Minimalism emerged in the 1960s as a radical new approach to composition. Alternately praised for its innovation and derided for its simplicity, it has had a significant impact on music since its debut, classical and otherwise. LaMonte Young, Terry Riley, Steve Reich, and Philip Glass are widely considered to be its founding pioneers (Potter, "Minimalism"). Minimalist pieces are typically characterized by "minimal" musical materials (limited notes, harmonies, etc.), repetitive structures, and a tonal (or quasi-tonal) sound. However, grouping these composers under the umbrella of minimalism belies differences between their basic aesthetics, motivations, and techniques. In this paper, I illustrate two distinctly different kinds of minimalism, as exemplified by early Reich and later Glass, respectively. Reich's *Violin Phase* demonstrates a brand of minimalism that is perhaps better described as "process music:" it is music that is largely generated from and concerned with a formal process, with a minimal amount of base material used as input to the process. Glass's *Glassworks* similarly makes movements from sparing amounts of material, but lacks a preoccupation with formal process. Instead, Glass's concern is the more traditional one, of capturing the audience's ear and creating affect by arranging his material as he likes. To demonstrate the differences between these two flavors of minimalism – both "minimal," in related but distinct ways – I analyze *Violin Phase* and the first two movements of *Glassworks*.

First, consider Steve Reich. In his remarkably brief essay "Music as a Gradual Process", Reich clearly lays out a musical aesthetic founded on the promise of processes. He stakes out a position that he contrasts with the two dominant areas of innovation of the day, the integral serialism of the modernists and the indeterminism of the avant-garde. He puts it simply: "I am interested in perceptible processes. I want to be able to hear the process happening throughout the sounding music" (*Writings, p. 9*). As he points out, both integral serialism and indeterminism often involve certain kinds of processes (such as manipulating a tone row or consulting the I Ching), but the processes are rarely audible in the resulting work – listening to something by Cage or Boulez, one could easily come away

without knowing a thing about the I Ching nor chromatic rows. He dismisses the use “hidden structural devices” as unnecessary, rebutting the complexity frequently sought and defended by the modernists. According to Reich, a piece can be plenty interesting even (or especially) when everyone plainly understands what’s going on: “Even when all the cards are on the table and everyone hears what is gradually happening in a musical process, there are still enough mysteries to satisfy all. These mysteries are the impersonal, unintended, psycho-acoustic by-products of the intended process. These might include sub-melodies heard within repeated melodic patterns, stereophonic effects due to listener location, slight irregularities in performance, harmonics, difference tones, etc.” (*Writings*, pp. 10-11).

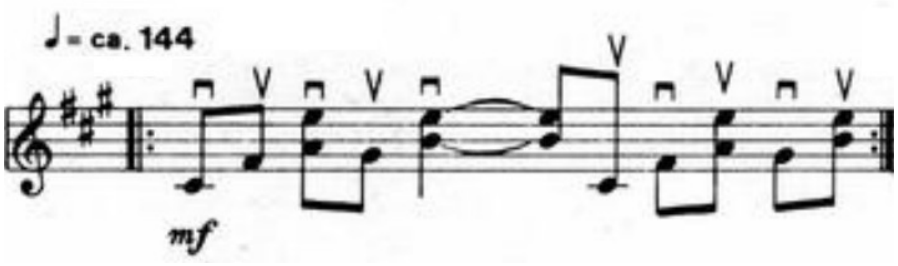
And these mysteries are precisely what Reich set out to explore in his early works, from the earliest vocal tape loops to the classically-oriented *Piano Phase* and *Violin Phase* to the pure, irreducible simplicity of *Clapping Music*. These pieces (along with the almost Cage-esque *Pendulum Music*) exemplify Reich’s notion of a process which, once “set up and loaded ... runs by itself.” *Violin Phase* is an especially clear and substantive example.

As Reich notes, “the distinctive thing about musical processes is that they determine all the note-to-note musical details and the over all form simultaneously” (*Writings*, p.9). And so it is with *Violin Phase*. The process can be described fairly concisely, like so:[1]

> Two violins (or one violin and tape) play a measure repeatedly. One violin holds a steady tempo, while the other intermittently accelerates so as to become out of phase with the first violin, one eighth note at a time. Every four phase shifts (i.e. every shift of a half note), pause the phasing so as the notice resultant melodies from the violins, and keep that phase shift playing at a constant tempo (via another violin or tape). Stop after eight phase shifts.

1 To clarify, this is the process described in my own words.

This description, along with a single bar in 12/8, is essence sufficient to describe the entire piece. Reich takes a little more space, so as to give helpful advice about recording the tapes, rehearsing, and how long to wait between accelerations, but that really is the core of the piece, and the eight page score for *Violin Phase* could be effectively re-derived from the above paragraph and the below measure.



The base material for *Violin Phase.*

Now *that* is minimalism! It has something to do with both brevity and interest. Not brevity of time (*Violin Phase* is reasonably drawn out at 15 minutes), but brevity of information. The total information necessary to describe the piece is quite small. But, contrary to Shakespeare's quip, brevity can be easily be divorced from wit. It's trivial to create a piece with little information and also little interest: for example, a piece that just repeats the initial measure from *Violin Phase* 360 times. What Reich is trying to do is create a piece that is minimal in the basic content, the information required to describe it, and maximal in terms of interest, or fascination. To accomplish this goal, he turns to formal processes. In *Violin Phase*, as in many of his early works,[2] that process is essentially phasing: taking something and gradually offsetting it against itself. The interest is in what results. Though the base material and the phasing process are both simple, easy to explain, and easy to understand, the results of the process may be intriguing, unexpected, and even beautiful. *This* is Reich's minimalism, and the essential goal of Reich's early work is demonstrating this idea of complexity through simplicity over and over again, getting it out into the world and making his case. This is his motivation.

2 *Four Organs* is a notable exception, as it uses a process of augmentation rather than phasing.

Now, consider the structure of *Violin Phase*:

Mark	1	2	3	4	5	6	7	8	9	10	11	12	13
Phase		0	1	2	3	4	4					4	5
Event							Track 2 (violin 1+3) fades in, Track 1 (violin 1) fades out		Resultant A	Resultant B	Resultant C		

Mark	14	15	16	17	18	19	20	21	22	23
Phase	6	7	8	8						
Event				Track 1 (violin 4) fades in	Resultant A	Resultant D	Resultant E	Resultant F	Resultant G	

As Reich claims, the structure results from the process, as do the individual notes. Reich's choices only affect three things: the base material, the process, and how he showcases the results of the process. The base material can be summarized as a single bar of 12/8, in the key of A major. This musical scrap has some interesting properties: it is varied, consisting single notes, double stops, and a long held note. Additionally, it has some internal repetition: the last five eighth notes are the same as the first five. Tonally, it uses every note in A major except scale degree four, D.[3] In A major, the measure can be heard as, roughly, I (A6 in the first four eighths) to V (E in the next three eighths) to I (A6 in the next four eighths) to V (E in the last three eighths). One point of interest is how these implications change over the course of the phasing process.

As for the process itself, Reich makes several choices designed to generate interest. One is pausing at discrete phase offsets, rather than continually phasing as in his earlier tape loops: this acknowledges the discrete nature of the base material, which consists of nothing quicker than eighth notes. Another choice is pausing longer at every fourth offset (corresponding to a half note). The use of 12/8 means there are many natural divisions Reich could have chosen, but he chooses to divide it into three half-notes. There's no need to proceed beyond the second half-note, as further offsets are

3 This creates a potential ambiguity in that the key could just as well be E major (or equivalently A Lydian).

equivalent to previous ones.[4] At each half-note, he not only lingers on the offset, but introduces another loop (violin or tape) to continue playing at that offset through the rest of the piece, and then engages in what he describes as a 'pointing out' process (*Writings*, p. 53). More than anything else, this makes clear Reich's didactic intent. He's not just coming up with the process, the input, and letting it run to completion: he's taking pains to point out that the process has results, that these results were not in the base material, and thus that these results are emergent: they come from the process. He gives credit to the members of his ensemble who spotted the "resulting patterns" suggested in the score, and he even invites future performers to come up with their own alternate resulting patterns, should they feel "they are more musically satisfactory than those written in the score." He not only wants the audience and performers to hear the process occurring: he wants them to hear the *results* of the process, are marvel at them as he does, the "mysteries to satisfy all."

As one final comment before moving on to Glass, Reich's minimalism has remarkable analogs outside of music, and even outside of art altogether. As a case in point, consider Conway's Game of Life, a famous automaton in computer science consisting of a 2D grid of cells (each of which may be "alive" or "dead") and a few simple rules describing how to update the grid, calculating a new value for each cell based on its immediate neighbors. This game is exquisitely simple, and much like Reich's processes, it can be "played" by making an initial configuration of the grid, and then simply letting it run on its own. The results are as remarkable as they are well-documented: it turns out that incredible complexity can result from this simple game, such that the right starting state can be made to compute anything computable: performing arithmetic, finding prime numbers, or generating digits of pi. And all of this complexity results from just a few simple rules. Interestingly, Conway's Game was published in 1970, right around the same time as Reich's early work.

4 For example, an offset of eleven eighths is equivalent to an offset of one; it's just a matter of which violin one views as the reference. Relatedly, after reaching an offset of eight eighths (two half notes), the result has a new natural grouping: it creates three identical 4/8 phrases within the combined 12/8 phrase. This is because, every four eighths, another tape loops around.

About a decade later (1982), Glass released *Glassworks*, after having had his breakthrough with *Einstein on the Beach* several years prior. *Glassworks* was intentionally much shorter than the long, drawn-out works he was known for, in order to make his work more accessible for new audiences (Glass, “Glassworks – Philip Glass”); the original cassette release bore a sticker proclaiming that it was “Specially mixed for your personal cassette player” (Penchansky). Nonetheless, it is considered a characteristically Glass-like work. Here, I consider the first two movements/tracks, *Opening* and *Floe*, which together approximate the length of *Violin Phase*.

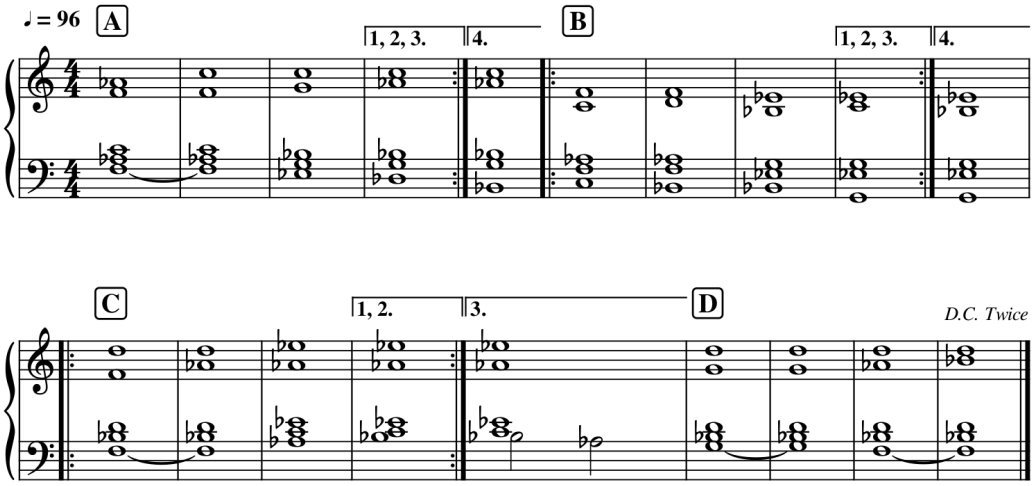
Opening has the following structure:

Section	A	A’	B	B’	C	C’	D
Measures	1-4	5-9	10-13	14-18	19-22	23-26	27-30
Progression	Fm, Eb6, $G^{ø}$	-	Fm^6_4 , Bb7, Eb^6_4 , Cm^6_4	-	Bb^6_4 , Bb^4_3 , Ab	-	Gm, Bb^4_3 , Bb^6_4

This whole structure is repeated thrice verbatim, with the exception of a french horn entering at the very end to lead into *Floe*. A solo piano piece, it consists of the seven sections described above, and consists of just three layers present throughout: a bass note, always with the duration half note, whole note, or two whole notes, beneath a repeated two-eighth-note figure, beneath a repeated eighth note figure, beneath a repeated triplet figure. The three-against-two effect is immediately striking, especially with pedal, and presents perceptual options immediately: you can hear the eighth notes, the triplets, or the interaction between them in a kind of sextuplet that has room for both. Also immediately striking is the harmony, which is remarkably poignant. In addition to a tonal center (which *Violin Phase* had as well), *Opening* features immediate, expressive harmonic motion, and even flirts with functional harmony. The A section sounds a clear F minor tonality, featuring the progression i-VII-$ii^{ø}$. In B, C, and D, the presence of D natural rather than D flat suggests the key of Eb major (or arguably F dorian). Viewed through the lens of Eb, B contains the progression ii^6_4 -V7- I^6_4 - vi^6_4 ; aside from the inversions,

a completely plausible, functional progression. C spells out the less classical (but very popular) progression V-IV, while D spells out iii (acting as a weak tonic)-V.

Aside from the striking rhythm and harmony, there are two more things worth noting about *Opening*. One is the lack of process: there is no formal process running to generate material; Glass simply composes it. The other is repetition: for a work lasting about 6:18, *Opening* repeats a lot. Between the “D.C. Twice” and the repeat bars nearly every 4 measures, the 30 measures written out on the page expand to 144 measures of sound; that is, each measure is heard verbatim an average of 4.8 times. Taking into account the written out repetitions that exist between A/A’, B/B’, and C/C’, there are only 19 distinct measures written on the page (as demonstrated in the ‘condensed’ opening below). This means each distinct measure of material is heard, on average, over 7.5 times! To put it another way, the 6:18 piece is essentially a 2:06 piece repeated thrice, but what’s more, all of the distinct content in the piece could be heard in under 50 seconds.



Opening, with arpeggios and verbatim repetition condensed.

Now consider *Floe*, which picks up right where *Opening* leaves off. Floe’s structure can be described as follows:

Section	A				B								C					D			
Mark	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Repeat	1	2	2	1	4	4	2	2	2	2	2	2	1	1	1	1	1	4	2	4	2
Time sig.	3/2			4/2									3/2			4/2					

The introductory A section presents a principle theme in the french horns and then introduces ostinatos in the other instruments: two flutes, four saxophones (two soprano and two tenor), and a Yamaha DX7. This leads into B, where *Floe* kicks into high gear. The ostinatos go into a flurry of eighth-note triplets, playing each figure four times per measure (resulting in a brisk ten notes per second at the indicated tempo!). At this point, the piece becomes very static, as the flutes, saxophones, and DX7 keep up their flurry of notes all the way until section C, starting at mark 13. In the meantime, the only changing feature is the french horn figuration. The two french horns experiment with different combinations of a small collection of simple rhythms, five in total. Finally, the ostinatos take a break in section C, as the horns resume the opening figure from the introduction, though now in 4/2 (and then 3/2) rather than the original 3/4. In marks 16-17, the slower ostinatos are reintroduced, as they were back at mark 4 previously, before giving way to the quicker figures in 18, marking the start of section D, the finale. All the parts are back in full force, and a new figuration is introduced to the french horns, which are now in unison. In contrast, the flutes, soprano saxophones, and tenor saxophones split at mark 19, picking up a diminished version of a rhythm previously featured in the french horns. As the piece races to its conclusion, the newly divided parts reach higher and higher with each passing mark, climaxing into an abrupt ending.

Floe is remarkably minimal in that it has just two basic ideas: a simple melody, F-E-D-E, and an affinity for very quick arpeggios. Like *Opening*, *Floe* repeats a lot; unlike *Opening*, the verbatim repetition only occurs at the short scale (i.e. four measures might repeat four times), and the large structure occurs only once. Also unlike *Opening*, the piece is amazingly static in terms of harmony: it’s

essentially an enormous F major triad (or, to be a little more nuanced, an alternation between an Fmaj7 chord and a Dmin7 chord). There are just five notes featured: F, A, C, D, E[5] – just enough for two closely related seventh chords. That's it.

Thus is the minimalism of Glass: minimal materials, repeated a lot. Astonishingly, it works. *Opening* really is beautiful and effortlessly moving, and I usually find myself content to let it run through all three large-scale repetitions. *Floe* is affectively very different from *Opening*, and the unrelenting, prolonged, harmonically static ostinatos create a kind of frenetic energy, which is very attractive to me, but recently prompted a friend to interject "You call that music?! Turn that off, it's driving me crazy!"

And of course all of this contrasts with Reich, which brings us back to the point. The basic technical contrast between Reich and Glass (at least between early Reich and mid-career Glass) is that Reich composes a small amount of material and then comes up with a process for systematically generating more,[6] using the original material as a seed, while Glass composes a slightly larger amount of material and then repeats it until he's satisfied, possibly adding and removing layers or making slight variations throughout. Reich's approach, as in *Violin Phase*, typically avoids large-scale repetition: the original fragment repeats for the entire duration of the piece, and there's short-scale repetition to let each subsequent phase offset sink in, but overall the piece is always moving forward as the process runs. Glass's approach often entails repetition at both small and large scales. Neither approach is necessarily better or worse; while Glass's *Opening* repeats much more (over 7.5 times per bar) than *Violin Phase* (about 2.5), Glass manages to fit two pieces of very different character and effect in a shorter timespan.

The basic aesthetic contrast is one of a thorough, systematic approach (Reich) and a looser, romantic approach (Glass). And the basic contrast in purpose is that, while Reich is making a point

5 Amusingly, these notes nearly spell out the name of the fifth movement, Facades.

6 Or the other way around. As Reich puts it, content suggests form, and form suggests content; "if the shoe fits, wear it."

about simplicity and complexity and attempting to demonstrate something interesting he's found to his audience,[7] Glass is trying to move you more directly (and sound good on your Walkman). In my opinion, they both succeed.

All that said, it's important to keep these differences in perspective. While Reich is certainly interested in achieving "a compositional process and a sounding music that are one and the same thing," he also makes the following strong statement:

> "In fact, although there is always a system working itself out in my music, there would be no interest in the music if it were merely systematic. You want to hear music that moves you, and if you don't, then you're not really very curious to find out how it was put together. The truth is, musical intuition is at the rock bottom level of everything I've ever done." (*Writings*, p. vii)

So Reich, like most any composer, wants to make moving music.[8] And naturally, Glass, like any composer, has systematic processes he employs in developing his music. It would be easy and pointless to caricature them to extremes, but like all composers they have fundamental goals in common. The difference is in how they reach them.

Reich and Glass are often grouped together as pioneers of minimalism. Indeed, "minimal" is a fitting descriptor for both composers' music. But it's enlightening to look at the differences between Reich and Glass, as they shed light on distinctly different flavors of minimalism. Early Reich represents the systematic approach he espused in his essay, a kind of formal-minimalist or process-minimalist, while later Glass is a composer using limited materials towards the traditional end of affecting an audience directly, representing a kind of expressive-minimalism or even romantic-

7 In a way, each subsequent Reich composition serves the same purpose as the 'pointing out' process in *Violin Phase*.

8 Another good Reich quote on the matter: "Obviously music should put all within listening range into a state of ecstasy." (*Writings*, p. 44)

minimalism. Ultimately, despite their differences, both composers have written enthralling, fascinating music that has cemented their reputations and influence in both the classical and popular music worlds.

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