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The Sea As Sculptress—From Analog to Digital

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ABSTRACT

In this paper I consider the potential of digital technology to raise ecological awareness and motivate change, focusing on my artwork, *The Sea As Sculptress*, a macrophotographic record of the marine life growing on sculptures I placed in the San Francisco Bay. Originally presented thirty years ago as a performative lecture with slide dissolves, I recently redesigned and updated the project as an extensive web site. Here, I present the initial context and intention of the project and then outline the strategies that I employed to translate and re-envision the work in light of both the development of new technologies and changing conceptions of art and ecology. I argue for the importance of collaboration between artists and scientists to develop and promulgate the values and policies necessary to address the many ecological challenges of our times.

Keywords

Ecoart, art/science collaboration, web design, digital art, ecology, macrophotography, engagement, interactivity, Exploratorium, water quality, San Francisco Bay, water quality

1. INTRODUCTION

As a young artist-in-residence at the Exploratorium, I was motivated by the story that the flourishing of marine life in the San Francisco Bay as a result of the Water Quality Act of 1972, was paradoxically destroying the wooden ships' hulls and piers that many wished to preserve. Starting at the winter solstice, 1978, I put sculptures made of untreated wood in the water at three locations--Fort Mason, China Basin and Alcatraz and by means of macrophotography, recorded the succession of life that grew upon them over a year's time. Using available technology, I presented the work, *The Sea As Sculptress*, as performative lectures, sharing stories of my experience while hundreds of slides projected from two dissolve units faded in and out, presenting an intimate view of the life growing in the bay. Believing, as Aldo Leopold states, that, "we can be ethical only in relation to something we can see, feel, understand or otherwise have faith in," ([9] p214). I followed the performances with discussion as to how proposed development projects might impact the life processes the audience had just witnessed. Now, thirty years from its inception, I've returned to this project, digitizing over a thousand slides and creating an extensive web site as part of the Outdoor Exploratorium.

My intention, then and now, was to create a project that engendered an appreciation for the specific environment of the

San Francisco Bay as well as a general understanding of ecological dynamics. In this paper I will reflect on the potential of new technology in the contexts of changing conceptions of art, ecology, art/science collaboration and the growing movement of ecological art. I am particularly concerned about the efficacy of digital ecological art to promote an ecological ethic. How can the virtual experience, the display on the computer screen, engender concern and caring for the tangible outdoors—the biophysical, or "natural" environments in which we live? How can artists use digital technologies to expand, and make more effective, the interpretive displays ubiquitous in science museums and public parks?

2. THE INITIAL PROJECT

Let me start by trying to sketch a bit of my original project and the artistic/intellectual climate that informed its inception, even if as a young artist I was not fully cognizant of it at the time. As I state on the web site, when I began work on *The Sea As Sculptress*, I was supporting myself:

"working as an ecological specialist for the National Park Service regional office in San Francisco, where I was responsible for reviewing stacks of environmental impact statements and assessments. Too often I found that even if these revealed significant ecological impacts, these impacts wouldn't be enough to change the course of a project without considerable public outcry. Furthermore the primary methodology employed was cost benefit analysis, which assumes that everything can be measured in comparable units. But how does one quantify beauty, or the loss of a barely visible organism? I turned to the arts, hoping to find a form that could raise ecological consciousness, address quality as well as quantity, and provide a means to explore the values that inform the decisions we make." [18]

At the time that I began, though the field of ecological art was in its infancy, the dematerialization of the object provided broader context. Jack Burnham, in his book *Beyond Modern Sculpture*, written a decade earlier, already spoke of art not as "objet d'art," but as "systeme d'art," meaning, in the words of Marga Bijvoet, that "the new art work or sculpture was characterized by a set of relationships, and no longer defined by its boundaries." [3] ([2] p28). A systems perspective, which informed early ecological artists, such as Hans Haake, Agnes Denes, Allen Sonfist, and Helen and Newton Harrison, was most central to my work [11]. I understood my detailed exploration of the marine life growing on

small sculptures within the broader context of what the results indicated about ecological relationships--the water quality of the bay, and by inference the actions of those living around the waters' edge.

I began the piece as a sculptural project creating a two-foot by eight-foot rectangular frame with blocks in the center, suggestive of vertebrae. As opposed to much of the land art of the time, which took the form of monumental earth works, I wanted to work on a small intimate scale. Instead of going out into the untrammled landscape, I would undertake an intimate investigation on the edge of an urban center. Conflating time and scale, by detailing the changes that occurred on tiny areas of wood, I would communicate a sense of large-scale ecological dynamics and patterns of succession.

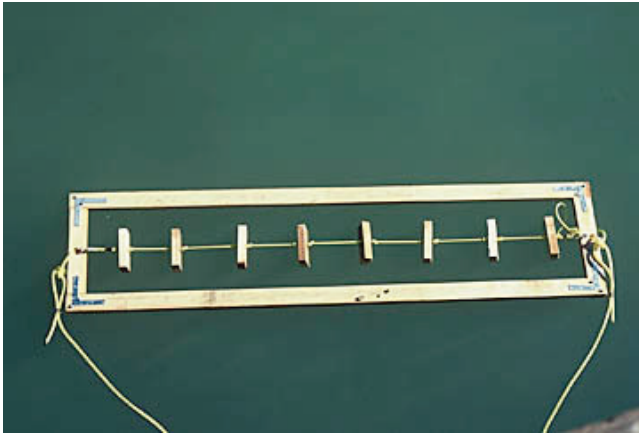


Figure 1. The initial sculpture at Fort Mason. Dec. 1978

Most of the photographs were taken on a scale of 2:1 or 1:1, meaning the size of the area photographed equaled the size of a 35mm negative, roughly 1x1 1/2 inches. This use of macrophotography allowed for a more intimate view. I eschewed objects, instead taking slides to be projected in a performative context. The performances allowed me to present the images in a narrative context and have direct engagement with an audience.

2.1 Art/Science Collaboration

While working on the initial project I was wary of close collaboration with scientists, something I regret in hindsight. Fundamentally I wanted to express delight in the natural world that I thought was often missing in the sciences. I felt deeply what several writers have articulated so eloquently as *The Death of Nature*--the "paradox of modern science," where the unraveling of the mechanical laws of nature lead to the discovery of a silent world, "or a "Dead World," where matter has "no life or feeling" [13] ([14] p6) ([5] p2).

Considering art/science collaborations in general for a moment, I think that it is important to recognize that artists can play an important role in communicating, or translating, scientific data, but that artists may also ask different questions, or pose questions in different ways. Through a delight in the visual and the conflation of time and scale, I communicated the larger ecological dynamics of the bay. I presented life processes of the bay in a tangible, intimate way, dispelling commonplace notions that the bay was basically a sewage dump and encouraging public concern for the quality of bay water. This was particularly true at Alcatraz,

where, thinking of the infamous prison that formerly occupied this site, everyone told me: "nothing will grow there." But since Alcatraz was located near the mouth of the bay, life there was extremely profuse. On the other hand, I always found much less growth on the sculpture at China Basin, which was located in an industrial area of the bay. Could my simple project also provide evidence of the deleterious impact of pollution?



Figure 2. Sample slide, Sea squirt *Botrylloides violaceus*, Fort Mason. November Scale 1:1

3. THE CURRENT PROJECT

Let's fast forward to the present. Just sorting through the boxes of slides I'd kept from the original endeavor, getting them scanned and then individually color balancing each, necessary for Kodachrome, was a huge endeavor. But all of these year later, I didn't simply want to reproduce the original project. The internet allows for the presentation of large amounts of data, but how could I make sense of what I had?

3.1 Strategic Decisions

One particular issue that I spoke of in the initial performances, and mention in the overview slideshow on the current web site, was the importance of names. I was actually performing the work every time I pulled the sculptures out of the water to photograph, particularly at Fort Mason, where many people would stop, point to things on the wood, and ask: "What is it?" So often if I replied with a name, usually just the basic type of organism, people had their answer. They stopped looking and walked away.

But now, almost thirty years later, I found myself fascinated by accurate species identification. The first scientist I consulted, Darren Fong of the National Park Service, sparked my curiosity. Concerned over the lethal impact of a recent oil spill, he remarked that I had wonderful baseline data, an observation repeated by many other scientists. As I talked to more scientists I realized that among other things I had the earliest, or among the earliest, evidence of the introduction of a couple of species into the San Francisco Bay. More than simply translating to digital media, the question quickly became, what did I want to communicate, and how could I synthesize precise scientific information in a visually delightful manner?

Working in a non-linear medium also presented the significant organizational issue of whether, or to what degree, to present the material as an open-ended archive, searchable by keyword, or

whether to present the images in pre-arranged narratives. Despite the current popularity and appeal of the archive, I felt that the material would be much more meaningful, though a lot more work to create, if arranged in a variety of narratives. These narratives would allow for multiple pathways of exploration, appropriate to the diversity of the anticipated audience, from school children to those drawn to the sophisticated synthesis of science and art offered by the Exploratorium.

Most significantly I faced the challenge of communicating the sensual engagement, which motivated the initial project, in a virtual form. My experience with the countless web sites of environmental and governmental organizations I consulted was that though the information was invaluable, the presentation was very text heavy, closely resembling the printed page. I also felt that interpretive displays, seldom designed by artists, tended to convey a lot of information while offering little engagement or inspiration for deep, critical thinking.

Instead, I chose to start simply, relying on clean, spare design while building on the strategies that I had used in the original performance--strong visuals accompanied by my oral narration and the sound track of Pete Richard's wave organ. The overview slide show most closely mimics the original performance. In ten minutes as opposed to the original hour, the slide show offers a synced sound and image overview of the project. I use Flash instead video software as it allows for high-resolution full-screen images at reasonable bandwidth. Then, once the viewer is intrigued, for those that want to learn more, the home page offers a site searchable by type of organism, location, and within a location, by month.

3.2 Effective Design Strategies

The following are some of the principles that I tried to employ to create a dynamic presentation:

3.2.1 Visual Impact

Instead of long scrolling pages, I design for a typically sized screen, placing a rectangular border around most pages and challenging myself to confine the text and imagery to that small area. Since the slides are powerful in and of themselves, I offer the slides full screen (at least up to a 23" monitor, the size of the original scans) wherever possible. In the pages devoted to specific organisms, instead of isolating an organism from its habitat, as is customary on most scientific illustration, whenever I have the material, I create montages, showing the variety of forms that organisms such as bryozoans, sea squirts or hydroids, can take.

3.2.2 Concise Text within a Larger Narrative Framework

Text is generally placed in a smaller text box, limiting line length, instead of sprawling across the page. I try to create a concise, accurate synthesis of complex scientific information by organizing factual information in specific narratives. The text on each organism panel is guided by a specific theme that is sometimes elaborated in the ecological linkages section. For instance, the mussels page focuses on tight community structure that contrasts with a link to the page on sprawling human population growth.

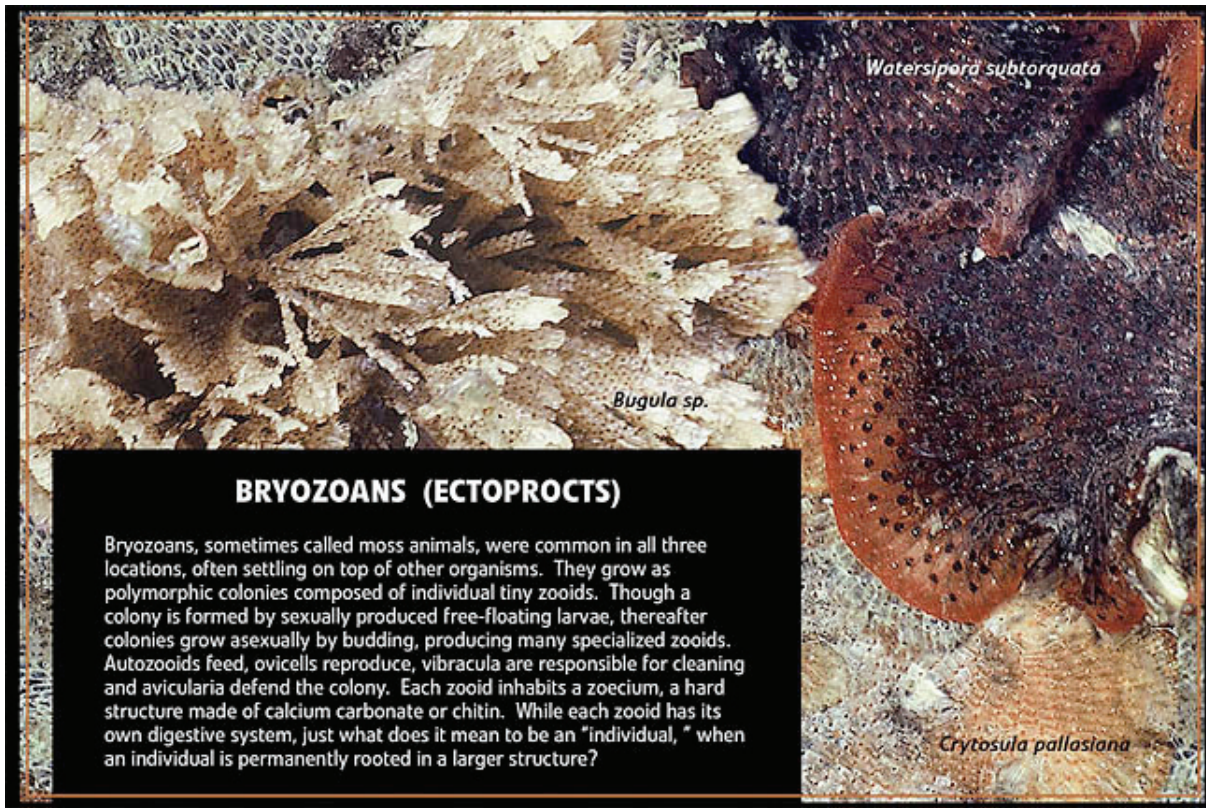


Figure 3. Bryozoans Page with Montage and Text

3.3 Probing Questions

Rather than simply providing answers, I think that facts should stimulate further thought. When I present a lot of information, such as in the organisms and ecological sections of the site, the information generally opens up into a question or a broad topic for contemplation. For instance on the limpets page: “As a result of climate change, how can we expect their territories to shift upwards in the coming years?” Or regarding introduced species: “Are we producing global estuarine communities of sameness? Or are we xenophobically worried about exotic others?”

3.3.1 Variety of Narrative Forms

I mix oral narration, text and captions. For the slide shows I provide verbal narration accompanied by wave organ sounds, with captions providing specific data requested by scientists, often accessible only by mousing over the slide.

3.3.2 Use of Reflexive Voice

I write reflexively. Since I am encouraging the viewer to make a personal relationship with the material, I choose to model that relationship.

3.3.3 Engaging Interactivity

Asking open-ended questions and providing multiple pathways for navigation are initial steps to encourage active engagement. The vertical blocks and some of the horizontal sculptures at Fort Mason and Alcatraz can be explored by directly moving the cursor over the structure, allowing for more direct tactile involvement. In the ecological linkages section I provide simple animation and an interactive map upon which several issues are represented.

3.4 Current Theoretical Context

While systems theory and an ecological perspective inform the initial project, it is useful to briefly reflect on the broader context within which I now find myself. In terms of the arts, while a full articulation of the nature of ecological art remains to be written (in fact this is something I am working on), Gablik’s “connective aesthetic” as well as numerous exhibitions over the past two decades provide a broader understanding of art as a relational practice [4]. Within the field of ecology itself, although systems analysis is still central, an open nonequilibrium model has replaced the concept of closed systems evolving towards a stable state of maximum complexity. So while I still believe that intimately experiencing the richness of the marine life in the bay can generate caring and concern for water quality, in the current incarnation of the work I propose a much wider series of linkages and interrelationships, which of course is facilitated by the medium of the internet itself.

3.5 Ecological Linkages

“Can we honor the myriad of life unfolding in the tiny area under the camera lens...by holding in mind the immense web of interrelationships which effect that small plane?” [18]

In the ecological linkages section, recent research and policy allows me to define water quality as the flourishing of organisms living in estuary waters, a broader definition than pollution control. Then, I am able to propose specific indicators of water

quality in a way that I couldn’t before. Using these indicators, the internet also serves as a research media that provides a wealth of evidence indicating that despite the Water Quality Act, which did motivate substantial clean up of point source pollution, as well as the good intentions and general ecological consciousness of the Bay Area population, by almost all indicators (except perhaps shellfish populations) the water quality of the bay has continued to decline. In subsequent pages I try to answer why, looking at what I identify as the most significant factors—toxic chemicals, habitat loss, fresh water inflow, introduced species, sprawling human populations, overfishing, and climate change. Furthermore, thirty years ago I was entirely unaware of the issue of introduced species, primarily from international shipping. Now recognized as a huge ecological concern, my slides provide ample evidence of these species. For my website, trying to demonstrate further relationships, I create a map imagining introduced species as indicators of global trading routes.

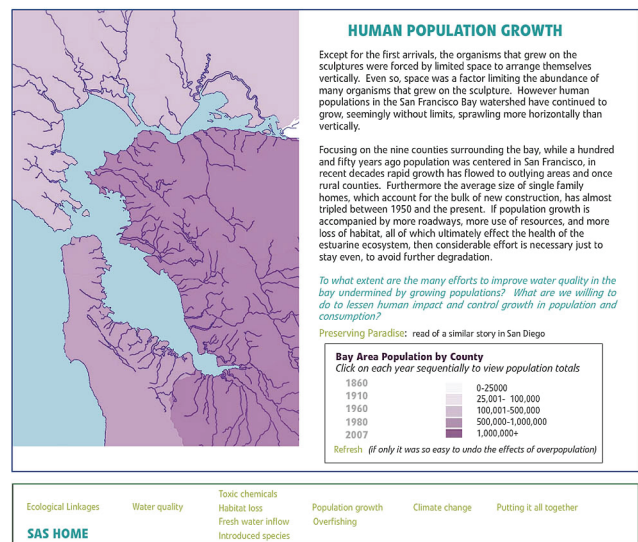


Figure 4. Interactive Map on Population Growth Page

4. IS IT ART OR IS IT SCIENCE?

When I originally created this project, I found myself falling in the crack between the two. Science museums advised, how beautiful, why don’t you approach the NEA for a grant? Art institutions replied, what beautiful slides of nature, go talk to the science museums. Only in the context of the experimental media of the time—performance art, such as Rachael Rosenthal’s space dbd, could I find a home.

Today I still hear these comments. The current project provides for many alternative points of access, from sumptuous slide shows to factual information about the different organisms found on the sculpture. But if the viewer lingers for more than a few minutes, the site communicates through a synthesis of the scientific and artistic, presented in a way that could only be done by someone conversant in both disciplines. While I don’t have the space here to fully develop an argument of all of the ways that I see art and science converging, I close with a few thoughts.

Both quantum physics and the research of cognitive scientists, from Maturama and Varela to Lakoff and Johnson, suggest that the observer and observed, and by inference, fact and value, the

realms of science and art, no longer can be understood as completely separate, distinct ways of knowing [1] [12] [8] [17]. Particularly in light of the urgency of ecological challenges, scientists are increasingly concerned with the need to communicate their findings and have a role in shaping public policy. A whole new discipline, conservation biology, recognizes that if scientists don't serve as advocates for ecological values, their study subjects may go extinct. [16] Similarly, as already mentioned, artists increasingly reject the notion of the artist as isolated iconoclast, or the separation of art and life, and instead embrace relational, connective and dialogical practices [4] [6] [7].

I hope that digital media can provide a locus for broad interdisciplinary collaborations and less rigid definitions. I add my voice to the eloquent arguments of Roger Malina and others that this convergence of art and science is vital to address current ecological challenges [10]. Artists must be more actively involved in cultural innovation, development of public policy, and the framing of scientific research, as well as in the interpretation or communication of scientific findings. To address today's problems we need not a rigid separation of fact and value but instead must work together to actively develop and promulgate ecological values that can be actualized by cultural change, scientific understanding, and technological innovation.

Starting with the simple query of what will grow in bay waters in the wake of pollution control, *The Sea As Sculptress* communicates the beauty and variety of marine life, blending scientific information with visual delight to ignite caring concern in the viewer. The site builds, demonstrating that simply controlling point source pollution is not enough. Despite sincere efforts to restore bay water quality, the growth in industry, agriculture, population, and global commerce has greatly increased the challenge of providing an environment where the organisms of the San Francisco Bay-Delta Estuary, as I define the larger system, can thrive. While solutions to these challenges are beyond the scope of the project, my work suggests that simple regulation of pollution is not enough. I provide the seeds for an ecological consciousness and more holistic approach, suggesting that an ethic based on the valuing of all life forms can lead to changes in life styles and political processes that will allow for the continued existence of the diversity of life found within bay waters [15].

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