth is currently on the faculty at Arizona State University where he teaches theory and composition and directs the New Music Ensemble. The recipient of an Arizona Commission on the Arts composer fellowship and three ASCAP awards for composition, his music has been performed at festivals and contemporary music concerts throughout the country.

Although the recipient of little recognition throughout his lifetime, Harry Partch is undoubtedly one of the most unique figures in American music. Indeed, with his strong convictions and rugged individualism, Partch aptly conveys the stereotype of the American pioneer in the most positive sense. Raised in the Southwest, he was musically self-educated, relying almost exclusively on libraries and, at least initially, on the music accessible to him in a fairly remote geographical and cultural location.

Throughout his life Partch worked to create a music of intense personal expression which was tangible and bodily – a music of corporeal essence. Without any strong support from the academic community, Partch lived and believed in his art with enormous vigor. His commitment spanned the complete gamut of musical involvement: He was active throughout his life as an instrument maker, continually designing, building, and refining instruments compatible with his corporeal and theoretical ideals; he was frequently involved as a performer; and, most important, he was a composer whose considerable output occupies a unique niche in the music of this century.

This paper is devoted to an overview of pitch control in one of Partch's later works: *Daphne of the Dunes*. Actually a 1967 revision of *Windsong*, composed in 1958 as the soundtrack to a film produced by Madeline Tourtelot, *Daphne of the Dunes* was written as the music

to a dance-drama based on the myth of Daphne and Apollo and is scored for a complement of twelve instruments.[1] Five – the Adapted Viola, the Harmonic Canon II (Castor and Pollux), the Harmonic Canon III (Blue Rainbow), the Kithara II, and the Surrogate Kithara – are string instruments. One – the Chromelodeon I – is a reed instrument. And the remaining six – the Cloud-Chamber Bowls, the Spoils of War, the Gourd Tree (with Cone Gongs), the Diamond Marimba, the Bamboo Marimba, and the Bass Marimba–are percussion instruments.[2]

It is initially important to emphasize that the core of Partch's work in the area of pitch is directed not merely toward matters of external organization, but is concerned with the nature of the most basic material itself. Partch's theories stem from the conviction that music committed a serious error when it unequivocally embraced equal temperament. In its attempt to provide a system capable of accommodating extensive transposition and chromaticism, equal-tempered tuning had also succeeded in compromising, thereby falsifying, acoustical relationships that were most basic and natural to sound.

While Partch was not unique in his recognition of this dilemma, his work certainly represents one of the most extensive efforts to pioneer a solution. For Partch, the answer was to be found in a system which restored the concept of acoustical proportionality to its members, and in *Daphne of the Dunes,* this desire is manifested in his use of what he called the 11-limit tonal system.

The entire pitch network of the 11-limit tonality is generated by the numerical factors 1, 3, 5, 7, 9, and 11 (called, by Partch, *identities*). This process is begun by first calculating all the possible permutations of ratios involving these six identities in their simplest form, placing them within the range of an octave,[3] and then converting them to specific pitches relative to the focal point of G as 1/1.[4]

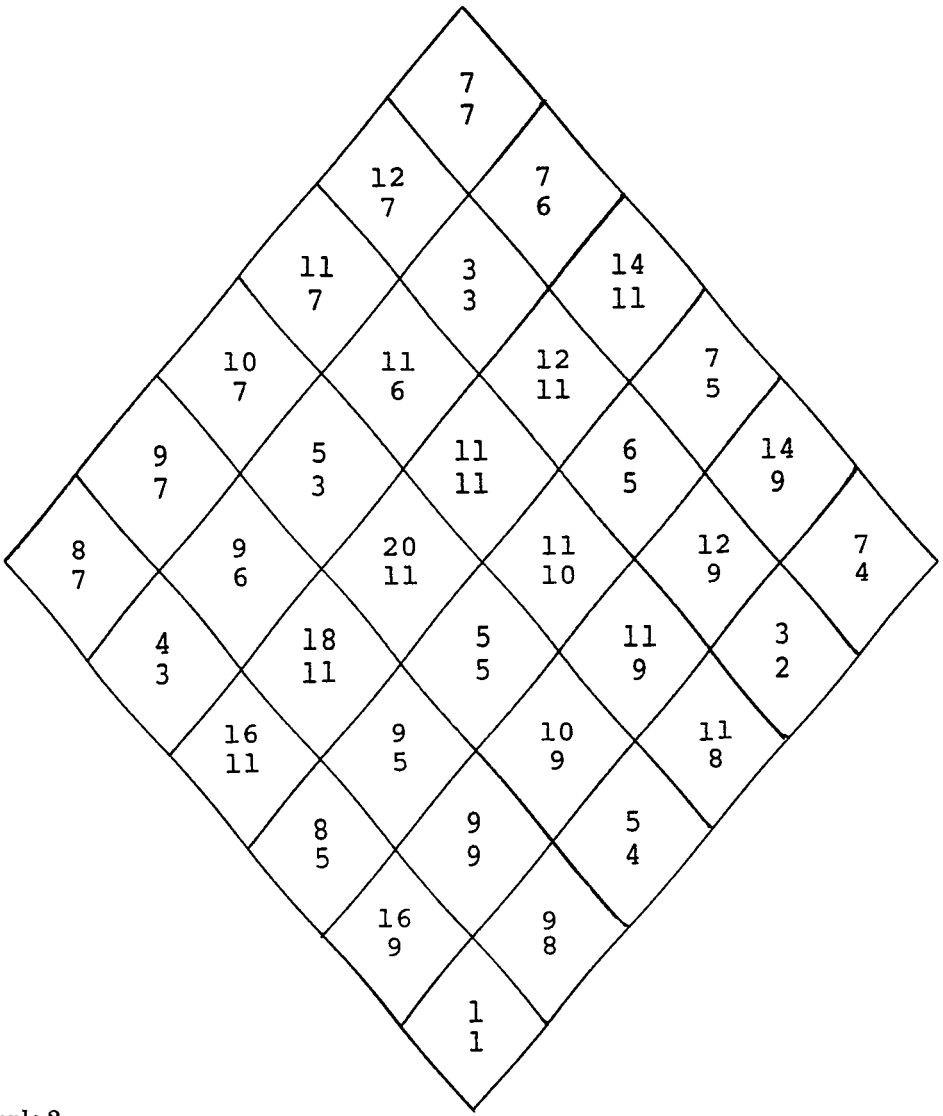
Possible ratios:	1	3	5	7	9	11	1	3	5	7	9	11	1	3	5	7	9	11
	1	1	1	1	1	1	3	3	3	3	3	3	5	5	5	5	5	5
8va adjustment:	1	3	5	7	9	11	4	3	5	7	9	11	8	6	5	7	9	11
	1	2	4	4	8	8	3	3	3	6	6	6	5	5	5	5	5	10
Pitches:	G	D	B	F↑+	A+	C↑	C	G	E	B♭↓	D	F↑	E♭	B♭	G	D♭↓	F+	A♭↑
Possible ratios:	1	3	5	7	9	11	1	3	5	7	9	11	1	3	5	7	9	11
	7	7	7	7	7	7	9	9	9	9	9	9	11	11	11	11	11	11
8va adjustment:	8	12	10	7	9	11	16	12	10	14	9	11	16	12	20	14	18	11
	7	7	7	7	7	7	9	9	9	9	9	9	11	11	11	11	11	11
Pitches:	A↓	E↓	C♯↓	G	B↓	D↑-	F	C	A	E♭↑	G	B♭↕	D↓	A↓+	F♯↓+	C↓+	E↓+	G

Example 1

Those ratios which share as their denominator the same identity are classified as *otonalities* – the factors 1, 3, 5, 7, 9, and 11 present in each set *over* a numerical constant (what Partch terms the *numerary nexus*). Those ratios which share as their numerator the same identity are termed *utonalities* as each of the six different factors is present under a numerical constant.

These sets are then represented in what

Partch calls the *expanded tonality diamond,* the otonalities reading diagonally from the lower left to the upper right and the utonalities from the lower right to the upper left.

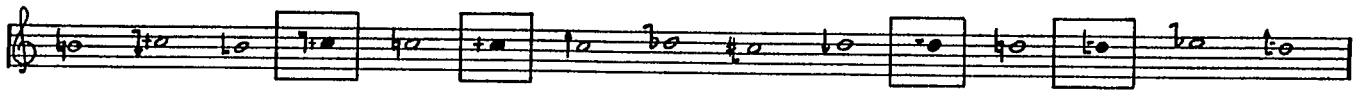


Example 2

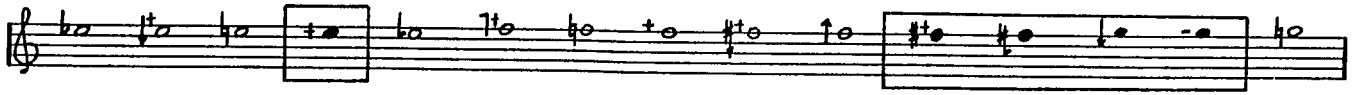
When organized into a scale, the twenty-nine ratioed pitches (represented in Example 3 by open note-heads) result in a formation which is inherently symmetrical. Beginning at the outermost pitches and working toward the center, every ratio in the scale has a complement which is its numerical inversion (taking into account the process of octave adjustment).

Example 3

	1	81	33	21	16	12	11	10	9	8	7	32	6	11
	1	80	32	20	15	11	10	9	8	7	6	27	5	9
Adjacency:		81	55	56	64	45	121	100	81	64	49	64	81	55	45
Ratios		81	54	55	63	44	120	99	80	63	48	63	80	54	44
Cents:		22	32	31	27	39	14	17	22	27	36	27	22	32	39



	5	14	9	21	4	27	11	7	10	16	40	3	32	14	11
	4	11	7	16	3	20	8	5	7	11	27	2	21	9	7
Adjacency:	56	99	49	64	81	55	56	50	56	55	81	64	49	99	56
Ratios	55	98	48	63	80	54	55	49	55	54	80	63	48	98	55
Cents:	31	18	36	27	22	32	31	35	31	32	22	27	36	18	31



	8	18	5	27	12	7	16	9	20	11	15	40	64	160	2
	5	11	3	16	7	4	9	5	11	6	8	21	33	81	1
Adjacency:	45	55	81	64	49	64	81	100	121	45	64	56	55	81	
Ratios	44	54	80	63	48	63	80	99	120	44	63	55	54	80	
Cents:	39	32	22	27	36	27	22	17	14	39	27	31	32	22	

Additionally characteristic of this scale are the varying intervallic distances between the scale steps – represented in the preceding example both in cents and as adjacency ratios. In examining these measurements it becomes evident that the initial twenty-nine note scale contains several scale steps which are, in relation to the majority of adjacencies, comparatively large (the boxed areas in the above example). To fill in these gaps Partch calculates fourteen secondary ratios (represented by solid noteheads), bringing the total number of pitches encompassed by the scale to forty-three.

Although Partch is clearly working to create a more uniformly gradated scale, it is significant to note that three important considerations govern his choice of these particular ratios over the many others that might have been employed. First, these ratios must be comprised of numbers within the 11-limit system. Since Partch has exhausted all of the simple identity relationships, he creates these additional factors by multiplying two previously established ratios of the system (for example: 15/8 = 3/2 x 5/4).

The second consideration stems directly from a concept of dissonance and consonance that is extremely fundamental to Partch's system of organization. Simply stated: *"The scale of musical intervals begins with absolute consonance (1 to 1), and gradually progresses into an infinitude of dissonance, the consonance of the intervals decreasing as the odd numbers of their ratios increase."*[5] In discussing the subdivision of gaps in the 29-tone scale, Partch clarifies his application of this concept, explaining that these particular ratios were chosen "because they are the ratios of the smallest number [and, therefore, the greatest consonance] available for the purpose..."[6]

The final, and perhaps most important, factor governing the selection of these ratios was their ability to combine with other ratios within the scale to form additional tonal resources. In this respect Partch was also clearly successful. The fourteen new pitches make possible sixteen other tonalities which, although often incomplete in their identity content, display the same basic construction as those in the expanded tonality diamond. These Partch categorizes as secondary tonalities.

Secondary Tonalities

Otonalities

1	3	5	7	9	11
3/2	9/8	15/8	21/16	27/16	33/32
6/5	9/5	3/2	21/20	27/20	
9/5	27/20	9/8		81/80	
16/15	8/5	4/3		6/5	
32/21	8/7	40/21	4/3	12/7	
32/27	16/9	40/27		4/3	
7/5	21/20	7/4			
27/20	81/80	27/16			

Utonalities

4/3	16/9	16/15	32/21	32/27	64/33
5/3	10/9	4/3	40/21	40/27	
10/9	40/27	16/9		160/81	
15/8	5/4	3/2		5/3	
21/16	7/4	21/20	3/2	7/6	
27/16	9/8	27/20		3/2	
10/7	40/21	8/7			
40/27	160/81	32/27			

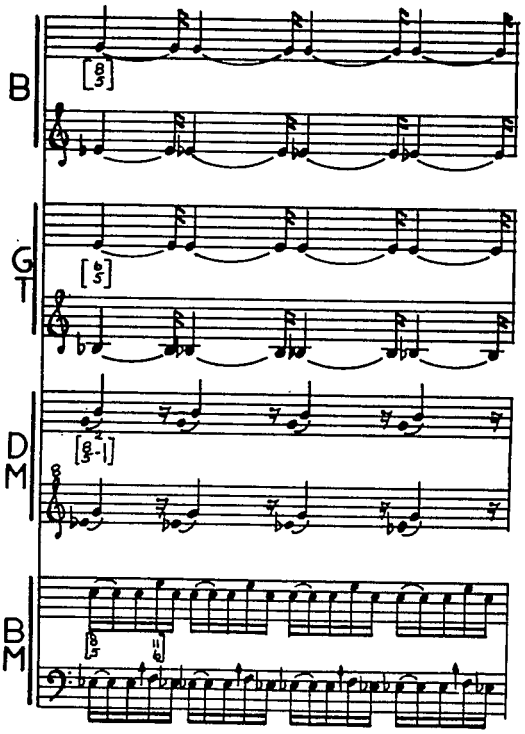
Example 4

The significance of this final criterion is the fact that it guarantees that every pitch in the 43-tone system can function as an identity element of at least one tonality. And it is clearly the organization of otonalities and utonalities which is of primary importance to Partch. An examination of these structures reveals that they share more than certain numerical constants in their generation. Each otonality consists of a 3/2 perfect fifth (the 3 identity), a 5/4 major third (the 5 identity), a 7/4 minor seventh (the 7 identity), a 9/8 major second (the 9 identity), and an 11/8 augmented fourth (the 11 identity) placed above a generating ratio temporarily representing 1/1 (the 1 identity). Each utonality consists of the same five intervals projected beneath the inital generating pitch.

These same intervallic relationships are also found in the secondary tonalities. The only structural difference is the omission in most of at least one identity element.[7] It should be noted, however, that Partch felt that the identities within a tonality were not of equal importance. Following his postulate of relative dissonance and consonance, he observed that in the 11-limit, the "establishment of tonality is achieved primarily through the 1-3-5 Identities and in diminishing degree through the 7-9-11 Identities."[8] In this regard, all of the secondary tonalities possess at least the first three identity elements.

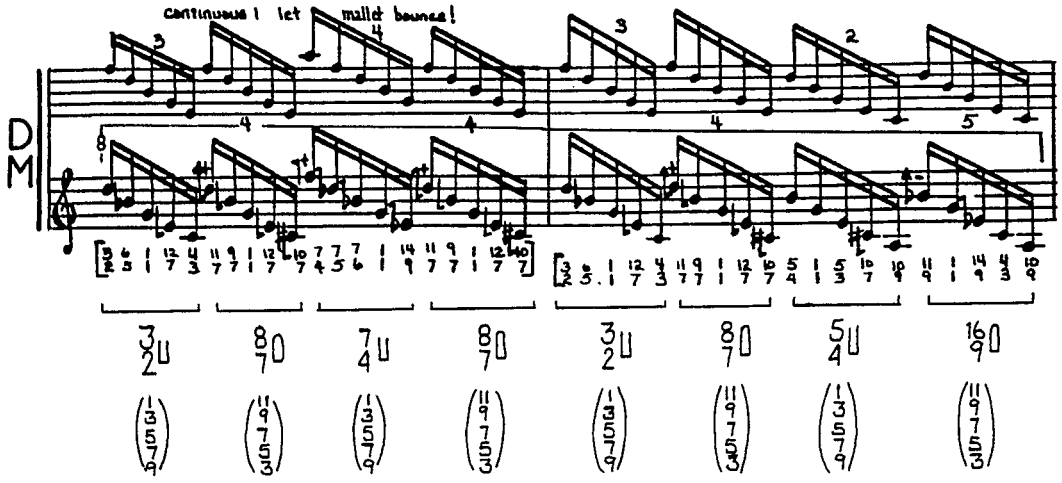
Since both the primary and secondary tonalities contain ratios which represent the most consonant realizations of the identities possible, Partch views these structures as tonal magnets. Their strong polarizing effect is one of stability and finality; the ultimate degree of consonance to which other more complex ratios must resolve.

It is this specific concept of the system as a series of interlocking otonalities and utonalities that proves to be the basis of pitch organization in *Daphne of the Dunes*. While clear verticalizations of tonalities form a smaller portion of the composition than might be anticipated, their appearance provides crucial points of focus and stability through out the entire work. To strengthen this effect, Partch often relies heavily on the lower elements of the tonality as is illustrated in Example 5.[9] Following an extended passage of relative tonal instability, four instruments combine in this measure to present the 1 (8/5), 3 (6/5), and 5 (1/1) identities of an 8/5 otonality. The only element foreign to this structure – 11/6 in the Bass Marimba – functions as a "non-tonal" pitch in the texture, somewhat similar to a non-harmonic tone in more conventional music.



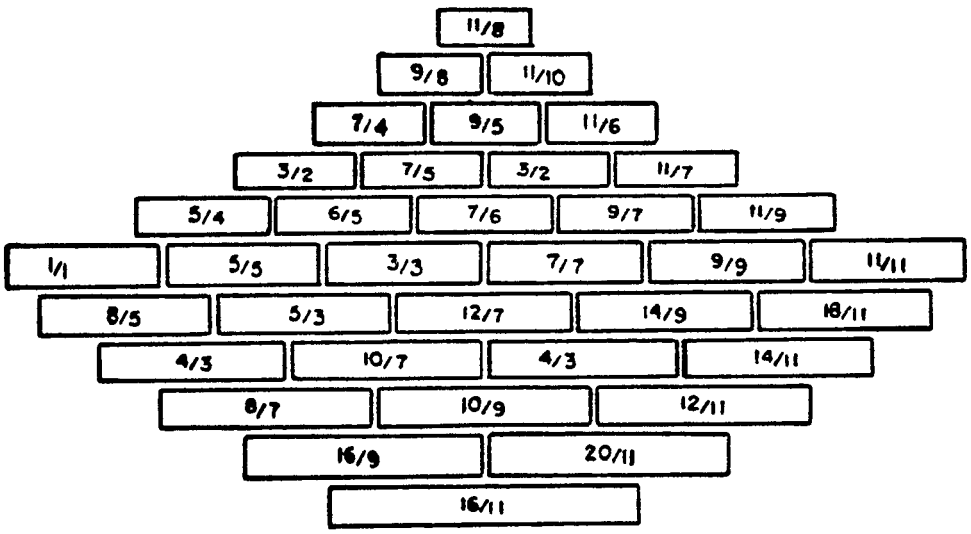
Example 5

A more complex example of this type can be seen in the Diamond Marimba part extracted from measures 17 and 18 (Example 6). Here the rapid alternation between several different tonalities and the presence of higher identity elements render this passage somewhat more transient in nature. At the same time, the continual involvement of 1/1 functions to bind these groups together, illustrating a technique of regulating tonal progression through common tones that Partch employs throughout virtually the entire work.



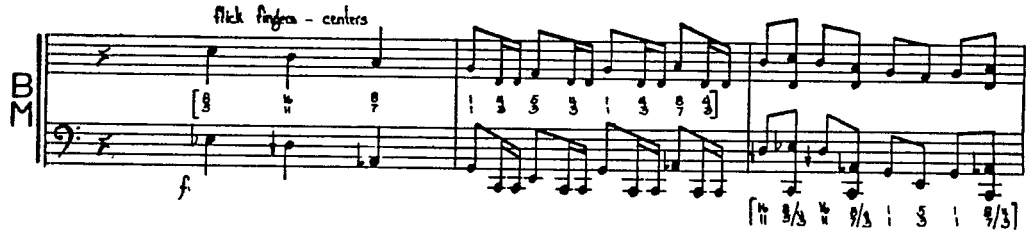
Example 6

This passage also demonstrates the close relationship between the system and the design of the instruments. The keyboard of the Diamond Marimba is limited to the twenty-nine ratioed pitches of the basic 11-limit system and their arrangement is only a slight modification of the expanded tonality diamond (Example 7). Thus the performer is able to play complete tonalities simply by moving diagonally on the instrument.[10]



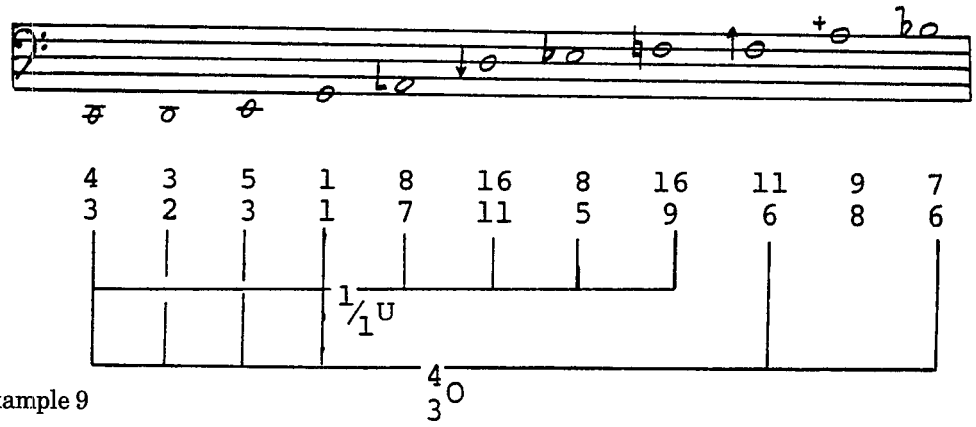
Example 7

Extended melodic lines that are restricted to the members of a specific tonality are also few in number, the unaccompanied Bass Marimba passage beginning in measure 34 existing as one of the few examples of this type in the entire work.



Example 8

The close relationship between instrument construction and tonal potential is quite apparent in this passage as well. Although individual pitches on the Bass Marimba can function as single elements of a large number of different tonalities, its melodic capability is fairly limited. With the exception of 9/8, extended melodic lines on this instrument tend to naturally project either a 4/3 otonality or a 1/1 utonality.



Example 9

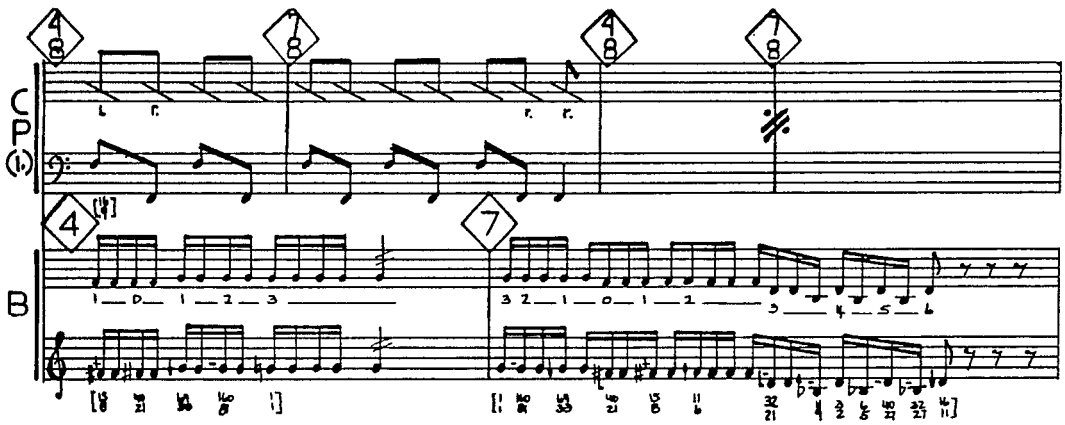
Actually, almost all of Partch's instruments display similar limitations. Many – such as the Bass Marimba, the Cloud-Chamber Bowls, the Spoils of War, the Gourd Tree, and the Cone Gongs – are capable of articulating only a small number of pitches from the 43-tone scale and usually only in specific registers. Accordingly, these particular pitches were "selected...because of the frequency of their occurrence in the tonal patterns used in the body of music for which they were intended."[11]

From this perspective it must be emphasized that the projection of a tonality need not be limited to a complete statement of its identity content, a point that Partch stresses in *Genesis of a Music*. *"But it [the establishment of a tonality] is also achieved in other ways...reiteration, emphasis, a drone bass, etc."*[12] In fact, in *Daphne of the Dunes*, the utilization of pedals and ostinati constitute the most common means of securing the tonal foundation, and their constant use over large time spans is directly responsible for a frequent slow rate of harmonic change.

To a large degree it is the two Harmonic

Canons that function most often in this role. Here again instrumental tuning proves to be a critical factor. Both the Blue Rainbow and the Castor and Pollux consist of two canons (right and left) each containing forty-four strings which are tuned by the insertion of movable bridges. In *Daphne of the Dunes,* the entire left canon of the Castor and Pollux and twenty of the strings on the left canon of the Blue Rainbow are set to sound 16/9 – a pitch that emerges, primarily through the drone-like efforts of these two instruments, as the most important tonal center of the entire work.

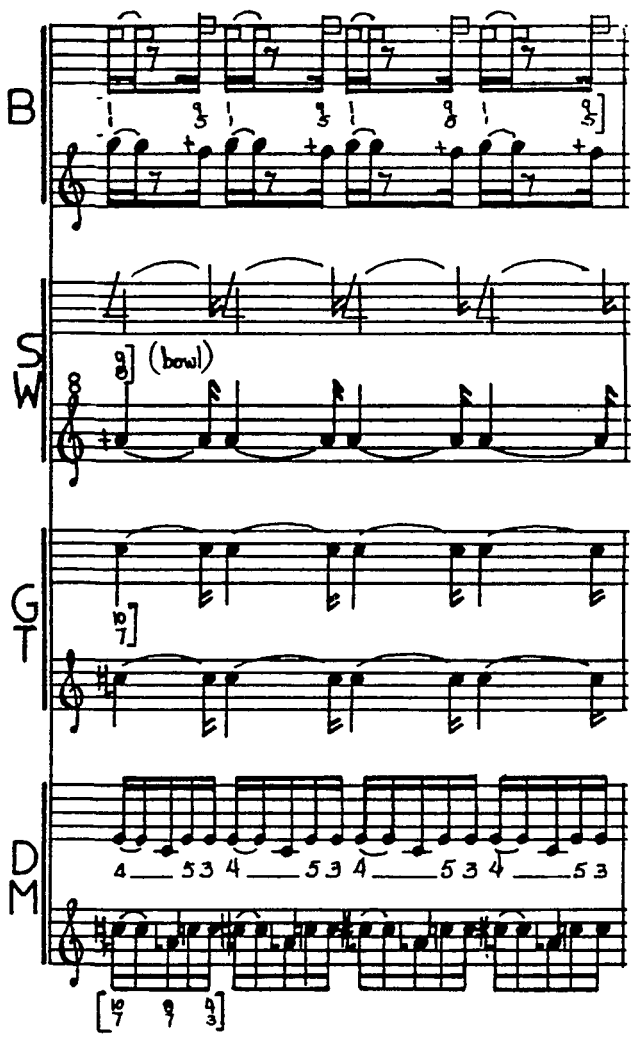
At times, these pedals simply reinforce an identity element of a tonality articulated by the other instruments in the texture. But they are also utilized to great advantage in situations such as the passage in Example 10 where the additional material is so highly chromatic that it would have been otherwise impossible to get a clear indication of any tonal center.



Example 10

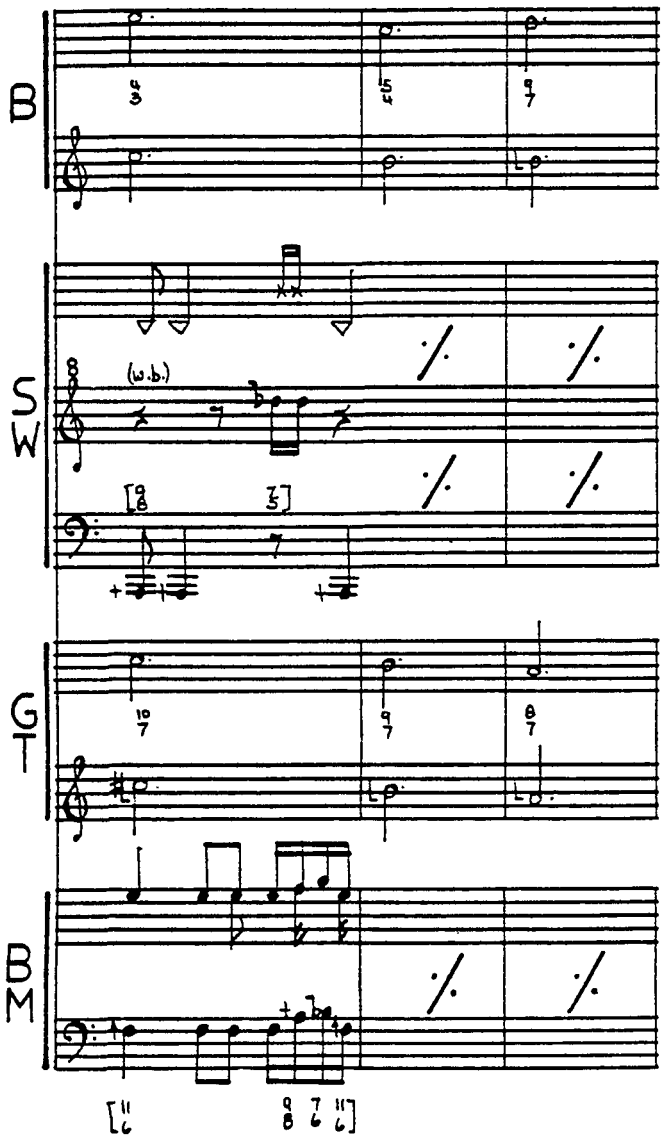
While the above procedures constitute crucial means for establishing tonality within *Daphne of the Dunes,* much of this work's unique character is the direct result of various techniques which disrupt the tonal stability and consequently increase harmonic tension within the music. Simultaneous tonal mixtures, or "polytonalities," occur with great frequency and are not limited to events which are simply the result of extended pedals.

In measure 43, for example, the 9/8 bowl of the Spoils of War and 9/5 in the Cloud-Chamber Bowls project the 1 and 5 identities of a 9/8 utonality, while 8/7 and 10/7 in the Gourd Tree and the Diamond Marimba supply the 1 and 5 identities of an 8/7 otonality. In addition, 1/1 in the Cloud-Chamber Bowls provides a common link between both tonalities, serving as the 9 identity of the 9/8 utonality as well as the 7 identity of the 8/7 otonality.



Example 11

Even more complex polytonal operations occur in sections surrounding the climax of the work. In measures 298 to 300, 9/8 in the Spoils of War serves as a pedal under several other tonal fields. The Bass Marimba repeats a melodic fragment which projects the 7 and 11 identities of a 4/3 otonality – a tonality reinforced by the momentary presence of 4/3 in the Cloud-Chamber Bowls – with 9/8 functioning both as a neighbor to 7/6 and in support of the pedal in the Spoils of War. Simultaneously, the Gourd Tree melodically outlines an additional area, providing the 1-5-9 identities of an 8/7 otonality. In this passage, there is an absence of common factors (although 1/1 would exist in both areas had it been present) and the 9/8 pedal proves incompatible with either of the other tonalities.

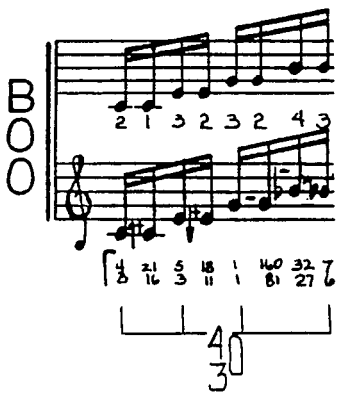


Example 12

To a large degree, the presence of such pivotal elements appears to be as significant in regulating the impact of polytonal structures as it is in the control of harmonic movement. In the latter, common factors function to promote a smooth sense of linear flow. In the former, the number of common elements is directly related to the degree to which the components of a polytonal texture blend and, therefore, to the aural complexity of the structures.

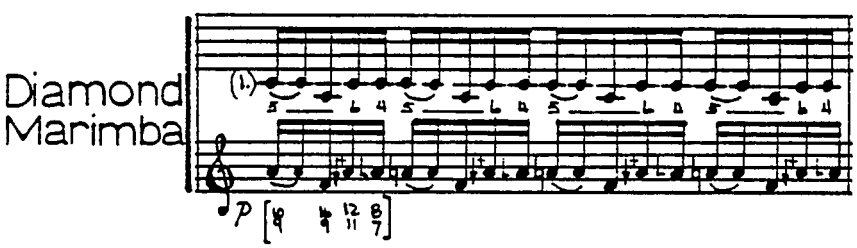
The pitch structure of *Daphne of the Dunes* is further characterized by an extensive and often elaborate use of chromatic elements. Generally, they are placed into fairly conventional non-harmonic situations with clear analytical implications. In measure 61, the Bamboo

Marimba begins by arpeggiating a 4/3 otonality through its 7 identity. Each pitch of the arpeggiation has been embellished with a non-harmonic tone which lies, in terms of the 43-tone scale, exactly one scale degree beneath or above the pitch to which it is most directly related.



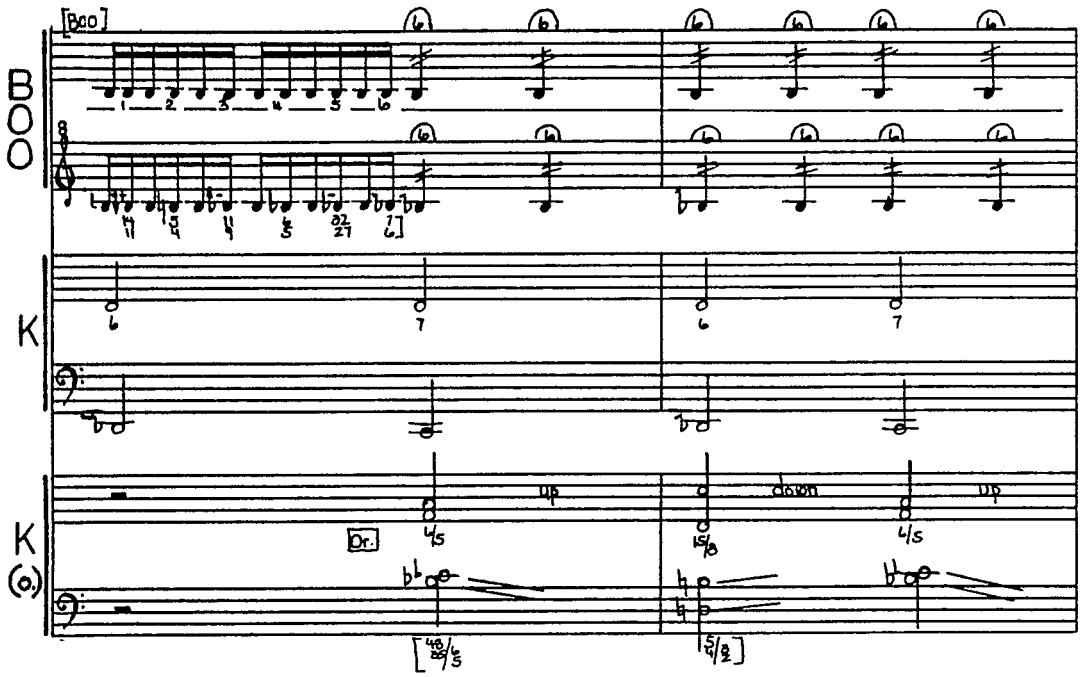
Example 13

Instrumental tunings prove to be an especially important factor with regard to the degree of chromatic intensity within such a passage. The Diamond Marimba ostinato which begins to work also employs similar non-harmonic elements with 8/7 and 12/11 functioning as upper and lower neighbors to 10/9. In this case, however, both chromatic factors lie two scale steps from the pitch they embellish, a distance made necessary by the fact that neither of the pitches directly adjacent to 10/9 are available on the Diamond Marimba in that register.



Example 14

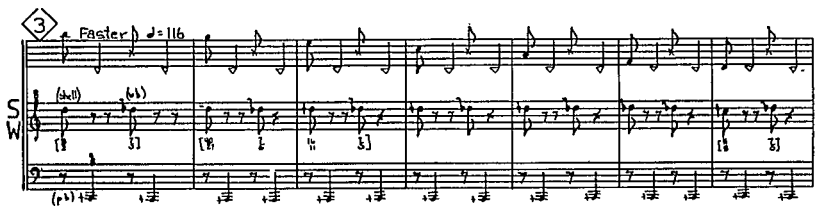
It is also common for Partch to utilize both the harmonic component and its chromatic neighbor simultaneously, a procedure which produces a slight clouding of the identity element and the resulting tonality. In measures 337 to 338, for example, the Kithara II and Bamboo Marimba provide the 1 (4/3) and 7 (7/6) identities of a 4/3 otonality with 7/5 in the lowest voice serving as an upper neighbor to 4/3. Playing from the opposite side of the instrument, an additional performer on the Kithara II articulates a series of dyads whose pitches chromatically embellish the established tonal components as well as the non-harmonic auxiliary. In measure 337, 48/35 (a pitch not contained within the basic 43-tone scale) and 6/5 function as upper neighbors to 4/3 and 7/6; while in the following measure, 5/4 and 3/2 provide upper auxiliaries to 7/6 and 7/5 (the 3 and 5 identities of a 7/4 utonality).



Example 15

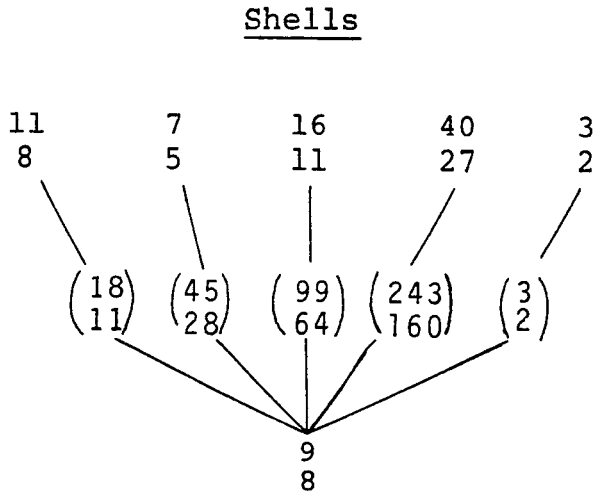
From the preceding examples, it can be seen that the concept of a neighboring tone is a bit more complicated than in equal-tempered music. Whereas in the latter, an upper neighbor to the pitch G could be one of two possibilities ($A^{\flat}$ and $A^{\natural}$), it could be any one of nine pitches in Partch's system. Within this enlarged wealth of gradations, the distance of a neighbor could be as little as fourteen cents and those which are in closest proximity to the inflected pitch have a tendency to sound more like slight microtonal distortions of the original.

Ultimately, this type of chromatic distortion affects not only the pitches involved but the intervals that these pitches form with other ratios in the musical fabric. A clear example of instrument construction in support of this concept can be found in the Spoils of War. In the version of this instrument used in *Daphne of the Dunes,* the seven brass artillery shells have been tuned to provide a chromatic scale segment spanning 11/8 to 3/2. Extended lines on this instrument at the work's climax utilize this scale segment primarily as a chromatic succession which embellishes 3/2 (Example 16). Simultaneously these pitches interact with

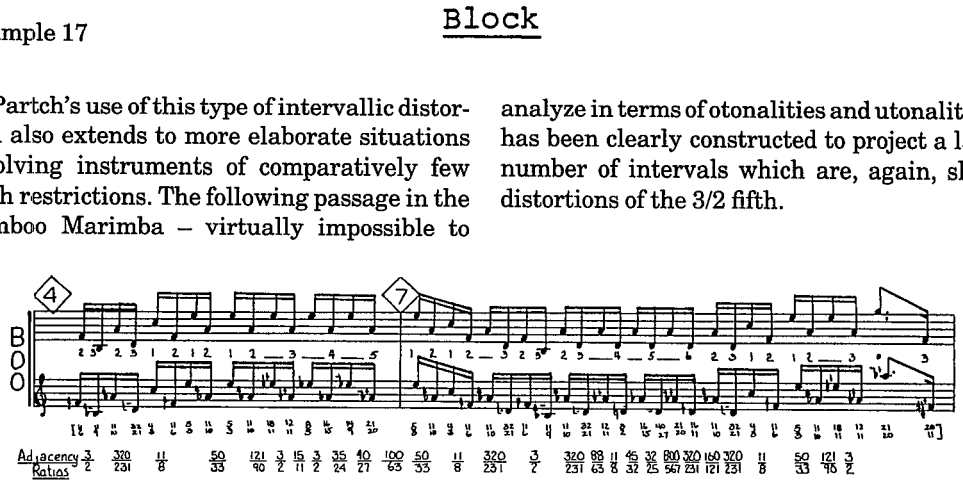


Example 16

the 9/8 pedal presented in the same instrument to create a succession of intervals which are microtonal distortions of the 3/2 fifth that exists between 9/8 and 3/2 (the 1 and 3 identities of a 9/8 utonality).



Example 17



Example 18

Partch's use of this type of intervallic distortion also extends to more elaborate situations involving instruments of comparatively few pitch restrictions. The following passage in the Bamboo Marimba – virtually impossible to analyze in terms of otonalities and utonalities – has been clearly constructed to project a large number of intervals which are, again, slight distortions of the 3/2 fifth.

Among all of the various formats in which chromaticism does appears in this work, there is a noticeable rarity of extended chromatic lines. In part, this could be attributed to the fact that the majority of Partch's instruments are simply not capable of articulating such a passage. The two Harmonic Canons could be tuned to present chromaticism in this manner and, in fact, portions of both the Blue Rainbow and the Castor and Pollux are set to produce chromatic scale segments. But Partch limits his use of these portions of the instruments to large

sweeping arpeggiations which function more as color washes than as clear lines. The Adapted Viola – fretted with guide pins hammered into the neck – is capable of articulating the complete 43-tone gamut as a scale, but its use in *Daphne of the Dunes* is actually one of "diatonic" simplicity instead. Extensive chromaticism in the Chromelodeon I, perhaps the best suited instrument in the entire ensemble for presenting lengthy chromatic lines, is almost totally restricted to large clusters – again, primarily for coloristic purposes. Thus, it remains the domain of the Bamboo Marimba to provide these longer scale segments and even here such statements are relatively rare.

Although the end product of Partch's work is often seen as a microtonal scale which encompasses forty-three tones to the octave, these latter observations tend to emphasize that the scale is, in reality, subordinate to the tonal system. In *Genesis of a Music,* Partch wrote: *"...music is not a fantasy of chromaticism. A scale is a source of materials, from which chords and melodies are drawn, and in which the scale as a scale appears only occasionally if at all."*[13]

In *Daphne of the Dunes,* it becomes especially clear that the ratios, chosen for their potentials within a system of interlocking tonalities, collectively form the scale and not the opposite. And it is this system that proves to be the fundamental governing force behind pitch throughout the entire work. Inherently capable of great variety, it offered Partch the ability to logically organize his proportional language into a cohesive framework and provided the basis for a lifetime of unique artistic expression.

References

1. Partch explicitly stated in the preface to the score of *Daphne of the Dunes* that the rewriting of *Windsong* was not an afterthought but a possibility that he envisioned when working on the soundtrack. From a musical standpoint, the two scores are virtually identical, the differences so minor that Partch felt the 1958 copyright would suffice for the later work as well.
2. For a complete description of the history, construction, playing, and tuning characteristics of each of these instruments, see Harry Partch, *Genesis of a Music,* 2d ed. (New York: Da Capo Press, 1974), pp. 195-319.
3. The process of halving or doubling one of the factors of a ratio does not change its pitch class but merely succeeds in placing the original pitch in a different octave. In this paper, all ratios are converted to the octave span between 1/1 and 2/1 for ease of discussion and comparison.
4. Since conventional notation fails to adequately express the expanded pitch resources of Partch's system, a somewhat unconventional system of pitch diacritics developed by Ben Johnston has been adopted. To arrive at the various accidentals employed to represent the ratios, the following procedure was observed: All naturalized (or uninflected) pitches represent ratios in C major just intonation in which the tonic, subdominant, and dominant triads have been tuned in 4:5:6 proportions. A # or ♭ raises or lowers a pitch, respectively, by the ratio of 25/24, a + or − raises or lowers by the ratio of 81/80, a ⌊ or ⌉ raises or lowers by the ratio of 36/35, and a ↑ or ↓ raises or lowers by the ratio of 33/32. In addition, the various symbols must at times be employed in combination to accurately represent a given ratio.
5. Partch, *Genesis of a Music,* p. 87.
6. *Ibid.,* p. 129.
7. These omissions are necessary to keep the pitch content of the secondary tonalities within the 43-tone system. The 7 identity of the 9/5 otonality, for example, would be 63/40 – a ratio not found in the existing scale.
8. Partch, *Genesis of a Music,* p. 183.
9. All examples from the music observe the format of placing Partch's original tablature notation immediately above the transcribed part for each instrument.
10. A similar correlation is evident in the physical layout of the Kithara II, which consists of twelve banks of six strings, each bank tuned to a specific, although incomplete, otonality or utonality.
11. Ben Johnston, "The Corporealism of Harry Partch," *Perspectives of New Music* 13:2 (Spring-Summer 1975), p. 96. Significantly, eight of the Bass Marimba's pitches are 1 identities of primary tonalities and all eleven are found in the expanded tonality diamond.
12. Partch, *Genesis of a Music,* p. 183.
13. *Ibid,* p. 121.

From Hearing and Reading to Listening and Understanding: An Attempt to Bridge the Gap

Michael W. Udow is Associate Professor of Music (Percussion) at the University of Michigan. He serves on the editorial board of Percussive Notes Research Edition *and is a member of the Percussive Arts Society Board of Directors. He is principal percussionist of the Santa Fe Opera and tours internationally as a percussionist-composer with Nancy Udow, dancer-choreographer, under the title* Equilibrium.

Preface: The following observations were made while spending the summer in Santa Fe, New Mexico. Not having access to my home library, I am unable to provide complete bibliographic information. However, the title of books and articles with author credits do appear within the body of this paper.

The Percussive Arts Society is a highly diverse organization with a membership spanning the ages of ten to ninety years. Members have specialized performance interests ranging from orchestral percussion to Middle-Eastern tambourine, from drum set to mallet-keyboard percussion, from marching percussion to mbira, and from contemporary music to playing the bones, as well as being composers, theorists and scholars from related fields. The list of interests is virtually unlimited. As a member of the editorial board of *Percussive Notes Research Edition,* I am charged with the responsibility of scrutinizing the quality of a percentage of the submitted articles, both in terms of content and communicative clarity. The function of *Percussive Notes Research Edition* is to foster an expanding network of information and ideas generating new areas of research and performance practice.

The Executive Editor of *Percussive Notes Research Edition,* Stuart Smith, recently requested that I present for the general readership an inside view of my responses while reviewing a manuscript for publication,

thereby giving the readership a personal example of how one can connect issues raised in one article to broaden our understanding of new and old performance practices and make interdisciplinary connections. For instance, a bass drummer in a marching band or orchestra or a drum set player could each reconsider, perhaps even re-define, the very nature of the acoustical phenomenon with which he or she is engaged.

In response to Dr. Smith's request, then, I would like to present some of my thoughts, perceptions, and connections made while reading Professor DeLio's article, which appears in this issue.

In addition to writing a highly informative article, Dr. DeLio presents insights which raise important issues. The central focus of this article is a report and analysis of Mr. Lucier's continued work with pure waves and, in this case, the use of wave forms to initiate (or in percussive terms, actuate), through sympathetic vibrations of bass drum heads, the ever-changing rhythms of ping pong balls reverberating against the drum membranes. The bass drum's primary function serves as a rhythm modifier through resonsance rather than as the timbral sonic entity, "bass drum." This is quite distinct from the way percussionists usually think of the term "bass drum" as used in a work like the "Dies Irae" of the Verdi *Requiem*. In fact, there is even debate as to the type of bass drum sound which best suits that part. Verdi requested a tightly stretched drum head. However, today most percussionists perfer to work for a large round deep tone with a punctuated presence in the initial attack of the sound. The word "bass drum" is actually a rudimentary description which gives the percussionist only a thumbnail sketch of the multiplicity of possibile sounds which may be achieved through careful instrument selection, suspension, actuation, and mallet (the actuator) choice as *dictated by the context of the music*. One need only reflect on the distinctions of the desired sonic results of the solo bass drum tremolo in Richard Strauss' *Salome* as she emerges with the head of John the Baptist, as compared with the bass drum integrated into the multiple percussion setup of Igor Stravinsky's *L'Histoire du Soldat* (or the required focused projection of tonal bass drums in today's drum corps, or the use of the bass drum in jazz drumming as compared with hard-rock drum set playing), to recognize the importance of the content of the music in a performer's ultimate interpretation of the part. I vividly recall in my "mind's ear" a distinguished performance by Mr. Alan Abel of Darius Milhaud's *Concerto for Percussion with Small Orchestra* where he judiciously substituted, at specific moments in the music, a larger suspended bass drum for the pedal operated drum. This substituation enabled the performer to shape and integrate the timbral weave between the bass drum, the other membranophones and the tam tam, creating a far superior result as compared with the exclusive use of the pedal-actuated bass drum on the floor.

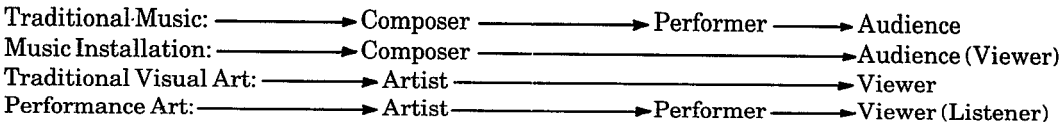
Alvin Lucier's use of bass drums as resonators has a relationship to Jean-Charles Francois' experimental performances with KIVA, the La Jolla-based intermedia ensemble. (*Percussive Notes Research Edition* Volume 21 Number 3, 1983 P. 8-17). Professor Francois, with the use of contact microphones, sends electronic and acoustic sounds through percussion instruments and extended tube resonators. These sounds are then amplified producing unusually intriguing sound colors. In both cases, an important concept emerges: percussion instruments are used as sound modifiers rather than sound sources which are then modified.

Research in the area of resonance seems to be an important priority among percussionists and manufacturers. Alan Abel's research and development of the suspended bass drum stand certainly prompted a scurry of activity in this area. With regard to timpani, discussion and experimentation now centers around the bowl design in terms of suspension, shape, materials, and cubic air volume. Del Roper combined an aluminum edging with rosewood bars to increase the ring time of the upper octaves of the marimba evening out the sustaining quality throughout the entire range of the marimba. Several manufacturers have added double resonators in the lower octaves of the marimba to acoustically amplify the fundamental tone's resonance. The Hinger Touch Tone Corporation's

development of the space-tone snare drum initiated further research in the area of snare drum resonance and sound projection. In the above cases there seems to be a direct connection between the quest for tone quality with increased resonance.

Composers and performers have often found unusual ways to utilize the concepts of resonance. While in England, I had an opportunity to hear drum set artist Bobby Orr perform an encore, an arranged excerpt of Rossini's *Overture to William Tell* performed on a pencil. The pencil was held by the teeth and struck with the fingers to produce the rhythm. By changing the shape of the mouth's resonant cavity, the melody was clearly audible and the audience found the performance a *tour de force*. George Crumb, in several of his works, uses stones with hand-altered resonance to change frequency. This same technique coupled with mouth resonance is subtly used in an exquisite musical moment in the 1973 Blackearth Percussion Group's recording of Edward Miller's *Quartet Variations* (Opus One Records). Vibraphone mouth vibrato, developed by contemporary percussionists, has been incorporated into the technique of jazz vibraphonists as a sonic effect. Hand-altered resonance-producing vibrato is a standard technique used by performers playing the sanza and mbira. The use of mouth and/or chest resonance is part of the standard technique of musical bow players. Professor David Reck, in his book *Music of the Whole World,* points out that people in one culture hold insects by one leg up to their mouths and couple their mouth resonance with the insects buzzing wings to acoustically amplify and reinforce shifting overtones. Certainly these examples are far removed from the research and compositional interests of both Alvin Lucier and Jean-Charles Francois. However, it is interesting for me to observe the bits of information emerging to the forefront of one person's thoughts suggesting new connections by piecing together images from the past.

The function of the performer is an important distinction between the work of Jean-Charles Francois and Alvin Lucier. In the case of KIVA, two musicians and a dancer interact and modify the acoustical and visual results within a performance. In the "Performance Version" of *Music for Pure Waves, Bass Drums and Acoustic Pendulums,* the performer is instructed to adjust oscillators to produce continually-changing rhythmic patterns of the ping pong balls bouncing against the vibrating bass drum heads. However, in the "Installation Version" of the same work; the frequency oscillator is pre-set, thereby eliminating the performer. Shifts in rhythm and sonic manifestations occur as a result of the environmental effect of temperature and humidity changes on the drum head(s). The elimination of the performer in this musical context sets up a *non-traditionally* based direct relationship between the composer and the audience, not unlike the *traditionally* based relationship of the visual artist and the viewer.



As expressed by Professor DeLio, "Changes in the frequency of the pure tone produce changes in both the speed and volume of the tapping sound. Thus, the original sound wave is rendered in two startling new ways – one sonic, the other visual." A strong sense of a direct link to kinetic art seems clear. When one considers the sonic and kinetic work of atomic artist Tony Price, where moving objects happen to produce sounds, it becomes apparent that some visual artists and composers have crossed boundaries. This, of course, is not a new concept. Happenings of the 1960s fostered the concept of interdisciplinary art experiments in the form of performances. With a different focus, Harry Partch created a total corporeal performance experience. The physics of sound coupled with a keen sense of individual compositional direction forced Harry Partch into designing and constructing musical instruments which exhibited masterful detail in both sonic and visual aesthetics. Partch often added gymnasts, singers and actors to his instrumental music ensemble, creating a total music theatre.

When I think of the total integration of the arts in society, I tend to seriously reflect on the question raised in the title of Professor John Blacking's book, *How Musical is Man*? Blacking describes the Benda society of Africa as a community where all members of the society were actively engaged in making music. There were no professional musicians. Comparing the Benda culture with other societies in the world, Professor Blacking questions the impact and value of the development of a professional class of musicians on the musical and creative fabric of the society as a whole. This is not to imply that professional musicians are not useful. Rather, it does question the effect of the development of the professional class of musicians on the remainder of the society with regard to the society's music making and creativity. One has to wonder if the lack of direct participatory involvement in the creative arts by the general society has a negative impact on the abilities of a society to ferret out connections for creative problem solving.

With the preceeding thoughts in mind, I was particularly interested in Professor DeLio's remarks concerning the listener's ability to recognize the act of perceiving as the grounds for cognition. An audience's ability to connect hearing to listening, listening to perceiving, and perceiving toward a state of cognition seems extremely rare in our society. As composer-educator, R. Murray Schafer points out that if we had "earlids" perhaps we would be much more selective in our hearing habits, which would be a step towards selective listening.

The ability of an audience member to elevate the mere existence of hearing to a level of listening must come from a desire to do so. If composers prefer an audience educated to listen, composers must assist in that educational process by composing works which help bridge the gap between hearing and listening. It seems self-evident that a significant percentage of music does not promote listening at all. "Muzak" ranks high in this category of promoting subliminal anti-cognition. A work of art, on the other hand, can promote receptivity and cognition if the perceiver has the proper training.

The intent of my remarks was to present one person's thoughts while reading an article. It is my hope that the above thoughts will encourage the general readership to approach articles in our Research Journal with a sense of adventure.

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