The Drawings of Jean-Pierre Hébert - *Master Algorist*

by Roman Verostko, 2003

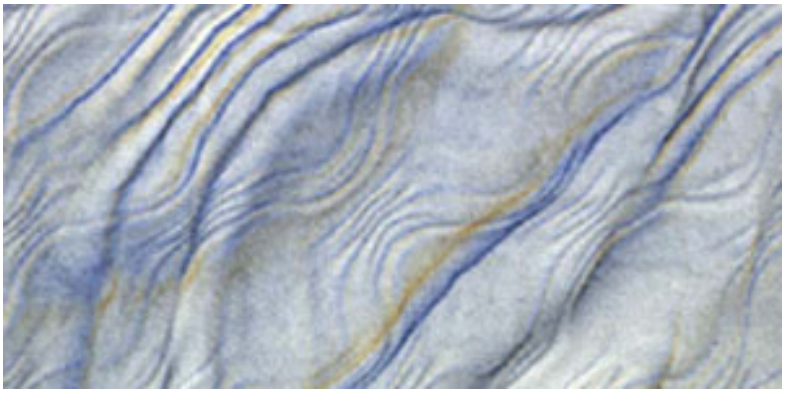
About Jean-Pierre Hébert. Jean-Pierre, a founding member of the algorists, has experimented with innovative algorithmic procedures for over 20 years. Although well known for the zen-like qualities of his algorithmic drawings, he has also created major work with alternative technologies developed in his studio. His experimental work testifies to a vigorous pursuit to join well-formed algorist procedure with fine arts traditions. Among late 20th Century algorists his work emerges with a rare blend of algorithmic virtuosity and a French *sensibilité* for the texture and feel of his media. During the last quarter of the 20th Century he and his fellow algorists opened a new frontier of visual form. Their work constitutes the first major body of art leading to the current "generative art" movementt.

Hébert is currently Artist in Residence at the Kavli Institute for Theoretical Physics at the University of California Santa Barbara. He maintains a studio and lives with his wife and children in Santa Barbara. For more on Jean-Pierre's practice visit his web site: *www.solo.com.*

About the author. Roman Verostko, a historian and active artist for over 40 years, is also a founding member of the algorists. His first encounter with Jean-Pierre Hébert's work reinforced his views on the form-generating power of algorithmic procedure. In his 1988 paper on *Software as Genotype* Roman identified the biological analogues to these procedures (Note 1). He pointed to form generating processes in algorithmic procedure that were similar to processes found in nature. Roman sees qualities of form in algorist art that have brought us to the threshold of a vast new world of visual form that was inaccessible to artists before we had computing power. By drawing on that power algorists have been tapping the richness of this vast new frontier of form for many years. He believes their work, in the last quarter of the twentieth century, marks the first stage of a generative art movement that is now growing vigorously and will find its fullness in the 21st Century.

Roman maintains an active algorist studio in his Minneapolis home overlooking Diamond Lake. For more on his theory and practice visit www.*verostko.com*.

My first encounter with Jean-Pierre revealed a person of rare sensibility to the processes of both nature and machines. Walking the beach in Santa Barbara he could easily be drawn to study patterns traced in the sand and ponder the processes shaping their form. Those processes hold "form-generating" power that is of great interest to the algorist. With the advent of computers, some artists had gained access to this power and had been exploring its dimensions long before we had ink jet printers and shrink-wrapped software. For many years, with a rare blend of artist/engineer expertise, Jean-Pierre has been exploring this power with a creative force that deserves our attention.



Detail of an algorithmic drawing displaying form qualities like those found in nature.
Untitled, J.P Hébert, 1999.

Somewhat like a musician writing the *score* for music an algorist writes the score for visual form. As an algorist, Jean-Pierre creates detailed coded procedures for executing his art forms. The instructions are written in a code (software) capable of executing the art-form idea with a drawing machine known as a plotter. .

This essay addresses his major drawing practice of the last quarter of the 20th Century. This practice includes the following elements:

- Original "form generating" concepts / ideas
- Executable coded procedures embodying these "form generating" ideas
- A drawing machine with a drawing arm, marking tools, paper & ink.
- A drawing machine table covered with sand executes sand traces
- Computers to drive the drawing machines and sand tracing tables.

Drawing machines are also essential tools in my own studio work. Over a decade ago our shared interests led to correspondence, studio visits, and idea sharing. Over the years I have witnessed the intensity of his experimentation, his steadfast growth as an algorist in the face of many obstacles, and the superb quality of his drawings. I was able to share his feelings when a rare set of triptych drawings that he had shown in Sidney (FISEA '92) were lost forever in a travelling exhibition in Australia. That masterpiece triptych would stand today as one of the great algorist works of the last decade of the 20th century.

Sand trace 2003

Studio & context – first encounters.

In 1988, when I had first seen one of Jean-Pierre's original drawings, I was drawn to the over-all quality and density of the pen and ink drawings. Achieving a high density of controlled pen drawn lines, without a single failure, over a large surface, is itself a noteworthy achievement. His drawings, with their undulating waves of form, re-enforced my conviction (and others, I'm sure) that coded procedures, coupled to computing power, were extending the drawing hand of the artist into new frontiers. This was something entirely new. One could see clearly, in the work of Jean Pierre, that his personal drawing style was being imbedded in the code. This convergence of "code" and sensibility for materials were essential, in my mind, for a meaningful marriage of art and the new information technologies. These factors and other mutual interests drew me more closely to Jean-Pierre's work.

As I recall, it was early in 1991 when I first visited his studio in Santa Barbara. As I approached his studio from the driveway I could hear the rhythmic hum of his pen plotter, a kind of musical interlude or studio serenade, before our meeting. The plotter yields a unique hum for each algorithm, so the next algorithmic hum will not be the same as this one. The softly modulating hum, that reminded me of a Tibetan mantra, is generated from the driving motor and the plotter's drawing-arm following its course. In effect the sound track of a plotter executing a specific drawing would be a "sound analogue" of the ink pen's path! (Note 3)

But there is another dimension that we could call the "mind-hand" of the procedure. We could say that the drawing arm of the plotter is an extension, a kind of prosthesis, of the algorist's "mind-hand". The algorist composer "feels" the drawing in the "mind-hand" in the very process of creating the code. This would be similar, I assume, to a composer listening to her "mind-ear" while composing music. Yes, the composer may sample this or that part of the score with a piano and accept this note while rejecting that one. In the end the "mind-ear" must finally write the score and get it right. And yes, the algorist may also generate samples of this or that visual element. But, in the end, the work takes place in the "mind-hand" as the code takes on its final working shape.

Untitled, 1979. Pen & Ink drawing

The Studio Sound & Spirit

Approaching Jean-Pierre's studio I heard the hum of his "mind-hand" as it confidently traced its path over the paper and I already sensed the work in progress at a distance. Later, in his studio, hypnotized by the pen as it meandered with precision, I sensed the deep mind and the hand of this algorist master. "Bravo!" I thought to myself. "He has extended his 'mind-hand' in a linear manoeuvre with seemingly endless improvisation on the very character of the manoeuvre itself". This, I understood, was a consequence of his artistic use of algorithmic procedures to achieve extensive improvisation. He implemented his procedure with a fine balance between algorithmic power and sensitivity to visual surface, texture, and color.

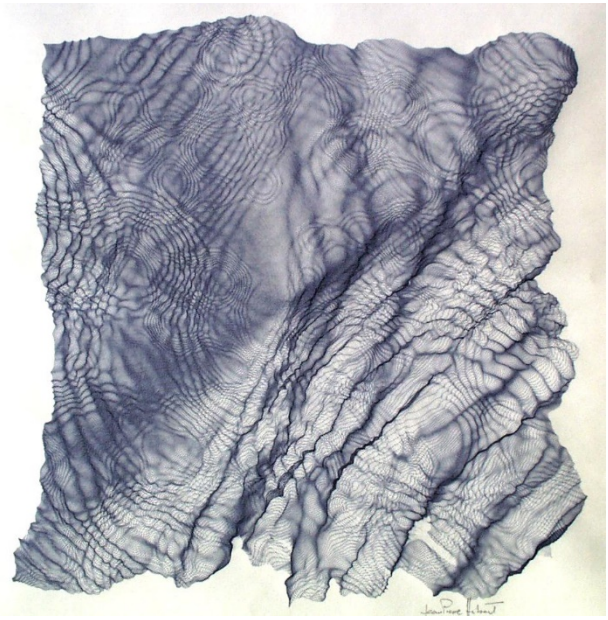
The drawing arm, improvisation and iteration.

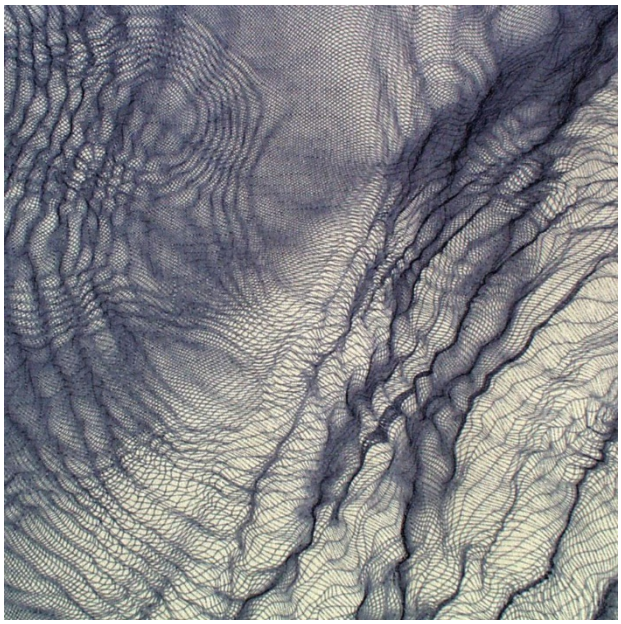
As noted earlier the plotter's drawing arm could be viewed as an extension of the algorist's "mind-hand". How and in what way the algorist hand is extended is the key point. In his 2003 statement Jean-Pierre quotes Sol Lewitt's observation" The idea becomes a machine that makes the art" (Note 4) The algorist writes a drawing instruction and this instruction, the algorithm, can be viewed as the logical engine, machine, for making the art. But are we able to identify what this logical engine achieves?

One may be tempted, as I was at one time, to view the plotter drawing arm as an extension of the artist's physical hand. This is not the quite the case. The machine does not "simulate" the algorist's physical hand. Rather the machine executes the "mind-hand" of the artist. The algorist's "mind-hand" can create original drawing manoeuvres that exceed the capacity and exterity of the human hand. Arrays of algorist drawing manoeuvres may include functions capable of unlimited iteration while improvising on themselves. The mind-hand can also create original procedures for a drawing loop that remembers what it has drawn then improvise on that drawing path for each step along the way. This kind of "mind-hand" engages procedures that excel what the hand can achieve. Through experience the algorist learns how to set rules to achieve personal aesthetic preferences.

Iterative procedures are not new. An algorithm for the Fibonacci number generates a sequence of numbers consecutive series whereby the next two numbers have a relationship approaching a golden section as the numbers increase. (Note 5).). What is new is the ability to execute code for extensive iteration with each loop improvising on information generated in the previous loop. Such drawing exceeds what the physical hand can draw. This capability would have been welcomed by early 20th century artists like Piet Mondrian, Naum Gabo and other pioneers of pure form.

Jean-Pierre creates algorithms that draw a line continually improvising on itself as it proceeds. The procedure yields self-similar qualities imbedded both in the lines and in the larger folds and undulations as they appear to slide and roll like the shapes we see in natural formations.



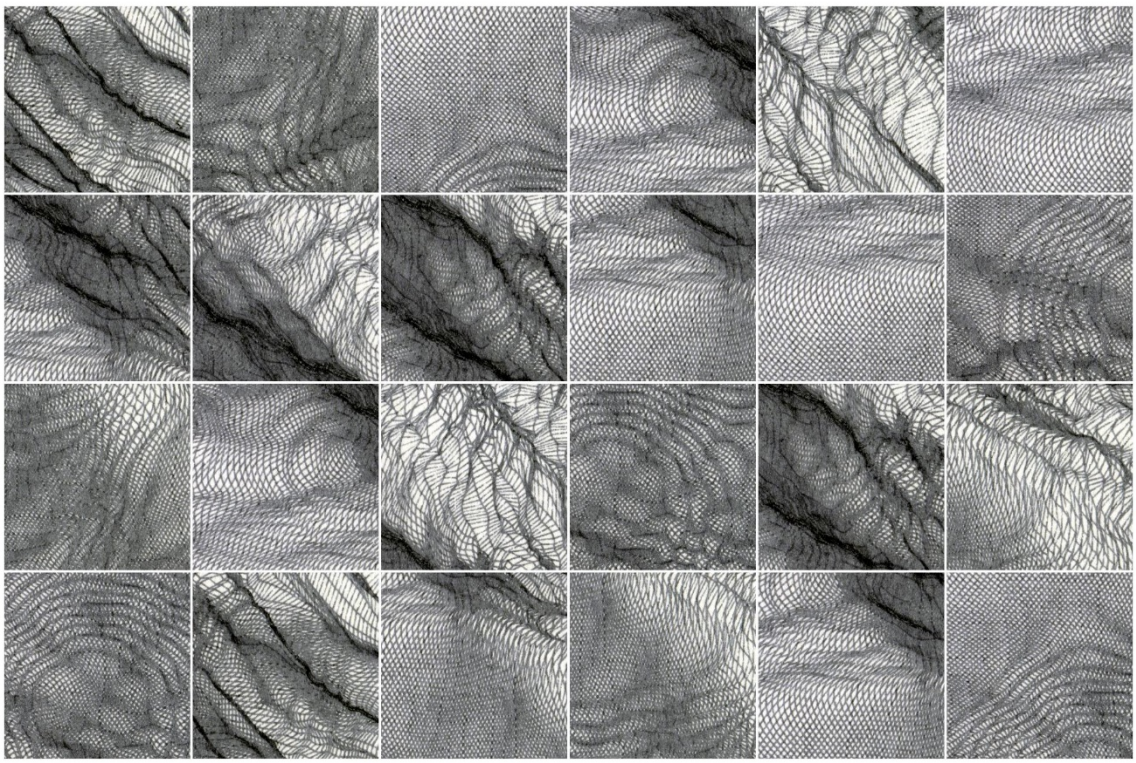


Untitled, 19??, ??" by ??". Pen drawing on paper using Payne's Gray Watercolour. Jean-Pierre's "mind hand" employs extensive drawing manoeuvres to achieve undulating self-similar visual forms. This drawing exhibits unique qualities of line and control clearly placing the work within the genre of late 20th Century algorist work. Layers of self-similarity are achieved both within individual lines and within the larger layers of form that emerge like tracings of some natural force. These qualities speak strongly with a mature drawing style that identifies with Jean-Pierre's unique "mind-hand". Such form is achieved via informed experience with coded procedures coupled with an experiential understanding of the unique qualities and limits of paper, pen and drawing medium.

Herein lies the unique feature of computing power coupled with an artist's coded procedure. This does not diminish the unique drawing hand of an artist using traditional drawing tools and procedures. What we seek to identify here are the unique features of the algorist procedure when it employs extensive algorithmic procedure with sustained precision.

Concretisation, the actual drawing.

We can code for unlimited sequences and literally a vast array of forms. Some 20 years ago an algorist colleague expressed being overwhelmed with the vast number of options his form-generator provided. This is a common experience upon first entering this new frontier. "Decision" in the face of a vast array of possible forms faces the algorist who choses to concretise a work of art in a material form. Even as one codes for "decision" the procedures for the "decision" procedures can become a nightmare.



A sampling of forms generated by Hébert's code. Choice of which form direction to develop for a specific work of art is one of many artistic decisions the algorist may make during generating a work of art.

Through experience an algorist learns that refinement and personal artistic preference narrows the decision tree. Another winnowing factor rests with the demands of concretising the form. The drawing process must be conceptualised in terms of specific drawing materials and tools. The code specifies procedures that connect to tools and materials in time and space. The actual procedure must mesh with the limits and the aesthetic qualities of paper and drawing instruments. At its best the code optimises the operation of tools and amplifies the aesthetic qualities of paper, ink and the character of the marking instrument.

At this point we are far from the endless arrays of forms one sees tumbling on monitors in cyberspace. An artist like Jean-Pierre works in the concrete world of paper, inks, pens, drawing machines and all the details of moving and working in physical space.

Coping with these technological limits requires patience and experience. With access to an untiring plotter drawing-arm Jean-Pierre learned to be careful not to specify linear work beyond the capacity of the paper. Getting it just right through trial and error demands time and intimate knowledge of paper and drawing instruments.

For example, intensive drawing on textured paper hones a pen or pencil point making it prone to cut or tear the paper. There were occasions when Jean-Pierre showed me drawings with paper torn by the pencil, over-saturated with ink, or guttered and torn by a honed pen point. Getting a paper surface, pencil softness or pen point, and linear activity "just so" demands a lot of trial and error. So technical trade offs between unlimited drawing power and the limitations of paper, size, pen points and ink had to be addressed in the algorithm itself, else the "mind-hand" drawing arm fails.

So, the code literally embodies, via procedures honed by experience, the artist's knowledge and sensibilities for the physical qualities of paper and drawing tools, their limits, and the precise manner by which the drawing machine draws with drawing instrument. These are the hidden factors that converge in the code to lend it the distinctive style of the artist who created it. His "mind-hand" resides in the code.

Algorist drawings, at their best, bear the imprint of their coded procedure. Just as surely as sculpture in stone may bear the unique mark of the sculptor's chisel so just as surely the lines in an algorithmic drawing reveal the distinctive qualities of the algorist's "mind-hand". Through a unique convergence of conceptual innovation and knowledge of materials, Jean-Pierre's code engenders a personal style present with each drawing. His linear forms celebrate themselves with self-similar meanderings coursing over the paper.

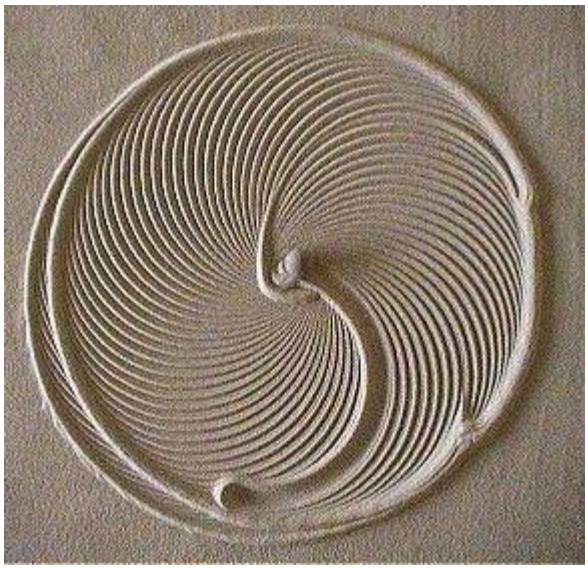
Contemplating their forms, I believe, reveals something of Jean-Pierre's inner "mind-hand". Through this work we are given a glimpse of the mysterious nature of this artist's inner world. This may be the greatest contribution of a master algorist like Jean-Pierre. His work leads us to experience a personal and private visual world via coded procedure, a world that would otherwise remain hidden from view
.

Left: Example of extensive plotting that approaches limits of media.

die Forelle (1997)
pen and white ink on slate paper, detail 5x3in. within 12.5x9in.

The art object.

Although this essay has been committed fundamentally to addressing Jean-Pierre's work with physical drawings I must add a note on his work with alternative technologies for algorithmic drawings. Among his experimental forays his "Sysiphus" project stands out for the quality of its work and innovative technology. This project creates drawings by tracing pathways on a table of sand with a steel ball. The moving ball, driven algorithmically by a concealed magnet, provides a transcending experience for those privileged to experience the process. I recall evenings when my wife and I along with Jean-Pierre and his wife sat for long hours into the night watching algorithmic drawings unfold in the sand.



Left: Sisyphus I, ca. 1997-98. A 3 ft by 3 ft version with sand drawing. **Right:** One sand drawing overlaying an earlier sand drawing, ca. 1999, 3 ft by 3 ft. Each line movement is achieved with a concealed magnet driving a steel ball on a path defined with X, Y coordinates. While the controlling algorithm may be studied and understood in every detail the procedure for creating both Sisyphus and this specific algorithmic sequence transcends human understanding. For many, including myself, experiencing the movement of the unfolding drawing evokes a sense of transcendence and mystery.

The silent tracing procedure draws one deeply into the process inducing a hypnotic trance similar to deep meditation. From my view such experience invites us to accept the processes of life as a wondrous self-sufficient mystery. We are fortunate for those rare times in life when we experience a moment of art or the awesome wonder of nature that seeks, and simultaneously defies, definition. It is indeed, in this sense, that JP's Sisyphus can evoke a sense of the transcendent.

As *Sisyphus* labours, pushing the steel ball along its drawing path, we might ponder how it came to know which path to follow and what forces caused the sand to yield to its movement. We are torn between the poetry of the unfolding line and the drive to understand how it came to be that way. In the end we are confronted with the same question we faced at the beginning. We can study the code for the drawing that is spelled out in every detail. But we may never fathom the procedure by which the code, namely the algorithm for executing the drawing, was created.

Post-script, a new frontier.

Research in the cognitive sciences may soon show us more specifically how the mind works in our hands, our legs, our speaking mouths, etc. Composers have been writing code with their "mind-ears" for centuries. Especially noteworthy would be Beethoven's 9th Symphony that was composed after he had lost his hearing - a masterpiece born within his "mind-ear". In fact, choreographers, playwrights and architects have all employed notational systems of one type or another specifying precisely how their "mind-art" forms are to be concretized.

So, we should not be surprised that Jean-Pierre's pen plotter drawing arm literally draws the form via JP's coded procedure. Executed with his code and studio materials the art form is surely a Jean-Pierre drawing bearing the unique qualities of his "mind-hand" just as surely as Beethoven's musical ideas are present today in my studio as I listen to his *Moonlight Sonata.*

Now artists like JP are creating visual form in many ways similar to the way composers have created musical form for centuries. But there is a new dimension to this art. True, we have had algorithmic procedure in the arts long before we had computers. But computers have given us an ability to extend a form-generating procedure to domains of visualization that were not, in practice, accessible before we had this computational power. These domains of visualization constitute a new frontier where algorists have been opening new pathways in the visual arts.

This leads us to the profound nature of the experience of art. The artist works in a domain that passes back & forth from the world of dreams and possible forms to the world of physical limits and the human senses. The new frontier lies somewhere in an unseen or unknown world of form that can be made visible and savored for its aesthetic quality.

With his colleague algorists, Jean-Pierre has been one of the pioneers of this new territory of visual form. He serves us well by showing that the "art object" in the emerging information age remains alive and well.

Roman Verostko
Minneapolis, June 2003.

Note 1. See: http://www.verostko.com/epigenet.html. This paper was presented at the Utrecht FISEA in 1988 and later published in Leonardo: "Epigenetic Painting: Software as Genotype, The New Art", *Leonardo*, Vol. 23 #1, January 1990.

Note 2. Throughout this essay I use terms like "mind-ear" and "mind-hand" to indicate that the creating process (writing the code) engages the whole person and cannot be identified with one body part separated from another. Our "ears", "hands", "brain" and "mind" operate in our bodies via a neurological web whereby we experience ourselves eating, working, sleeping, playing, and, if we are fortunate, creating a bit of something here or there along the way.

Note 3. Emanuel DM Pimenta [edmp@asa-art.com], an electronic artist, architect and composer from Portugal, informs me that he has composed music employing the marvellous sound of a pen plotter. Steve Dietz upon his first experience hearing my pen plotter also remarked on the seductive sound of the engaged drawing arm. This mysterious presence of a working pen plotter, well known to users, contributes, in my mind, to the qualities of an algorist's studio work.

Note 4. See the Jean-Pierre statement at: http://www.solo.com/gallery/statement03.pdf

Note 5. Each number in the series adds itself to the previous number to determine the next number in the series. This yields the interesting Fibonacci number series when starting with 0, thus 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233…etc. to infinity. Iterative techniques allow one to improvise the next action by applying a function to information contained in recent actions. A drawing path routine might build the next drawing pathway using a function that operates on information gleaned from the last couple drawing pathways. By improvising on previous drawing paths in a series of recurring loops the algorist can build visual compositions that yield an uncanny life of their own. Such procedures literally "grow" a visual form. By trial and error, the algorist learns to create form-generators that embody individual style. Aspects of these procedures were addressed in my 1988 paper on *Epigenetic Art: Software as Genotype*, see Note 1 above.