

Summary of Proposed Research/Creation

I am proposing to make a one hundred-minute long film, titled *The Young Prince*, based on alchemical themes. The film will be about transformations—about transformations of imagery, about history as transformation, about eros as a transformative power, about that old Eisensteinian idea of collage and montage as transformation, but most of all, about transformations of the self. The film will combine two sorts of transformations—electrical transformations, produced by digital image processing, and chemical transformations, produced by processing the film by hand, in small batches. Thus, it will be a dialogue between two technologies, the older chemical/mechanical technology of the era that gave birth to the cinema, and the new electronic/digital computing technology more commonly associated with video—a dialogue between what was and what is yet to be.

My projects usually join aesthetic with technical interests; this project is no different in this respect: I propose to work on a computer tool that I can collaborate with in making visual compositions. This tool will allow me to take a Cagean approach to image processing, for it will enable me to use measures of image similarity to constrain random selection of image processing methods. The application of these constraints will conform with compositional ideas I have developed over the years—to implement this it will incorporate an expert system developed through “fuzzy machine learning” methods.

I have aesthetic reasons for wanting to undertake these technical explorations. Some of these derive from the composer John Cage, who believed that the creative process should imitate nature in its manner of operation and strived to find creative methods that would accord nature a role in shaping the work. For Cage, chance operations (which have a long history in music composition) figure among the methods that achieve this goal of selfless making. The richness of Cage’s writing helped make the use of aleatory techniques common among composers, and his influence was reinforced by the rigour and richness of writings and compositions by Iannis Xenakis and James Tenney—composers who, like Cage, took an interest in stochastic methods.

I have attempted to extend Cage and Tenney’s ideas to the visual domain. To my knowledge, no one has taken a similar approach; indeed, I do not know of anyone who has explored the creative use of image understanding and image recognition methods in film or video making. (Considerable work has been done investigating the use of these methods for image retrieval, but I do not know anyone else exploring their artistic use.) While my interests are in developing a creative tool that I can use in film projects, much of this research could be generalized and used in multimedia applications in the image industries (in advertising, television production, special effects for motion pictures). The compositional paradigm that this application reflects has wide acceptance in experimental music; the application that we envision may well find just as wide acceptance among new media practitioners.

The completed film will be shown in speciality cinemas, galleries and museums. Technical reports will be published in specialty journals (e.g. *IEEE Trans. on Multimedia* and *IEEE Trans. on Neural Networks*), while reports directed to the media professionals will appear in the trade magazines (e.g. *Montage*). I presented a lecture on the project to the Liaison of Independent Filmmakers of Toronto; this was reported on in the LIFT newsletter [1]; in another issue I was interviewed about this project [2].

2. Detailed project description: I am proposing to make a film, *The Young Prince*, based on alchemical themes. The film will be about transformations—about transformations of imagery, about history as transformation, about eros as a transformative power, about that old Eisensteinian idea of collage and montage as transformation, but most of all, about transformations of the self. The film will combine two sorts of transformations—electrical transformations, produced by digital image processing, and chemical transformations, produced by processing film by hand, in small batches. Thus it will be a dialogue between two technologies, the older chemical/mechanical technology of the era that gave birth to the cinema, and the new electronic/digital technology commonly associated with video—a dialogue between what was and what is yet to be.

My recent scholarly work has concerned the spiritual ideas that excited so many creative figures of the twentieth century. I am rather tough-minded, and at first my interests in these ideas were purely scholarly: I was interested in developing what I believe to be a more accurate account of the origins of the early modernist cinema than that presented in the standard texts. To understand the influence of the occult, I began to read works by Gurdjieff [3, 4], Blavatsky [5, 6], Ouspensky [7, 8] and by the alchemists (especially Thomas Vaughan [9]), not as a disciple but as an art-historian attempting to understand ideas that gave shape to some of the artworks I most admire. I am very close to completing two book length manuscripts on the topic (and their contents have already been the basis of a special graduate course I gave last summer).

As an artist, I also began to think about connections between the transformation of the image by chemical and electronic means and the alchemical conception of transformation. Most people, I suspect, still associate alchemy with efforts to transmute lead into gold. This transformation served alchemists as a metaphor for the transmutation of the self, from the troubled, baser self into the gold of a free self, possessing awareness of the nature of reality. Alchemy concerned the transformation of the human psyche; the gold the alchemists sought to produce was the wholeness and health of the human spirit.

Alchemy's central metaphor relies on a fundamental article of alchemical faith: that what goes on inside a person imitates that which goes on outside; thus alchemists' study of natural processes led them, by analogy, to psychological insights concerning achievement of psychic wholeness. The faith that there is a correspondence between the inner and the outer worlds seems especially apposite in photographically-based arts, arts that begin with what lies outside us (the world we photograph) which often is taken as an image of what goes on within us. (It presents the gift of presence as the visible representation of an invisible realm).

Occult and alchemical systems intrigued me for another reason. For many years, I have studied the ideas of Cage [10, 11, 12, 13, 14], Xenakis [15], Tenney [16, 17] and Kasemets [18], composers who have made use of aleatory methods (or stochastic methods, or chance operations). Cage's purposes for introducing chance operations have had an especially strong attraction for me: like Cage I had developed concerns about artistic methods that put the artist's will at their centre and had found many reasons for avoiding authorial imposition and 'egocentric' making.

To advocate avoiding authorial imposition is not a brief for formlessness, however—rather, it is based on the faith that there is a creative force beyond the individual, and that when one finds the means to escape from wilfulness, one stands a chance of bringing processes that shape an individual work into alignment with a higher creative force. That, at any rate, is the goal. The artist's task becomes one of finding a field and a method that allows this creative energy to play itself out. Stated more practically, the goal becomes that of identifying a set of attributes and formulating principles that determine stochastically the values these attributes will take on. The details of work are beyond the composer's choosing. Still, the task of identifying these attributes and principles can be carried out well or badly—the extraordinary richness of

the work of Cage, Tenney, and Kasemets is testimony to fact that some composers can bring their thinking in line with these higher shaping forces (obviously not all composers can do so equally well) and can sense their basic manner of operation. When a composer taps into this unfolding process at a deep level—when a composer abandons the limited self and identifies with the process—then the process can produce forms richer than anything the limited self can conceive.

Alchemy proposes there are stages in the transformation of the self, beginning with the restoration of essence, rising through the transformation of essence into energy (the development of awareness), the transformation of energy into mind (coordination of mind and energy in movement) and ending with transformation of mind into emptiness (moving energy with the mind). I was struck, first, by the correspondence these ideas have with ideas about the creative process I have just presented and, second, by the “cinematicness” of the language in which these stages are described: the first phase is analogous to the discovery of being of things (glimpsing their character through getting/making a clear image of the object); the second phase is analogous to the dynamizing of reality (that process that one-time Rosicrucian Eisenstein [19] valorized); the third phase, in which the mind is swept along by movement of that energy is analogous to the stage in which we experience our thought being moved by the dynamic forms we see on the screen; while the final phase is analogous to the experience of ecstasy, in which we abandon ourselves and experience movement (energy) as everything.

A core idea of the alchemical system is that one cultivates a way of being in the physical world in which one experiences the spirit’s (the imagination’s) capacity to influence matter—or to become incarnate in matter. One witnesses the soul in action at the physical level. Alchemists understand this as the world of nature and the imagination “co-influencing” one another—mutually co-operating to bring forth the work; the “maker” forges a partnership with the creative force in life. We experience a form of this “co-influence” often—we adopt a negative attitude towards life, and no matter how wonderful the opportunities we are presented are, what we do (or make) becomes quite toxic—you have to learn to melt down this lead to let gold appear. This is a wonderful analogy to the creative process, in which the physical world and the imagination co-create the forms we experience—or, more accurately in which the mind enters into the world of matter, senses its potential, and allows it to guide the shaping force of the imagination. (It is an even better description of the cinema itself as photography is the product of the co-influence of the physical world and the imagination). In artmaking, when we let our will go and collaborate with nature in a profound way, when we have faith that a higher process is “the better maker,” the results (right down to the work’s minute details) can be wondrous. We learn to forego judgements about what aleatory processes produce—we come to believe that we should accept what they create for us, and with us. The human artist learns to trust that what “the better maker” made was created for him or for her—and for one particular occasion. This experience I refer to (accepting the paradox) as “ecstatic peace.” Art and life become one; that is why this union of the self with not-self is a goal of many religious traditions.

The form of the new work will derive from these ideas. The film will begin with long, slow images of water (floods, creeks, rivers, sea-surges) and of decaying things (well-suited for the chemical treatments they will be receiving), and old skin, becomes more dynamic with images of distilleries, furnaces, children, the sun and moon, and birds (some readers will notice the alchemical iconography), and at the end, it will (I hope) evoke those states in which the mind is first swept away in the movement (the energy)—provoked with images that suggest the *coniunctio oppositorum* and montages which fuse built sites and nature through motion. I hope this last section will engender the experience of the mind giving itself over to movement, to energy—so one has the experience of feeling one is identical with all that is. This is a state

rarely achieved in film, but it does sometimes come forth (as Snow's *La Région Centrale* shows).

The filmmaking methods I will use are consonant with the desire to create a selfless work, for they make extensive use of chance operations. I shall introduce chance operations into the work in two ways: by using chemical processes and by using digital processing. The chemical processes result from processing film footage by hand, in small batches. Because the chemicals are applied by hand, not by machine, they produce fluctuating effects (spots, blobs and shifting colours), resulting in a considerable amount of visual activity that sometimes interferes with our ability to see the underlying images. The fluctuations are random: I cannot predict exactly what the effects of chemicals will be—some experience with hand-processing gives me an inkling of possible results. That allows me to collaborate with the natural forces that shape the final form. But if I do my job well, then the images behind these surface fluctuations, underneath these surface events, will have visual interest; and the interference will seem just a little bit sad—as they interfere with the identificatory pleasures of apprehending the underlying image. But like the decay of the objects themselves, the image's decrepitude can be a source of considerable visual interest: loss in one domain is repaid by gain in another.

I shall also introduce chance operations into the work by using a digital tool I am building that allows me to use constrained random operations to select the image processing algorithms to be applied to particular images—these constraints allow my filmmaking experience, and my understanding of the appropriateness of specific image processing methods to certain types of images, to be brought to bear. Tenney's writings (especially [17]) on music help me understand how to do this; they alerted me to possibilities of using similarity to constrain random processes. The software tool I am building allows me to do this.

[technical section omitted]

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Summary of Proposed Research

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Detailed project description

I am proposing to make a film, *The Young Prince*, based on alchemical themes. The film will be about transformations—about transformations of imagery, about history as transformation, about eros as a transformative power, about that old Eisensteinian idea of collage and montage as transformation, but most of all, about transformations of the self. The film will combine two sorts of transformations—electrical transformations, produced by digital image processing, and chemical transformations, produced by processing film by hand, in small batches. Thus it will be a dialogue between two technologies, the older chemical/mechanical technology of the era that gave birth to the cinema, and the new electronic/digital technology commonly associated with video—a dialogue between what was and what is yet to be.

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As an artist, I also began to think about connections between the transformation of the image by chemical and electronic means and the alchemical conception of transformation. Most people, I suspect, still associate alchemy with efforts to transmute lead into gold. This transformation served alchemists as a metaphor for the transmutation of the self, from the troubled, baser self into the gold (or *argentum*) of a free self, possessing awareness of the nature of reality. This is the real nature of what alchemists call their “Magnum Opus” or “Great Work”: alchemy concerned the transformation of the human psyche; the gold the alchemists sought to produce was the wholeness and health of the human spirit.

At another level—and alchemy is a subject that one studies by noting the parallels among different metaphoric tenors—the ambition of turning base materials into gold (or *argentum*), describes re-moulding one’s gross, material body into a vessel fit for the most precious element, the Elixir of Life, which, in the alchemical system is not really a drink that one

consumes to ensure longevity, but the Life Force that animates both the human form and nature. Alchemists' ideas about the body figure prominently among my reasons for proposing a work that deals with alchemical themes. My book, *A Body of Vision: Representations of the Body in Recent Film and Poetry*, surveyed the influence that Gnostic ideas have had on representations of the body in art of the last eighty years; it proposed that the Gnostic cosmology had provided a vocabulary of concepts about the body that many recent poets and filmmakers had found helpful in expressing their attitudes towards embodiment (a vocabulary that was used even by artists who would never think of identifying themselves as Gnostics). Alchemy is allied with the Gnostic system—and it especially provides a rich iconographic repertoire depicting different states of the body, which they understand as the expression of different states of consciousness. This aspect of alchemical thought interests me especially.

The faith that there is a correspondence between the inner and the outer worlds seems particularly appealing for anyone interested in photography and the photographically-based arts, arts that begin with what lies outside us (the world we photograph) which often is taken as an image of what goes on within us. (It presents the gift of presence as the visible representation of an invisible realm).

Occult and alchemical systems intrigued me for another reason. For many years, I have studied the ideas of Cage (1961, 1967, 1974, 1981, 1986), Xenakis (1992), Tenney (1984, 1988) and Kasemets (1995), composers who have made use of aleatory methods (or stochastic methods, or chance operations). Cage's purposes for introducing chance operations had an especially strong attraction for me: like Cage I had developed concerns about artistic methods that put the artist's will at their centre and had found many reasons for avoiding authorial imposition and 'egocentric' making.

To advocate avoiding authorial imposition is not a brief for formlessness, however—rather, it is based on the faith that there is a creative force beyond the individual, and that when one finds the means to escape from wilfulness, one stands a chance of bringing processes that shape an individual work into alignment with a higher creative force. That, at any rate, is the goal. The artist's task becomes one of finding a field and a method that allows this creative energy to play itself out. Stated more practically, the goal becomes that of identifying a set of attributes and formulating principles that determine stochastically the values these attributes will take on. The details of work are beyond the composer's choosing. Still, the task of identifying these attributes and principles can be carried out well or badly—the extraordinary richness of the work of Cage, Tenney, and Kasemets is testimony to fact that some composers can bring their thinking in line with these higher shaping forces (obviously not all composers can do so equally well) and can sense their basic manner of operation. When a composer taps into this unfolding process at a deep level—when a composer abandons the limited self and identifies

with the process—then the process can produce forms richer than anything the limited self can conceive.

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Alchemy also proposed that the transmutation of lead into gold occurred in a series of stages, each correlated with a particular metal. According to one taxonomy of stages of alchemical development, each stage is signified by a colour (that gives it its name) and correlated with a metal: The first stage, *nigredo*, is signified by black and correlates with lead; the second stage, *albedo*, is signified by white and correlates with the silver; and the final stage, *rubedo*, is signified by red and corresponds to gold. The progress through these stages parallels psychic growth and development: in its infancy the personality is represented by lead, but as this *prima materia* matures it moves from total darkness to intense brightness and finally to a marriage of both. This will provide the film's colour scheme.

A core idea of the alchemical system is that one cultivates a way of being in the physical world in which one experiences the spirit's (the imagination's) capacity to influence matter—or to become incarnate in matter. One witnesses the soul in action at the physical level. Alchemists understand this as the world of nature and the imagination “co-influencing” one another—mutually co-operating to bring forth the work; the “maker” forges a partnership with the creative force in life. We experience a form of this “co-influence” often—we adopt a negative attitude towards life, and no matter how wonderful the opportunities we are presented are, what we do (or make) becomes quite toxic—you have to learn to melt down this lead to let gold appear. This is a wonderful analogy to the creative process, in which the physical world and the imagination co-create the forms we experience—or, more accurately in which the mind enters into the world of matter, senses its potential, and allows it to guide the shaping force of the imagination. (It is an even better description of the cinema itself as photography is the product of the co-influence of the physical world and the imagination). In artmaking, when we let our will go and collaborate

with nature in a profound way, when we have faith that a higher process is “the better maker,” the results (right down to the work’s minute details) can be wondrous. We learn to forego judgements about what aleatory processes produce—we come to believe that we should accept what they create for us, and with us. The human artist learns to trust that what “the better maker” made was created for him or for her—and for one particular occasion. This experience I refer to (accepting the paradox) as “ecstatic peace.” Art and life become one; that is why this union of the self with not-self is a goal of many religious traditions.

The form of the new work will derive from these ideas. The film will begin with long, slow images of water (floods, creeks, rivers, sea-surges), of decaying things (well-suited for the chemical treatments they will be receiving) and old skin, of fire, embers and ashes, will become more dynamic with images of distilleries, bellows, furnaces, children, the sun and moon, salt, sulphur mercury and gold, birds, a lion and a dolphin, of burning with fever, drowning, being swept into a tornado, being challenged by the opposite sex, magically transforming into somebody else (some readers will notice the alchemical iconography); and at the end, it will (I hope) evoke those states in which the mind is first swept away in the movement (the energy)—provoked with images (including male and female synthesized into the alchemical figure of the Rebis) that suggest the *coniunctio oppositorum* and montages which fuse built sites and nature through motion. I hope this last section will engender the experience of the mind giving itself over to movement, to energy—so one has the experience of feeling one is identical with all that is. This is a state rarely achieved in film, but it does sometimes come forth (as Snow’s *La Région Centrale* shows).

The filmmaking methods I will use will be consonant with the desire to create a selfless work, for they make extensive use of chance operations. I shall introduce chance operations into the work in two ways: by using chemical processes and by using digital processing. The chemical processes result from processing film footage by hand, in small batches. Because the chemicals are applied by hand, not by machine, they produce fluctuating effects (spots, blobs and shifting colours), resulting in a considerable amount of visual activity that sometimes interferes with our ability to see the underlying images. The fluctuations are random: I cannot predict exactly what the effects of chemicals will be—some experience with hand-processing gives me an inkling of possible results. That allows me to collaborate with the natural forces that shape the final form. But if I do my job well, then the images behind these surface fluctuations, underneath these surface events, will have visual interest; and the interference will seem just a little bit sad—as they interfere with the identificatory pleasures of apprehending the underlying image. But like the decay of the objects themselves, the image’s decrepitude can be a source of considerable visual interest: loss in one domain is repaid by gain in another.

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to be applied to particular images—these constraints allow my filmmaking experience, and my understanding of the appropriateness of specific image processing methods to certain types of images, to be brought to bear. Tenney’s writings (1988) on music help me understand how to do this; they alerted me to the possibilities of using similarity to constrain random processes. Tenney made extensive use of measures of similarity in the analysis of music structures in his book *Meta+Hodos*, and subsequent composers applied those methods to generating series of musical events. I was intrigued by the possibility of developing analogous compositional procedures for working with sets of images and, in particular, by the possibility of using measures of similarity to constrain random processes. I decided to develop a computer application that would allow me to do this and, at the same time, would be consistent with the principles I used in composing films. I set to work at constructing a tool that would emulate my customary way of working and would extend it, by eliminating subjective whim. I conceived this program as a means that would allow me to collaborate with the machine to produce “visual compositions.”

I first developed a rudimentary application that stored a set of images (that might constitute a number of sequences in a film) in a database along with a set of image descriptors (“meta-data”) and a set of image processing algorithms. The application applied image-processing methods to the images in the database; the methods to be applied were selected by random processes that operated under the constraint of estimations of the similarities between images. Images were partitioned in groups based on the similarities indicated by their descriptors, as were the image processing methods (the decision on which methods most closely resembled other methods was completely informal and subjective) and the image processing methods to be applied to a reference image were chosen at random; the user was asked to confirm the choice and, after that, the methods most similar to the randomly chosen method were applied to the images in the database that most resembled the reference image. The scope accorded to randomness in the selection of the processing methods varied with the way the system is trained: when the reference images that were used to train the system had little similarity to the target images, the program relied more on random selection; when the reference images bore a strong resemblance to the target images, random selection had a less important role (and the use of methods that can take on varying attributes, and change with the degree of difference between the reference image and target images, was favoured). Processes that adapted to the degree of difference between the reference image and the target images were used to create the impression of a continuous, on-going change that sweeps across a set of images (that could, for example, represent a shot in a film or video).

I used this application in a film (titled *Crack, Brutal Grief*) that I completed three years ago. This way of using image processing methods in film/video production interested me enough (and, I thought, the results were good enough) that I wanted to carry work on this

application further. The first improvement to make was obvious: using image descriptors was awkward and introduced an unnecessarily subjective element. I realized that the application would more truly reflect the compositional ideals to which I aspired (especially the Cagean ideal of avoiding authorial imposition) if I were to make use of methods to “compute” the similarity between the two images algorithmically. The tool we are developing will allow me to do this.