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**Excerpt from: Qing Huang, 2003, *Multimedia Representation of Tao*, Masters Thesis, University of Latrobe, from Chapter IV, pp: 42-51**

**A copy of Qing's animation, *The Way*, is archived on the ABC web at URL:  
<http://www.abc.net.au/arts/strange/animations/way.htm>**

## **THE MULTIMEDIA APPROACH**

Following on from my investigation into traditional Chinese aesthetics; it is the contention of this thesis that it is essentially an art of fractal forms and brush-works. In being inspired by this Chinese philosophy of aesthetics in brush-works alongside modern day chaos theory, I wanted to take the process one step further by extending and incorporating these ideas into a 3-D computer animation work.

Over the last decade, digital art has rapidly emerged as a unique exciting field, blending many different types and forms of expression not previously thought possible. Rather than seeking to emulate traditional media, through imitating Traditional Chinese art, my principle inspiration was to adapt this modern technique medium to promote the unique aesthetic awareness present throughout Traditional Chinese art-works. The result is neither a cartoon nor quasi, hyper-realistic CG entertainment. Rather, it is a dynamic painting/picture in motion taking viewers into the world of Traditional Chinese, Taoist aesthetics.

The major problem area and challenge, of turning this artificial stereo space into a different format was solved by sacrificing the surface quality of the objects. What is deemed essential to capture and represent in Western traditional art is actually redundant in traditional Chinese aesthetics. It is rather, the fractal surfaces of natural objects that are the main "dusty" playground of this art. It is the artists' privilege to distillate the degree of representation of the surfaces they are attempting to depict. The Artists must decide on the degree of luminance and color to use in an attempt to capture the silhouette and particular texture of each object. The surface of an object is thereby, reduced to a minimum where there is only a network of strokes provided in order to suggest the form being presented. In this radical way, forms are in effect transformed into 2-dimensional interrelations from the usual 3-dimensional ones. The forms presented undergo a type of metamorphosis creating a paradoxical scene of fractal dimensional forms that occupy a field somewhere between 1 and 2 Dimensions. 3-dimensional factors become, in effect, compressed and easily translate into 2-dimensional forms; where the fractal edges of objects become free floating and unfixed. Consequently, in my animation, these forms are constantly changing, contrasting and interacting with each other in the viewers' vision. A dynamic interaction between viewer and painting ensues. The aim is to get the viewer to focus and concentrate more on the forms' outlines, giving them an active, animating sense, and to break apart the boundaries between various objects and weave the forms into a single fabric in 2-dimensional space, whereby each frame becomes an inseparable part of a continuous and homogenous process. Such a fabric of forms and shapes takes on the appearance of a constantly changing and mutating analogue of

patterns in Nature, and so meeting then the aesthetic criterion of both Chinese traditional art and fractal dimensional forms.

One advantage of using computer animation lies in its unique ability to simulate natural physical forces like gravity, magnetism and air-currents. This provides the artist with a greater flexibility in imitating subtle natural movements. In modern, industrial terminology, these are called secondary or procedural movements. Such techniques have been directly employed in this thesis in order to season the forms selected with sophisticated yet realistic movements. The techniques available compensate for the inadequate physical appearances in the animation. In weaving these two aspects together, the results achieved are characteristic of those in Chinese art. That is, the characteristic tastes in forms and movements appear similar. In traditional Chinese aesthetic philosophy, these visible forms of Nature are but transient patterns of movement of the *Tao* (Life force). Such forms are merely contingent exemplars of underlying universal forces and/or truths.

Another advantage of the computer animation technique lies in its particle system. This system is normally used to mimic natural phenomena such as fire, smoke, and water etc. Here it has been utilized in emulating the brush-works technique itself along with depicting more discrete forms. The brush-works in Chinese art theory speak of themselves in such terms as speed, angle, turn, pressure, force, number and randomness. Such aspects are suitable for the particle system to mimic in an explicit way. Though brush-works themselves are not things, their movements and changes in a pictorial space create an effect of rhythmical tempo and spontaneity which Chinese art theory requests artists to have through the cooperation of their hands and mind at the moment of drawing or painting.

Thanks to the latest developments in the computer animation industry, most major 3D software packages are already integrated with non photo-realistic rendering such as painterly rendering. However, neither the still-frame digital imagery methods nor the frame-to-frame CG methods can produce pictures that can match the natural spontaneity or the quality of human handcrafted art. This may, in part, be due to scientists and technicians who, in developing these formats, lack an artistic instinct or touch. On the other hand, the technological barrier discourages most artists from adapting such a modern media to their art.

In using traditional Chinese art principles combined with the CG techniques, I have created a type of hybrid art form that utilizes both modern animation techniques and traditional Chinese ink painting. I have endeavored to capture both the special energetic quality and tastes typical of traditional Chinese brush-works, the profoundness of that Chinese aesthetic medium, as well as embrace the novelty and freedom of an era that the modern technique brings with it.

## **1. Related Works**

Technically this CG animation follows on from the recent growth in computer graphics

research, which focuses on techniques for producing *non-photo realistic renderings* (NPR) from 3D models. Recent works includes the research of Kalnins : ‘Drawing strokes directly on 3D models.’ (Kalnins et al. 2002) This allows a designer to directly annotate a 3D model with strokes, imparting a personal aesthetic to the non-photo realistic rendering of the object. Another recent research work of Michaels [Figure 43] (Michaels et al. 2000) allows the computer to plot the brush strokes directly onto the screen in the actual size, color, angle, shape and texture; It then applies various real-time filters onto the brush strokes to generate the effect of dynamic changes in a 3D world.

A technique introduced in the paper ‘Painterly Rendering with Curved Brush Strokes’ by Aaron Hertzmann, (Hertzmann et al. 1998) had already been integrated into the recent versions of Maya 4.0 and 4.5 3D packages. Other animations like: “A Reverie in the Mountains” [Figure 44] by Keizan Musouzu (Musouzu et al. 1997) created a 3D world of Japanese ink painting. Then there’s Sugana Yoshinori’s simulation of “Manga” (Japanese drawing style) (1999); as well as Ching Clara Chan’s animation of “Autumn Bamboo”. [Figure 45] (2000) which attempts to create an animated Chinese ink brush painting by applying procedural shades onto 3D models.



Figure 43



Figure 44

Most of these previous animations were centered on mechanical aspects of technique, by



Figure 45

creating equations and algorithms to simulate traditional tools in an automatic manner. They lack an in-depth understanding of the rationale behind the styles they are attempting to emulate. Technicians often mimic a traditional painting style by treating it like any another natural, physical effect. However, mastery of technique alone is not sufficient to capture and impart the true aesthetic meaning and quality of the work being rendered. A greater understanding and knowledge of the underlying tenets of the work is necessary to infuse these traditional methods with the artists own personal aesthetic annotations and emotional intentions in their visual styles. “The perfect painterly rendering algorithm remains elusive.” says Joshua Seims “there is no single correct solution, no ‘rendering equation’ to solve. ... No one knows what those styles should look like when animated.” (1999, p. 52) The effects achieved in these works do not reach a level where the feelings of beauty, action, anger, excitement and joy are imparted in the way in which Taoist aesthetics would demand. The potential success of this new medium of art “will come from learning how to apply the emerging techniques, feeling through their strengths and weaknesses and by opening our eyes to new ways to create – not by constraining the new medium to replicate or replace what has gone before it.” (Cooper 1999, p. 64)

My animation work seeks to demonstrate the philosophical ideas and aesthetic principles of Traditional Chinese, Taoist thought in action. It adapts the techniques of this modern media tool to this philosophy of aesthetics. My methodology demonstrates the artistic controls and selections involved in using the existing techniques to produce the effects achieved. I believe, that by using the method I have employed, a person without a classic training in Chinese ink painting can still successfully emulate past master works. Anyone who is willing to use this sophisticated new media as an expressive medium, can create a strongly stylized artwork following in the Traditional Chinese, Taoist aesthetic context.

## 2. Main Techniques

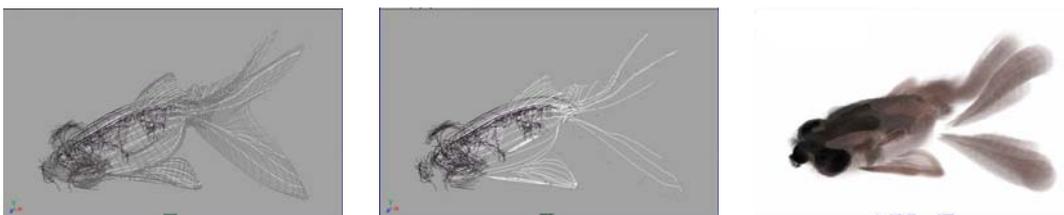


Figure 46.

The principal aim of this animation is in depicting objects and subjects in the medium of artificial instrumental lines (brush-strokes). In order to achieve this, I have drawn on the vast archival category of brush-strokes, derived from the history and development of traditional Chinese art. It is from this database that various reference images have been selected in modifying particle shapes. However, various models still needed to be developed in order to provide basic structures for the subject matter being depicted. But, for most of these subjects a more precise, detailed and complex model was not necessary as it would defeat the purpose of attempting to capture and render a style characteristic of traditional Chinese ink paintings, that is essentialist and minimalist. Sometimes only simple geometrical shapes, like spheres and planes, were needed in order to assemble the basic structural frames. It is the morphology, the bend and curve of the subject in action that dictates the particles' movements. These attach to and ride along with the geometrical structure leading to the objects appearing as they do. [Figure 46] Sometimes an object, such as a tree, was generated directly from particles, without any geometrical models needed [Figure 47].

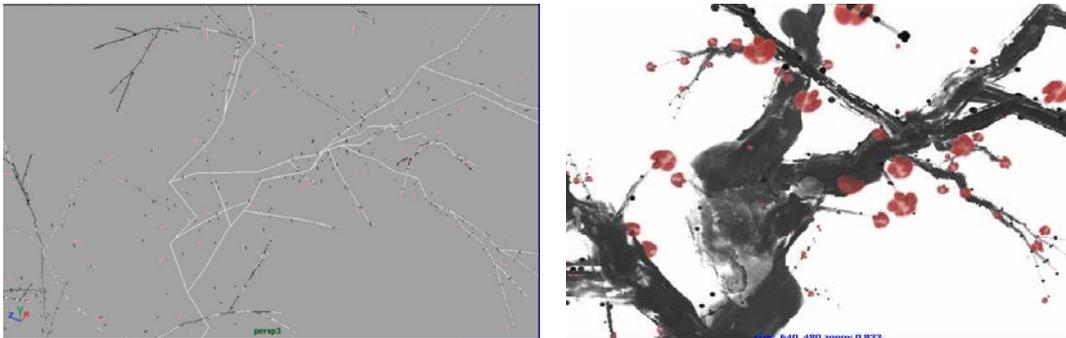


Figure 47

Firstly, a series of reference images of brush-strokes was compiled, derived either from Chinese art works or from brush-strokes which I created. [Figure 48] In manipulating details from these brush-works, such as scale, orientation, color, transparency, texture, shape and movements of particles, I was able to create my own catalogue, comprised of a series of particle strokes, to select from. [Figure 49] These original particle strokes were used for specific parts of objects depicted, but with the suggestion of the forms represented being undeniably present, along with the hand-drawn quality. Often a single brush-stroke will comprise several layers of identical particle strokes. These particle strokes are used to form and convey the quality and texture of each attribute depicted, for example: wet or dry, smooth or rough etc. This is achieved by incorporating different reference images of varying brush types. Other functions including smearing, erasing, coloring and transparency are also used in altering the detail and appearance of particle strokes. Occasionally, a stroke was directly applied onto the view-plane to a specific place on the frame in order to achieve an overlapping effect. Another reason for doing this was to change the overall balance and intentionally alter the effect of each picture. So the rhythm and tempo of the silhouette and shade of each stroke along the form being depicted can also be manipulated. Such discrepancies occur in and do not transcend a 2D function. Other functional changes such as animated textures, offsetting, alpha channels,

camera angle and the procedural movements of the objects themselves, serve to combine and create an effect of random contingency. This enables the computer animator to imitate and capture an effect characteristic of hand-drawn painting. Other factors enabling the computer animator to alter the character of particle and brush-strokes include the application of force, the use of deformation techniques such as turbulence, gravity and random wiggles and curvature. Hence, a transformation and metamorphosis of sorts can be achieved, in utilizing these functions to adjust the parameters of different fractal structures. These procedures assist the computer animator in producing different patterns, styles and gestures in a transient manner, helping to imitate and capture elemental forces and forms in nature. In doing so, the animation technique reflects the Chinese aesthetical perspective of forms in an explicit and dynamic way.

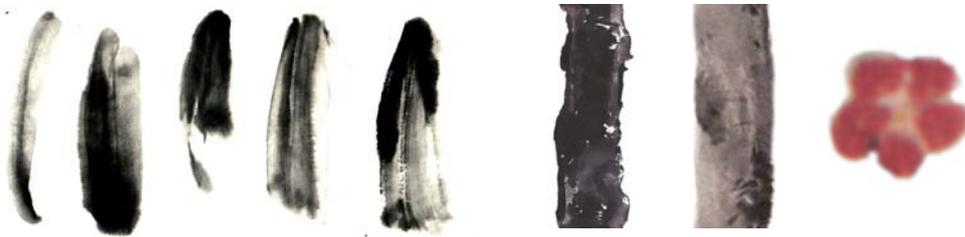


Figure 48.



Figure 49

### 3. Result, Discussion and Direction

Using the method described above, yielded imaging with a degree of contingency and spontaneity approaching that of the hand-drawn method, in its style and quality. Use of this method realizes the aim of my initial purpose, of successfully translating 3D factors into a workable 2D medium. The objects in the animation provide for the interplay and interrelationship of each individual brush form. Yet, despite this, each stroke represents a detached, isolated and abstract entity. By composing and reconstituting these different entities, including their movement, force, and variation into differing parameters, they can be used to suggest the form, character and nature of a particular subject. So a recognizable picture results from an indirect, random and spontaneous methodology flowing from the Chinese aesthetic tradition. The principal style sought in this animation is both ambiguous and suggestive at the same time. So a Chinese paradox forms the point of tension and harmony in and of the animation. This paradoxical nature is present in both the 2 and 3 dimensional interplay, as well as the internal and external representation of particular and universal aspects of each form in nature. So a playful paradox informs the heart of my art.

In order to achieve the desirable brush-works effect and correspondent forms, three major aspects need to be addressed.

1) *Designing a suitable and basic brush-works profile.*

Reference images play a crucial role in defining the outline of a brush-stroke. Virtually any type of brush-stroke can be created with the possibilities seemingly endless. Personal preference for style can derive from the type and shape of brush-stroke you make. Attributes like length, width, softness, hardness, color, density, turning and angularity, can all be adjusted within the software. However, the fundamental character of the brush including the starting and ending shape, side profile, dryness and wetness, smoothness or jaggedness are principally defined by the reference images' profile. The amount of consideration and forecasting needed in order to achieve a desirable single brush-stroke outcome is both substantial and significant.

2) *Design and configuration of the strokes.*

Once the types of brush-strokes desired are obtained the next difficulty lies in the configuration of these brush-strokes in respect of the subject matters. Too many or too few strokes can either make the appearance of an object redundant, clumsy or hollow making later adjustments of the animation time consuming. The strokes need to be concise and appropriate enough to represent the forms depicted. This process requires a comprehensive understanding of both the internal and external properties of the forms selected for the animation. This involves an intense observation of the details used in the design model that leads to the visual codification in the deployment of each stroke selected. In short, it requires an artist's eye, along with an appropriate degree of geometrical and engineering knowledge. I bought a couple of goldfish and captured several yabbies allowing for direct, first-hand observation upon constructing each scene in the animation.

3) *Consideration of animation*

The suggestive mode of stylization used required the objects to be depicted in a symbolic and simplified manner. The animation of each subject matter plays a crucial role in complimenting and intensifying this suggestion. Small, subtle movements such as leaves swaying in the wind, or flowers floating on the water, can be magnified as inseparable aspects to the expression of those forms. This is similar to traditional Chinese art, where the rendering of the activity and movements of forms is vital to capturing their essential character. The unwrapping and perturbing of the strokes, the fading and spreading of their shade and texture, can be used to produce variations and changes of the strokes' form. This in turn creates a contrast among the strokes affecting the morphology of the forms depicted and suggesting the manifestation of unseen, invisible forces; namely, the life force of the form itself.

To create the effect of psychological involvement in the animation, all the elements

(brushes and objects) must be in constant movement. This is done for three purposes: 1) to create a sense of flux and unfixeness. In this continuous movement, abstract brush-strokes transform from one thing into another, giving a sense of metamorphosis, denoting the continual flow of the life force. 2) It creates an effect of contingency among forms where contrasts, variations, seemingly accidental recombination's and reconfigurations ensure the effect of Chaos. This serves to create a sense of tension and ambiguity for viewers to wonder and marvel at. 3) The occasional incompleteness of forms in the animation leaves a space for viewers to fill with their own imagination ensuring an active participation of the viewers' own psychological and aesthetic anticipation and perception.

Animation is a dynamic art form unfolding along a time dimension. This animation extends the notion of dynamism to a level where the visual recognition of our sensory systems is under constant challenge. A degree of uncertainty about the forms in the animation is always present, a limitation allowing for dynamic visual signals. As Qi Boshi notes: "The best quality of a Chinese ink painting is its criticality of being recognizable and unrecognizable at same time." This dynamic and paradoxical aspect present in our sensations gives the ancient art its eternal inspiration. Nature also provides for a dynamic environment, which, though seeming to appear repetitive (e.g. The four seasons), always inspires and surprises in its unceasing diversity and difference.

In addressing these concerns and incorporating them into the animation work, it demonstrates a strong link with the Chinese tradition, by following the abstract aesthetic nature characteristic of its ink-paintings. Hopefully, this computer animation work succeeds in creating an interesting hybrid between modern computer graphics technology and traditional Chinese painting. It demonstrates that Traditional Chinese art principles (simplification, codification, and dynamic spontaneity) are congenial to this modern art media. With the aid of computer animation, artists can liberate themselves from the tedium of complex model building and realist imitation. They can use it to accentuate their personal and spiritual artistic beliefs and styles of expression through the use of abstract brush-strokes. The evaluation and principles of Chinese instrumental lines like speed, angle, turn, pressure, force and randomness; can all be adapted and embodied into the process of internal CG programming.

Perhaps the unique style adapted in my animation could result in some feedback from the field of software development, or even set a new trend. The built-in brushstroke lines can allow users better control of their curve vertexes. The orientation, size and stamp densities of individual particles along the splines allows a more direct means in creating desired brush-stroke lines. As with the built-in functions of tree and plant generation in the software, other forms like rocks and mountains can be formed in a similar reiterative mathematical fashion, drawing on both Chinese aesthetics and Fractal Chaos theory.

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