AESTHETICS in the AGE of NEW MEDIA

Edited by Lorenzo Serini and Marta Vero

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Abstract

The paper starts by formulating Cohen’s principle – the theory that, whilst computers follow a different order of creativity from humans, this difference can, nevertheless, actually be used to extend the scope of human creativity itself. The principle is explored in relation to drawing and painting with computers.

An image is drawn or painted by a computer in the fullest sense when a hardware-programme relation invents new visual forms designed explicitly to be printed out, or otherwise marked, on surfaces existing independently of the computer itself. The main varieties of this are – the interactive; the projective; and the interventionist. Such images also have correlated stylistic features namely hyper-real precisionist visual qualities, and, in other cases, performative effects (where the image draws attention to the process of generation).
All these features are explored in relation to the work of Patrick Tresset, Harold Cohen, and Desmond Paul Henry.

Introduction

There have been many ways in which mechanical devices have given assistance to drawing and painting over the centuries, but is now possible for these activities to be conducted by computer-driven machines and taken to an unprecedented level of completeness. This use of computers in drawing and painting is certain to be developed a great deal further. In the present paper, therefore, I will address some of the main conceptual issues arising from such usage.

One of the most distinguished practitioners of computer art is Harold Cohen. He has also formulated an important theoretical point, which I shall, henceforth, call Cohen’s principle. It informs much of his artistic work and writings but the elements of it are contained, succinctly, in the following remarks.

“The day may or may not come when machines have a sense of self. If it doesn’t, it means that machines will never be creative in the same sense that humans are creative. But even if that day never comes, it doesn’t mean that machines have no part to play with respect to creativity. Had I not met my first computer in 1968, had
I not found this particular way of expressing my own needs with respect to art-making, my life and work surely would have followed a very different vector for the past forty years”².

What Cohen is describing here – over and above its tentative expression and biographical aspects – is an interlocking dual point concerning the limits and possibilities of creativity in computing. One can state the principle more formally as follows. *Unless computers acquire selfhood then they will always follow a different order of creativity from that of humans, but the difference at issue here can actually be used to extend the scope of human creativity itself.*

This is a key point concerning creativity and computers per se, but of course, for Cohen and the present paper, the specific case of drawing and painting with computers is the main focus of interest.

To take things forward, it is important to explain the components of Cohen’s principle, starting with the idea that computers cannot be creative in a human way without acquiring a sense of self. One might insist at the outset, that a sense of self grows – it is not something that can be programmed into a computer. Of course, it might be that enormously sophisticated hardware and programmes might allow a computer to adapt and develop its own programming in response to visual, auditory, tactile, and even olfactory stimuli/input.

However, one must question the criteria of adaption and development here. Or, to put it another way, ask what is the criterion of apperception whereby we can justify the claim that what the computer ‘perceives’ or does involves it also ascribing these deeds to itself?

As I have argued at great length elsewhere, the unity of the self is based on a holistic structure of experience where the momentary is of key importance. Indeed, the unity of self-consciousness is, in essence, an aesthetic narrative. All these features converge on the fact that what happens matters to us because it is soon lost in the passage of time. This intrinsic knowledge of imminent loss means that things engage us emotionally – over and above their use in the practicalities of survival, or in terms (where appropriate) of the pleasures of consuming them or otherwise interacting with them. Being in time involves more than physical endurance. We have to change position, and adopt changing patterns of proximity to and distance from those things and phenomena which will furnish us with the means of subsistence and survival.

This existence-through-change is informed by the knowledge that, after childhood and youth, we are in a state of continuous decay, and will eventually die. This is far more than mere factual recognition. As I have shown elsewhere, imagination plays a necessary role

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3 See for example the discussion in Crowther (2003), Chapter 5. A more recent statement of the theory will relevance to the present discussion is Crowther (2013), pp.101-123.
in experience⁴. This means that cognitive engagement with facts from the past, or future or counterfactual possibilities, involves a creative modelling of them in the present moment – on the basis of our own personal narrative, the sense of ‘my personal story, so far’. The modelling in question here is fraught with gaps and instabilities as well as with a quasi-sensory richness that mere thought processes do not have. It is the way our existence as embodied finite beings is exemplified in every moment, whether we are conscious of it explicitly or not.

It is important to emphasize, also, that the cognitive and emotional basis of experience is determined also by our form of life as social and biological beings. Indeed, the character of our sociality, is profoundly shaped by the possibilities and problems presented by our biological being (especially in relation to procreation and child-rearing) as well as by differences and rivalries between individuals.

The point to gather from this, is that apperception – our sense of self – is something bound up with finite embodied individuals who live and die in communities, and whose unity of self-consciousness involve a personal narrative arising from the continuous dialectic of emergence, dwelling, and loss in experience. It might be possible to create artificial human beings one day – through bio-engineering, but these will not be computers. If

⁴ Cfr. op. cit.; see also Crowther (2003), chapter 4. The problem is addressed in even greater depth in Crowther (2013), pp. 37-56.
such beings were augmented through technological components, it might be possible for them to evolve, but, even so, this would take us far beyond the realm of the computer.

Now, it might be asked why I have justified the first aspect of Cohen’s principle in such detail. Human selfhood and creativity is clearly of an entirely different qualitative order from that of machines – however sophisticated they might be. Can’t we just leave it at that? The answer is no. For if we fail to explain what these differences centre on, then we fail to do justice to the other half of the principle – namely that it is the very difference between computer and human creativity that allows the former to assist in developing the latter.

Elsewhere, I have shown, at the greatest length, how drawing and painting have an intrinsic significance as enduring expressions of presentness. They preserve a notional moment of visual experience, by preserving and disclosing the autographic means whereby the image was created. That which is transient and ill-defined in ordinary experience is taken to a higher level of accomplishment. It symbolically transcends the experiential basis of finitude.

Now, the digital image can also preserve and explore a notional aspect of how a three-dimensional state of affairs might appear, but it does so through non-autographic means. Like drawing and painting,

as such, it can create aesthetic space, but it gives its own ‘feel’ to this – a feel which, ironically enough, is an expression of envisioning things in space \textit{without having to feel}.

We are thus led to the second aspect of Cohen’s principle, namely that the very difference between computer creativity and human can allow the former to extend the latter. In order to understand how this is possible, we must consider the \textit{logic} of what it even means to draw or paint using computers. By investigating this, we will become clearer about what is distinctive about images produced by such means.

First, all advanced computers can display visual images and print them out, but this does not involve drawing or painting with computers as such. To draw or paint rather than simply reproduce from existing databases, the computer must use a hardware/programming interaction that can invent visual forms. This involves the design of new images. Of course, this might involve programmes that sample or synthesize pre-given visual data, but the point is that it changes these into configurations that do not match what is already in the world.

Now, it should be emphasized that images of this kind can be exclusively digital - when they are created only for projection on an electronically sustained screen. In such cases, it would again make no sense to describe this as drawing or painting with a computer. True, the designer might emphasize line aspects or images generated through textures and
masses, and in this way compose using principles also used by drawing or painting. But this would be a case of generating images on the model of drawing and painting rather than drawing or painting with computers.

For us to describe them in such terms, accordingly, the following characterization would be appropriate. *An image can properly described as drawn or painted by a computer when (i) the relevant hardware/programme relation invents new visual forms designed explicitly to be printed out, or otherwise marked, on surfaces that can exist independently of the computer itself, and (ii) whose appearances allow the image’s computer origins to be recognized.*

This last point is necessary because if the image did not disclose its computer generated origins, there would be no reason to treat it as anything other than mere visual information as such. For some communicative purposes, this informational role is sufficient. But if being drawn or painted by computer is to have distinctive artistic significance, then it follows that these origins must be recognized and play a role in our appreciation of the image.

There are two major possibilities here (with plenty of cross-overs and combinations of them possible also). On the one hand, the hardware-programming interaction can be orientated towards enhancing illusionism in the marked surface. The evidence of digital origins here is shown—manifestly—by the hyper-real precision of contours and tonal
gradations, but, at the same time, this feature also tends to play a game of subtle self-concealment by its very role in enhancing the illusionistic features of the final image. Such precisionist works usually involve the image being printed-out onto the appropriate surface, rather than marked out through the use of some instrument of drawing or painting.

On the other hand, however, there are ways of marking the pictorial surface which emphasize that the image has been physically drawn or painted by a computer. Images with this performative emphasis tend to appear immediately naïve and schematic vis-à-vis their composition and colouring – and it is this that leads us to consider them as having mechanical origins. Whereas, in other words, the precisionist image shows its digital status as a consequence of how it enhances virtual illusion, the performative image orientates us, from the outset, towards the relation between its pictorial content and the mechanical means whereby this is produced. Such images often involve hardware that makes use of specially created or adapted instruments for marking the final image on the pictorial surface.

Having, therefore, described the logic of drawing and painting with computers, I turn now to how this logic is enacted in physical terms, i.e., how the computer actually creates the image. This goes beyond questions of how the image is printed out or otherwise marked on the pictorial surface. In fact, there are three rather more general possibilities here
Conditions of Creativity: Drawing and Painting with Computers

(with, of course, again many potential overlaps or combinations between them). The possibilities are:

1) Interactive – a relation between hardware and programming that enables the computer to design the image as a causal response to some external input – e.g. the presence of some material body or state of affairs which will be actual subject of the drawing or painting, or, in other cases, will at least prompt the computer to generate forms as a ‘response’ to its presence.

2) Projective – a relation between hardware and programming that simply designs and prints and/or marks the image on an external surface without any reference to other external stimuli (over and above the artist’s physical activity in programming it).

3) Interventionist – a relation between hardware and programming where physical intervention from the artist (or from contingent circumstances) in the course of the image-producing process is allowed for, or, in some cases, even demanded.

I have, then, explored the two aspects of Cohen’s principle by showing the limits of computer creativity in comparison with that of humans, and by considering the features that give images drawn or painted by computer their distinctiveness. To show how the latter can extend human artistic creativity, I now consider important examples of Interactive, Projective, and Interventionist computer art.
I.

In the case of computing that draws and paints through informational input from external ‘stimuli’ Patrick Tresset’s work with the drawing machines that he calls ‘Paul’ and the painting machine ‘e-David’ (in collaboration with Oliver Deussen) offer remarkable examples of this – ones, indeed, which have received large-scale publicity outside the realms of computer art, *per se*.

Both sets of machines have been designed to draw or paint portraits of human faces. The ‘Paul’ machines, for example, can scan and discern salient contours in the subject through Gabor filters, whilst ‘e-David’ paints the subject from an image stored in the memory of one of the ‘Paul’ robots. The programmes of both systems incorporate informational translations of Tresset’s own style of drawing, and a range of styles associated with other well-known artists.

However, some wider ambitions are involved. Tresset claims that:

“Our aim is to develop autonomous systems that are capable of conceiving and producing artifacts that have a range of qualities and characteristics that enable their status as a work of art. Objects, to be considered as having such status, must be exhibited–evaluated–appreciated–acquired in a contemporary art context, and in the same manner as artist-made artworks.”

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The assumption is that by increasing the level of ‘autonomous’ artistic creativity in the computational systems, they will likewise increase the value of both the robots and the work they create. Originally, Tresset developed drawing using computers as a way of re-invigorating and extending his own artistic practice, but he has hinted at more radical possibilities vis-à-vis autonomy in computer creativity. In his words:

“A few years ago I would have said it wouldn’t be possible, but now I believe a robot will be able to develop its own style. It all depends on whether I can secure funding”7.

For Tresset, the development of style is the decisive factor in working towards this goal. Style is a complex combination of characteristics. As Tresset and Deussen put it:

“Each style-space and subspace is characterised by a number of dimensions, and governed by specific rules that define elements such as conceptual stances, colour harmonies, type of composition, inherited strategies, rules and knowledge (schemata) are developed–adapted–personalised through practice, exploration and experimentation. As in other domains of expertise, schemata can be described as the sets of knowledge and strategies for: action, information gathering, evaluation, planning required to achieve a task,

7 Clark (2012).
with the schemata for high-level tasks relying on lower-level schemata”8.

These features allow the ascription of levels of artistic autonomy to the relevant computing systems. Those with the most autonomy are capable of developing their own ‘style-space’ – i.e. can go beyond the imitation of existing artistic styles. The key to this in the case of the “Paul drawing machines, and the e-David robot painter, is the way in which the programming and hardware instruments are able to draw and paint on the same basis as human modes of handling these media (albeit far more efficiently). Tresset and Deussen claim that:

“With regards to the physicality of the output, paintings and drawings are physical objects that have specific qualities that can only be appreciated when in their presence. Artworks are objects with aesthetic qualities that are valued, not only for what they represent and how they depict but also for their material properties such as scale, textures, how the surfaces reflect light”9.

As well as exemplifying this artistic dimension, the ‘Paul’ robots also engage with another feature of the artistic situation – namely interactivity with the subject of the portrait.

Drawings produced by ‘Pauls’ in the studio involve visual feedback from a complex system of sensors which perform continuous ‘real time’

scanning of the portrait subject, until the image is complete. When Tresset creates public installations using groups of these machines, the feedback process is only simulated – to give the viewer the same sense of theatricality of engagement that might be involved with a human artist. The sitter is put in a situation where he or she has to sit still, but is, at the same time curious about the complex array of devices as they tick and whirr and move around the picture’s surface appearing to create the image as they go along.

The portrait drawings appear as strangely watery-looking likenesses where contours and shadows are generated from spidery-webs of linear structure.
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Paul Crowther
But this leads to one of the main difficulties. Artistic achievement involves individual style, and the images produced by ‘Paul’ and ‘e-David’ are clearly identifiable as products of those unique machines. However, the key to the artistic character of a style, is not just the fact that we can recognize it. What is decisive is the way it allows the artist to visually and emotionally explore the individual subject that he or she is representing. As well as manifesting individual identity, it must also present a visible appearance particularized. Interestingly, Tresset and Deussen themselves observe that:

“Styles are not isolated or autonomous, they contain traces of influences from past and
contemporary art history. These influences are not expressed directly as a kind of patchwork or collage, but rather they are combined and in a certain manner “digested” by the artist. Artists make these influences their own, transformed by their “personality” or what we could consider the artists characteristics, such as their strengths and weaknesses (psychological, motor, perceptual, cognitive). This process enables the artwork produced to display rich coherent individual style, in which art history and contextual influences are embedded. This facilitates the perception and appreciation of artworks as works of art”.¹⁰

However, whilst one might through programming achieve a distinctive visual style in computer representation, what will always be missing – unless computers develop selfhood – is the ‘digested’ feature noted above. This involves all the complex holistic elements bound up with the ways in which things matter to us. To achieve a level of artistic creativity that involves a truly autonomous style, individuality is not enough. What is just as decisive is how – on the basis of individual style – the artist responds to, and ‘digests’ the human and personal significance of what is being represented. It is this particularization of the image that is missing from Tresset’s and Deussen’s creations, and which, indeed, is the unbridgeable gap that will always separate drawing and painting with computers from human artifice.

The point is, then, that even if a computer could be programmed to develop an autonomous style, this would still be limited in terms of artistic value. The programme might be refined so as to make every one of its pictures ‘different’ on the basis of some scanned idiosyncrasy of each particular subject-matter, but this would not amount to particularization in the sense described. Indeed, developing the criterion of idiosyncrasy in this context would involve immersion in a form of life, rather than the formulation of operational parameters.

Of course, one might adapt a programme so that under certain circumstances it would leave the instrument of drawing and painting to function without guidance, temporarily. This would introduce some particularity into the image on the basis of chance. However, difference engendered in this way would, at best, help identify the particularity of the image. It would not particularize how the subject-matter was presented in the ways that artworks do – where different ways of exemplifying the style, present different ways in which the artist finds the subject meaningful.

These points suggest that machines that aim to, in effect, draw or paint from life may attain great range vis-à-vis how they achieve their representational transcriptions, but they will not interpret the world. The issues pertaining to selfhood that were raised in developing Cohen’s principle present an insurmountable obstacle to the achievement of real artistic autonomy.
However, we must recall, also, the other aspect of Cohen’s principle, namely that it is the very difference between computer and human creativity that allows the former to extend the latter. To comprehend the ramifications of this, we must now consider the appearance of the Paul and e-David drawings and paintings in more detail.

Their programmes are based on features of their own creator’s artistic styles together with those of artists who are valued by those creators (e.g. Giacometti, and Bacon). The resulting images do not have the sharp definition and precision of tonal gradation associated with images generated in purely digital terms. Earlier I described them as ‘watery’. This is because their salient forms appear to be woven from filamentary lines. In drawings and paintings by humans line and tone is generated in a way that – no matter how finished – points back towards its origin in gesture. But the filamentary lines of Paul’s drawings seem to be reaching blindly towards the subject through generating its traces. There is a formal fragility to such images that evokes a vulnerability – an appearance of something caught-in-passing, and which has now gone. As already noted, this is an expression of Tresset’s own style and those which interested him; but it is a function, also, of the machine’s working method. The trailing contours; the threading of loose lines reflect the real time scanning process that continuously reorientates the instrument of drawing or painting so as to
create form. This process tends also to visually shred the substantiality of the plastic mass of the sitter’s face and main features. There are no highlights and shadows that declare themselves as highlights and shadow. Instead these are rendered through intense linear accumulations or gaps between them.

The upshot is ironic. The certainty of machine processes here issue in images whose essence is to be visually tentative. Drawing and painting of the autographic kind – no matter how loose the style – are normally closely directed, and this directedness is manifest in the completed image. The activity of making the image is read-off, as it were, backwards from the completed product. But in the images made by Paul and e-David the productive activity of line or dabs of pigment is left open. The image presents itself as activity as much as it does finished product. To put this another way, Tresset and Deussen’s machines, seem to create works where the final image seems to be constantly anticipated, as well as actually given.

There is a fascinating ambiguity here. For well as seeing these works as anticipations of becoming in the terms just described, their process-emphasis can also be read as the reverse of this – as showing faces dissolving or decomposing. On these terms, in other words, the particular mechanical way in which the Tresset/Dreussen machines physically compose their image is what gives them their especially interesting style. They extend Tresset’s and
Dreussenn’s own original style and style-inputs not by copying human creativity, but through the aesthetic associations that arise from their mechanisms of marking *qua* mechanical.

II.

I now consider those idioms of drawing and painting with computers that mark the external surface material on the basis of the hardware programming relation alone, rather than through scanning some external stimulus. Harold Cohen’s own work offers an important example of this.

For him, the main basis of creativity in art is when the artist begins to question factors that are assumed to be basic to his or her field of practice. In his own case, in the mid 1960’s Cohen became sceptical of the idea that artistic creativity was based on a continuous probing of and response to the medium. Instead, he considered the idea of devising rules for creating paintings, which would allow the work to be created by simply following these. In 1968, he acquired the means for doing this when a graduate student from the University of California at San Diego taught him basic computer programming.

The AARON drawing and painting machine was the outcome of this. For the first decade of its operation, it was confined to drawing. The next
major step in its development is characterized by Cohen as follows:

“I could never shake off a growing sense of absurdity; if the program was so damned smart, why couldn’t it color its own drawings? Was it working for me or was I working for it?”\textsuperscript{11}

During the mid-1980’s, this led Cohen to formulate a key contrast.

“not even the greatest colorists could write down the instructions for coloring a complex image and give them to someone else to execute. The computer, on the other hand – mine, at least – had no visual system at all. But on the enabling side, it’s able to build and maintain schemes of many kinds, at any level of complexity. Obviously the machine couldn’t do coloring the way I did it myself. But I saw that it could do it, if only I could develop an adequate formalism in which to describe color relationships within something as complex as an image”\textsuperscript{12}

Hence, Cohen’s decisive realization that:

“programming might involve trying to think in the computer’s terms, as it were, rather than trying to get it to think in human terms. That, truly, was where the real breakthrough was for me”\textsuperscript{13}

This extending of creativity by dialogue with the distinctive features of computing allowed other

\textsuperscript{11} Cohen (2010), p. 5.
breakthroughs for Cohen, including an AARON program that can create its own forms. Again, as he puts it:

“In the new version of the program, everything is built from an abundant supply of a single element; a small, hexagonal cell which attaches itself to the corners of other cells. Once a colony of cells has reached a certain size or complexity, AARON draws its enclosing boundary, using very much the same code it used in its very earliest versions forty years ago, and places this newly generated formal element into the developing image”\textsuperscript{14}.

The fruits of this extension of Cohen’s own creativity through computing are strikingly manifest through the entire history of AARON’s drawing and paintings. The middle first decade of the twentyfirst-century has been especially rich in this respect. \textit{040501} (2004, Pigment on paper, 46 by 57.75 inches 1/3) is an excellent example.

\textsuperscript{14} Op. cit., p. 11.
The colors are intense (perhaps even optically super-saturated) and are unnaturally flat—in the sense of having no individual tonal gradation. Such tonal meaning that is evoked by this (and cognate works) is an optical effect arising from the juxtaposition or proximity of colored areas or forms. Intricate tendril-like linear structures weave and interweave as the basis of the work’s compositional structure, creating floral and related organic allusions.

Images such as this are a feast for the eye, but they also involve what might appear to be an inhibiting factor. With his customary insight, Cohen himself notes what is at issue here:

“Marvellous though it may be to make images without the troublesome material side
of image-making, part of the problem with electronic imagery is precisely its untouched-by-hand look; if it wasn’t touched by hand, if it shows no evidence of the manipulation of material, then it becomes that much harder to believe in its intentionality.”

This is an extremely complex issue. With all Cohen’s images it is quite clear that they have not been drawn or painted autographically. Indeed, they are manifestly machine products. Now in one sense this distances the viewer from the intentionality that characterizes ‘normal’ images, but the emphatic machine-generated appearance also means that we do not mistake them for natural products. In keeping with the second aspect of Cohen’s principle, we detect an order of creativity that has been enabled by the computer – there is an intentionality of design, if not execution by hand.

The upshot is a complex dialectic. The images by Cohen from the first decade of the present century, for example, underline the fact that, when someone represents something, that something is not simply duplicated, its appearance is transformed. Imagination creates visual reality at a second level of appearance wherein it is invested with human significance. Now the many idioms of drawing and painting – no matter how wild or ‘expressionist’ they may be – can easily be taken for granted. We loose sight of the al-

most magical transformatory power of imagination. However, in the case of computer-created images such as those currently under discussion, the machine aesthetic of how they are composed and marked on paper, sets them radically apart from first order natural appearance. Or, to put this another way, the very fact that the images are so manifestly not autographic renders the subject-matter’s appearance strange or uncanny, and, through this, the power of imagination to transform is made vivid.

However, this lack of autographic intentionality led Cohen’s work in another new direction. In the course of meeting the challenge of producing three-dimensional works (for installation commissions) he started marking the panels produced by Aaron with oil paint. Through this, his dialogue with the computer is taken to a new level, with some restoration of ‘intentionality’ to the final image.

Cohen has recently taken this to an even higher stage. In his words:

“I’m using a large (= about seven-foot) touch screen. A smaller second screen displays controls that allow me to mix and store colors, select “brush” sizes, record the movements of my finger on the screen, keep records of a dozen works in progress and build Postscript files for my printer. In practise, line drawings made by AARON are displayed on the touch screen, where I add color. Every movement of my finger is recorded, and becomes part of the
printing file, along with the original drawing. Thoroughly autographic”¹⁶.

The importance of this for Cohen, is that it is the first time he has been able to record his own gestural activity alongside AARON’s. This means that, instead of bringing AARON’s work into his own physical world – using material to color it, Cohen, has in effect, entered AARON’s domain in order to play his role in the collaboration.

H. Cohen, Waki in Rio

¹⁶ Cohen in personal e-mail correspondence with the author, 10th May, 2015.
Interestingly, this takes us back, also, to the origins of drawing with computers – where physical intervention from the artist (or from contingent circumstances) in the course of the image-producing process was allowed for, and, in some cases, even demanded. I consider this now in relation to the work of Desmond Paul Henry.

III.

In 1952 Henry acquired an analogue computer that had been used in the bombsights of a second world war aircraft. During the 1960’s he created three drawing machines through successive cannibalizations and developments of this computer. His work attracted some attention – notably through features in the national press and local television, and more importantly, through inclusion in the ICA organized *Cybernetic Serendipity* exhibition of 1968.

Henry is now generally acknowledged as an important pioneer, even though his work was not widely influential at the time. However, for the purposes of the present study the importance of Henry is in terms of the very concept of drawing and painting with computers. The most remarkable thing about Henry’s work is that its inspiration came not so much from experience of artistic practice, but from a love of technology.
The aforementioned analogue computer was a constant source of fascination for him. It had originally been used to calculate the accurate release of bombs on the basis of information concerning height, air speed, wind direction, and bomb weight. Henry attached the machine to a servo motor, and would watch the computer’s gear trains, cams, integrators and differentials in motion – observing, in effect, the spectacle of a *ballet mechanique*. In 1961, he modified the internal moving parts of the computer to create a drawing machine based (initially) on biro pens directed in synchrony with a moving table action. The upshot was a process of creation with special emphasis on semi-circular and elliptical forms aligned with one another in extraordinarily fine gradations. These structures expressed the motion of the computer’s own relevant working parts.

The key to Henry’s creativity, however, is the interaction between the hardware and a strategy of programming that sets it free to ‘do its own thing’. Henry would simply add parts or modify the system without planning what kind of image would result. Faults in the system would play their own role in determining the image’s appearance, and in some cases, the drawing would be finished, when – literally – it fell off the table. Such products were always unique, as the Drawing Machines did not have memory settings that would allow them to repeat a pattern.

At any time during the image-generation, Henry could personally intervene in the process. And he
often did so through additions by hand. As Elaine O’Hanrahan notes:

‘he would select a drawing instrument and embellish the pictures with some or all of the following: highlighting, miniscule figures, angled lines, background shading. This imaginative response was sparked by the suggestive features created by the drawing machine, which he utilised to “force inspiration”\(^ {17}\).

The key point to note is that whilst there is a long tradition of using machines to create art, and to incorporate chance effects into art, Henry’s drawing machines come from an entirely different direction. The origins of his drawing machines are in the being of the machine itself. In everyday life, machines work to perform their tasks but their idioms of working pass unnoticed – absorbed entirely in fulfilling the functions for which they were designed. What Henry’s work does is to allow the mechanism of the analogue computer to become an end in itself. His creative additions learn from, and augment a process that has already been inaugurated by the drawing machine itself.

There is an extraordinary implication in this. Kant held that:

“**Beauty** is the form of **purposiveness** of an object insofar as it is perceived in it without representation of an end”\(^ {18}\).

\(^ {17}\) O’Hanrahan (2010), p. 27.
\(^ {18}\) Cfr., for example, Kant (2000), p.120.
He generally insisted that only natural forms such as flowers, bird plumage, and crustacean shells could have this beauty; mechanical productions were ruled out - except in those cases where the design feature was overwhelmed by a decorative display (as in wallpaper and the like).

Now it is a reasonable assumption that Kant would have allowed the products of Henry’s drawing machines to be described as having purposiveness without purpose. This is precisely because they have been set free from their official function and allowed to create structures that are formally fascinating, but which are not functional in any practical way.

And this even goes deeper than Kant’s notion of beauty. The key to this is in the actual visual appearance of Henry’s machine drawings. In a work such as *Tourbillons (Whirlpools)* (no. 030) made by Drawing Machine 1 in 1962, the image is composed of diaphanous interweavings of the most delicate filamentary forms and colors in circles, semi-circles and ellipses.
These curvilinear emphases, are, of course, causal expressions of the motion of the drawing machine. But, at the same time, they evoke associations with organic structures and life forms. In symbolic terms, the machine affirms its own life. It works as brute process directed through its designer and operators, but this is enabled by the
nature of its own components and the particular way they interact with one another. The Being of that which is mechanical – its disclosure and celebration as something co-existant with being human as well as a tool for humans, is celebrated by Henry’s work.

This alongsidedness of human and machine is expressed with especial poignancy in *Tractatus 6.2322* (no. 069) made with Drawing Machine 2 in 1967.

The title alludes to a passage from Wittgenstein’s *Tractatus Logico-Philosophicus* that reads:

“It is impossible to assert the identity of meaning of two expressions. For in order to be able to assert anything about their meaning, I must know their meaning, and I cannot know their meaning without knowing whether what they mean is the same or different”¹⁹.

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The passage is obscure, but perhaps emphasizes that affirmations of the identity of two expressions are ‘impossible’ in the sense of saying nothing at all. This is because in order to make such explicit affirmations we must have already recognized the similarity or difference between them. Henry added his titles as an afterthought without any programmatic goal, so it is reasonable to assume that the present one is vaguely ironic play on this strategy. In order to affirm the link between the image and the title, one must already have – as it were – done the cognitive exploration that allows the connection to be made. But this means that the title itself does not serve any useful purpose vis-à-vis the meaning of the image. It is simply an identifying label.

The actual work *Tractatus 6.2322* presents a circular central form with radial petal-like ellipses. It could itself be a machine part. But the illusion of three-dimensional growths that surround it and seem to have collided with it and fractured it, point towards the mutability of the machine. It may be destroyed in the vicissitudes of what happens in the world; it may decay, or be grown over, or all these things. In this respect, like humans, the machine is fallible and will come apart in time.

Now this avenue of interpretation may not have been explicitly intended by Henry, but it is what his work amounts to, if we actually look at it, and consider it in relation to its machine origins. What he has done is to programme the computer hardware so as to allow it – in effect – draw its own mode of
Being. And, of course, the beauty of this is that the programming here is not done through software, but by physically setting dials and adjusting the machine and by making additions by hand. A connection with the autographic dimension is maintained.

Conclusion

I have then considered the three main idioms whereby computers can be used to create drawings and paintings. The Henry idiom of hardware that creates the image through programming and physical interventions is not only the earliest of these modes it is the most basic one - because of the importance of the artist’s physical activity in manipulating the hardware, and intervening on the marked surface.

Cohen’s approach is an exemplary expression of the mainstream idiom – where the interface between hardware and software designed by the artist bears the burden of the creative endeavour. The Tresset/Deussen machines are the most developed modes of drawing and painting by computer because they synthesize the real time ’attention’ of the artist working from immediately given material.

Now whether or not any of these idioms are more complete than the others is besides the point. Their aesthetic value is based on the character of the image and how they change our view of the world. As we have seen in terms of Cohen’s principle, there
may be individual computer art styles, but they will not achieve the particularized quality wherein an individual style interprets the visible world. Henry’s and Cohen’s recent work move in directions whereby this particularity is introduced through the artist’s physical interventions on the image. And this, as we have seen, is due in large part to the second aspect of Cohen’s principle – that the distinctive characteristics of the drawing machine can – *qua* their machine features – actually extend an artist’s own personal creativity. This is perhaps the *natural* way ahead.

In fact, the relation to nature is the key to a final special enigma of drawing and painting with computers. Organic life originates ultimately in mechanistic causal interactions between elements of matter. However, at the same time the question arises as to why inanimate matter tends towards the productions of organic life. This may just be the way things are, but it might be evidence of some more ultimate design. Now, when the computer draws or paints organic life we have the uncanny effect of natural form presented as the effect of manifestly mechanistic means. But we also know that in this case, the computer is being directed by an intelligence – but one whose directions (in the form of the programme) are not themselves immediately visible. The computer drawn or painted image of organic life alludes, thereby, (associationally at least), to the mystery of the origins of life itself.
References

The images of Patrick Tresset’s and Harold Cohen’s work were supplied by, and remain the copyright of the artists. The Desmond Paul Henry images were supplied by Elaine O’Han-rahan representing the artist’s estate, and remain the copyri-ght of that estate.

Clark Nick, “Is it art – or science? The robotic Rubens that redefines portraiture”, The Independent, January 23th 2012.a

Cohen Harold, Driving the Creative Machine, Orcas Center, Crossroads Lecture Series September 2010.


