

## Aleph Null

- **Aleph Null:** An online *graphic synthesizer* and *instrument of colour music* by me, Jim Andrews. [Here's a link to lots of links to my work.](#)
- **History:** I started Aleph Null in 2011. Previous to Aleph Null, I wrote another graphic synthesizer called dbCinema in Director. That's at [vispo.com/dbcinema](http://vispo.com/dbcinema) . There are currently versions [1](#), [2](#), [3](#), [3.1](#) online of Aleph Null.
- **The name:** *Aleph null* denotes the first level of infinity in the work of mathematician Georg Cantor. He actually proved things worth knowing about infinity--beautifully. I've admired his work since I studied it as an undergrad (English/Math degree). It has the beauty of the greatest poetry or music. It's not acknowledged as art but is utterly transcendent.

### **Aleph Null 1.0: [vispo.com/aleph](http://vispo.com/aleph) (2011)**

- Funded by Canada Council senior arts grant. Uses the (then newish) HTML 5 canvas—Flash's “replacement”—to explore generative art with native JavaScript.
- Architecture: One onscreen *brush* with different configurable *nibs* draws successive *brush-strokes*. This painterly metaphor runs through all versions of Aleph Null.
- Version 1 is an *instrument of color music*, but not a *graphic synthesizer*.
- I showed Aleph Null 1.0 in Paris at the Sorbonne at a conference on innovative writing called And Now in 2012, where three digital literary scholars--Leo Flores, Giovanna Di Rosario, and Mark Marino--presented papers on Aleph Null.



*Illustration 1: From Aleph Null 1.0 (2011). Version 1 was colour music only. No bitmap processing. Vectors and gradients only.*

## **Aleph Null 2.0: [vispo.com/aleph2](http://vispo.com/aleph2) (2017)**

- Supports create/destroy/edit of multiple brushes.
- Some nibs do bitmap processing; Aleph Null is now also a bitmap *graphic synthesizer*.
- Some nibs work with text, which can be filled with colour or bitmaps.
- Behaves on mobile devices with touch interfaces.



*Illustration 2: From Aleph Null 2.0. Several David Bowie brushes in honour of the then-recently-departed genius. The brush is a long, thin straight line sampling images of David Bowie from different eras in his life.*



*Illustration 3: From Aleph Null 2.0 (2017). Some new nibs write text filled with image. You configure the text and the font. In Aleph Null 3.0, you can also specify the images that fill the text and use your own fonts, also.*



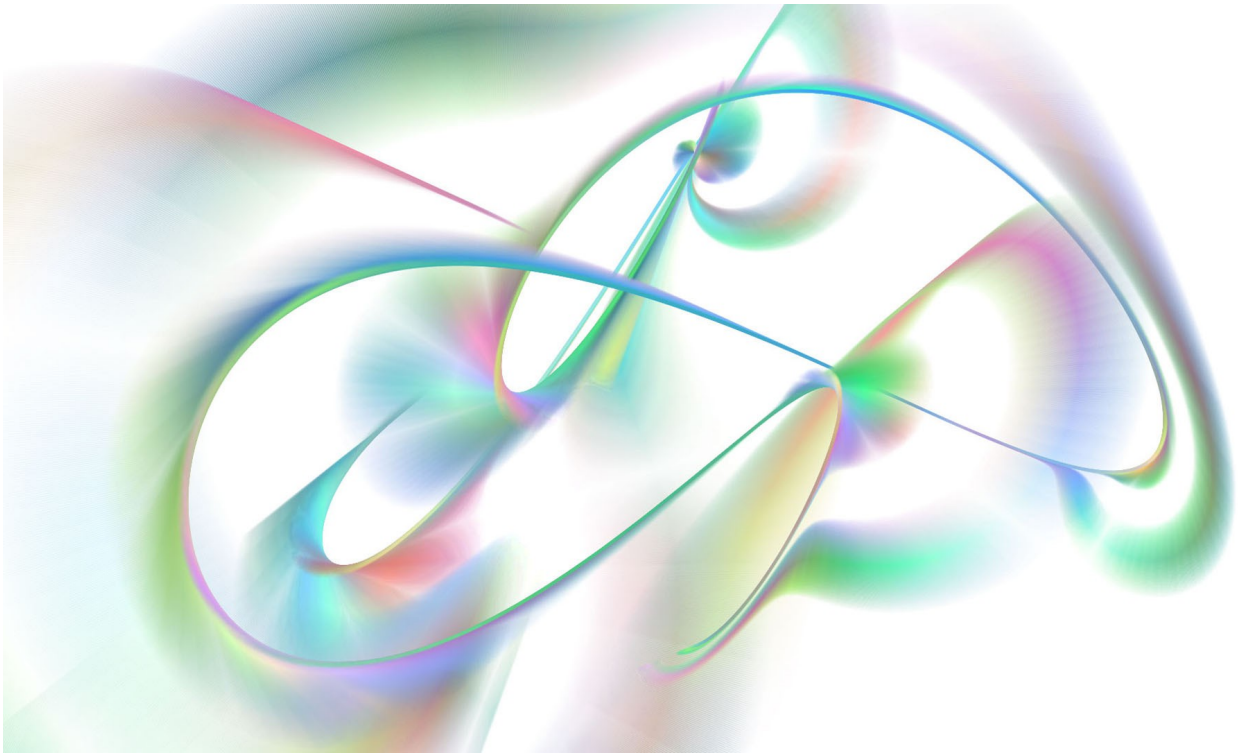


Illustration 4: From Aleph Null 2.0 (2017). The nib that made this is strongly related to the nib that made the Bowie image. But this one uses gradients, not bitmaps, as paint.

### **Aleph Null 3.0:** [vispo.com/aleph3](http://vispo.com/aleph3) (2019)

- **19 invited artists** in Aleph Null 3.0. There's a custom nib for each artist, and the nib uses images by that artist. Artists: Jaka Zeleznikar (Slovenia); Ted Warnell (Canada); Dan Waber (USA); Stasja Voluti (Canada); Nico Vassilakis (USA); Andrew Topel (USA); Regina Celia Pinto (Brazil); Brad Pasutti (Canada); Jim Leftwich (USA); Jukka-Pekka Kervinen (Finland); Karl Kempton (USA); Adeena Karasick (Canada); Chris Joseph (UK); Klaus Peter Dencker (Germany); Maria Damon (USA); bill bissett (Canada); Catherine Mehrl Bennett (USA); Brent Bechtel (USA); Gary Barwin (Canada);
- **Import your own images** into a brush. It samples from them, uses them as 'paint'.
- **New architecture of layers.** A brush draws/paints/writes in a layer. Layers can be moved up and down (*bring to front* etc).
- **Fundamental current Aleph Null architecture:** Multiple brushes, each one on a layer/canvas possibly with other brushes.
- **New control panel** and many new controls.
- **Set pixel dimensions** of Aleph Null canvas arbitrarily high.
- **Video Tutorials:** [vispo.com/aleph3/slideshow/info.htm#tutorials](http://vispo.com/aleph3/slideshow/info.htm#tutorials) . Topics include how to import your images; how to save high-res screenshots; how to work with layers; and how to work with text. There's another tutorial at [youtu.be/p1UwupHJlto](https://youtu.be/p1UwupHJlto) .
- Create/save **high-res screenshots**.
- I put \$5000 into printing and framing some work from Aleph Null 3.0 and [showed them in Vancouver](#) at Massy Books in 2019 as covid was beginning.
- Aleph Null 3.0 was published in the Electronic Literature Organization's [Volume 4 of their collection of eLit](#).





Illustration 5: From *Checking In* (2018 videopoem) from *Aleph Null 3.0* in collab with Adeena Karasick. Two brushes. One text, one bg.

- *Checking In* videopoem appeared in a show called [Videopoetry 1980-2020](#) curated by Tom Konyes in Vancouver at Surrey Art Gallery.



Illustration 6: From *Aleph Null 3.0* collaboration with the legendary Canadian poet bill bissett.

The [collaboration with bill bissett](#) is extensive and involves thousands and thousands of images.



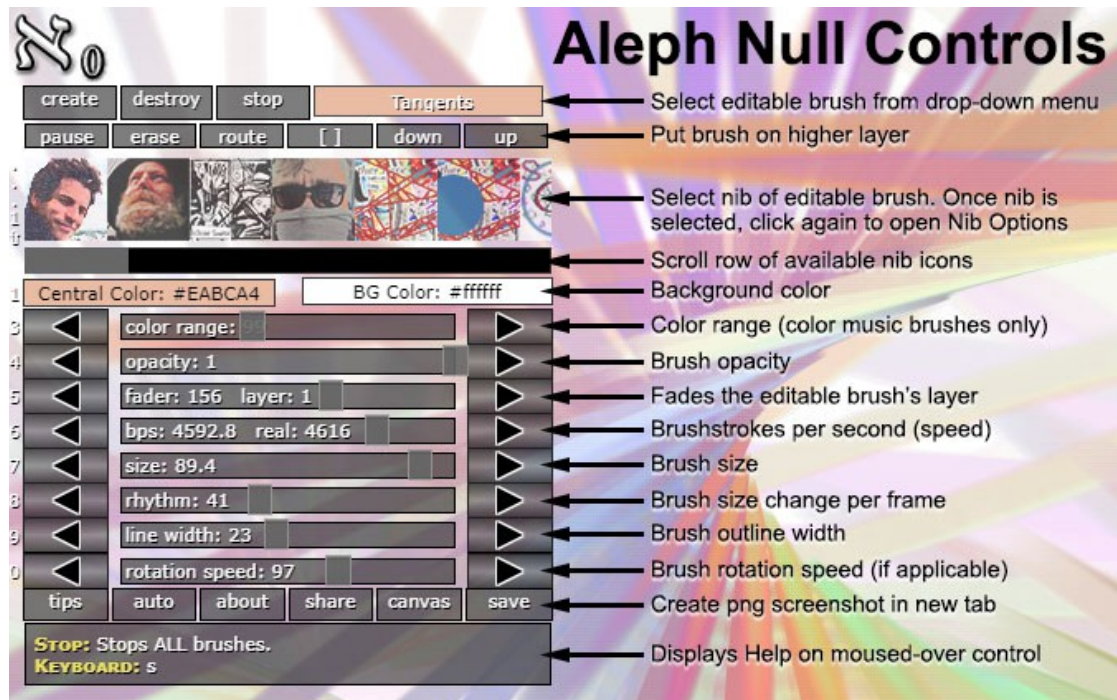







Illustration 7: Images of Trump and accomplices mixed with Aleph Null 3.


**Aleph Null 3.1:** [vispo.com/aleph4](https://vispo.com/aleph4) (version 4 is unfinished now).

- **Art:** Here are some art projects I've created with Aleph Null
  - *Aleph Null, Graphic Synthesizer:* [vispo.com/massy/Aleph\\_Null\\_Graphic\\_Synthesizer.pdf](https://vispo.com/massy/Aleph_Null_Graphic_Synthesizer.pdf)
  - *City on the Other Side of Time:* [vispo.com/aleph4/images/jim\\_andrews/alchemy/slidvid10](https://vispo.com/aleph4/images/jim_andrews/alchemy/slidvid10)
  - *Colour Music:* [vispo.com/aleph4/images/jim\\_andrews/gradients/entrance](https://vispo.com/aleph4/images/jim_andrews/gradients/entrance)
  - *American Hitler:* [vispo.com/aleph4/images/jim\\_andrews/aleph/entrance](https://vispo.com/aleph4/images/jim_andrews/aleph/entrance)
  - *Indicted 2023:* [vispo.com/aleph4/images/jim\\_andrews/aleph/indicted/Indicted\\_2023\\_pressRelease.pdf](https://vispo.com/aleph4/images/jim_andrews/aleph/indicted/Indicted_2023_pressRelease.pdf)
  - *Collaboration with bill bissett:* [vispo.com/aleph3/images/bill\\_bissett](https://vispo.com/aleph3/images/bill_bissett)
  - *Collaboration with Jim Leftwich:* [vispo.com/aleph4/images/jim\\_leftwich/entrance](https://vispo.com/aleph4/images/jim_leftwich/entrance)
  - *Collab with Adeena Karasick:* [vispo.com/aleph4/images/adeena\\_karasick/entrance](https://vispo.com/aleph4/images/adeena_karasick/entrance)
  - *Collab with Kirill Azernyy:* [vispo.com/aleph4/images/kirill/end\\_of\\_recognition/slidvid](https://vispo.com/aleph4/images/kirill/end_of_recognition/slidvid)
  - *Collab with Daniel F. Bradley:* [vispo.com/aleph4/images/danielbradley/slidvid1](https://vispo.com/aleph4/images/danielbradley/slidvid1)
  - *Collab with Karl Kempton:* [vispo.com/aleph3/images/karl\\_kempton/slidvid/info.htm](https://vispo.com/aleph3/images/karl_kempton/slidvid/info.htm)
  - *Time Machine:* [vispo.com/aleph4/images/jim\\_andrews/time/entrance](https://vispo.com/aleph4/images/jim_andrews/time/entrance)
  - *Alchemical Cosmography:* [vispo.com/aleph4/images/jim\\_andrews/alchemy/entrance](https://vispo.com/aleph4/images/jim_andrews/alchemy/entrance)
  - *No New Ideas:* [vispo.com/aleph4/images/no\\_new\\_ideas/entrance](https://vispo.com/aleph4/images/no_new_ideas/entrance)
  - *Collab with several other artists:* [vispo.com/aleph3](https://vispo.com/aleph3)

The rest of this doc is 'how to' material concerning Aleph Null.



- In this workshop, we're going to look at:
  - **Aleph Null URL:** [vispo.com/aleph4/an.html?d=Tangents](http://vispo.com/aleph4/an.html?d=Tangents)
    - The above URL takes us to Aleph Null 3.1 with the Tangents nib running. The above is the best URL if you have a slow internet connection because the Tangents nib does not download any images. It just uses pure color, as do the other color music nibs.
    - A simpler to remember URL is [vispo.com/aleph4](http://vispo.com/aleph4) . This takes us to Aleph Null 3.1 with a *random* nib running.
  - **Toggle controls:** Click the aleph null symbol  at top left to toggle display of the controls.
  - **Program Architecture:** The basic architecture of Aleph Null: possibly multiple 'brushes' drawing/painting on possibly multiple layers or canvases.
  - **Getting Help:** mouse-over (or tap) a control and look at the Help that appears below the control panel, as in above diagram where the mouse is actually over the “stop” button.
  - **Change a brush's nib:** click any of the *scrollable* row of icons like this: 
    - The colour music nibs: 
    - The bitmap sampling nibs: 
    - The text nibs: 
  - **Create/delete a brush:** click the “create” button to create a *random* brush; click the “destroy” button to delete the editable brush.
  - **The editable brush:** select the brush you want to be editable from the list of brushes via the drop down menu at top right of the controls.


- **How to tell what layer a brush is on:** it's displayed in the fader slider bar. Look for the fader slider in the controls above. The lower the layer number, the higher the brush is; layer 1 is the top layer. Most of the controls apply only to the editable brush. The fader slider, on the other hand, applies to the whole layer. If there are multiple brushes on the same layer, they get faded the same amount.
- **Move a brush to a different layer:** use the “up” and “down” buttons. You can only move a brush to a different layer if there is more than one brush.
- We'll also look at the other buttons and sliders in the control panel. Don't be afraid to mess with them. You can't break them. When you change the editable brush in some way, the change is almost always visible.
- **How to import your images into the editable brush:**
  - The editable brush must have a bitmap sampling nib. The nib icons of bitmap sampling nibs are bitmaps like these ones: 
  - Click the nib's icon to open the Nib Options window, shown below. This window varies depending on the particular image nib (circles, or text, or whatever).

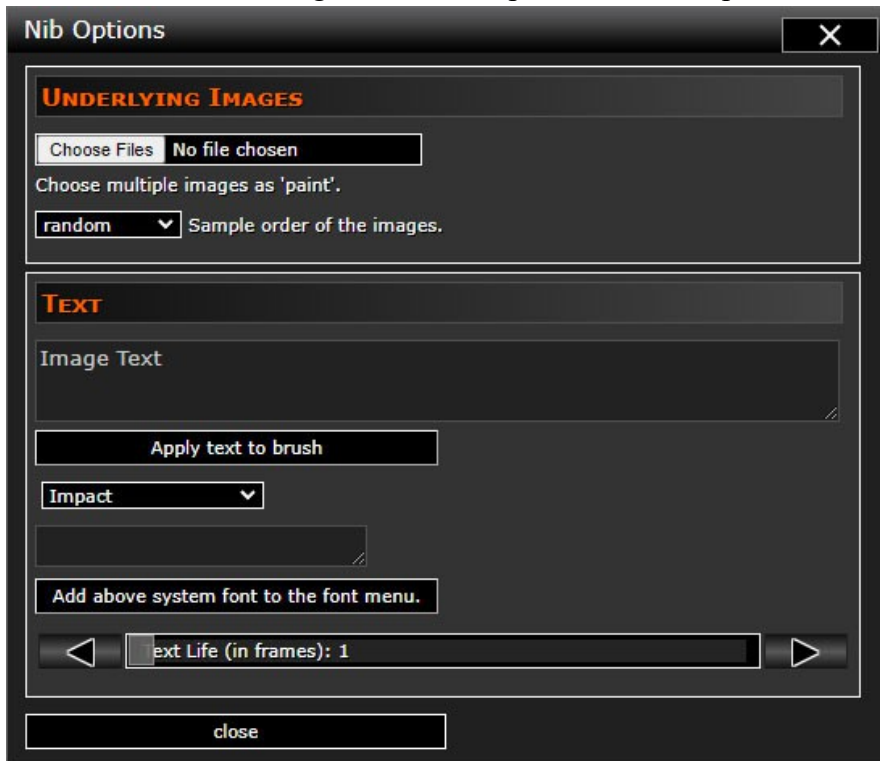


- The above Nib Options window is what you see if the editable brush draws circles.
- You see the “Choose Files” button, above. Click/tap it to select multiple images.
- The “ms per image” slider in the above dialog box tells you how long the nib will sample any of your images before moving on to sample another image. For example, suppose the “bps” slider (brush-strokes per second) is set at 1 and the “ms per image” slider is set at 2000. Then the brush will draw 2 brush-strokes in 2 seconds (cuz “bps” is 2), and they will look much the same, cuz the underlying image is only updated once every 2 seconds (2000 ms). If the “bps” slider is set to, say, 5 (5 brushstrokes per second, or one every 200 ms) and the “ms per image” slider is set to something *less* than

200, then each brushstroke will look at least a little different from the previous one. But don't set the “ms per image” slider *too low* cuz then your computer will do more image processing than it can really deal with. I like to keep the “ms per image” slider somewhere between 30 and 200, normally. If you find that brushstrokes look the same, you probably need to lower the “ms per image” slider for that brush. Then again, maybe you want the brushstrokes to look the same for a while.

- **How to import your texts into the editable brush:**

- The editable brush must have a text nib. The text nibs have text on them, like these: 
- The one with the blue background will also let you import *images that fill the text*.
- The one with the red/yellow background lets you *change the color of the text*.
- When the nib icon of the editable brush is the text nib with the blue background, and you then click the nib icon again, the Nib Options window opens:



- Paste your text where it says “Image Text”, above.
- By default, the nib will display the text word-by-word. Words should be separated by spaces. If you want two or more words to be displayed at once, use caret's to separate them, like this: three^words^displayed.
- Put multiple spaces between words for longer pauses between words. For instance, you normally would put two or three spaces after periods, so that there's a bit of a pause after each sentence.
- To get Help on above features you don't understand, move the Nib Options window so the Help displayed by the controls is visible. Then mouse over mysterious controls. Help will either appear at the bottom of the controls, or Help will appear beside the control.
- **How to pause/play:**
  - The “pause” button (or space key) toggles pause/play of the editable brush.




- The “stop” button (or “s” key) toggles pause/play of all brushes.
- **How to erase the screen:** The “erase” button clears all layers.
- **How to toggle fullscreen:** The “[ ]” button toggles fullscreen on/off.
- **The “route” button:** The “route” button changes the path traversed by the editable brush.
- **How to share Aleph Null:** If you click the “share” button (toward the bottom of the controls), a URL will be copied to the clipboard that you can paste into social media or email or whatever. The URL will open Aleph Null and start using the currently editable brush.
- **How to change canvas size:**
  - Setting the canvas size to something large is useful when you want to create high-res images for print. There's the screen size of the display but we're talking about the canvas size. That size affects the size of the image you get when you press the “save” button.
  - To change the canvas size, either simply resize the browser to the size you want,
  - Or click the “canvas” button (bottom right-ish in the main control panel). The below dialog box opens:



- Enter numbers (measured in pixels) in the “Width” and “Height” boxes and then click the “Set canvas size” button.
- Really big numbers may make Aleph Null slow, depending on the horsepower of your machine. The color music nibs are far less computationally intensive than the bitmap sampling nibs.
- You won't see the difference in size on the screen if you set big numbers. But when you click the “save” button to save a screenshot, you will see that the png is the size you set here.
- **How to save screenshots:**
  - When you press the “save” button (bottom right button in the main control panel), a png image is generated and placed in a new tab.
  - That image is the size of the display (in pixels) or it is the size you set when you clicked the “canvas” button (in pixels).
  - Browsers, these days, do not allow new tabs to be created without your permission. So you will have to allow Aleph Null to create a new tab for created screenshots.
  - To see how to give permission for Aleph Null to create a new tab for screenshots, see these

short videos:

- Aleph Null “save” button: [https://youtu.be/Pi5s6-hY\\_qE](https://youtu.be/Pi5s6-hY_qE)
- Creating a sequence of screenshots: <https://youtu.be/5LgY-IB20BI>
- Creating screenshots under iOS: <https://youtu.be/rqAPQR9upF8>
- **How to make a brush follow the mouse:**
  - Find the “auto” button in the main control panel. It's in the bottom row of buttons, along with “tips”, “about”, “share”, “canvas” and “save”.
  - If you mouse-over the “auto” button, you see Help on it below the button.
  - When the “auto” button says “auto”, that means that the brush's position is automatically determined by Aleph Null.
  - When you click the “auto” button, it will change to displaying the word “mouse”. The brush's position should then be determined by the position of the mouse.
  - If you click the button again, it displays “click-list”. Click a series of points that the brush will cycle through as brushstroke position; double-click to end the point-definition phase. “Click-list” only works with some nibs such as the bill bissett dirty concrete nib.
- **“Central Color” color picker:**
  - Locate the box/button in the main control panel labelled “Central Color”. Click it to open the “Central Color” color picker.
  - This color picker does different things, depending on the nib of the editable brush.
  - If the nib is a color music nib, ie, it's one of these nibs  then the “central color” changes the colors that the nib draws. You can see what I mean when you change the “central color” yourself. The colors the nib draws will be centered around the “central color”; the range of colors will be determined by the “color range” slider, ie, the larger the “color range” value, the more colors it draws.
  - If the nib is a bitmap-sampling or a text nib, then the “central” color sets the color of the outline of a brushstroke. And the “line width” slider determines the width of the outline.
- **“BG Color” color picker:**
  - Locate the box/button in the main control panel labelled “BG Color”. Click it to open the “BG Color” color picker.
  - This sets the bg color for all of Aleph Null. The “BG Color” is painted below all the other layers. Each layer/canvas does not have a bg color.
- **“color range” slider:**
- Locate the “color range” slider on the main control panel. You can slide the slider to set a value or, for more granular control, use the arrows at the ends of the slider. To use the keyboard, first press the “3” key on the keyboard (note the “3” to the left of the “color slider”) to put focus on the slider, and then use the right and left arrow keys on the keyboard.
- When the editable nib is a color music nib, choosing the nib's “Central Color” and “color range” values determine the palette for the nib's color music. All the colors the nib draws are centered around the “Central Color”. The smaller the value for the “color slider”, the closer



all the colors are to the “Central Color”.

- If the nib is not a Color Music nib, the “color range” slider has no effect.
- **“opacity” slider:**
  - Locate the “opacity” slider on the main control panel. You can slide the slider to set a value or, for more granular control, use the arrows at the ends of the slider. To use the keyboard, first press the “4” key on the keyboard (note the “4” to the left of the “opacity” slider) to put focus on the slider, and then use the right and left arrow keys on the keyboard.
  - The “opacity” slider determines the opacity of the editable brush.
- **“fader” slider:**
  - Locate the “fader” slider on the main control panel. You can slide the slider to set a value or, for more granular control, use the arrows at the ends of the slider. To use the keyboard, first press the “5” key on the keyboard (note the “5” to the left of the “fader” slider) to put focus on the slider, and then use the right and left arrow keys on the keyboard.
  - The larger the value of the “fader” slider, the more quickly everything on the editable brush's layer fades to total transparency. To see what the “fader” slider does, crank it up and look at the brush. Then crank it down all the way to 0 (turned off) and observe the difference.
  - All the other sliders operate *only* on the editable brush. The “fader” slider, on the other hand, operates on the layer the brush is on. That is, if two brushes are on the same layer, they will have the same “fader” value.
  - Note that the “fader” slider displays two values: the “fader” value tells you what the fader value is for the editable brush (and other brushes on that layer); the “layer” value tells you what layer the editable brush is on. Layer 1 is the topmost layer.
  - If you want to know what layer a brush is on, make it the editable brush and then look at the “layer” value in the “fader” slider.
- **“bps” slider:**
  - Locate the “bps” slider on the main control panel. You can slide the slider to set a value or, for more granular control, use the arrows at the ends of the slider. To use the keyboard, first press the “6” key on the keyboard (note the “6” to the left of the “bps” slider) to put focus on the slider, and then use the right and left arrow keys on the keyboard.
  - “bps” means *brush-strokes per second*. Each brush renders brush-strokes. This tells you the speed with which the brush paints or draws or whatever.
  - The “bps” slider displays two numbers. The “bps” value is the value you have set it to. The “real” value is the actual value that the brush is drawing at. What's the difference? Well, the bitmap-sampling nibs do a lot of computational work, depending mainly on the “bps” and “ms per image” values. You can crank up the “bps” slider higher than your computer can perform. In that case, the “bps” value will be the value you wanted it to draw at, but the “real” value is the actual number of brush-strokes per second the brush is laying down.
- **“size” slider:**
  - Locate the “size” slider on the main control panel. You can slide the slider to set a value or, for more granular control, use the arrows at the ends of the slider. To use the keyboard, first press the “7” key on the keyboard (note the “7” to the left of the “size” slider) to put focus on the slider, and then use the right and left arrow keys on the keyboard.

- The “size” slider determines the size of the editable brush's brushstrokes. Usually what that means is obvious. If you look at the brush as you change the value of the “size” slider, the brush-strokes gets bigger or smaller as you change the slider. In some nibs, the maximum size gets bigger and smaller. That is, the brush-stroke size varies, but, still, the max size is fixed by the “size” slider.
- In the “shard” nib, the “size” slider determines the max number of points along the perimeter of the screen.
- **“rhythm” slider:**
  - Locate the “rhythm” slider on the main control panel. You can slide the slider to set a value or, for more granular control, use the arrows at the ends of the slider. To use the keyboard, first press the “8” key on the keyboard (note the “8” to the left of the “rhythm” slider) to put focus on the slider, and then use the right and left arrow keys on the keyboard.
  - The “rhythm slider determines the amount of change, per brush-stroke, in the “size” of the editable brush's brush-strokes. For instance, if the editable brush has a Tangents nib, then if the “rhythm” slider is set to 1, the size of the brush-strokes will get smaller each brushstroke by one pixel, until they reach a minimum size, and then they get bigger again each brush-stroke by 1 pixel.
  - It's called the “rhythm” slider cuz it can set a visual rhythm.
- **“line width” slider:**
  - Locate the “line width” slider on the main control panel. You can slide the slider to set a value or, for more granular control, use the arrows at the ends of the slider. To use the keyboard, first press the “9” key on the keyboard (note the “9” to the left of the “line width” slider) to put focus on the slider, and then use the right and left arrow keys on the keyboard.
  - Determines the width of the outline of the editable brush, in pixels.
  - You can change the color of the outline with the “Central Color” color picker.
- **“rotation speed” slider:**
  - Locate the “rotation speed” slider on the control panel. You can slide the slider to set a value or, for more granular control, use the arrows at the ends of the slider. To use the keyboard, first press the “0” key on the keyboard (note the “0” to the left of the “rotation speed” slider) to put focus on the slider, and then use the right and left arrow keys on the keyboard.
  - Determines the rotation speed of the editable brush—if it rotates. Some nibs rotate. Others don't. If the nib doesn't rotate, this slider has no effect.
- **Preparing images for use in Aleph Null:**
  - Although no preparation of images is actually *required*, I have found that, in many—though not all—cases, some initial preparation of the images makes for *more interesting* results.
  - The first time I did some initial image preparation was in my collaboration with bill bissett. What I did there was create png versions of the images. Png images can have transparent parts, whereas jpg images can't. By deleting the backgrounds of almost all the images, and 'haloing' the text (or other fore-grounded material), the images layer better in Aleph Null.





- To the left is a [bill bissett](#) concrete poem I did some Photoshop work on for use in Aleph Null:
- You can see that the tan background has been removed; the only thing left of the background is the tan 'halo' around the text. The 'halo' makes the text more readable when it's layered among other such 'haloed' texts. This requires a little smarts with Photoshop or the free Gimp or some other bitmap-processing program. But not too much. You need to get good at selecting stuff, and expanding/contracting a selection, and feathering the edges of selections a little bit.
- Sometimes I also do some other sorts of image preparation in Photoshop. The below image (Lorenz Stöer, 1567), which I use in [City on the Other Side of Time](#) and [Alchemical Cosmography](#), not only has the background removed, but

three of the sides of the image are faded out gradually. I wanted to avoid hard, straight line borders between images. I wanted more 'synthesis' of images than simple 'juxtaposition', 'collage' or whatever.

- Sometimes I also give some of the images a dropshadow. Like the 'haloing', this helps distinguish one image from an adjacent, overlapping one, often. Also, it can add a little bit of depth.



- I want the images to mix together in interesting ways. But if you do that simply by creating low-opacity strategies, the result tends to be washed out and samey. Another way to say that is that the Aleph Null processes are quite *noisy*. In the information theory sense of *noise*. They are obliterative of images. Aleph Null produces a kind of *obliteration*.
- Working with Aleph Null has given rise, in my musings on the matter, to the *poetics of signal and noise*. The Aleph Null processes, at least those of the bitmap-sampling nibs, are noisy, obliterative. How do you create and sometimes retain signal under such processes?
- Part of one of many possible answers is that you prepare the images for interesting obliteration and synthesis. Of

course, another part is that the processes of the nibs themselves should interestingly mix the images. Suggestions for interesting nibs?

- Thanks for your interest in Aleph Null.
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