Reassembling Kaija Saariaho's *Vers le blanc* (1982)

by Landon Morrison

Kaija Saariaho's *Vers le blanc* (1982) for computer-generated sounds – an early study on voice synthesis created with the CHANT program at the Institut de Recherche et Coordination Acoustique/Musique (IRCAM) in Paris – has enjoyed a rather curious existence as a piece that is well-known yet rarely if ever heard. No recording has been released, so aside from those present at the première (Darmstadt Festival, 1982) and a handful of other concerts, no one knows what it sounds like. Nevertheless, thanks to a score that appeared in Saariaho's 1987 article "Timbre and Harmony" (see *Plate 1*), the piece lives on in the imaginations of many readers. As notated, it appears to be nothing more than a single motion from one harmony to another, which happens "so slow that changes of pitch become imperceptible to the ear."[1]

In a stroke of luck, I recently discovered a recording of *Vers le blanc* while doing research at IRCAM, and upon listening, I was immediately struck by the music's subtle timbral details. A trio of voices marks the beginning and ending of the piece, but in the middle, the choral timbre grows more artificial and alienated. Saariaho alluded to this transformation in her article, speaking of a desire to "create the illusion of an endless human voice, sustained and 'non-breathing,' which at times departs from its physical model."[2] Clearly, then, the work-as-heard is about more than slow-moving harmonies; and in fact, I would argue that the notated example above occludes as much as it reveals. Given the extreme reduction of pitch information, the piece forces listeners to shift their focus elsewhere, allowing timbre to move to the foreground, and rendering the medium of conventional staff notation rather ill-equipped to represent the kinds of sonic phenomena central to an understanding of this music.

I wish to express special thanks to IRCAM and the Paul Sacher Foundation, which provided the archival materials presented and discussed in this text. Without their kind support, I would not have been able to access materials that have proven vital to my research. For those interested, a fuller version of this article with audio excerpts is currently under preparation for online publication; for details, please contact the author.

1 Kaija Saariaho, "Timbre and Harmony: Interpolations of Timbral Structures," *Contemporary Music Review*, 2, no. 1 (1987), pp. 93–133, esp. p. 104.

2 *Ibid.*, p. 105.

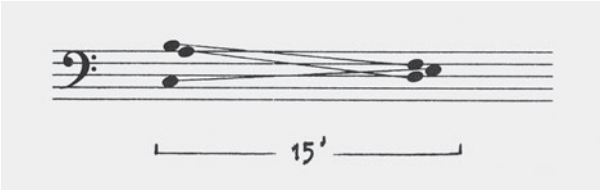

Plate 1: Kaija Saariaho, harmony in *Vers le blanc* (reproduced from Kaija Saariaho, "Timbre and Harmony," see note 1, p. 104).

For greater clarity, we can look to a key archival document housed in the Kaija Saariaho Collection at the Paul Sacher Foundation (PSS), in which Saariaho graphs the temporal evolution of parameters lying beneath the level of the note (see *Plate 2*). The diagram – dated July 19, 1982, roughly a month before the Darmstadt première – is exceptionally clean, most likely because it was created with the advantage of hindsight after the work's completion.[3] Visually striking, its layering of line-graphs reads like a blueprint, mapping the interaction of various sonic parameters into a composite image that neatly encapsulates the composer's later view of musical form as a "multi-dimensional network in which detail is strictly controlled on several levels."[4]

Since this diagram has not been previously reported and offers an unusual level of insight into the composer's formal conception of the piece, it is worth taking time to unpack some of its finer details. At the beginning, the high-to-low pitch content from the work's opening trichord is spread over three systems, labeled I–II–III. Within each of these voices, Saariaho charts the contours of individual sub-note parameters. For instance, looking at system I, the fundamental frequency for the uppermost voice is defined along the top of the system; in this case, a B at 246.94 Hz, which incrementally descends to an F at 174.61 Hz. Next, values are listed for a tremolo parameter, which moves from 0 to 1.8 (ca. 180˝) and then back to 0 by the end of the work (920˝). The same holds true for all other parameters, which include variables like vibrato frequency, amplitudes for different formant regions, randomization factors, and so on. In this way, the trajectory of the work's sub-note elements is characterized by a movement away from, and then back to, an initial state of repose, which is represented by the default values within the CHANT program.

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3 An earlier draft of this form diagram exists, which Saariaho appears to have polished and revised before arriving at the final version shown in *Plate 2*. An inscription on the margins reads: "This piece was realised at IRCAM, Paris, during the spring 1982 (programme 'Chant'), with a technical help of Jean-Baptiste Barrière, whom I thank for the innumerable advices. The original version is on 4 tracks."

4 Kaija Saariaho, "Timbre and Harmony" (see note 1), p. 124.

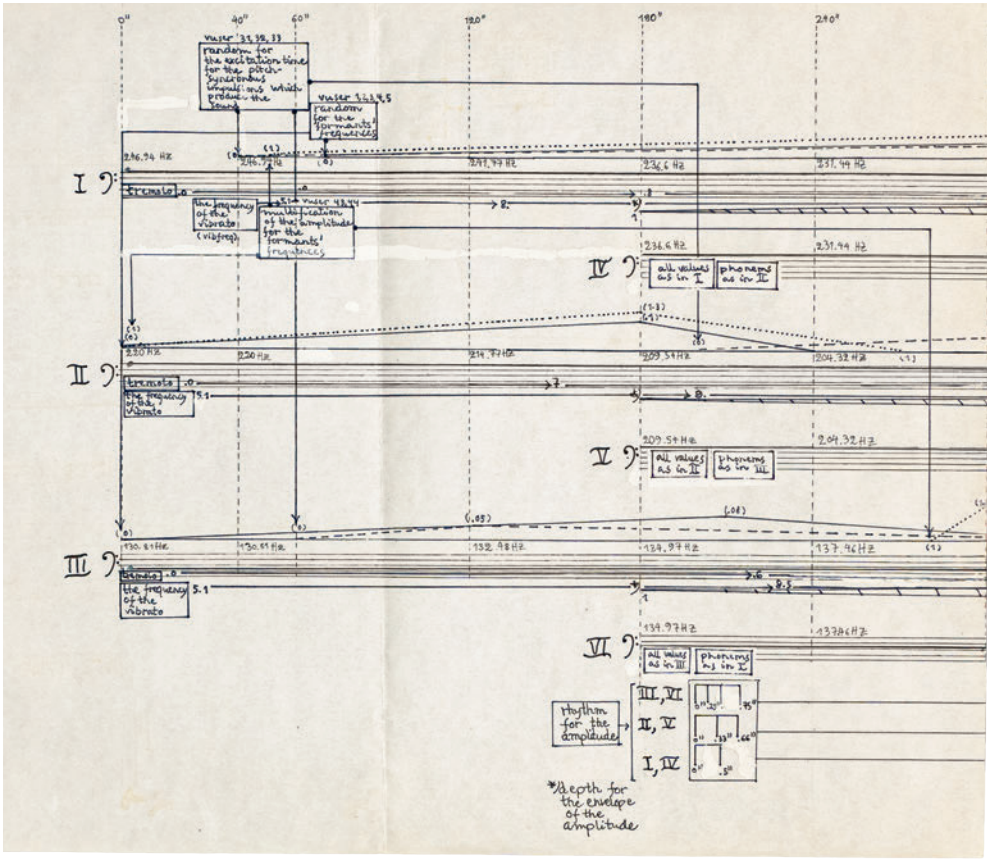


Plate 2: Kaija Saariaho, form diagram of *Vers le blanc*, excerpt (Kaija Saariaho Collection, PSS).

Following suit, the other two voices have their own sets of parameters applied to them, and when three new voices enter (IV–V–VI) a few minutes into the piece (ca. 180″), each adopts parameters from the voice above but pairs them with a new set of functions, as indicated by instructions that read (e. g. in the first voice): "all values as in I, phonemes as in II" (I will return to the issue of phonemes below). In addition, the entrance of these recombined voices aligns with the commencement of a rhythmic process in which three patterns – indicated at the bottom of the diagram with values of .5, .33, and .25, which can be translated to 8th, triplet 8th, and 16th notes – are superimposed and gradually altered, so that the 16th and 8th notes converge on the triple subdivision by the end of the piece. Hence, a rhythmic interpolation runs in parallel with the harmonic interpolation, except in this case "rhythms" are applied to the amplitudes of continuous voices, yielding more of a subtle pulsation than a detectable pattern.

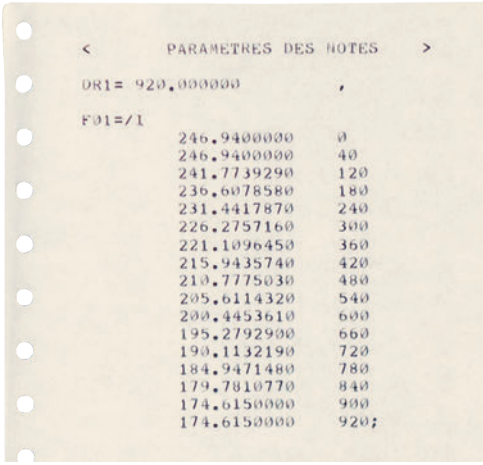


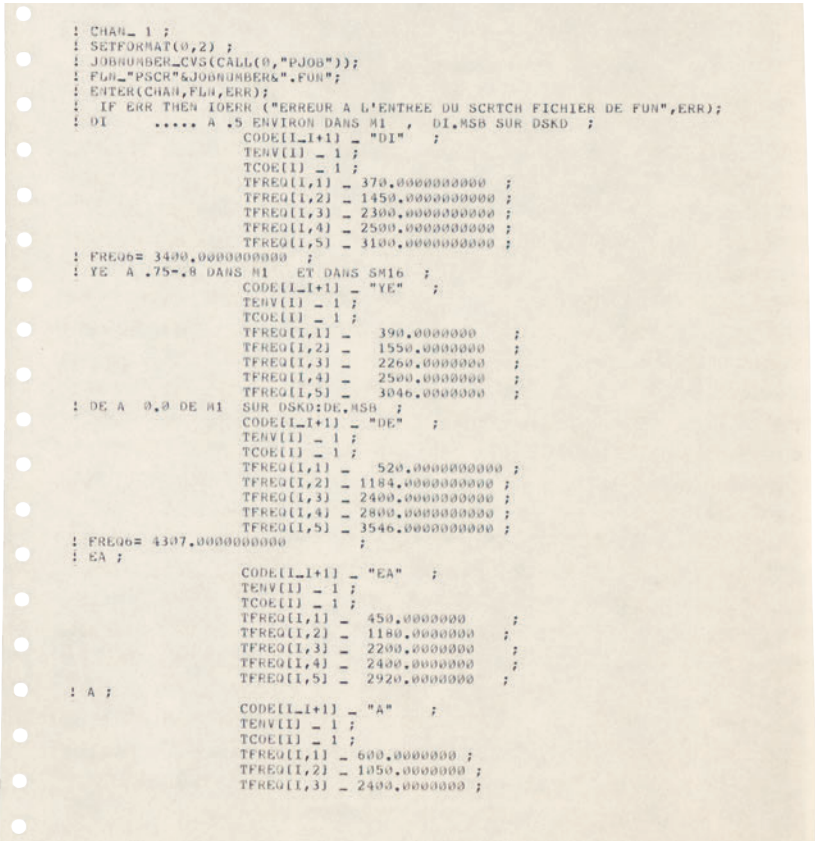
Plate 3: Kaija Saariaho, *Vers le blanc*, parameter file for voice 1, excerpt (Kaija Saariaho Collection, PSS).

The wealth of microsonic detail contained in Saariaho's diagram points to the presence of an underlying code. Although the original CHANT program is no longer operative, all of the work's code has been preserved in hard copy on thick reams of sprocket-fed printer paper.[5] Consulting this material resource, and with the aid of a difficult-to-find CHANT user's manual, I have embarked on a media-archaeological dig of sorts, excavating the work's code for significant musical information.[6] Here I will summarize a few highlights, starting with a parameter file for voice 1 (see *Plate 3*), which plots a series of value-time pairs, or what is known in programming parlance as "breakpoint functions."

The formatting of the code here is important. All time-based processes in CHANT were defined using breakpoints – a design feature that imbued the program with a strong sense of linearity since breakpoints essentially are coordinates used to plot the trajectory of a line that indicates change over time. In this case, the numbers on the right indicate duration, ranging from 0 to 920 seconds, while those on the left define frequencies for the fundamental pitch (246 Hz to 174 Hz). The file continues with similar breakpoint lists governing values for formant regions, tremolo, vibrato, and all of the other parameters detailed in the previous form diagram. These secondary and tertiary parameters distorted the default vocal timbre of the

5 The code for *Vers le blanc* is dated between March 2 and July 9, 1982, according to the time stamps on hundreds of printed pages in the Kaija Saariaho Collection.

6 I obtained a copy of the *CHANT Manual* through private e-mail correspondence with IRCAM researchers Nicolas Donin and Axel Roebel, February 12, 2019 (P. F. Baisnée and The Chant group, *CHANT Manual*, IRCAM, April 29, 1985). See also Xavier Rodet, Yves Potart, and Jean-Baptiste Barrière, "The CHANT Project: From the Synthesis of the Singing Voice to Synthesis in General," *Computer Music Journal*, 8 (1984), no. 3, pp. 15–31.



```
! CHAN_ 1 ;
! SETFORMAT(0,2) ;
! JOBNUMBER_CVS(CALL(0,"PJOB"));
! FLN_"PSCR"&JOBNUMBER&".FUN";
! ENTER(CHAN,FLN,ERR);
!  IF ERR THEN IOERR ("ERREUR A L'ENTREE DU SCRTCH FICHIER DE FUN",ERR);
! DI     ..... A .5 ENVIRON DANS M1   ,  DI.MSB SUR DSKD  ;
                  CODE[I_I+1] _ "DI"   ;
                  TENV[I] _ 1 ;
                  TCOE[I] _ 1 ;
                  TFREQ[I,1] _ 370.0000000000  ;
                  TFREQ[I,2] _ 1450.0000000000 ;
                  TFREQ[I,3] _ 2300.0000000000 ;
                  TFREQ[I,4] _ 2500.0000000000 ;
                  TFREQ[I,5] _ 3100.0000000000 ;
! FREQ6= 3400.0000000000  ;
! YE  A .75-.8 DANS M1   ET DANS SM16  ;
                  CODE[I_I+1] _ "YE"   ;
                  TENV[I] _ 1 ;
                  TCOE[I] _ 1 ;
                  TFREQ[I,1] _   390.0000000    ;
                  TFREQ[I,2] _   1550.0000000   ;
                  TFREQ[I,3] _   2260.0000000   ;
                  TFREQ[I,4] _   2500.0000000   ;
                  TFREQ[I,5] _   3046.0000000   ;
! DE A  0,0 DE M1  SUR DSKD:DE.MSB  ;
                  CODE[I_I+1] _ "DE"   ;
                  TENV[I] _ 1 ;
                  TCOE[I] _ 1 ;
                  TFREQ[I,1] _   520.0000000000 ;
                  TFREQ[I,2] _ 1184.0000000000 ;
                  TFREQ[I,3] _ 2400.0000000000 ;
                  TFREQ[I,4] _ 2800.0000000000 ;
                  TFREQ[I,5] _ 3546.0000000000 ;
! FREQ6= 4307.0000000000        ;
! EA ;
                  CODE[I_I+1] _ "EA"   ;
                  TENV[I] _ 1 ;
                  TCOE[I] _ 1 ;
                  TFREQ[I,1] _  450.0000000     ;
                  TFREQ[I,2] _  1180.0000000    ;
                  TFREQ[I,3] _  2200.0000000    ;
                  TFREQ[I,4] _  2400.0000000    ;
                  TFREQ[I,5] _  2920.0000000    ;
! A ;
                  CODE[I_I+1] _ "A"    ;
                  TENV[I] _ 1 ;
                  TCOE[I] _ 1 ;
                  TFREQ[I,1] _ 600.0000000 ;
                  TFREQ[I,2] _ 1050.0000000 ;
                  TFREQ[I,3] _ 2400.0000000 ;
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Plate 4: Kaija Saariaho, *Vers le blanc*, function file for voice 1, excerpt (Kaija Saariaho Collection, PSS).

CHANT program, giving Saariaho the ability to "add different kinds of noises and shadings to the sound."[7]

In tandem with parameter files, CHANT processed what was known as a function file, which Saariaho used to access a dictionary of speech phonemes stored in the program's memory. The original code from this dictionary is pictured at the top of a function file in *Plate 4*, with phonemes listed on the left ("DI–YE–DE–EA–A") and corresponding formant structures on the right ("TFREQ" numbers 1–5). Continuing for several pages, the dictionary contains a total of twenty-six phonemes; these provided a basic vocabulary for composers working with CHANT, so that, when a

7 Kaija Saariaho, "Using the Computer in a Search for New Aspects of Timbre Organisation and Composition," in *Proceedings of the International Computer Music Conference*, s. n. (1983), pp. 269–73, esp. p. 270 (online: http://hdl.handle.net/2027/spo.bbp2372.1983.021; 20 March 2020).

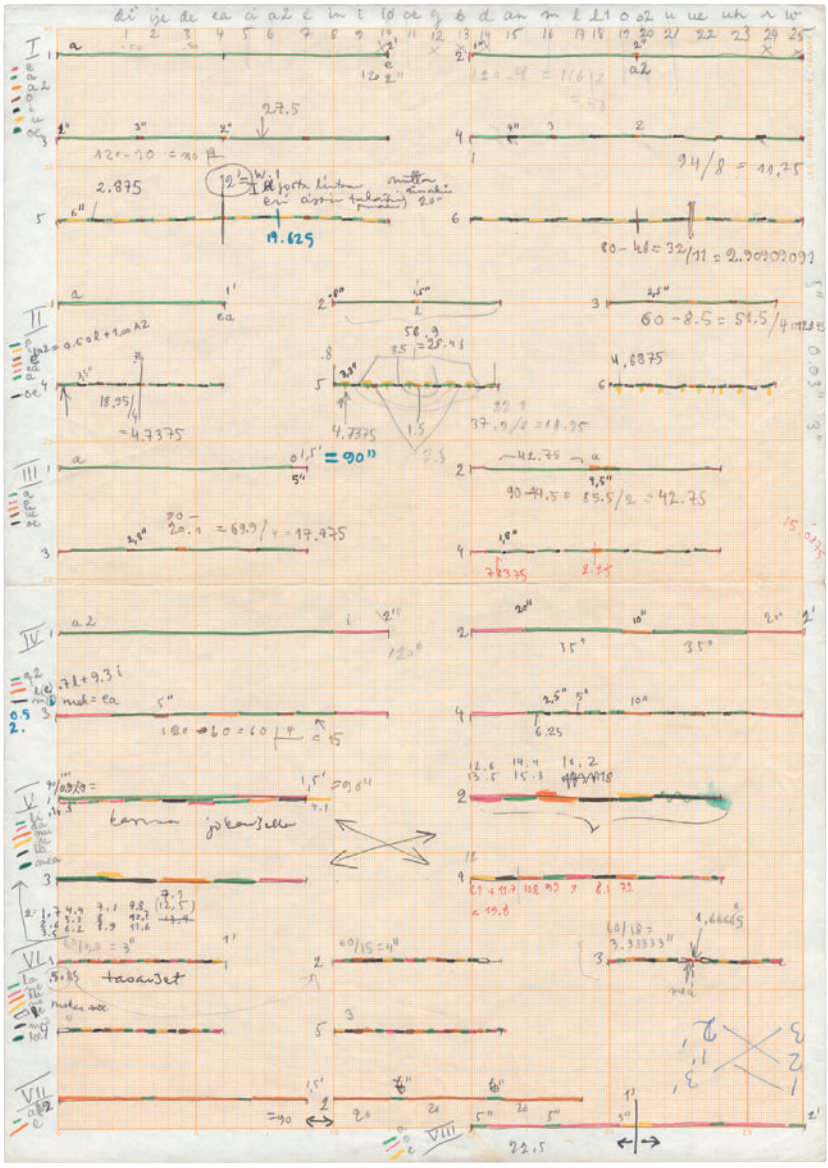

Plate 5: Kaija Saariaho, *Vers le blanc*, sketch of eight phoneme sequences (Kaija Saariaho Collection, PSS).

particular phoneme was defined, the program would look up the corresponding formant structure and implement the appropriate spectral envelope. As a general rule, these structures were represented in the program by five frequencies that acted as central peaks of the formant regions within a given spectrum.

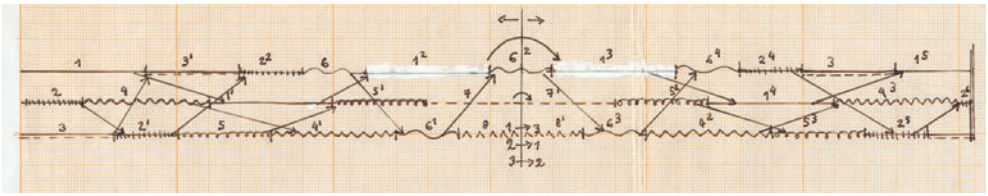

Plate 6: Kaija Saariaho, sketch of phoneme structure in *Vers le blanc*, excerpt (Kaija Saariaho Collection, PSS).

Saariaho used the dictionary of phonemes encoded in CHANT to program multi-syllabic musical "phrases" in each voice. The logic behind her structuring of phonemes is revealed in another sketch (see *Plate 5*), in which she used these phrases as the basis for a larger formal plan, ordering them into eight self-contained processes. Looking at the first of these processes (I, top of page), there is a color-coded guide to the phonemes on the left margin, and then a series of corresponding diagrams on the right, showing a given unit of time (two minutes, in this case) that is repeated, symmetrically sub-dividing into smaller increments, with new phonemes progressively added to the mix. As the process unfolds across several stages (1–6), the durations of phonemes become shorter, quickening at some points to the pace of one per second. Moving down the page, each of the eight processes (labeled I–VIII) proceeds in a similar fashion, providing fixed phonemic strains that govern each of the phrases. The interplay of these speech filters offered a means of organizing musical development at the microsonic level, which proved especially important in a work that otherwise neutralizes harmonic motion.

To gain a final perspective on how these phonemes are deployed in *Vers le blanc*, we can turn to another handwritten diagram, shown in *Plate 6*. Here, Saariaho maps out a birds-eye view of the entire work, with the eight phonemic processes woven together in a continual transference across all three voices. Because the processes are of different lengths, the shift from one to another is never synchronized between voices. The sole exception occurs at the midpoint of the piece, where all three voices pivot around a central axis. Fanning outward, the voices maintain a mirror symmetry around this axis, with each voice mapping onto itself. Thus, this last sketch reveals an over-arching palindromic shape that acts as a metaprocess subsuming the eight smaller processes from *Plate 5*, which become mid-level building blocks.

Saariaho's approach to musical form in this work is striking because it ties together two of her primary compositional influences. On the one hand, she embraces the use of acoustic models based on analyses of the human voice as a way of working with timbre, evincing a drift towards what Gérard Grisey famously characterized as a "spectralist attitude." On the other hand,

she arranges these spectral models in symmetrical fashion, demonstrating her continued use of strict ordering procedures and abstract formal structures in her computer-based music. These two sides of her musical persona converge in the previously hidden formal dimensions of *Vers le blanc*, providing insight into the origins of compositional techniques that have become hallmarks of Saariaho's mature style, including her use of interpolation systems to build continuous musical processes, her adoption of spectral models as an acoustical basis for harmony, and her turn towards parametric compositional thought to control the microphonic aspects of sound.