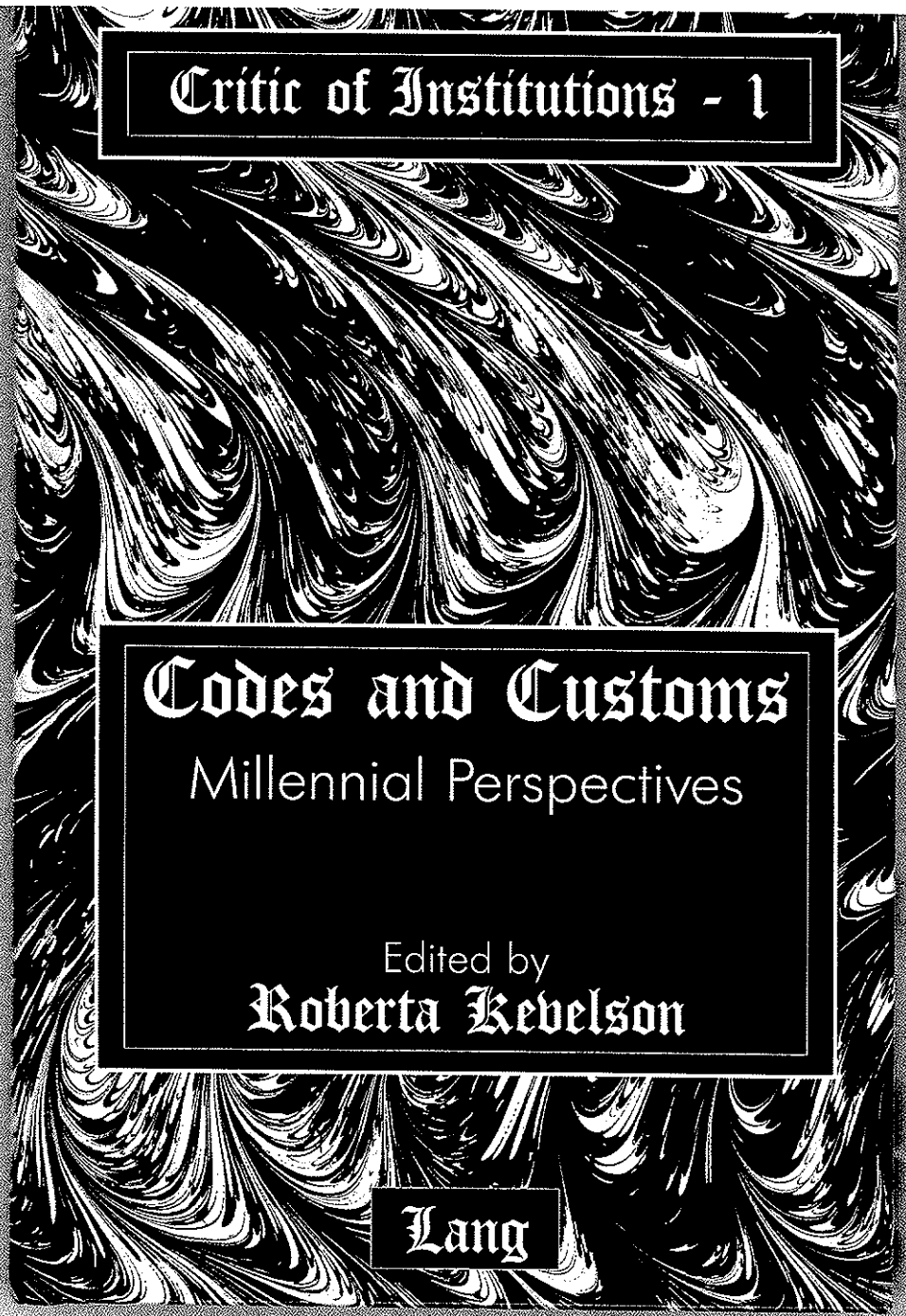
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Author's Note: References in this paper are to Herodotus, 1954, *The Histories*, tr. Aubrey de Selincourt, Baltimore, Penguin Books, and Francis Fukuyama, 1992, *The End of History and the Last Man*, New York, The Free Press. I wish to thank my superb graduate seminar in historiography at Penn State University, spring 1993, for insightful comments on both works.

Chapter Thirteen

The Millennium, Montage, Remote Sensing and the Earthscore Method

Paul Ryan*

I

Let me state at the outset that I consider celebration of the millennium in the year 2000 as monospecies vanity on the part of humans. We have taken dominion over the earth. We have increased and multiplied. In so doing, we have committed serious crimes against the earth community and become an endangered species ourselves.

Any species that destroys its environment destroys itself. Humans are destroying their environment. Humans are destroying themselves. Some of the codes and customs associated with Christianity and its millennial thinking have aided and abetted these crimes against the earth in the name of a heavenly God. Critiques of the role of Christianity in ecodestruction have been made by others. It is not the intent of this paper to add to this criticism directly. As someone who spent over four years with a monastic order of the Roman Catholic Church, I have struggled to 'recycle' some of the codes and customs of Christianity into a sustainable ecological culture. (Ryan 1993:259ff.) Part of that effort at recycling has been to develop the Earthscore Notational System for using television to orchestrate perceptual consensus about the natural world. In effect, the Earthscore Notation provides the architectural plans for developing an information transmission system based on shared perception of the natural world and not speech or writing. Conceivably, such a system could help neutralized the blind destruction of the natural world by those who take as their highest authority what is written, even in the Bible. Such a system would help generate codes and customs in keeping with sustainable ecological living on this planet.

My intention in this paper is to articulate the relationship between remote sensing of the earth by satellite and the Earthscore Notational System. Remote sensing of the earth from space by synchronous satellites may help offset the remote but erroneous sensing of time encoded in the millennial illusions of the West. I begin with a consideration of the word 'montage.'

The word 'montage' is taken from the French '*monter*' which means 'to mount.' A montage is a composite picture made by combining or 'mounting' several separate pictures together. Since the word 'montage' cames also from the word for 'mountain,' we can relate montage to the earth by saying that a montage combines a number of separate 'hills' so that together they stand out 'like a mountain.' A film is a montage of moving images cut or edited together into one sequence that the editor hopes will stand out in the minds of moviegoers like a mountain against a plain.

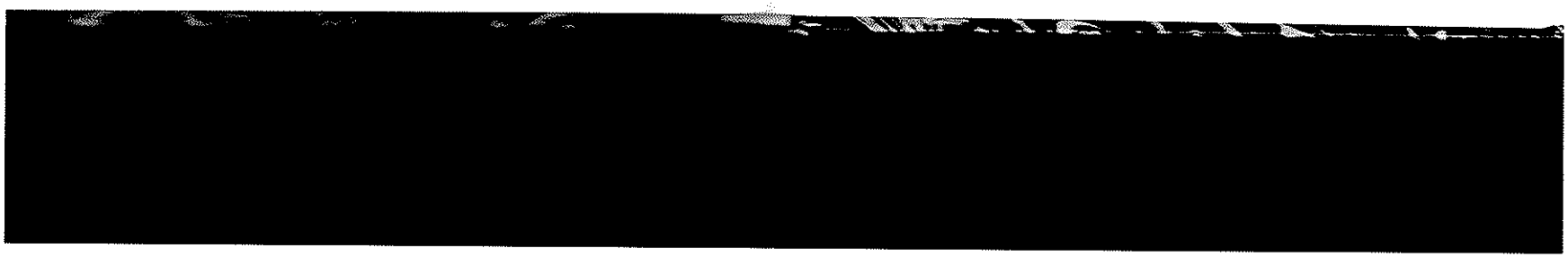
One of the recent stand out films produced by Hollywood, *Jurassic Park*, is a montage about the disastrous consequences of recreating the DNA sequence of dinosaurs. The medium of film and the message of *Jurassic Park* fit together very well. Using all the tricks of the editing trade, our emotions are manipulated by shocking sequences of humans being stalked and eaten by dinosaurs, dinosaurs created by the hubris of men who presume to splice together the genetic sequences of extinct species.

I will return to the medium of film and montage, but for now let me hitchhike on the message of *Jurassic Park*. The story plays on current fears that we humans are ourselves an endangered species, a species which could go extinct like the dinosaurs. This fear in not just fluff for the summer film crowd. This fear is based on real facts. Although there is dispute over the interpretation of some of these facts, enough serious people are now sounding the alarm so that the warnings cannot be ignored. For example, in 1990, the respected Worldwatch Institute in Washington, D.C, issued a report predicting that if current trends of human destruction of the natural environment continue, our species has only another forty years before we reach a threshold of irreversible environmental destruction. (Brown, 1990) In this context, the millennium is trivial. In this context, *Jurassic Park* is

more than a summer movie,, more than a summer montage. It is a projection of our own species' fear of extinction.

Our human species has evolved from a complex combination of geological, vegetative and animal processes on planet earth. Some call this process natural selection. The scientist, Stephen Jay Gould, says that if the videotape of evolution were rewound and started again the chances of it coming out the way it has are practically non-existent (Gould, 1991). The evolution of life on earth over the past four billion years is a magnificent ongoing achievement. Stupendous in ways we hardly appreciate. The message of *Jurassic Park* is that we do not understand the evolution of life well enough to tinker with its sequences. Unfortunately, what we are doing is much more than tinkering. Predictions are that if current trends continue, by the year 2050, one out of four species on this earth will have been edited out of existence by the hands of man (Tangley, 1992). Millions of species left on the cutting room floor by those who would montage together an ignorant and irreverent fantasy of millennial life on earth as a monospecies movie of humans by humans and for humans. If we want to perish from the earth, this is certainly one way to do it.

Satellite images gathered by remote sensing of the earth differ radically from the images produced with the medium of film. Film images are pictorial. You can see them on the film itself. Satellite images are digital composites created by electronic scanning. Film images are prepackaged montages projected on the walls of caves we call movie theaters and pay to sit and watch with strangers. Hovering over the whole earth, satellites can scan the entirety of planetary processes in a comprehensive way and deliver the images to our home in ways that do not rely on montage. Mountains are mountains. Hills are hills. There is no need to splice together hills to make mountains. Each has its position in the dynamic equilibrium of the biosphere. Remote sensing invites contemplation of this dynamic equilibrium that can lead to ways of living in terms of the dynamics that shape this equilibrium. Manipulating satellite composites created by electronic scanning into montages or what I will call 'false mountains,'



makes no sense. If the weather channel on television suddenly started cutting up their satellite images into 'exciting' montages, we would be properly shocked.

Mentioning the weather channel brings up the natural affinity between remote sensing by satellite and monitoring events with television. What is unique about television is that it allows us to monitor events simultaneously with others. Whether it's the weather, a baseball game, the funeral of a president, or a royal wedding, television allows us to monitor events simultaneously with other people. The condition of viewing proper to television is monitoring: for example, a security guard watching six different monitors of entrances to a building, or someone with a remote control grazing through the channels looking for events of significance to them. When the scanning capacity of remote sensing by satellite is added to television, as we see in the weather channel, the range of events which we can monitor simultaneously with others increases dramatically. We are positioned to monitor the ensemble of events that constitutes the ongoing ecological activities of this planet.

In fact, NASA is currently deploying what they call their Mission to Planet Earth to do just that, monitor every ecological system on the globe. This mission includes forty-one satellites, costs over 30 billion dollars and when fully operative in the year 2000 will deliver, every week, as much data as exists in the Library of Congress. Vice President Al Gore, who sponsored the Mission as a Senator, expressed the concern that much of this data will wind up on in disks on the shelves of NASA and never trigger a human synapse (Gore, 1990). The Earthscore Method that I have developed addresses this difficultly by combining remote sensing with television.

The way this would work is to build a television channel dedicated to monitoring the ecology of a city and developing consensus among the inhabitants about how best to live in the city without destroying its supporting ecology. This television ecochannel would be used to systematically scan the watershed that cradles this city to see whether the figures of regulation that orchestrate the life of this watershed are in fact

functioning as they should. That scanning would include both satellite images and complementary ground based observations. Using this shared observation of ongoing ecological events, the community could develop polices and practices that insure long term living in this place without destroying the ecosystem.

Because there are so many films on television and because so much of the medium of television now uses the syntax and grammar of montage, it is difficult to differentiate between montage and the way in which I am talking about monitoring. I want to spend a little more time on this before detailing the Earthscore Method.

As we have seen, television has to do with monitoring events simultaneously with others. Monitoring a mountain range is different that cutting together hills to make a mountain, as in montage. Monitoring invites scanning for events, like a Samurai warrior sleeping in a meditation state who can be awaked by some change in the normal pattern around him, or submarine radar, that scans for unusual blips on the screen. A whale watch cruise is monitoring, looking for the event of a whale breaking water while on the open sea, not sitting inside watching on a screen the edited experience of someone else's whale watch. What happens happens, and you observe. On a real whale watch, you don't leave anything on the cutting room floor.

By contrast film has to do with projecting a world view. As a medium this is what film does best, it projects a world view. *Gone with the Wind* projects a view of the South destroyed by the civil war. *Triumph of the Will* projects a Germany shaped in the image of Adolf Hitler. *Jurassic Park* is a view of a world destroyed by man's intervention in biological evolution. In film, a director cuts together a series of moving images from different viewpoints and projects a view of the world for the film audience. The great Russia master of montage, Eisenstein used film to projects a world view based on the dialectics of Marx. This world view has come apart with the end of the cold war. We are now looking for a 'new world order,' a new view of the world.

I submit that we cannot come to such a new understanding of the world if we do not shake the montage tradition of thinking in terms of edits and splices. Please understand me, I am not trying to denigrate the achievements or the ongoing importance of film. Even a less than classic movie like *Jurassic Park* can be instructive for us. However, shadows on the dark cave of the movie house screen pale when compared to the sunlight of contemplating the earth afforded by satellite images. I think it's time for montage thinking to yield center stage. It's time for a change. However great the vision of a film director, it is still the vision of one person being marketed to the many. With satellites and television we can now have many eyes looking out of many heads at the whole planet. We can be on intimate terms with the immensity of the whole earth. The Earthscore approach is about coordinating our seeing, developing a shared perception of the planet and letting a new world order grow out of that perception. How do the ecosystems of the earth behave and how should we behave in compliance with those systems? These are the questions. The earth itself as we see and understand it better and better through satellites and television is, in fact, the ground for whatever new world order emerges. We must understand the dreams of the earth for the human species and not submit to the dreams of privileged men projected onto movie screens. Let the private world views of our great film directors projected in the dark caverns of our movie theaters become detritus for our species, that is, fragments of organic perception which we recycle as we craft a pluralistic view of the whole earth.

I contend that montage thinking goes hand in hand with manipulating the earth out of human hubris and contributing to our destruction as we see in *Jurassic Park*. By contrast, monitoring is a kind of contemplation that leads to action within a context. Many of the ills of the planet that we are now aware of have become visible from contemplating images produced by remote sensing: rainforest destruction, ozone depletion, and desertification to name just a few. Contemplation of these images has lead to identifying the ills and working toward correcting them.

There is one final point I want to make about the difference between montage and monitoring. Occasionally filmmakers include the experience of seeing a film within the film itself, especially in the Italian tradition which has given us such wonderful films as *Il Paradiso*. But film within a film is for the most part an exception, and you never view the film on the actual set where the film was made. By contrast, with satellite scanning via television, such as with the weather channel, we are almost always looking at images that include the place where we are. We are mapping the world in a way that includes ourselves our home and our lives in a very direct way. This realm where the map and the territory overlap is a very complex area of human experience, as we are painfully reminded by the war over how to relate map and territory in the former Yugoslavia. Here I can only note the issue for you and say that the Earthscore Method is organized around a 'sign of itself' (Ryan, 1993:345ff.) that can help us navigate this delicate realm without depending on reference and glorification of a specific territory or homeland that automatically invites fighting to the death for that territory. Let me now go on to detail for you the way the earthscore notation provides a shared perception of the environment through ongoing monitoring.

The need for a shared, systematic perception of the environment was best articulated by the biologist, C. H. Waddington, after he did an extensive study of modern painters (Waddington, 1970). Waddington noted that as a species we transmit information over generations both genetically and through speech and writing. Speech and writing inevitably result in authority structures, someone telling someone else what to do. The child is told, 'No, don't touch, the oven is hot.' The integral development of perception and behavior in the child is stunted and instead his or her behavior is linked up to the language commands of others. Based on his examination of how modern painters had learned to see nature without language, Waddington suggested institutionalizing this same possibility for the human species as a whole. Though he never said how, he thought we could generalize the silent success of painters such as Monet, Cezanne, and

van Gogh and evolve an information transmission system based on shared perception of environmental realities rather than on speech and writing.

The problems with language are explained in detail by linguist Derek Bickerton in his provocative book, *Language and Species*. Bickerton suggests that despite the vast powers language has conferred on our species, some of the consequences of modeling reality with language threatens the continuation of our life on earth. Language can create dysfunctional representations of reality, representations that result in antibiological conduct, such as a heretic who refuses to recant and is burned to death or a soldier following orders who races across a field into the certain death of machine gun fire. With a series of pessimistic speculations, Bickerton extrapolates this antibiological aspect of language to the species as a whole and concludes 'Perhaps language is, after all, terminally dysfunctional.' (Bickerton, 1990:253)

The Earthscore Notational System provides a formal basis for the evolution of a shared perception of the natural world that could offset the potentially destructive aspects language has for our species. The immediate embodiment of such a system would be a series of television stations dedicated to monitoring local ecosystems. At these stations, remote sensing provided by satellite could be easily integrated with ground based monitoring. The programming on these television stations would include not only the contemplative observation of ecological systems but the interpretation of these observations in terms of local knowledge. These regional television stations could be linked by satellite with other regions in a global television network that provided our species with an on-line shared perception and interpretation of planetary processes. Such a global television network would support effective decision-making about human species' response to changes in the earth.

II
The Earthscore Notational System

Let me now talk more specifically about the earthscore notational system in non-technical language. For those of you interested in the evolution of this system and a more technical description, I recommend you read *Video Mind, Earth Mind*, (Ryan, 1993) a book I recently published that articulates my work in depth.

The Earthscore Notational System grew out of my efforts to use video to interpret nature. I began working on the system in 1971 while living in the Hudson River Valley and trying to interpret the natural world as a video artist. It did not take long for me to realize that no matter how good I became at producing landscape video as an individual artist, it would have little effect on how people actually treated the ecology of the Hudson Valley. What was really needed was a cooperative group of videographers who could interpret the natural world and present it to the community at large on an ongoing basis. To produce such an orchestration of perception a notational system was needed in order to insure that such an effort could be effectively organized and continue over generations. No such notational system existed. In effect, I needed to invent an information transmission system based on perception.

The difficulty of inventing a video notational system suitable for the natural world becomes evident when we make a comparison between recording nature on video and playing music on a piano. Video is a perceptual device with which we can look at the natural world. The natural world can often be a buzzing, blooming confusion. We have never codified a clear system of 'notes' in nature. By contrast, there is a clear system of musical notes encoded in the piano. In fact, the piano was constructed to play these notes. We do not know the 'notes' according to which nature was constructed. A notational system designed to interpret the natural world must somehow be based on clear 'notes' elicited from the natural world. For example, in order for videographers to record salmon spawning in a way that is faithful to the spawning process itself, they must understand the

'notes' or what we can call 'figures of regulation' guiding the 'performance' of the salmon. Ecological videographers must know how to read these underlying figures of regulation, or notes in nature, just as dance videographers must know the choreography of the dance they are recording. Once the underlying figures of regulation for salmon spawning in a particular river are identified and put together, i.e. composed into a score, then videographers who know the notational system and that particular score can record and monitor the salmon run year after year, generation after generation. If a particular performance of the salmon as recorded does not comply with the score, then the videographers are in a position to scan the ecological system for perturbations and alert us that something might be disturbing the underlying figures of regulation for the spawning run. This may result in a revision of the score for monitoring the performance if the disturbance of the salmon is for natural reasons and/or a correction of some human activity that is ecologically destructive to the salmon run.

Let me first identify the five components of the Earthscore Notational System:

1. a comprehensive set of categories for observing nature.
2. a formal way to organize these categories.
3. a process for cooperative learning and production.
4. models for intuitively understanding events in nature.
5. a way to interpret these models for any community of people.

Let me provide a brief explanation of each component.

A. A comprehensive set of categories for observing nature

Because I wanted a notational system that was responsive to the the totality of the environment, I was attracted by the comprehensiveness of the categories developed by the American philosopher Charles Peirce (1839-1914. See Otto-Apel, K. 1981). For Peirce, knowledge is based on observation and comes in three modes: firstness or positive quality, secondness or actual fact, and thirdness or laws that will govern facts in the future. Peirce argued that by working with these categories, it is possible to determine, from our knowledge of some parts, what other parts are missing, and to prevent arbitrary additions. Knowledge can grow organically, like the body of an animal. By observing natural phenomena using these categories we can develop a unified understanding of whatever we are observing.

The first category is called Firstness. The taste of banana, warmth, redness, feeling gloomy: these are examples of firstness. Firstness is the realm of spontaneity, freshness, possibility, freedom. Firstness is being 'as is' without regard for any other.

The second category is called Secondness. Secondness is a two-sided consciousness of effort and resistance engendered by being up against brute facts. The actual 'thisness' of something, as it exists, here and now, without rhyme or reason, constitutes secondness. To convey the pure actuality of secondness, Peirce often used the example of pushing against a door and meeting silent, unseen resistance.

The third category is called Thirdness. Thirdness mediates between secondness and firstness, between fact and possibility. Thirdness is the realm of habit, of laws that will govern facts in the future. With a knowledge of thirdness we can predict how certain future events will turn out. It is an 'if . . . then' sort of knowledge. Thirdness consists in the reality that future facts of secondness will conform to general laws.

When we attempt to interpret a natural site with a video camera, we are confronted with 'everything.' We need to make selections. If those selections are arbitrary, the final tape can leave out significant aspects of the ecosystem. Significant omissions can make the interpretation of the site faulty. Peirce's categories of observation: firstness, secondness and thirdness are, in effect, a theory of everything. Using these comprehensive categories, it is possible to make selections that are responsible to 'everything' at the site.

B. A formal way to organize these categories

The second component of the Earthscore notation is a formal mathematic figure that organizes the three categories which I call a relational circuit. This figure is very simple (Ryan, 1993:103). I've taught it to six grade students in a half hour. In the Earthscore Notational System, the relational circuit is used to organize the categories of quality, fact and law or firstness, secondness and thirdness in unambiguous, relative positions. The relational circuit is to the Earthscore System what the staff and bars are to classical music notation. I originated the relational circuit based on my own video experimentation.

The relational circuit is a self-penetrating, tubular continuum with six positions that allows us to think unambiguously. There is a part contained by two parts, -- the position of firstness. There is a part contained by another part and containing a part, -- the position of secondness. There is a part that contains two parts, -- the position of thirdness. The circuit allowed me to organizes differences in videotapes I produce in terms of these three positions and the three 'inbetween' positions that connect them in the continuum. In contrast to 'the cut' in the montage tradition, let me point out that this is a continuum without a 'cut.' It makes use of a way of thinking that is technically called 'prescinding.' Prescinding is a term from medieval philosophy that literally means thinking 'before the cut.' Differences in the earthscore system are not derived from cutting and splicing the continuum but moving from one position to another in the relational circuit.

Nature in New York City, a twenty seven minute videotape I produced (Ryan, 1989) is an example of such composing in terms of a continuum. In keeping with this continuum thinking, all the transitions are dissolves,or A/B rolls, corresponding to the positions inbetween firstness, secondness and thirdness. This tape was edited in six second passages. Each passage corresponds to firstness, (F) secondness (S) or thirdness (T). A given sequence might run FSFT, SFST, TSFS, TFSF with dissolves from one passage to another. When my film-minded colleagues ask me how I justify all those dissolves, I ask them how they justify cutting up the continuum in the first place. I also argue that television puts your mind in a zen-like, alpha state where it does not make choices and that dissolves are more appropriate for the alpha state of the television viewer. The relational circuit allowed me to maintain a sense of the continuum and compose in terms of a continuum. The circuit allows composing with the firstness (quality), secondness (fact) and thirdness (law) of natural phenomena in a non-hierarchical way that is analogous to the painter Cezanne composing with what he fondly called his *little blues*, *little browns* and *little whites* (Lacan, 1978).

However, since *Nature in New York City* this tape was produced by myself as a solo artist, it falls short of the ideal in which cooperating videographers interpret the ecology. Videographers can establish cooperation using the relational circuit through a process I call 'Threeing.' This is the third component of the Earthscore Notational System.

C. A process for cooperative learning and production

Before tackling the problem of a video notational system, I was part of a video production group in New York City during the late sixties called Raindance. This was the initial period of the brave new world of video when art and social change went hand in hand. At Raindance, we often created shared video perception of events spontaneously, without fixed roles or hierarchies. A limited number of portable cameras would be passed around based on affinities, shared sensibilities, and whatever was happening. I was involved in making making many videotapes in this manner. Whether it was the first Earth Day in New York City or a day on a California beach, recording and replaying with video involved spontaneous cooperation within a small group.

Threeing is my name for a formal, teachable version of the kind of cooperation that happened spontaneously within Raindance. In the summer of 1989, I taught a dozen young Urban Conservations Corps videographers in New York City to observe sites in Central Park using the protocols of

threeing. The youngsters went on to incorporate this cooperative way of observing sites into a series of tapes. One of these tapes won a national prize from the American Film Institute (The Parks Council, 1989). Currently, I am teaching this method of video production at The Savannah College of Art and Design in Georgia.

Unlike the tradition of film production, in which each member of the production team has a fixed role such as director, camera person, sound person and so forth, -- threeing enables the members of a video team to take turns playing all roles. The roles correspond to the categories of observation; firstness, secondness and thirdness. By taking turns in the different modes of observation mapped by the relational circuit, the videographers can produce a comprehensive videotape about the site.

Threeing is a nonverbal way in which three people can relate to each other simultaneously. The protocols of interaction in threeing, which include a decision making process, are easily learned. Threeing is a kind of practice that works for three people in a way analogous to how T'ai Chi or yoga works for the individual. T'ai Chi and yoga balance a person's well-being with a system of changing postures. Threeing balances the relationships among three people with a system of changing positions that relate to the three categories of observation. The system of changing positions is codified by the relational circuit, which can be outlined in two dimensions on the floor. Videographers who practice threeing are capable of orchestrating their perception of the natural world without fixed roles and without a dependence on language.

D. Models for intuitively understanding events in nature

Video recording and playback, with its possibilities of time lapse and slow motion, enables us to understand natural patterns in an intuitive way. Think of time lapse film studies of budding flowers and slow motion studies of insects. Watching these moving images, it is possible to understand the pattern presented in a single gestalt without using language. The moving image allows the natural event to occur in the mind like a fist in the hand.

There is a spontaneous, intuitive appreciation of a law of nature. This intuitive appreciation of natural law through perception is the fourth component of the Earthscore Notational System.

Muybridge's famous photos of a running horse, done on a wager about whether the four hooves left the ground at once, is an instance of this intuitive appreciation. Such intuitions can also be understood in a mathematically formal way using the catastrophe theory of the topologist, Rene Thom (1975). Catastrophe theory is a mathematical method for modeling discontinuous phenomena or events. Television and video monitor and record events. Just as Euclidean geometry offers a formal understanding of geometric surfaces and solid objects, catastrophe theory provides a formal understanding of events or changes from states of equilibrium, i.e, discontinuous phenomena. Based on Euclidean Geometry, someone faced with tiling a wall knows with mathematical certitude that of all possible regular polygons (equal-sided, two dimensional shapes) only three (hexagon, square, triangle) can fill the plane packed edge to edge. Based on catastrophe theory, someone observing nature with a video camera knows with mathematical certitude that there are only seven kinds of discontinuity possible in any phenomena controlled by no more than four factors. Just as the continuous relational circuit organizing the categories of observation constitutes the 'staff' of the Earthscore Notational System, so these seven elementary models of discontinuity constitute the basic 'notes' of the system.

In nature, the combinations of these basic seven models of discontinuity are multiple and not readily apparent. Yet the underlying structural stability of discontinuous phenomena in nature can be understood by careful observation. Each 'event pattern' in nature, each event regulated by a figure can be understood in terms of its 'chreod.' Chreod is a term taken from the Greek that means 'necessary path': '*chre*' meaning 'necessary,' plus '*ode*' meaning 'path.' If any natural process is disturbed it will return to the pathway necessary for its structural stability, just as a flooded river returns to its riverbed. These necessary pathways of nature, or chreods, can be

rigorously modeled using the seven elementary catastrophes and variations on these seven (Casti, 1988).

In my own work as a video artist, I have repeatedly returned to moving water as the richest single source for developing a vocabulary of 'chreods' in nature. Water takes so many different shapes such as billows, droplets, backcurls, waves, fantails and cascades. Each of these shapes exhibits a different pathway in which water can flow, a different chreod. In 1975, I recorded over forty-five chreods on videotape at the waterfall in High Falls, New York. In 1983, I did a study of the Great Falls in Paterson that was edited into a tape with five sets of seven different kinds of chreods. In 1984, I did a study of the coastal waters of Cape Ann above Boston. In 1986, I crossed the Atlantic Ocean on a sixty-foot North Sea trawler and videotaped over thirty hours of ocean waters. More recently, I have produce a tape that sets of water chreods and fire chreods (Ryan, 1993, *Water Fire Water*).

Building up a vocabulary of chreods can give us an articulate set of notes with which to score natural phenomena. For example, horseshoe crabs laying their eggs in Jamaica Bay, New York City, is a natural process regulated by a chreod. The crabs only lay their eggs in the wet sand during the extended ebb tides created by the full moon in June. This assures maximum protection for the eggs from predator birds and land animals. The birthing activity takes place within a necessary figure of regulation. If you destroy that figure of regulation, that chreod, you have destroyed the natural process of birthing in that site. Catastrophe theory can give us a rigorous model of the figure of regulation for birthing. Using that model we can develop predictions that guide our decisions about how we behave toward the horseshoe crabs.

To sum up this section on the formalization of our intuitive grasp of natural events, I am saying that the difficulty of discovering clear 'notes' in the buzzing blooming confusion of nature can be resolved with systematic observation of an ecology by video teams trained in my process of cooperation called Threeing and schooled to identify the chreods of an

ecosystem. The systematic observation of 'everything' would insure that we did not miss anything significant. By identifying the chreods we can rigorously model the underlying structural stability of the various events in the ecosystem. Through more observation by remote sensing and on the ground video observations, we can then find out how these various chreods relate to each other. The syntax of interrelationships between these chreods would, in effect, constitute the 'score' for that particular ecosystem. We would be eliciting the score from the ecosystem itself by careful observation. Once we know the score we can observe and monitor how the ecosystem actually performs or fails to perform in compliance with that score. Failure to comply would mean that we need to reinterpret our score and/or to correct any behavior of ours that is making the ecosystem incapable of performing according to its natural score.

E. A way to interpret these models for any community of people

Once we have our models of ecosystems we still need to make it possible for the various members of the community of people whose lives depend on these ecological systems to interpret the models. To achieve this earthscore I use semiotics. Semiotics is a general approach to knowledge based on an appreciation of knowledge as a process of generating signs. Parenthetically, let me mention that one of the benefits of grounding our understanding of the earth in shared perception and semiotically interpreting that shared perception is that we can avoid stiffening of our understanding into ideologies and factions. Semiotics allows a community to constantly recycle its images and language in a regenerative way that makes it easier to avoid harden into ideological positions around the 'environment.'

The semiotics used in Earthscore derives from the philosopher Charles Peirce and encompasses both perception and language. Any kind of local knowledge, any art form and any scientific discipline can be incorporated into this system. The system is is too complex to present here. But it is inclusive of everything from a smudge of paint to a syllogism. The system

exfoliates from the categories of firstness, secondness and thirdness into a tenfold schema, a twenty-eight-fold schema and a sixty-six-fold schema.

My design for a regional television station, mentioned above, is based on using the sixty-six-fold classification schema to articulate the relationship between humans and ecosystems as different aspects of one continuous circuit. The programming offered by the station is organized according to this circuit in roughly the following way: differences in the ecosystem as monitored make differences in how the ecosystem is modeled on television. In turn, these models make differences in the actual interpretations of the ecosystem by specific people, which make differences in how the community as a whole interprets the ecosystem. In turn, this interpretation makes differences in how the community behaves toward the ecosystem. By following this circuit, a community can identify and eliminate errors in its relationship to the ecologies that support its life. For example, errors in how we treat ecosystem that supports the horseshoe crabs could be identified and corrective policies developed through a process of consensus building over the television ecochannel.

IV
Remote Sensing

This ends my brief description of the five components of the Earthscore system. Now let me return to remote sensing. Recall the staggering amount of information that NASA's Mission to planet earth will produce: *every week* as much information as exists in the library of Congress. This information payload will have to 'land' amid myriad human cultures with highly differentiated forms of local knowledge. I believe that the Earthscore Notational System can be used to insure safe landings. Earthscore allows us to cultivate a system of information transmission based on shared perception of the natural world. As I stated, the immediate embodiment of such a system would be a series of television stations dedicated to monitoring the ecologies of particular regions and developing consensus among inhabitants and policy makers about how to preserve and restore ecosystems. At these

stations, remote sensing provided by the Mission to Planet Earth could be easily integrated with ground based monitoring. The programming on these television stations would include not only the contemplative observation of ecological systems from satellites and on the ground but the interpretation of these observations in terms of local knowledge. These regional television stations could be linked by satellite with other regions in a global television network that provided our species with an on-line shared perception and interpretation of planetary processes. Obviously, such a global television network would support effective global change decision making among many members of the human species and not leave all that data in disks that never get used.

To suggest how remote sensing is integrated into the Earthscore Notational System, I will take you through a kind of meditation on a remotely sensed image using a tenfold semiotic sign classification. (Merrell, 1991) By constructing a meditation I simply want to make you more conscious of how your feelings, facts, and ideas, i.e., your use of your mind in terms of firstness, secondness and thirdness can be more explicitly connected to satellite images. The semiotic component of the earthscore notational system makes clear these relationships, allowing us to then recompose them, as a community, into a coherent understanding of the earth that can guide our behavior toward the earth.

To say it another way, this meditation is designed to slow you down and let you consciously experience what normally happens in a flash when we see an image. In this meditation, the image is remotely sensed from space. Obviously, you have the option of participating in these brief guided meditations or simply listening to how the the semiotic process of signs generating other signs can work.

First get comfortable.
Shift around until your body is at ease.
Close your eyes and empty your mind.
Pay attention to your breathing.
Let the air around you breathe you.

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Settle into a zen state of mind,
a mind that doesn't know,
a beginner's state of mind.

Now ready yourself to open your eyes.
Ready yourself to see an image on a slide in front of you.
Please keep your mind from the automatic response of identifying the slide and naming the image. There will be time for that later.
For now just prepare to let the image be present to your beginner's mind as an image.

Let your eyes open. Look at the image in front of you.
Let your mind fill with the blues and whites and browns of the image.
Do not name what you see.
Simply let the quality and color and texture of this image fill your mind.
Let yourself realize that this image represents something real, something that exists.

Now realize that this image positions you in the blackness of space. You are detached from the image and floating in space apart from the image.

Recognize that the image is whole and round.
Recognize that the whites and the blues and the browns have a particular configuration and shape, that the swirls of white suggest motion.
Recognize the image as an undivided whole floating in space.

Let yourself understand that this image is an image of something real, something that has this particular configuration, and no other.
It could be oblong, but it is round.
It could be just browns and grays but it is not.
It has this specific composition and no other.

Establish a relationship in your mind between this specific composition, this unnamed image and yourself.
Be aware that this swirl of blues, whites and browns could mean something to you.
Recognize that what this image may mean to you it may also mean to others.

Name this image.
This is planet Earth.
This is not a dead planet like Mars.

This is the image of a planet that many people are coming to believe is a self regulating entity.
Let us accept that understanding for now.
Let us use the term Gaia as a name for what we see.
Let us use this name to extend our meditation.

According to atmospheric scientist and author of the Gaia Hypothesis, James Lovelock, the earth is a self editing, self correcting process that maintains life. For example, although the temperature of the sun has gone up 20 percent since the inception of the earth, the temperature on the earth has remained constant. Although the periodic table of elements would predict that the amount of oxygen in the atmosphere would only be a few percent, in fact the earth maintains a 21 percent oxygen level. If it were 25 percent, a single lightening bolt could burn down an entire forest. If it were 15 percent many creatures simply could not live. These patterns, and many others such as the maintenance of three percent salinity in the oceans and the function of white clouds in regulating temperature, have led Lovelock to posit the Gaia Hypothesis, which states that the earth is a self correcting entity. Life is as much part of the earth as feathers are part of a bird. As of this date, a scientific consensus has developed that supports a weak version of his hypothesis and the discussions continue.

Let us recognize the fact that this is an image of a planet that maintains temperature levels and oxygen concentrations that allow me to continue my life. My life and the life of this planet are inextricably linked.

Finally, recognizing that if the life of the earth, my life and the life of my kind are to continue, the ways in which this earth regulates itself must be understood and respected.