



AMERICAN UNIVERSITY STUDIES

Art as Inquiry

Toward New Collaborations Between
Art, Science, and Technology

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work might have a positive influence and possibly lead to a return of a concept in landscaping and gardening that is not a thin overlay to cover the natural conditions and, even worse, destroys the site's inherent environmental qualities. Meanwhile, teaching about his concerns has also become an important part of his work, and Sonfist accepts invitations to give seminars and to work with students on ecological development projects.

HELEN MAYER HARRISON - NEWTON HARRISON: The Ecological Argument

A Self-generating Eco-system

Although Newton Harrison taught painting at the University of San Diego since 1967, his interest soon switched to experiments with forms of colored light, such as glow discharge tubes, to see if light could behave like color. Thus, when he was invited to participate in the *Art and Technology Program* of the Los Angeles County Museum of Art in 1969, he submitted a proposal on "light as color."²⁵³ Because the program set out to bring artists in touch with scientists, he was put in touch with Dr. Robert Meghreblian and some of the other plasma experts from the Jet Propulsion Laboratories (JPL) in Pasadena, California. After this meeting "evolved (into) a productive problem solving situation," a rapport was established between Harrison and JPL staff which existed throughout the collaboration. Harrison's research resulted in an installation of five plexiglass tubes, made by a local plastics firm, containing liquid crystals, which would change color under heat and pressure. Newton described the final effect: "...in the first tube I put an arc that was a mixture of helium and argon. The helium helped the arc path; the argon guaranteed that it would be a shocking pink-violet arc. We set it up so that the gas was injected in such a way that it started out as lightning, staying lightning for about two minutes; became an arc; stayed the arc for about three minutes; became a glow - a total glow in the tube ... the glow started to break down into platelets and then I shot more gas in so it would be an arc again. This was a ten minute cycle."²⁵⁴

It is rarely mentioned that Newton Harrison presented yet another work in the exhibition, the *Brine Shrimp Farm* which became *Survival*

Piece #2: Notations on the Eco-system of the Western Salt Works (with the inclusion of brine shrimp). *Survival Piece #2* consisted of a series of 10 x 20 foot ponds, each containing brine shrimp and algae. The shrimp ate the algae, which by producing carotene altered the salinity of the water which in turn changed color, from green to olive, to brown, to brick red, as the salinity of the water grew. Designed with the assistance of Dr. Richard Eppley from the Scripps Institute of Oceanography, the piece addressed "questions of how living organisms react to specific environments."²⁵⁵ In 1970 Newton Harrison also participated in *Explorations* and he was the recipient of a grant from Experiments in Art and Technology's "Projects Outside Art" program. Possibly because of this interest in technological processes, as well as the new concern for natural growth processes Harrison's career took a major turn. He decided to abandon his studio almost as a protest against what he now considered art's narrow focus on object making. One could interpret this experiment as a key work in the artist's beginning to understand something of natural ecological growth systems. Meanwhile, he had met Helen Mayer, whose interest in growing processes may have pushed him further in this direction. The first published ecological piece was exhibited at the Howard Wise Gallery, New York in 1968: *The Slow Birth and Death of a Lily Cell*.

Reflecting upon his decision to switch from experimentation with technological processes toward processes in nature, Newton Harrison said: "I had been thinking about the issue of survival as subject matter. My first response was to ponder earth - literally the ground I stood on. I asked myself what earth meant to me, and what I knew about it. And, to find out, I decided to make earth. I gathered different kinds of manure, sewage, sawdust, vegetable matter, clay and sand ... this was in 1970." And Helen Harrison commented: "And I began to utilize the piles of earth by containing them and then growing things. So, openers in earth art for us was to make earth, to plant, to grow, to harvest, to do it consciously, to change ourselves thereby. We did not consider it either interesting or valuable to use earth to make forms on unusual sites."²⁵⁶ These considerations led to the development of their so called *Survival Pieces* (1971-1973). Because of their ecological concerns, these works already differed from those of other artists who worked with earth as material. Meanwhile the Harrisons had begun their collaboration as artists; a collaboration that continues until the present day.

Newton Harrison was born in New York City, 1932. He attended Antioch College, Yellow Springs, Ohio, and subsequently entered the Pennsylvania Academy of Fine Arts in 1952 where he studied sculpture. He graduated from Yale University, New Haven. Helen Mayer Harrison was born in New York City, 1929. She studied at Cornell University, New York State and Queens College, New York where she graduated in English literature. It was followed by a Master of Arts degree in education at New York University. Between 1949 and 1953 she held various teaching positions. She met Newton Harrison, and they married in 1953. In 1967, they moved to La Jolla, California, where Newton Harrison had obtained a teaching position at the University of California, San Diego. Helen Mayer Harrison obtained a doctorate degree in the philosophy of education and became Director of Educational Programs at the University Extension, from 1968-1973. Both have since then shared a professorship in the Visual Arts Department, and were Head of the Department, until their retirement. The Harrisons still live and work near San Diego. In 1993 they formed The Harrison Studio with architectural designers Gabriel Harrison and Vera Westergaard.

The consecutive *Survival Pieces*, six in total, are experiments with the self-generative aspects of different kinds of growing processes. Plants were grown in a portable pasture. Another consisted in the breeding and 'harvesting' of catfish. To create a portable orchard, eighteen trees, each in a cubic yard of earth, were placed to grow under artificial light. And as a comment on the snail infestation in California at the time, the Harrisons put white Peking Ducks in the exhibition garden, which ate the snails. Unfortunately the ducks also proceeded to eat from the real garden, which was not foreseen. The objective of these experiments was to (re)create eco-systems, in a kind of artificial setting. *Survival Piece #3: Portable Fish Farm*, exhibited at the Hayward Gallery in London (1971), probably became the most remembered of the *Survival Pieces*. Harrison's plan to electrocute the fish in public had reached the news media, causing great bewilderment and hostility toward the artist. According to the artists, this was a much more humane way of killing fish than the techniques usually applied (which was correct). But Jonathan Benthall criticized *Portable Fish Farm* for being rather contradictory in its intentions, pointing out, correctly in my view, the artist's naiveté in not having completely thought the implications of the

piece through. After all, argued Benthall, "the farm requires an elaborate support system of water-heaters, agitators, syphons, etc., powered by electric current which was presumably generated at one of the big power stations in South London that belch smoke into the air. So not only did Harrison fail to recognize the literary symbolism of electrocuting fish: he also failed to recognize that its consumption of power was polluting the air of London and using up fossile fuels..."²⁵⁷ Yet Benthall's conclusion was that the project was interesting and had to be taken seriously. The *Survival Pieces* presented the visitor with the process of closed (eco)-systems as art 'objects' without an aesthetic beautification. Using relatively simple technologies, the artists' farming system dealt with self-generating life-cycles. The results were obtained from detailed research, but were not meant to be used scientifically. They only served the arts. The meaning of the works consisted in visualizing ecological processes, not just growth processes. In this respect they belong to the first ecological art works.

Their experiments and problems with brine shrimp and catfish (*Survival Piece #2* and *#3*) had brought them in touch with scientists from the Scripps Institute of Oceanography. It was John Isaacs of the Institute who directed them to their research on the *Scylla errata Forskal*, a fast-growing, edible, but cannibalistic crab, which had become a threatened food source in Sri Lanka. A Sri-Lankan zoologist, Ranil Senanayake, had brought some crabs, which had been sent to him by his mother, for research on aquaculture. "We put aside all art and began investigation into the crab. We decided to let the crab be our teacher."²⁵⁸ Again, it tells something about their approach: accepting that natural phenomena teach, i.e. inspire them or us, rather than them or us trying to teach, i.e. dominate nature. Their research on the crabs took such a seriously scientific turn that Isaacs suggested to them to apply for a Sea Grant from the Scripps Institute, which they received in 1974.

The research into a contained and self-generating eco-system in which *Scylla errata Forskal* would survive made them realize the complexity and fragility of eco-systems in general. It took quite some time before they discovered the conditions necessary to sustain the crab's breeding cycle. It was this section of the cycle that caused scientists headaches and the problem had not been solved yet. The Harrisons carefully patterned their working method after the functioning of eco-systems, so that their work could pass as science, but the story of their

research evolved into the artists' most elaborate art project to date: the *The Lagoon Cycle* (1972-1985).²⁵⁹ The portable orchards, the vegetable gardens and fish farms that were intimate survival pieces installed in galleries, had gradually expanded into planning whole eco-systems.

The Lagoon Cycle

The Lagoon Cycle consists of 60 parts, and, exhibited, functions as a photomural, 360ft. long and about 8ft. tall. All the different resources have been composed into large photographic panels, each panel containing a layered collage of photographs, maps, aerial and satellite photographs, drawings, blueprints, texts. The data are rewritten into a narrative, in which two principal actors - the Lagoon Maker and the Witness - exchange points of view on the functions of the 'lagoons.' It was first shown at the Johnson Gallery, Cornell University at Ithaca, New York, in 1985 and then at the Los Angeles County Museum of Art in 1988.²⁶⁰ It is dedicated to the world's major estuarial lagoons, where ecological balance is in danger of being destroyed. *The Lagoon Cycle* is a fictional narrative about seven lagoons, each of which represents a phase in the process of thinking about the survival of the human species and the earth. The narrative takes place in the form of a dialogue between the Lagoon Maker on one side, who represents the position of the efficient organizer and developer of new technologies which promise progress and success, and the Witness on the other, who observes and comments on the possible consequences of the Lagoon Maker's proposals and plans. Among the ecological systems the lagoon is a system that, although quite fragile, reacts upon changes with the greatest resilience and flexibility in adaptation. The lagoon also serves as a metaphor for life, representing both the "fragility and endurance" of a survival system.²⁶¹

The First Lagoon: The Lagoon at Upouveli recounts the visit to Sri Lanka and the search for the crab as a possible subject for a self-generating aquaculture system. It became a confrontation with the decline of the traditional ways of living, like fishing or the rice culture, through the introduction of new technologies like the tractor replacing the water buffalo.

The Second Lagoon: Sea Grant tells how they obtained the Sea Grant and their consistent research into living habitats and in particular

into the mating of the *Scylla errata Forskal*. It narrates the idea of the tank as replacement for the lagoon, in which the lagoon becomes the metaphor for a bioregional system with an elaborate chain of interdependent life cycles. *The Second Lagoon* also critically addresses the supposed objectivity of scientific methodologies.

The Third Lagoon: The House of Crabs tells how the Harrisons are approached by "a marketing agent, businessman, scientist, journalist, and accountant," who advise them how to capitalize on the success story of the crab's breeding cycle. The story becomes an observation about the capitalist free market economy, which is one of the major causes of the discrepancies between the first and third worlds. It becomes a criticism on all existing models.

The Fourth Lagoon: On Mixing, Mapping and Territory takes the history of the Salton Sea as a point of departure for a disastrous example of destroyed ecological systems; it proposes an estuarial poly-cultural farming system based on a self-sustaining chain of production or a balanced life-cycle.

In *The Fifth Lagoon: From the Salton Sea to the Pacific - From the Salton Sea to the Gulf*, the Lagoon Maker proposes to cut a channel through the mountains to the Pacific Ocean or through the Colorado River delta to the Gulf of California so that the polluted Salton Sea will be fed and cleansed by the clean ocean waters and will turn into a productive estuarial lagoon. The Witness responds but "if the polluted waters of the Salton Sea are exchanged with the Pacific or the Gulf, who will flush the Ocean?"

The Sixth Lagoon: On Metaphor and Discourse takes the whole of the Colorado River basin as its subject for a discourse on how, through the canalization of the entire river, the building of power plants and irrigation systems, and our modern life style, human intervention has completely disturbed the original environmental conditions, which eventually will turn against us.

The Seventh Lagoon: The Ring of Fire proposes a ring of aquaculture systems surrounding the Pacific Ocean which would supply the world with sufficient food without having to resort to the industrial and technological operations that have caused the ecological imbalances we have to confront now. It considers the world's oceans as the ultimate lagoons. "Lagoon Maker and Witness begin a search for new guiding metaphors to replace those of force and fire, as they perceive the accelerating greenhouse effect as nature's response to the

millennia of force and fire. Finally they muse, the oceans will rise gracefully, but will people withdraw with equal grace?"²⁶²

The survival of the earth is the underlying theme in *The Lagoon Cycle*, but functions here only as one layer among a number of inter-contextual levels. Newton Harrison explained: (like a collaboration of an alga and a fungus) "...which exist in symbiosis; they help each other survive. One of them takes energy from the rock, the other takes energy from sunlight. They interact and feed each other. That's nature's response to a minimum condition. At the other end, the rain forest is nature at work in a maximum condition - the conditions of maximum available energy: water, sun and heat, where plants have even evolved that grow upon plants - all surfaces support life. Now we, like nature, also cover surfaces. And we work and account for a surface, we're taking our lesson from what we're referring to."²⁶³ The 'Lagoons' contain a body of information and data pertaining to the 'problem' to be solved for each lagoon. The information is based on scientific data encompassing geological, oceanic, atmospheric, topographical, and surface structure schemata. In addition there is information about the geographical situation, about economic, social and political issues as well as historical expositions. One may add that the whole creation of *The Lagoon Cycle* also serves as a metaphor for the way the artists perceive their function in society as artists, comparing and connecting the process of creating the work with the processes in nature.

Mapping and Metaphors

The artists' use of maps has been compared to the cartographic traditions of the past, the Renaissance and 16th or 17th centuries. To interpret *The Lagoon Cycle* in terms of a single layered map would show a complete misunderstanding of the intentions of the makers, although the Harrisons will not deny that they may have been inspired by this tradition. Yet their goals and those of the cartographer (now and in the past) are obviously wide apart. The cartographic map is basically a reduction of three-dimensional relationships in space and time to a two-dimensional scale. For the Harrisons, though, it is a means of framing their concepts; a means for them to design a conceptual model that enables them to create a 'world' that reaches out into many different

'regions' (territories, disciplines, space and time etc.) both real and imagined. It enables them to simulate a world in which all these different regions can be perceived in relationship to one another. However, these relationships are subject to processes, and to change, depending on the way we think about the urban context, the landscape, ecology, about the survival of the world, so that their mapping requires an approach which systematically layers the research facts and data. The Harrisons' intent and method would appear to have much more in common with a contemporary kind of mapping. In cybernetics, mapping is a technique of explanation, for example, whenever a 'conceptual model' is invoked. Computer simulations of complex communicational processes also use this technique of mapping. Mapping then becomes a technique to transform input into information. In a way, *The Lagoon Cycle* is art as communication, as information carrying a message. But the meaning of its message(s) can only be deduced from reading its context(s). In *The Lagoon Cycle* these messages are (re)presented in the conversations between the two protagonists in (changing) their views of structure and content on the one hand and process and context on the other.²⁶⁴ Ultimately the artists' method of contextualization portrays an attempt at a new way of thinking, away from an atomistic to a relational mode of thinking, which is expressed as follows: "It creates us while we create it, since being an incomplete system, we must supply what nature does not. When this supplying is done with awareness, our behaviour alters to become a metaphor for nature. I believe this would be as true for any community."²⁶⁵

The Harrisons have been categorized as conceptual artists, story artists, ecological artists, social critics, landscape artists, and have been linked to performance art. The preparatory scientific research remained of secondary consideration. These categorizations would in a way be correct if they did not suffer from a major flaw: they only take into account one aspect, at most two at a time. However, the explorations of growth processes, for example, were from the start concerned with a complex set of ideas. Although the artists did not theorize upon these activities in terms of a 'systems approach,' like Hans Haacke, the initial approach was very similar. I refer to Haacke's research exemplified in his *Visitors' Profiles*, which installation suffered critical attacks of presenting too didactic, too literal a picture. Criticism concerning the artists' early ecological projects was related to general accusations: that

they were utopian survival proclamations, showing goodwill but not well-founded upon facts, knowledge or correct analysis, and therefore appeared somewhat dishonest as far as the aims of the ecology movement were concerned. Much of the ecologically oriented art was indeed often accompanied by a rhetoric that was not sustained by the work itself, but one can hardly accuse the work of the Harrisons of such superficiality.²⁶⁶ Several years later, when the Harrisons had moved part of their activities into the 'real world,' similar criticism kept being brought up, accusing the artists of having neglected the communities they were addressing.²⁶⁷ The artists may indeed not have fully recognized all the political and social implications then. However, when Helen and Newton Harrison now operate outside the museum or gallery context as teachers or organizers, as facilitators offering knowledge and understanding of difficult environmental issues, their work shows the strength it implicitly holds. It is important to keep in mind that the Harrisons go about their projects as researchers set out to solve a problem, and initially they worked mainly with scientists or engineers. Yet they perceive themselves as storytellers and their work as art, whose the final form serves to transcend the literal process (in contrast to Haacke who has purposively emphasized the literalness of his work) onto a metaphorical level: the workings of the small eco-systems which were set up and in fact controlled by human intervention were in the end references to the earth's ecological systems at large. Through understanding a simple system, the Harrisons sought to understand, and create understanding about the larger, more complex systems of life. What were at first personal explorations in search of a new art form, developed into large-scale interdisciplinary research projects into global survival plans, with proposals, collaborative actions and political and social discourse.

A Different Function for Artists

The road which the Harrisons have mapped out for themselves has taken them to places few artists dare to go. Their interdisciplinary projects are now no longer only with scientists and professionals of other disciplines, but involve city planners, community groups, politicians, and so forth. It has added another dimension to their work as well as to their function as artists, whether one calls it social work, political

activism, city planning, or art consulting. *The Serpentine Lattice*, a conceptual design offering options for reforestation of the Pacific Northwest (1992-1993), for example, brought together not only biologists, ecologists, environmentalist and art historians from the university, but also local citizens and activists, former loggers and lumberjacks.²⁶⁸ Their proposals now receive serious attention. *Meditations on the Condition of the Sacramento River, the Delta and the Bays at San Francisco* (1976-1977) was one of the earliest projects of such scale. Its revised version, the *Sacramento Meditations* (1980), consists of nine texts, nine mappings of California, and includes the state and federal power plants, and a scheme of irrigable and potentially irrigable land. The subject of the *Sacramento Meditations* is to make the public aware of the disastrous consequences which the enormous water consumption by the urban population and agricultural irrigation systems might have. They describe how ingenious technological constructions have reversed the flow of the San Joaquin River and the ecological consequences for the flora and fauna surrounding the original course of the river, and not only that. They narrate how a system of dams and power stations indeed regulates the the water supply of the whole central valley in California, they ask: "what if all that irrigated farming was not necessary," for instance.

The works of the Harrisons are not about presenting solutions only. More important is the call for change; to inspire a way of thinking which changes the attitude that has led to many of the problems today. Important for them is that we begin asking questions, start a discussion, a conversation. For they are painfully aware that nothing will happen if our thinking does not change. Newton Harrison: "Therefore, new paradigms will be needed which will lead to new legal and social codes that will permit land and water to be passed on to succeeding generations intact, non-renewable resources husbanded, and renewable resources not depleted. ... For if the paradigms that inform the present use and energy practices of our culture (exploit / consume / transform into goods / transform into profit) as typified by our use of the Sacramento-San Joaquin watershed do not undergo modifications slowly (through civil means) or more rapidly (through revolutionary means), then they will surely undergo modification through massive biological revolt as ecosystems simplify in response to increasing stress and become minimally productive."²⁶⁹

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were in danger of being destroyed were moved to the roof of the building, where they will grow the next two years. After their work on the threatening deforestation in North America the Harrisons became interested in what happened in Europe. They were told that the problem here was of a completely different nature: the disappearance of the meadows in Europe; some of them centuries old and belonging to the richest existing biodiverse eco-systems. And they arrived at the conclusion that the European meadow developed from an unconscious collaboration between culture and nature. And that it appeared one of the last examples of biodiversity on the whole continent. They visited numerous meadows and found a 400 hundred year old one in the Eifel which existence was threatened by a housing project. It was decided to try and save it and bring it to the roof of the Kunst- und Ausstellungshalle. This was the beginning of a project which led to the creation of the "Meadow Stories." Herein the Harrisons proceed their discourse on biodiversity with warnings, possibilities and choices for future generations to preserve and develop meadows and gardens to show respect for the original local vegetation.²⁷³ For not only the disappearance of the meadows is at stake; their destruction will effect complete water retention systems and ultimately endanger our drinking water.

Another large project still in progress is *Tibet is the High Ground*, in which the Harrisons propose reforestation of the Tibetan Plateau. Using photographs, map drawings, poems and performances, they present the idea of an "analog" forest, or "a simplified woodland-rainforest eco-system," which will be less complex than the original, but still bring yields to its inhabitants, by protecting the existing topsoils and the riverine and wetlands ecologies along the rivers that originate here. And these are the seven largest rivers of the South-Asian continent: Indus, Yellow River, YangtzeKiang, Salween, Mekong, Brahmaputra and Ganges. The woods of the Tibetan Plateau have been systematically cut and carried off, in particular since the Chinese invasion after the Second World War. How grave the consequences of this destruction will be has not fully been comprehended. Erosion and floods are common features now. But, ask the Harrisons, "Can it be true that (even) the drought in California and inland Oregon is a result of the northward shift of the jet stream across the Pacific so that the moisture laden air instead gifts its waters to the Pacific northwest? Can it be true that the jet stream is veering south to avoid the chimney effect over Tibet? Can

it be true that the chimney effect over Tibet and the emerging desert is a response to the loss of forest and other vegetational cover?"²⁷⁴

Formally the work of the Harrisons has not changed much. Mapping and storytelling remain their footholds, both being central elements in the long human tradition of knowledge and information transference. Newton Harrison has also described their method as "conversational drift." "When we get up to tell stories (to the Croatian water Department), the storytelling is what causes the conversation to drift. After we've told our stories those government officials see our images differently. The conversation drifts and in this context the idea of purifying the whole (Sava) river seems more real and less difficult." Graig Adcock interprets the work of the Harrisons: "By doing art with ecological content, the Harrisons imply that the human species should treat the planet as sculpture. Such an idea strikes many people as absurd, but humans are clearly modifying the ecosystem and changing the fragile biosphere of the planet. The Earth will become and already is very largely, an artificial construct."²⁷⁵

However, rather than submitting to a doomsday scenario they maintain an optimistic attitude. The principal argument in their strategy against entropy is the ecological argument, and their scientific research withstands comparison with environmental impact studies. Questioning certain scientific and technological methodologies, they suggest that nature, science and technology are not incompatible. Probing the boundaries of art with non-artistic 'scientific' methods, they bring these disciplines into the domain of art. Although they question the modernist concept of art, they perceive themselves as artists in search of a new territory for the visual arts. Although their work has been accused of using traditional means, only a superficial interpretation can lead to this conclusion. The layering of the work comprises information of scientific data, historical schemata, geological processes of the past and present, information about natural landscape conditions and human involvement, presented as interrelated events that have evolved over a period of time and space. There is an unmistakable concern about current and future ecological disasters, using metaphors as a strategy to voice their warnings and suggestions for change. Their message: the need for everyone to take responsibility for their environment.²⁷⁶