

The Interplay of Order and Disorder in *balagan*

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Abstract. "balagan" (commissioned by Ina/GRM, 2001) is a pure electroacoustic piece for eight channels. The sounds are all of acoustic origin, processed primarily by fragmentation and hybridization. The processing was done by programs I wrote in Max/MSP; the octophonic spatialization was done using my own streamlined and automated version of Ircam's Spatialisateur. In what follows, I start from the founding idea of the piece – disorder – discussing how this idea gave rise to the form, and then showing how it relates to the composition of the sounds. I discuss the kinds of sound processing used, emphasizing the different methods of control, and focusing in some detail on two contrasting approaches to soundfile fragmentation.

balagan, disorder

In Hebrew, *balagan* means "mess." The principle problematic for me in composing the piece revolved around this issues raised by this title: disintegration, chaos, disorder.

There is a tension inherent in this kind of project – a pulling in different directions – a problem which, if music were a logical discourse, would be considered an internal contradiction. A piece which is "about" disorder must necessarily represent and enact disorder; and yet if it is to have any impact, if it is to "mean" or to communicate anything at all, it must contradict its own thesis: it must speak of disorder in an orderly fashion; it must be an orderly enactment of disorder. So there is an inherent impossibility – or improbability – for a coherent, highly-organized piece of music to explore disorder explicitly as a kind of theme. Music is organized sound: if it's disorderly, is it still music?

But this contradiction is not only imposed by the nature of musical and human discourse; it is not only a conflict between the idea of disorder and its possibilities of realization or expression. It is inherent in the notion of disorder to begin with: disorder is not just the absence of order; nor is order the simple exclusion of disorder. The two opposites do not exclude each other, they are folded into and founded on each other.

So there is a conflict between disorder and the orderly expression of disorder, and another – parallel, if you will – conflict within disorder itself. In basing a musical composition on the idea of disorder, I was hoping (perhaps not so consciously as I present it here) that the one (the conflict between disorder and order) could become the image or representation of the other (the conflict within disorder itself). In short, I was hoping that the internal contradiction at the most fundamental level of the project I was proposing, far from being a hindrance to the exploration of disorder, would allow me to get somehow closer to the "truth of the matter."

Put more simply, I wanted to explore some of the ways in which disorder, disintegration, chaos interact with order, coherence, unity. I wanted to work with their interpenetrations, with some of the ways in which each is found within and founded on the other. The question (or one of them) was how things fall apart, and how in falling apart they take on orderly, coherent shapes.

Disorder, form

So, my practical problem was this: how to work with the idea of disorder in a coherent and formally organized piece of music? Faced with this difficulty, I wanted above all to avoid two extremes. The first was the liquidation or neutralization of the disorderly (subversive) nature of the content in an overly orderly and coherent discourse. I didn't want the *what* (disorder) to be swallowed up by the *how* (order). The second extreme I wanted to avoid is a music which retains its conceptual integrity at the price of intelligibility and musicality: a piece that can only be appreciated in conjunction with its program notes.

I ended up with something that has a peculiar kind of form, or formlessness. I like to think that it resembles the "constructures" my daughter used to make when she was 2 or 3 years old. There are many small objects arranged on the floor. Seen from a distance – as you enter the room, say – they give you the impression of a big mess; but if you look more closely, you become aware of a strong coherence in the juxtapositions and successions of objects. If you then begin to follow these links, you discover a changing, evolving logic; you get the feeling that it could lead almost anywhere, but never arbitrarily – that each step, however unforeseeable, would display an inner necessity. In the end, if you continue, you are drawn into a kind of labyrinth, filled with interconnections and relations.

So in composing *balagan* I worked very hard on *local connections*, a continuous flowing from one thing to the next; I pushed this principle of interconnectedness to the point that in many cases the two "things" are no longer perceived as two things connected by a transition but rather as a single continuously evolving flow. At the same time, this "flow" could not be linear: it needed to be able to change direction very quickly. The law of local coherence had to remain constant, but the logic of this coherence needed to be free to shift – in both foreseeable and unforeseeable ways. So rather than a flowing stream, or a geometrical shape: an endless turning, a continual unfolding towards something new. This evolution never comes back to its starting point, or to any other point already explored, never arrives (for instance) at a restatement of the opening "theme." At the end you are very far away from where you were at the beginning. And yet the whole is laced with interconnections – recollections of previous elements, and foreshadowings of those to come – and it never, in all its many turnings, exits from a certain vast but limited soundworld.

You may judge for yourselves to what degree I was successful, but if this experiment functions as I intended it, *balagan* will be perceived *at the same time* as a big mess and as a coherent, unified whole.

Composing the sounds

For me, the process of composing electroacoustic music tends to fall into two main phases: generating the sound material – what I will call composing the sounds – and

using the sound material to construct the piece – which I will call composing *with* the sounds. Until now I have been talking about composing with the sounds; I will now turn to the composition *of* the sounds themselves.

I would like to stress that for me the process of composing the sounds for a piece is a completely integral part of composing the music. It is thoroughly infused with the compositional idea behind the piece – as are the preliminary stages of recording the raw sounds and developing the tools that will be used to process them.

With this in mind, let's turn to the two main processes mentioned above. Fragmentation: cutting up sounds into little bits and spitting them out in various ways. Hybridization: combining the spectral energies of two different sounds in order to produce a third which is neither one nor the other, nor necessarily anything intermediate. These two processes are contrary and complementary, and also thoroughly appropriate to the idea of *balagan*: fragmentation – how things fall apart; hybridization – how things combine. And the third main process – spatialization – is equally coherent with the central theme. Throwing things around, bits and shards of world flying wildly outwards: clearly, spatialization can be a way of making a mess – but also, and *at the same time*, of creating musical coherence, of suggesting or reinforcing relations among sound objects. If I throw two objects in the same direction, or in the same way, they are musically linked.

Multiple parallel approaches

I develop my own tools for sound processing. The overall openness of this approach plays an essential role in my methods for the "composition" of sounds.

Very often, presented with a compositional problem, I will develop in parallel several different possible solutions. So if I would like to generate a certain type of sound, I may develop two or more methods. This is partly because I cannot be sure ahead of time which one will produce the most interesting results given the sounds I plan to use. But it is also because two different methods will never produce exactly the same result; they will necessarily produce sounds with different qualities and characteristics. In this way, I am able to generate different but more or less closely related families of sounds.

Hybridization

In composing the sounds for *balagan*, I took two distinct approaches to sound hybridization. I built both a vocoder and a cross-synthesizer. These two methods for combining the spectral energies of two sounds work in totally different ways.

A vocoder passes each of the two sounds through a bank of band-pass filters and uses the amplitudes of one bank to control those of the other. The idea is to apply the spectral envelope of the first sound, with all its temporal evolution, to the second sound. But since the actual processing is done by the filters, the main characteristics of the resulting sound are determined by the filtration itself as much as they are by the sound which is controlling the filters.

Cross synthesis, on the other hand, performs a fast Fourier transform on the two sounds; combines the data of these two analysis in various ways; and resynthesizes the resulting sound. So this processing is a kind of scrambling and reorganization of the

sound's entrails. The color of the resulting sound (often quite harsh) is determined as much by this scrambling itself as it is by the fact that this scrambling is controlled by another sound.

In short, these two analogous processes produce sounds that are totally different. And so the two families of sound which I generated using these processes, while closely related conceptually, have very different musical functions in the piece.

I also used a third, very simple, method of hybridization: the application of the amplitude envelope of one sound to another. To this process (which might be considered a kind of “one-band vocoder”) I added a variable degree of ring modulation – which was sometimes useful to bring in a bit of the timbre of the modulating sound. I found this process to be remarkably effective on certain sounds – particularly when applied in stereo.

Fragmentation

With soundfile fragmentation, I also took two very different approaches to the problem. This time, however, the differences are not on the level of the processing algorithm – the two programs are built around what is essentially the same machine – but rather on the level of the control interface. Let us consider the evolution of these patches concretely and in detail.

For an earlier piece, *not even the rain* (2000), I wrote several programs for soundfile fragmentation, notably that shown in Figure 1.

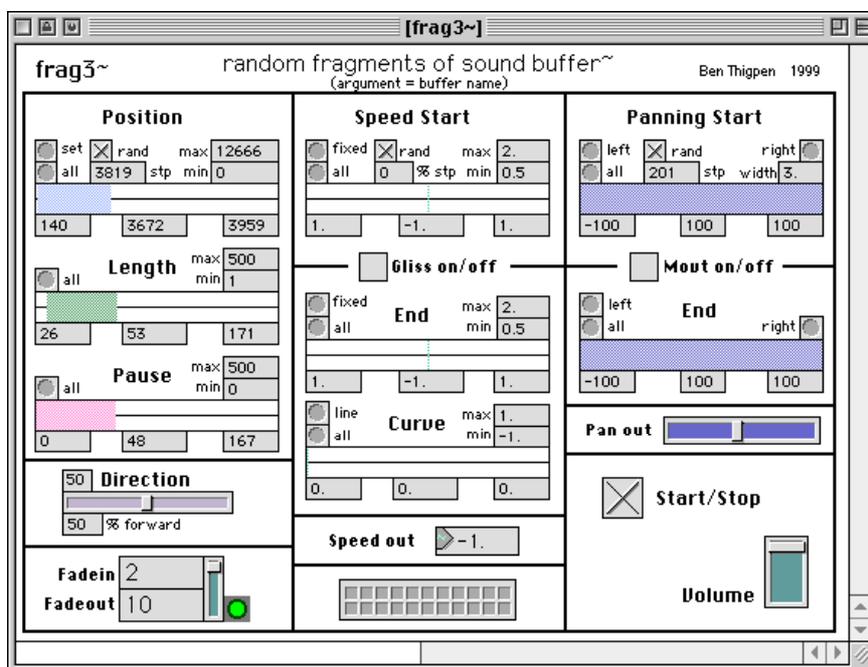


Figure 1. A program for soundfile fragmentation

This patch generates a series of soundfile fragments, the parameters of each fragment being chosen at random between the minimum and maximum values set on the user interface. It produced a lot of very interesting and useful results. However, for *balagan*, I wanted to go beyond what I found to be its major limitation: the rhythms it produced tended to be "characterless." When I used this patch, I often needed to

continuously vary the pause and length parameters, in order to introduce contrasts, sudden shifts, etc. I felt that I needed to integrate something more evolved than a simple random distribution for the generation of rhythms; I needed to impose some kind of order, limitation, or regularity so that the rhythms themselves could become meaningful.

So here I am at the sound processing level, working with the problematic of the integration of order and disorder: I needed to integrate more order into the disorder of this patch, so that the rhythms it produced could become more meaningful, and so that their disorder could be perceived as such.

Faced with this problem, then, I did what I usually do: I developed several different solutions. The first is a module that chooses randomly among a limited set of rhythmic values, usually (but not necessarily) integer multiples of a basic pulsation, each one having a variable weight, or probability of being chosen. The second explores non-linear random distributions, allowing for such things as a sporadic alternation between very short and very long values. The third employs a chaotic algorithm; its rhythms are characterized by shifting, not-quite-repeated patterns.

Figure 2 shows the three rhythm generators.

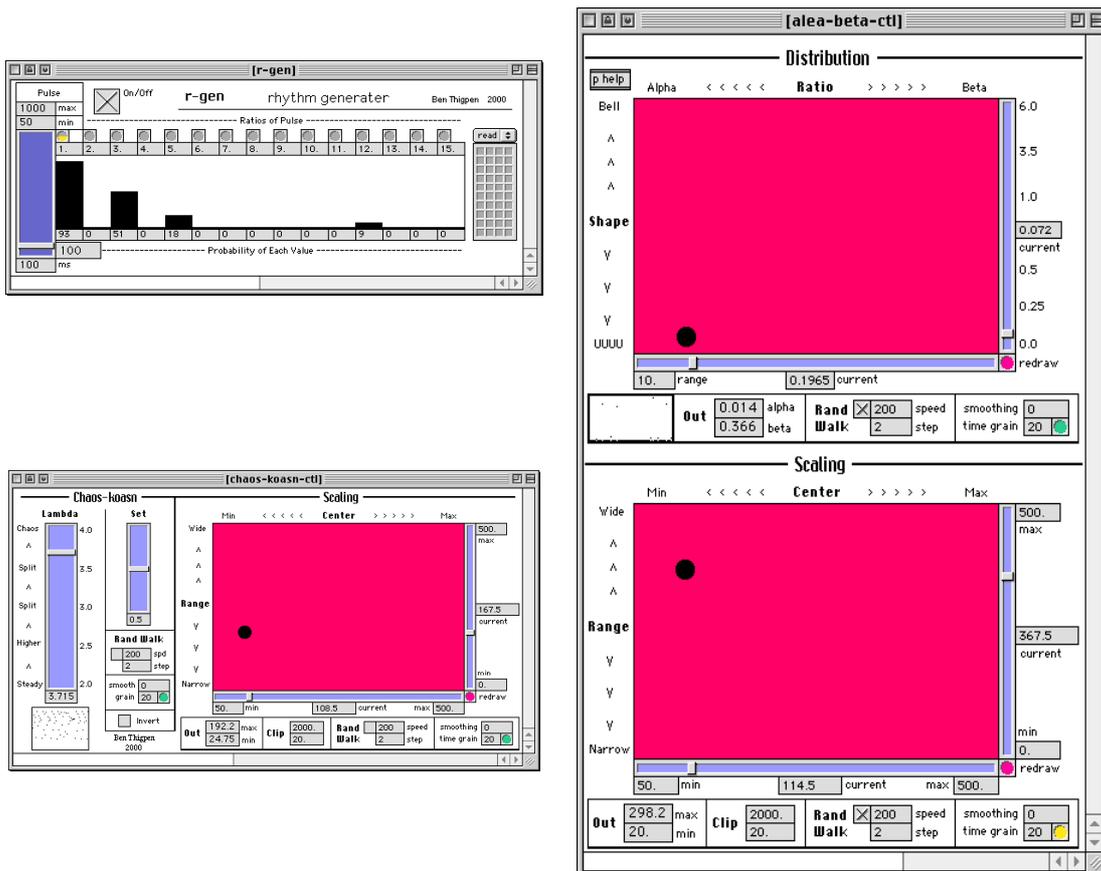


Figure 2. Three rhythm generators

I would like to mention the different levels of control involved here. Each fragment is generated randomly by the machine, so at the local level I have no control. But I control the parameters of the machine; my control is global. This global control is

first parametric (I can set the precise values), and second gestural (I can drag around the faders). The gestural control in particular allows me to interact with the sound as it is generated, introducing evolutions, abrupt changes, irregularities, and so on.

But there is also a third type of global control: I introduced an automated random walk on several of the most important parameters. In this way, if I don't touch the interface at all, the parameter (and so the sound) will nonetheless shift, evolve, change. So I relinquish direct control over the precise value of this (already global) parameter; but I control the machine that controls the parameter; I have global control of a global parameter. The final rhythm is the result of a certain type of random process controlling the parameters of another type of random process. What I control is the kind of activity it will display. And the machine will also always respond to human intervention: I can place the fader in a specific location, and it will continue its random walk from there.

Let us compare this with the other fragmenter that I mentioned; it is shown in Figure 3.

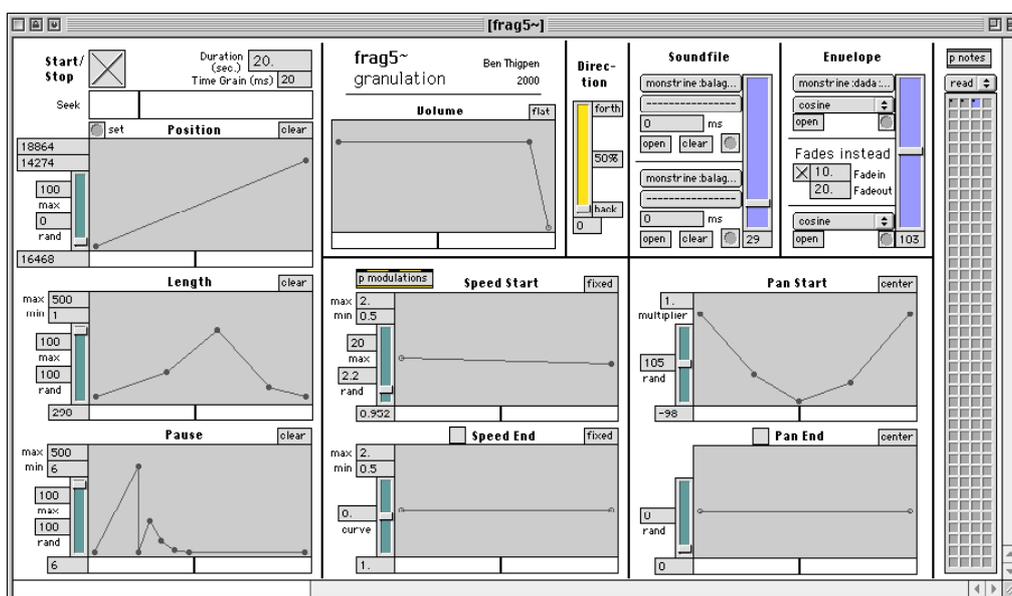


Figure 3. A program for *writing* soundfile fragmentation

In constructing this patch, I took another, contrary, approach. You will recognize all the parameters from the previous patches, but the method of control has been completely changed. Rather than making the machine more intelligent through the types of controlled random behavior I've been describing, I made an interface that allows me to specify the temporal evolution of each parameter precisely with an envelope. The orientation is not global, as before (controlling the overall behavior of a more or less autonomous machine), but local: the envelopes describe the specific local values for each parameter. Most importantly, in this patch I am involved in *writing* the sound whereas before I was *playing* it. Here I don't interact with the sound while the patch is running: instead, I specify the parameters and listen to the result; then I correct or modify the parameters and listen again.

And the results are very different. The previous patch produces interesting sound textures with no linear directionality (unless gesturally imposed). This one, on the other hand, produces very coherent, formed, clearly evolving, directional objects.

I hope it is clear that these two approaches to soundfile fragmentation are *also* two approaches to the integration of order and disorder. In the first case, I start from a random behavior and limit it, imposing order in various ways. In the second, I start from a kind of directional, evolving order given by the envelopes' curves. Then I am able to introduce a variable degree of disorder for each parameter: next to each envelope is a fader marked "rand." This fader opens a band around the precise values of the envelope; the actual values used for any individual fragment are chosen at random within this band.

Conclusions

It is essential to my approach as a composer to create a coherence between the two levels of composing the sounds and of composing with the sounds. For this reason (among others), I develop my own sound processing tools as an integral part of the compositional process. In this way, I am free to explore the universe of sound in the ways that I desire – developing my own algorithms, multiplying parameters, conceiving alternative interfaces, creating multiple levels of control, etc. This is my current approach to the problem of generating sound material which is both original and intimately connected with the compositional idea of the piece.