O Christmas Tree

"But you can't write music that way!" – Elliot Carter, 1972

Dating from my student days (1971-72), *O Christmas Tree* (originally titled simply *Christmas Tree*) was inspired by the giant tree that appeared in the Juilliard lobby every year. It always struck me as a bit odd, since Juilliard never seemed much like a Christian place, being in the heart of Jewish New York and with over twenty percent foreign students, many from Asia.


CHRISTMAS TREE

by

John Melcher

ORCHESTRATION:

Clarinet in Bb (doubles bass clarinet)
Trumpet in Bb
Violin
Harp
Piano

january, 1972
NEW YORK

All instruments sound where written.

Title page from the original score

Conception

What intrigued me most were the lights, which were unusual in that they each flashed individually. This would give rise to different kinds of patterns. At one moment, for example, there might be only red lights, or only the lights on the bottom of the tree, or several lights of the same color might flash in series, giving the impression of movement. The effect was kaleidoscopic and quite mesmerizing, and I would sit and watch it for long periods, until my visual perception of it became almost subconscious, and I began to wonder if there might be some way to express that experience musically.

Earlier that year, our weekly Composer's Forum had been graced by the great composer Iannis Xenakis, whose ideas of "stochastic" and other mathematical processes to determine musical elements in a composition were very controversial and widely discussed in our little circle.

For me, some of his ideas and techniques seemed ideal for my immediate musical goal. I wanted an effect of extremely unpredictable melodic patterns arising almost simultaneously, sometime in solo lines (like all the red lights flashing), sometimes with notes passing from instrument to instrument. Today, I'd probably say I wanted the texture to be "fractal" in nature, but at the time, that branch of mathematics didn't really exist.

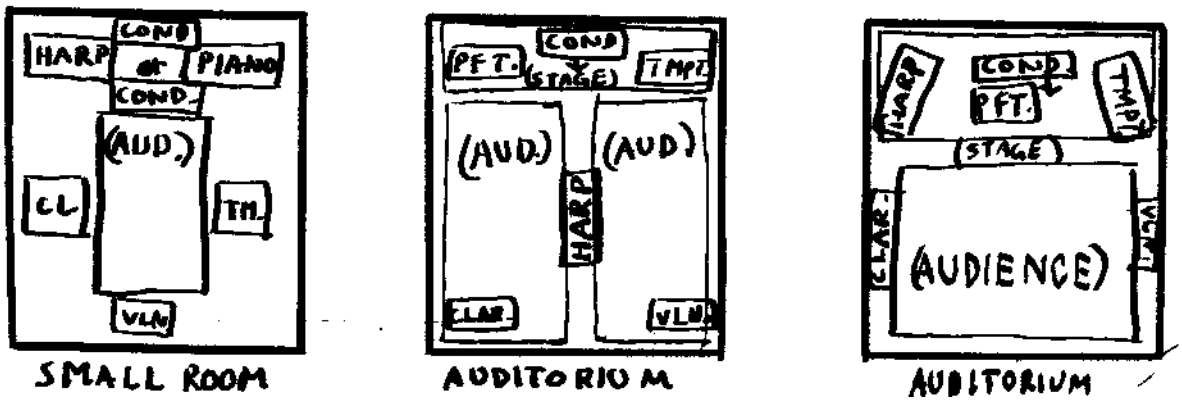
The instrumentation – Bb clarinet (doubles bass clarinet) Bb trumpet, violin, harp and piano - was designed to give as diverse a range of timbres as possible, further enhanced with mutes and a variety of playing techniques. Also, I had in mind a performance of school friends:

Clarinet:	Bernie Yannota
Trumpet:	George Karmazyn
Violin:	Paul Hatton
Harp:	Alyssa Hess
Piano:	Bruce Adolphe
Conductor:	Neville Dove

Sadly, this performance never happened.

O Christmas Tree

I also envisioned the instruments spread around a performance space, again with the idea of separating each voice from the others.



Performance notes from the original score

Overall Structure

Now for the "math", actually more arithmetic than the complex calculus equations of Xenakis, which were (and remain) somewhat incomprehensible to me:

The overall structure is based on the idea of the "Golden Ratio", something I had noticed in the first movement of Bartok's *Music For Strings Percussion and Celeste*. Usually applied in visual arts and architecture, the ratio of the smaller part to the larger is the same as the larger is to the two together, or: S:L = L:S+L. Via some calculations I've never quite fathomed, this ratio is exactly:

$$\frac{\sqrt{5}-1}{2} \approx .618$$

In other words, If the total length (in inches or seconds) is 100, the larger part is 61.8 and the smaller is 61.8 x .618 = 38.2.

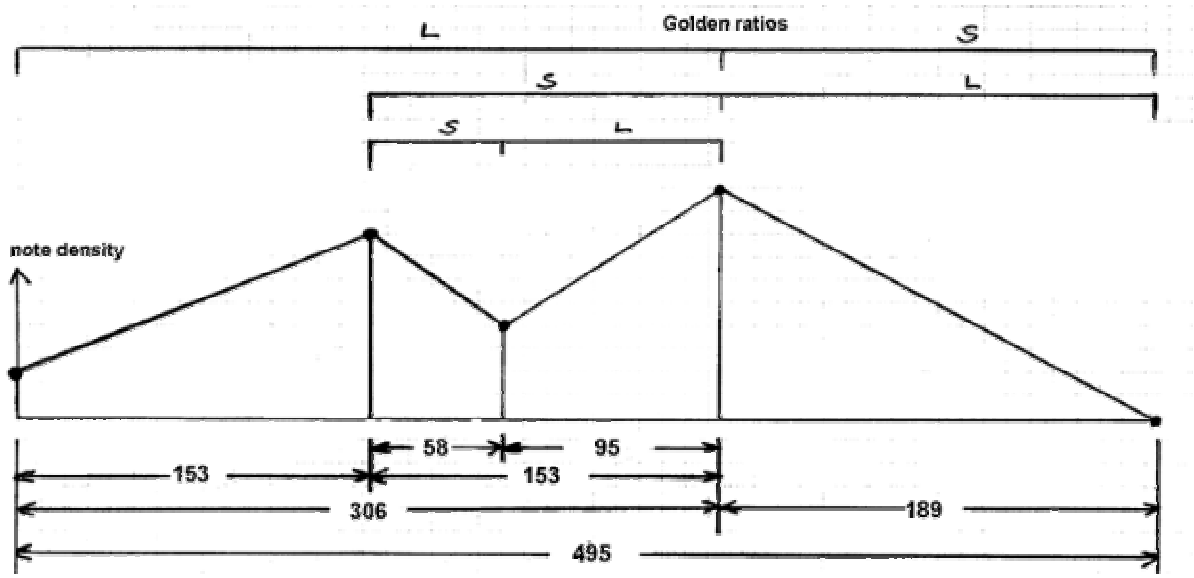
Another way to find these ratios is to generate a *Fibonacci series*, where the value of term **n** equals the sum of the preceding to values, for example: **1, 2, 3, 5, 8, 13, 21, 34, 55**... As the numbers get larger, the ratio of any two adjacent numbers approaches the Golden Ratio:

1:2=.5 2:3=.667 3:5=.6 5:8=.625 8:13=.6154 13:21=.6191 21:34=.6176

This kind of number series determines the overall proportions of the music. The overall shape of this composition is: very spare notes becoming dense, then becoming somewhat thinner, then very dense, then extremely sparse. As shown below, the total length is approximately 495 seconds (8:15). Maximum note density (notes per second) is reached at 306 seconds. The first section, building up to maximum density, is divided exactly in two,

with a secondary density maximum occurring midway. And so on. Note the Golden Ratios which occur, and the corresponding Fibonacci series:

58 95 153 189 306 495



Overall structure - numbers represent seconds

Determining "rhythms"

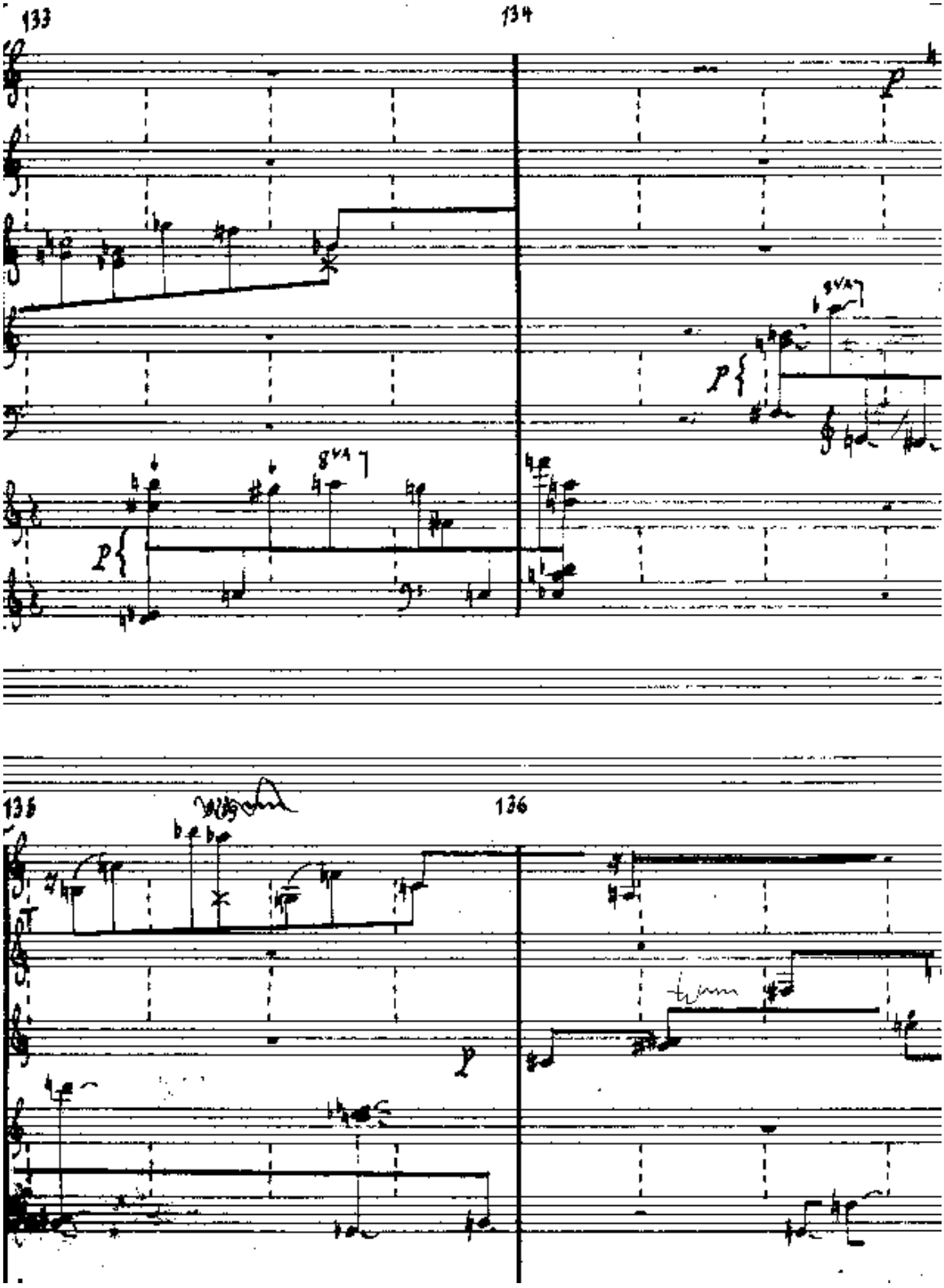
The above chart shows the average note density. I wanted to avoid any obvious rhythmic patterns, so I determined exactly when each note should sound using a tempered "scale" of durations (discussed by Stockhausen at length in his articles for *Die Reihe*) and a random number table. After more than 30 years, I can't be sure, but I believe I used six duration values per durational "octave", each the same amount larger than the next smaller value.

'octave":	1	2	3	4	5
1	1.000	2.000	4.000	8.000	16.000
2	1.123	2.245	4.490	8.980	17.960
3	1.260	2.520	5.040	10.080	20.160
4	1.414	2.829	5.658	11.351	22.702
5	1.587	3.173	6.346	12.693	25.386
6	1.782	3.562	7.125	14.250	28.500

In this pre-calculator era, it was no trivial matter to find the sixth root of 2 (it's approximately 1.1225), so I either did it by trial-and error or substituted approximate values. In any case, the original draft used traditional notation, so values were rounded up or down to the nearest tuplet.

These were the possible note values. Which value was chosen was determined by a table of random numbers, with the overall note density curve shown above used to set the "octave". Not having a computer to generate such numbers, I recall using a table of trigonometric functions, one digit at a time. In this example, only the digits 1 through 6 would be used.

The resulting rhythms were mind-bendingly complex to read, much more so than the music would suggest, so I abandoned that format in the final draft in favor of a kind of spatial notation common in the 1960's. Here's an sample page:



Sample page from the original score of 1972

O Christmas Tree

Determining pitches:

I employed a strange variant of traditional serial techniques, the goal being to obscure any melodic motives that might appear, while maintaining a general quality to the lines and harmonies – there's that fractal concept again.

To achieve that, I created a 19-note row that is repeated over and over, transposed up a fifth each time:

C Ab A G F# E F Eb D C C# A B A# G F# G# E D#

At the beginning, the note range is restricted to one note. This gradually widens to encompass the full range of every instrument.

At least this is how I remember it. When I look at the score now I find numerous variations – mistakes? I remember being exhausted, trying to finish and copy it in time for my jury exam.

And the rest is…history?

I needn't have bothered. This distinguished, learned composition faculty, comprising my teacher, Vincent Persichetti, plus Elliot Carter, Roger Sessions and Hall Overton, had trouble understanding what I was trying to do. Mr. Carter in particular wanted to know how I derived my "melodic" ideas, and when I tried to explain as best I could considering my serious sleep-deprivation, he said "But you can't write music that way!"

I really didn't have a reply to that remark, but I did realize our irreconcilable artistic differences and decided not to re-enroll the next year.

This work has never been performed live. It sat on a shelf, forgotten, and would have been destroyed along with most of my other compositions from the 70's, were it not for a desire to keep it around as evidence to refute Elliot Carter's claim. Finally in 2004, worried that my only copy of the score was fading away and I had at last a computer-based music studio with tools sophisticated enough (Gigastudio and Pro Tools) to make a decent electronic version, I created the version you have here. The result surprised me; it actually sounds pretty much the way I had imagined, and I realized that I could, indeed, write music that way!

I've resisted urges to make major revisions to this work, though I was tempted to add a part for electronic sounds. A few changes were necessary however. For one, the middle four pages disappeared from the only copy of the score. I attempted to reconstruct these lost 16 measures as best I could while keeping to the original style. I believe I've succeeded; in listening to the result hundreds of time, I can't hear where the new material is spliced in. I also needed to make the usual minor revisions that come after hearing one's work for the first time: register or articulation changes for individual notes, dynamics, etc.

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Bangkok, Thailand
October, 2005