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electronic instrument known as the *Ondes Martenot*. With an oscillator based on radio sine waves played through proprietary speakers, Murail uses the Ring-Modulation function on this instrument to create original, organic overtones and complex timbral spectra. *Sweetwater.com* gives an example of the process of ring modulation: “If you send one 100 Hz sine wave and one 400 Hz sine wave to a ring mod, then it will output two frequencies: the difference signal of 300Hz (400 minus 100) and the sum signal of 500Hz (400

plus 100). When you apply ring mod to more harmonically rich waveforms, such as sawtooth or pulse waves, it generates clangorous sounds due to the shifting and often discordant harmonic relationships between frequencies” ([Sweetwater](#)).

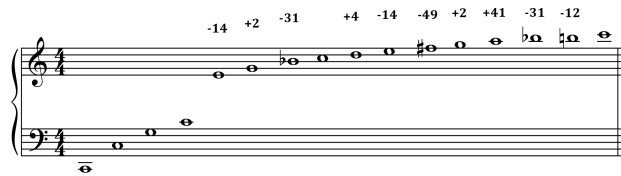
Les Courants de L'espace is written for a chamber orchestra of 26 musicians, plus one Ondes Martenot. Murail uses more traditional composition techniques to create a sense of form and structure throughout the twenty-minute-long work. This composition in particular is exemplary of the Spectralist ideology being used as a method of orchestration *in combination* with other compositional devices. These devices that Murail utilizes in *Les Courants* include *call-and-response*, *rallentando*, polyrhythms, microtonality (although related to Spectralism), and aleatoric notation. The entirety of this work is based on the idea of *call-and-response* between the Ondes Martenot soloist and the orchestra. The strange and enigmatic tone emitted from the Ring-Modulated Ondes Martenot functions as the muse for the timbral explorations of the orchestra.

Les Courants de L'Espace begins with the Ondes sustaining a long, soft tone in the highest register of the instrument's range. Murail chooses this introductory technique as it prepares the audience directly for the new timbre that will be exploited in the following minutes. Slowly and cautiously, the flutes and strings join in, emphasizing the *sum-and-difference tones* from the Ring-Modulation as mentioned earlier. Only one minute into the piece, and one can hear the spectral blend of harmony and timbre, as multiple tones play at once creating a pseudo-chord, but with the way that Murail blends the tones through varied dynamic usage and timbral shading from the Ondes, this pseudo-chord presents as more of a single, altered-harmonic tone.

For the first four minutes, Murail continues to utilize the technique of spectral orchestration in conjunction with the call-and-response relationship between the Ondes and the orchestra. The percussionists add to this eerie quality by using continuously tremeloing maracas, a brush scraping the head of a bass drum, and suspended cymbal rolls. The first structural event happens about five minutes into the piece. Starting from the low register, the Ondes plays a few ascending legato tones while the orchestra creates a sustained, but textural sonority. This short melodic fragment from the Ondes acts as a

transitional motive into the next section, where the Ondes player uses the instrument's glissando ring to play long, whipping glissandi that span most of the full range of the instrument. Murail orchestrates this gesture by adding low brass playing blatty, *cuivre* tones, dynamically swelling in parallel with the upward and downward whips of the Ondes glissandi. By doing this, Murail is creating a conjoined timbre derived from the sonic findings of experimentation with the Ondes Martenot, a cornerstone method of the Spectralist ideology.

Later in the piece, Murail uses another technique related to the Spectralist aesthetic- Microtonal melodies based directly on the harmonic series. The following graphic shows the resulting frequencies



from a C2 fundamental written within the confines of traditional musical notation. The numbers above the upper notes indicate how many cents (equal

division of a half step into 100 parts) flat or sharp the given note is. As there is no direct way to notate microtonality, composers have created many different symbols, including variations on traditional accidental markings. On the following page, we see an excerpt from the score of *Les Courants de L'Espace*, showing the use of quarter-tone notations in the strings section. Phenomenologically speaking, this technique can be experienced as a traditional melody being played 'out of tune', as it takes an extremely high-caliber string ensemble to be able to effectively recreate this sonic function, convincing the audience of the intent of deliberate microtonality.

Ondes M. *poco a poco cresc...*

1. *mf*

2. *mf*

3. *mf*

Vns. 4. *mf*

5. *mf*

6. *mf*

7. *mf*

Altos 1. *mf*

2. *mf*

3. *mf*

Vcs. 1. *mf*

2. *mf*

Cb. *mf*

dim.

Ondes M.

1. *mf*

2. *mf*

3. *mf*

Vns. 4. *mf*

5. *mf*

6. *mf*

7. *mf*

Altos 1. *mf*

2. *mf*

3. *mf*

Vcs. 1. *mf*

2. *mf*

Cb. *mf*

dim.

also la sand.

also la sand.

The climax of *Les Courants* happens around the proverbial ‘golden-mean’ of the musical timeline - around 61.8% into the piece. The climactic sequence begins with a dense, sustained cluster-chord in the orchestra. As this chord swells, the strings begin to tremolo, and the percussion enters with a loud, raucous ratchet accompanied by other various noisemakers like a ribbed, plastic drainage tube being scraped with drumsticks. The percussion then influences the entire orchestra by slowing down the tremolos into a classic, Tristan Murail-style transitional figure of rapidly slowing orchestral stabs. As the stabs continue to repeat at slower and slower intervals, the strings begin to play very quietly in between each interval, creating a sense of a synthetic reverberation, tailing the immense synchronized orchestral accents. This creates a binary between the loud hits, and the ghostly afterthoughts of *sul ponticello non vibrato* strings. Just when the hits slow to almost a full halt, the Ondes, which was previously far in the background, emerges with a single low, accented staccato note. Here, the idea of call-and-response is realized to its extremity as the Ondes’ accented strike sends a metaphorical shockwave throughout the orchestra, rejuvenating the previous orchestral repetitive ostinati. This new orchestral wave then dies down, only to be met with another strike from the Ondes Martenot. The shockwave begins again but with another layer as the Ondes strikes for a third time, creating two orchestral waves. These two waves - split between different wind and string instruments - create a brief polyrhythmic figure as their respective inertias decrease at different speeds. A fourth Ondes strike brings the low brass into the texture. These three wave-like rhythms all begin to slow down asynchronously, leading the audience into the next section of the piece.

For the final large gesture of the *Les Courants*, Murail chooses to end with another orchestral swell which morphs again into a percussive, full-orchestra ‘chord’ repeating in ostinato. Again, characteristic to Murail’s aesthetic tastes, this ostinato slows down, adding new timbres and variations to each repetition. This time, to conclude the piece, each repetition as it slows down, becomes longer without losing any dynamic energy. As the silence between the repetitions increases, each strike becomes more and more abrasive as it lengthens and becomes more textural. The final strike, led by the very loud ratchet, rings through the hall as the piece speaks its final thought.

The title, *Les Courants de L'Espace* ambiguously translates to “The Currents of The Space” in English. The title’s meaning must be thought of as an art form of itself, being open to various interpretations. I see the idea of *Currents (Les Courants)* as referring to the present- meaning objectively not the past nor the future. I also interpret the word *Space (L'Espace)* to be related to musical space. As is evident from Murail’s compositions and musical philosophy, one can deduce that music, at its core, is a form of art that uses not only the medium of time, but maybe even as prominently, the medium of space; atmospheric space, aural space, registral space, and the most obvious: acoustic space. Many other compositions can be used to support this claim as well, but by contemplating the impetus behind Spectralism as a derivation of musical content, as well as analyzing the musical gestures exploited in Tristan Murail’s composition, it is evident that *Les Courants de L'Espace* deals with the interactions of sound in present acoustic space. The multiple iterations of oscillating orchestral strikes throughout the piece seem to further emphasize the *Nowness*, as to not focus on what has already happened, but to instead focus on the emission and execution of the sonic event and its interaction with the acoustic, registral, *spectral*, and musical space as it happens in sync with the fleeting moments of The Current.

Handwritten musical score for orchestra and strings, featuring various instruments and measures highlighted with blue and red boxes.

Measures 38-41 (Blue Boxes):

- Flutes (Fl):** Measures 38-41, marked *pp*.
- Horn (Hth):** Measures 38-41, marked *pp*.
- Clarinet (Cl):** Measures 38-41, marked *pp*.
- Bassoon (Bsn):** Measures 38-41, marked *pp*.

Measures 42-45 (Red Boxes):

- Piccolo (Pc 1):** Measures 42-45, marked *mf*.
- Piccolo (Pc 2):** Measures 42-45, marked *mf*.
- Piccolo (Pc 3):** Measures 42-45, marked *mf*.

Measures 46-49 (Blue Boxes):

- Violins (Vns):** Measures 46-49, marked *pp*.
- Violas (Vcs):** Measures 46-49, marked *pp*.
- Celli (Cb):** Measures 46-49, marked *pp*.

Measures 50-53 (Red Boxes):

- Piccolo (Pc 1):** Measures 50-53, marked *mf*.
- Piccolo (Pc 2):** Measures 50-53, marked *mf*.
- Piccolo (Pc 3):** Measures 50-53, marked *mf*.

Measures 54-57 (Blue Boxes):

- Violins (Vns):** Measures 54-57, marked *pp*.
- Violas (Vcs):** Measures 54-57, marked *pp*.
- Celli (Cb):** Measures 54-57, marked *pp*.

Handwritten musical score for a large ensemble, featuring various instruments and vocal parts. The score is divided into systems, with some sections highlighted by colored boxes (blue, pink, green, red) and others by a large blue bracket.

Top Section:

- Flutes (Fl):** 1. and 2. staves. A blue box highlights the first system.
- Flute Basso (Flb):** 1. and 2. staves. A blue box highlights the first system.
- Clarinets (Cl):** 1. and 2. staves. A blue box highlights the first system.
- Flauto Contralto (Fas):** 1. and 2. staves. A blue box highlights the first system.
- Cor Anglais (Cor):** 1. and 2. staves. A blue box highlights the first system.
- Trumpets (T.p.):** 1. and 2. staves. A blue box highlights the first system.
- Timpani (Tbn):** 1. and 2. staves. A blue box highlights the first system.
- Percussion 1 (Pc 1):** 1. and 2. staves. A blue box highlights the first system.
- Percussion 2 (Pc 2):** 1. and 2. staves. A blue box highlights the first system.
- Percussion 3 (Pc 3):** 1. and 2. staves. A blue box highlights the first system.
- Piano:** 1. and 2. staves. A pink box highlights the first system.
- Ondes M.:** 1. and 2. staves. A red box highlights the first system.

Bottom Section:

- Vocals (Vns):** 1. to 7. staves. A large blue bracket highlights the first system.
- Alto 2 (Altos 2):** 1. and 2. staves. A large blue bracket highlights the first system.
- Vocals (Vcs):** 1. and 2. staves. A large blue bracket highlights the first system.
- Contra Bass (Cb):** 1. and 2. staves. A large blue bracket highlights the first system.

Handwritten Annotations:

- At the top left, there is a tempo change: $\leftarrow 50 \rightarrow$ *Rall.* $\rightarrow 120 \rightarrow$.
- At the top right, there is a tempo change: *Cédez.* $\rightarrow 120 \rightarrow$ *Alto*.
- At the bottom, there is a note: ** Tous les sons répétés doivent être effectués d'une légèreté absolue, suivie d'un crescendo (cresc.)*

Handwritten musical score for a symphony, featuring a large section of the score enclosed in a blue box. The score is written on multiple staves, including strings, woodwinds, brass, and piano. The tempo is marked "Rall" (Ritardando) and the dynamics range from "pp" (pianissimo) to "f" (forte). The score includes various musical notations such as notes, rests, and dynamic markings. A red circle highlights a specific measure in the piano part. The page number "39" is visible in the top right corner.

Handwritten musical score for a symphony orchestra. The score is written on multiple staves, including woodwinds (Flute, Clarinet, Bassoon, Cor, Trumpet, Trombone), strings (Violin, Viola, Violoncello, Contrabass), and piano. The score is marked with a red bracket on the left and a blue bracket on the right. The music is in 4/4 time and features various musical notations, including notes, rests, and dynamics (mp, mf, f, sf). The score is written in a handwritten style, with some corrections and annotations visible.