

and the tropics
will become uninhabitable
and the far north
will become temperate
and corn rice wheat and beans
plantain manioc and yams
and all the grains and starchy roots
known and unknown
named and unnamed
will have to grow elsewhere than now
and most life
known and unknown
named and unnamed
will have to go elsewhere than now
as vast parts of the eastern seaboard
of North America
and parts of Europe
near the North Sea
and South America near the Amazon
and China in the east
and Russia in the north
India in the northeast
and other bits of Asia Africa
Polynesia Melanesia
Australia and even Japan
will join the growing sea

And in this new beginning
this continuously rebeginning
You will feed me
when my lands can no longer produce
and I will house you
when your lands are covered with water
and together
we will withdraw
as the waters rise

THE TIME OF THE FORCE MAJEURE

AFTER 45 YEARS
COUNTERFORCE IS ON THE HORIZON

Helen Mayer Harrison
Newton Harrison



If You Wish to Understand

the Force Majeure Best to Read the End First

If You Wish to Understand

a 45-Year Journey Best to Read from the Beginning

If Your Curiosity

Is of a Different Order Best to Begin Anywhere

If You Wish to Know

What Other People

Have Written on Our Work Go to Where the Paper Changes

THE TIME OF THE FORCE MAJEURE

After 45 Years

COUNTERFORCE IS ON THE HORIZON

Helen Mayer Harrison

Newton Harrison

Essays by

Anne Douglas & Chris Fremantle
William L. Fox
Eleanor Heartney
Roger F. Malina
Paul Mankiewicz & Dorion Sagan
Anne Whiston Spirn

Edited and designed by

Petra Kruse & Kai Reschke

PRESTEL

Munich · London · New York

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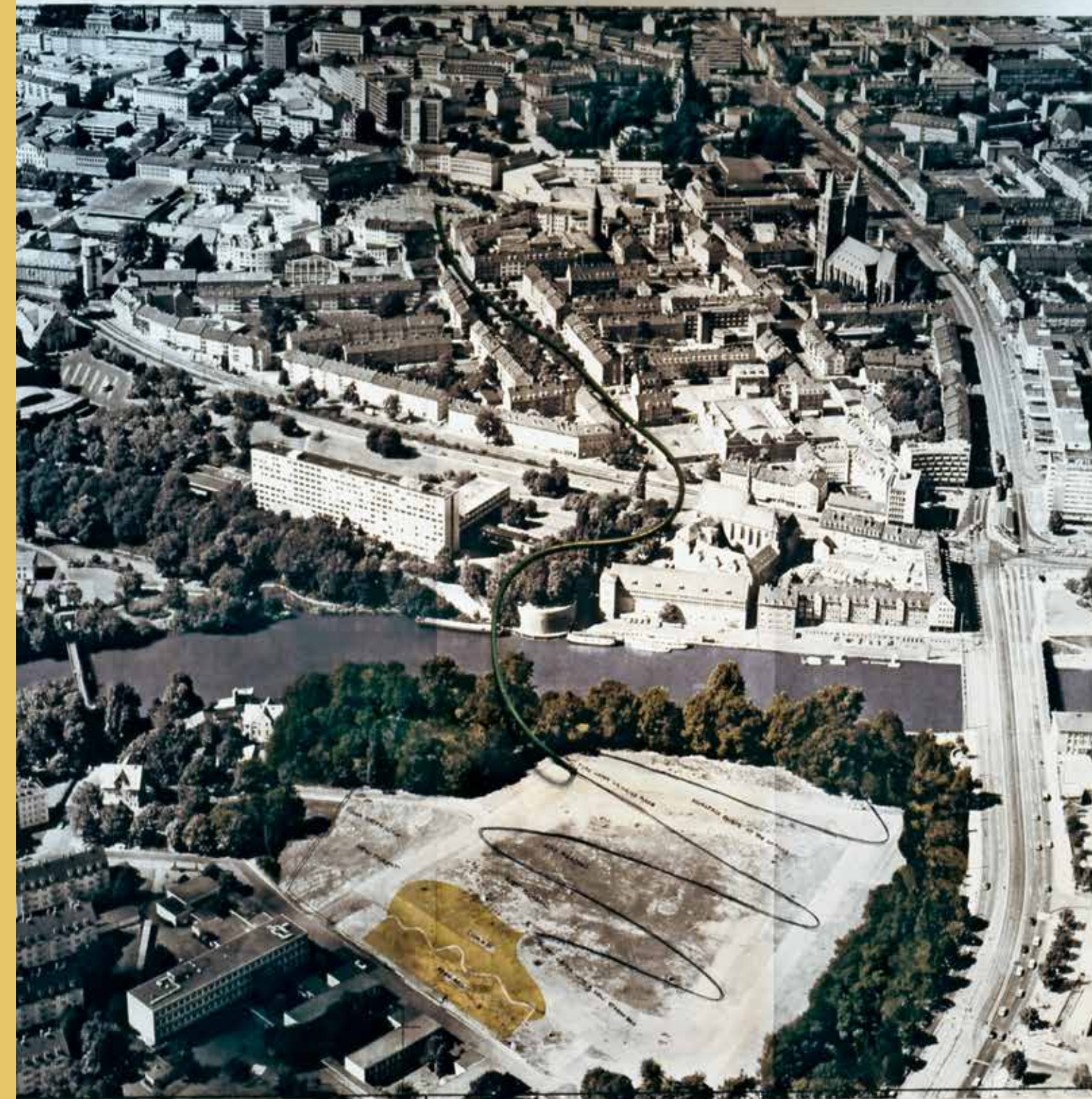
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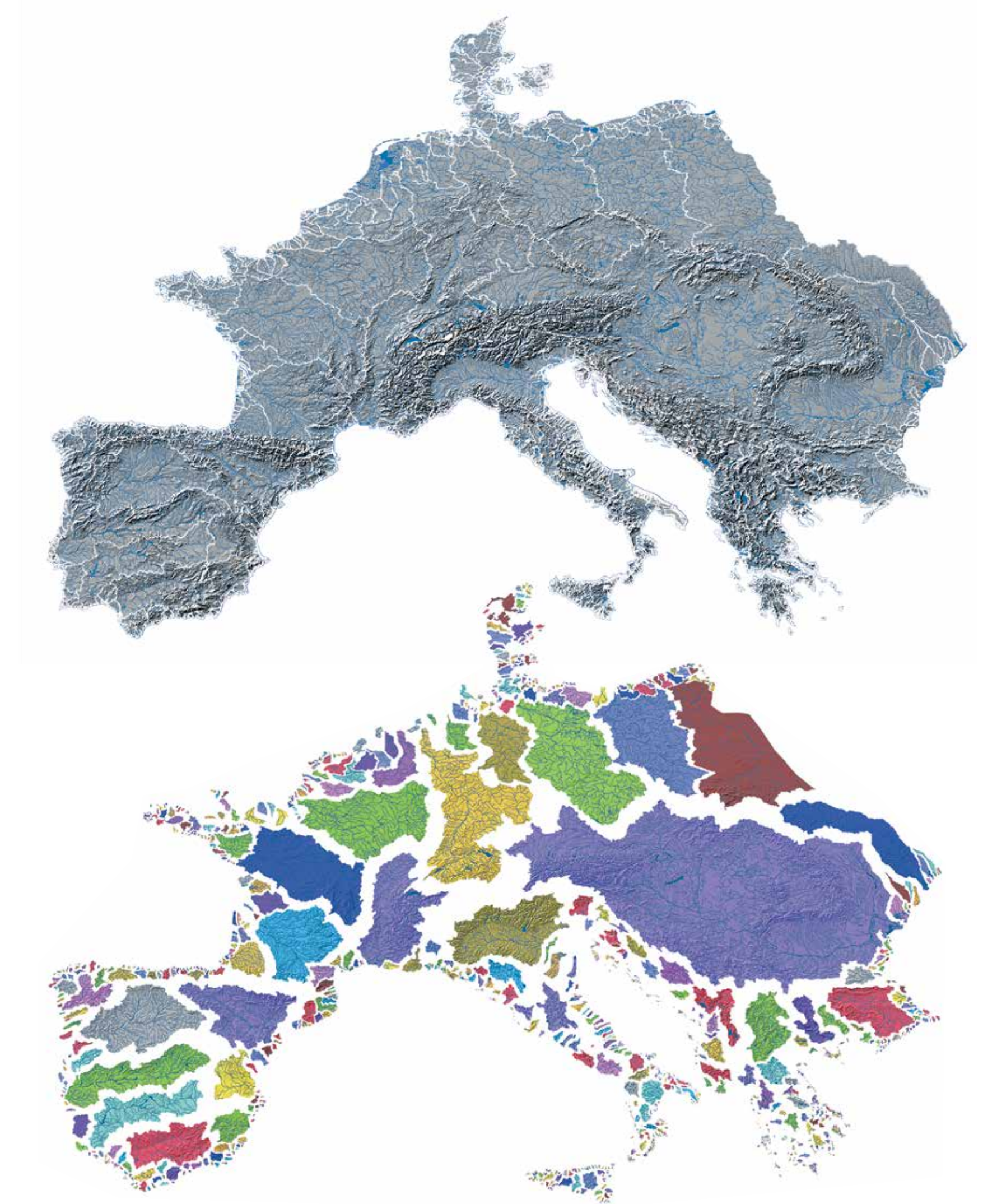
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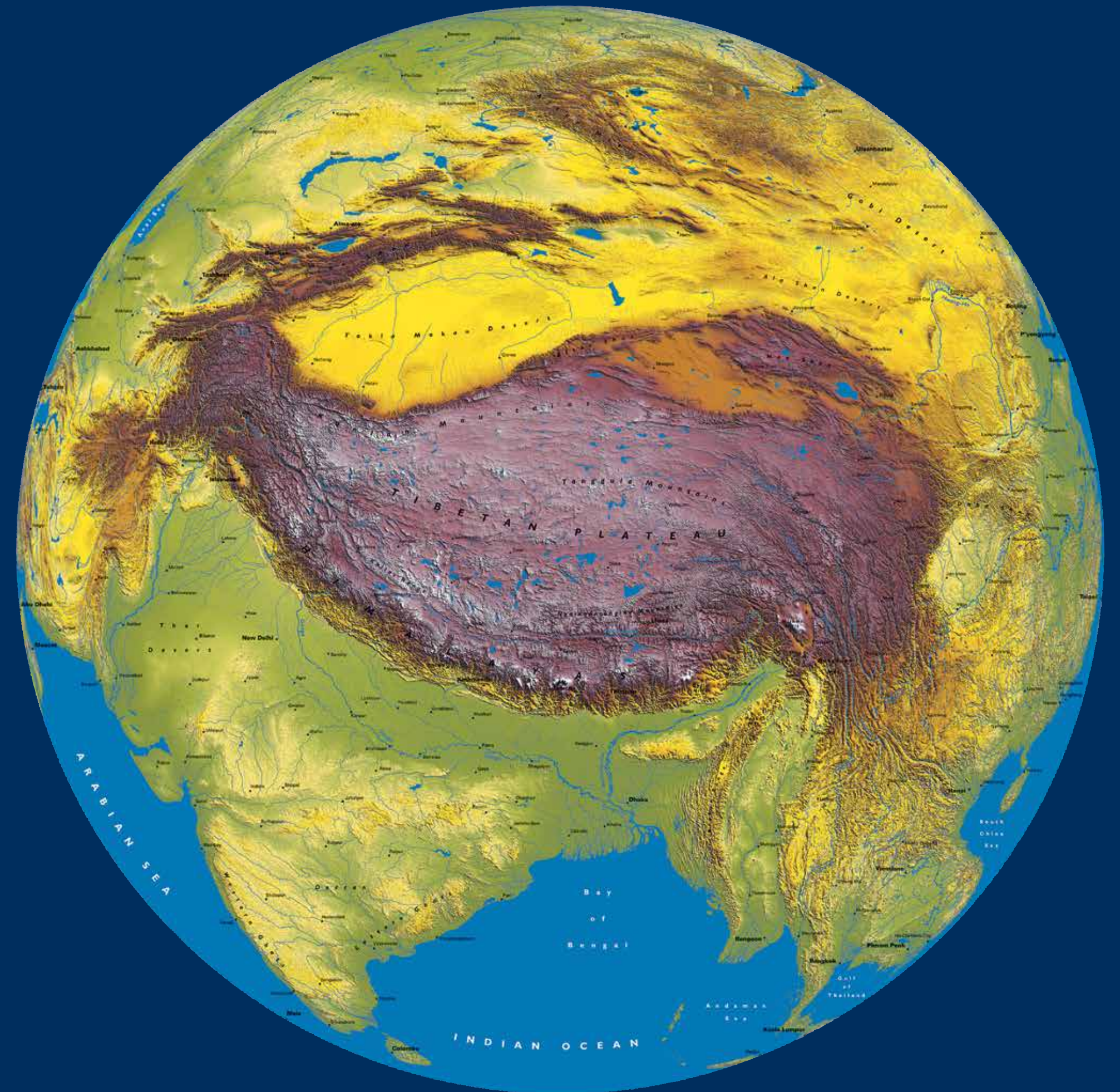
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Paul S. Mankiewicz is Founder and Director of the Gaia Institute, chair of the New York City Soil & Water Conservation District, and founding member of the Urban Soils Institute at Brooklyn College/City University of New York. He has built a rooftop saltmarsh growing in a soil made from shredded Styrofoam cups, packaging, and compost watered with backwash from a swimming pool filter; an ecological cap over a contaminated community garden in the East Village with New York City’s U.S. Department of Agriculture food certified composted biosolids to detoxify lead; and a dozen street-side storm water capture swales using the broken glass waste stream of the city to hold water for the trees.

Making Earth,
Then Making
Strawberry Jam

Making Earth

1969–1970 Pepper Canyon Outdoor Studio

at University of California, San Diego, CA

Making Strawberry Jam/Strawberry Wall

1972 Woman’s Building, Los Angeles, CA

Making Earth

1990 Contemporary Arts Museum Houston, TX

It was 1970; Earth Day had happened. I was becoming ecologically aware and had made the decision that I would do only work that benefited the ecosystem in some way. Though I knew nothing about how ecosystems actually worked, I asked myself if there was a source, a place where I might begin, and a material I might begin with. Having a penchant for research, I’d also become aware that topsoil was in danger in many places in the world. So I took a decision to make earth—to go to one of the principal sources, which is itself alive, and from which terrestrial life springs. Something as common as air or water. Something ubiquitous. Something that everybody feels they can enact their will upon. It was the earth itself, and anyone with a simple shovel, in one stroke, could interrupt the living properties within it.

I chose to make earth by gathering sand and clay, sewage sludge, cow, chicken, and horse manure, and leaf material. I then threw in some worms. I watered it every few days and turned it repeatedly, using a hand shovel, which I saw as a metaphor for creating earth (as opposed to an overreaching steam shovel, a tool for destroying earth). I kept turning the earth, which at first had a foul smell dominated by sewage sludge; after almost four months, however, the earth developed the rich smell of a forest floor. I actually tasted it.

I became involved with the making of earth as a kind of private performance.

The mixture combines with time, and our touch, becoming literally a living element, a medium for growth ... every morning I spend 10 minutes of my time with a shovel, 10 with a hoe, 10 with my hands, and one minute with a hose ... I notice that I breathe in when I pick up a shovel full of earth and breathe out when emptying it. I notice that I make three hoe strokes on inward breathing and three strokes on outward breathing ... In the beginning when the mixture smells vile, I take very deep breaths, drawing in air slowly, but letting it out quickly. At that point my behavior is almost gluttonous. I become very possessive, running my hands through the earth to break up small lumps. This behavior seems compulsive to me. Yet it is very necessary that I touch the soil all over, as a form of ornamentation.

Rereading this early description, I remember the flavor of those moments. Allan Kaprow had begun doing private performances (of a very different kind); Pauline Oliveros, Eleanor Antin, David Antin, and Jerome Rothenberg were all performing in each other’s presence there at University of California, San Diego (UCSD); and we were all



Watering earth



Turning earth



Hoeing earth

Shoveling and shoveling



Feeling and crumbling



Smelling and tasting



Strawberry wall detail
Woman's Building
1972
Helen Harrison

very aware of Dennis Oppenheim, Vito Acconci, and others in New York. In those early years of working together, Helen and I were always attuned to the everyday events in our part of the art world.

In this earliest phase of our collaboration, however, Helen answered the question that outweighs the performance, the ritual, and the referential structure.



I, Helen, began to invest myself in the earth that Newton had made. I began growing things in it. Corn did not work out so well, but strawberries did, and I found myself growing the sweetest, most delicious strawberries that any of us had ever tasted.

At this very early point in our working together, we did not know whether we were going to make collaborative work and individual work, or do all our work as a two-person collective.

Later, I designed a work entitled *Making Strawberry Jam* for the exhibition *In a Bottle* at California State University, Fullerton, in 1972 (repeated at the Woman's Building in Los Angeles). In a ritual somewhat paralleling Newton's *Making Earth*, I made batches of strawberry jam once a day for 30 days. Each day I added less sugar, until at the end I used no sugar! The idea was to slowly diminish my own and my family's taste for sugar, to decontaminate our appetites. I showed the work, but nobody lost a taste for sugar. It appeared that nobody was going to give that up.

Survival Piece I

Air, Earth, Water, Interface:

Annual Hog Pasture Mix

1971 Museum of Fine Arts, Boston, MA

2015 Museum of Contemporary Art,

Los Angeles, CA:

Earth, Air, Fire, and Water: Elements of Art

Exhibition

Sometime that same year, I heard from David Antin that Virginia Gunter, who was curating a major exhibition at the Museum of Fine Arts, Boston (*Earth, Air, Fire, and Water: Elements of Art*), was interested in a work from me.

I had in mind to make a growth piece. I wasn't quite sure what I wanted to grow, except that I wanted to grow it under light. A bit influenced by John Cage and his use of chance operations, I commissioned Robert Kushner, then a young decorative painter in my class, to look through seed catalogues until he chanced upon a mixture that was totally singular; I would plant whatever he brought and see what happened. After a few days, Kushner showed up with a big smile on his face, and handed me an advertisement for R. H. Shumway Seedsman's Annual *Hog Pasture* Mix. And that's how *Hog Pasture* came to be.

Hog Pasture was constructed and exhibited in midwinter, in a small room. (The piece itself was 2.4 by 5 meters; the room perhaps 7 by 5.) I made the earth mix too rich, and *Hog Pasture* grew almost 1.3 centimeters a day once



the seeds germinated. It was cold and gray outside. The room, warmed by grow lights and slightly moist, carrying the smell of budding life from the rich soil, became a favored gathering place for people who came for the relief of being in a microclimate that wasn't winter.

When I asked the museum staff to supply a hog for the pasture, so that I could metaphorically turn the museum into a protein production site, I was politely turned down.

There was something extraordinary about this exhibition. It was as if Virginia Gunter had invited us all to do the riskiest work we could think of. For instance, Dennis Oppenheim used his budget to rent a bunch of German shepherd guard dogs. He was making some kind of reference to war, but it looked to me like

Hog Pasture
ten days
after sowing
the seed



Hog Pasture installation
in preparation



a mad form of irony. The dogs, not being permitted inside the museum, ended up in a small space outside the museum, presumably guarding us all, except that the dogs were bored and slept a lot. Then Bob Morris talked Virginia into dropping small boulders from the roof of the museum, but this idea, like my hogs, was politely turned down. There was a lot of background talk about Morris taking other artists' ideas and making them better than the original artist could have made them. I personally never

saw an example of this. I liked this show a lot, as many of the artists were given permission and took chances that they might not have been able to elsewhere.

At the time I put a lot value on dialogue—or better yet, debate—with my contemporaries. I was particularly annoyed by the critical acclaim for what I thought were vacuous formalisms. For instance, if you took the frame from one of the light boxes over *Hog Pasture* and put it askew on a wall, it could be read as a somewhat dramatic Dan Flavin. If you removed the earth from the wooden container beneath the light box, repeating the container as a module (perhaps across a large floor), a new pattern would emerge, and you might have a Donald Judd-like experience. If you took the earth from the box and added enough to fill a room, you might have *Earth Room*, a work that Walter De Maria would make in 1977.

I did not subscribe to the notion that the form was the content (which overstated the obvious fact that content could not manifest physically in the absence of form). Even at that point, I was arguing to put the utilitarian aspect back into the form. In retrospect, I may have been a bit harsh in my dismissal of a great deal of then current work.



Installation, courtyard of the Los Angeles County Museum of Art
Art and Technology exhibition

In 1971, when the landmark *Art and Technology* exhibition—which included my *Artificial Aurora Borealis*—was being installed at the Los Angeles County Museum of Art (LACMA), there was much excitement and press. Maurice Tuchman, the senior curator, had put his two best talents to work on the exhibition: One of them was coordinating large installations with heroic themes, the other generating funding and publicity. Together these strategies made for powerful public notice. Claes Oldenburg’s *Ice Bag* was being constructed outside the museum entrance; one of David Smith’s Cubi sculptures was on the next level down. Below that, at street level, was an open space, perhaps 12 by 18 meters, with a big pond on either side. The water in the ponds was very clear. Tuchman explained that they used algacide, a lot of it, to keep the water clean. He asked if I had any ideas that would suit this space—and if so, whether I could do something inexpensively.

I had recently finished my first eco-critical works, and something about all that algacide bothered me. I wondered why pure water was aesthetically necessary. I began talking to scientists at Scripps Institution of Oceanography, not far from the art department at University of California, San Diego (UCSD), and soon found myself in the company of two very sophisticated algologists, Richard Eppley and Michael Mullin. I asked if they knew of any algae that changed colors. They thought it was an odd question ... but suggested I get on a plane and fly to San Francisco, and look down at the salt ponds as the plane was coming in for landing. So I did.

Some ponds were hues of green, some reddish-pinkish, and one brown. Eppley and Mullin later explained that an algae called Dunaliella grew in those ponds. In normal seawater Dunaliella behaved as blue-green algae, but as water evaporated and the ponds turned saltier, the algae grew carotene so that it was able to resist the increased salinity. This accounted for the different colors in the ponds, as they moved from blue-green to almost brick red. They said that the clear ponds with white around the edges were 10 times saltier than seawater, and nothing could

live in them. These ponds were being prepared to harvest salt. Then they explained that a small crustacean called Artemia—brine shrimp—lived in the other ponds. These brine shrimp, like the Dunaliella, were among the only species that could live in such salty water, and their eggs were so durable that they could survive space flight. They also said that the Dunaliella–Artemia interaction in extremely saline waters was the simplest working ecosystem that they knew of. In that moment a work was born.

I gathered inoculations from salt ponds with varying salinities, and put them in 19-liter glass jars on the roof of the algology labs at Scripps. I fed them liquid plant food. My Dunaliella were fruitful and multiplied. I added brine shrimp. They, too, were fruitful and multiplied.

The Dada aspect of my persona liked the idea of growing algae between the two large ponds at the museum, where so much effort had been spent on killing algae. So I designed a six-by-12-meter water piece, divided into four three-by-six-meter ponds, 20 centimeters deep, with polyethylene inserts to prevent leaks. Each pond had a different salinity, and each was inoculated with algae from my experiments at Scripps. The algae were fed and thereafter inoculated with brine shrimp eggs; the sun was the engine. The algae took on different colors, and the shrimp farm appeared as a four-stripe painting; the Dada aspect of my persona also liked the idea of “growing” a color field painting.

The algae became stronger and stronger. As the months passed, many of the indoor works that were electronically driven began to run into technological difficulties. I liked the idea that for my work, the sun was the engine, and I wasn’t having any technological difficulties.

Many of the works inside the museum cost 50 000 dollars or more (including my own *Artificial Aurora Borealis*); I liked the idea that the shrimp farm cost only 700 dollars—barely more than one percent of the average cost of a work in the show.

Survival Piece II

Notations on the Ecosystem

of the Western Saltworks

with the Inclusion of Brine Shrimp

1971 Los Angeles County Museum of Art, CA:

Art and Technology Exhibition

2002 Les Abattoirs, Toulouse, France



After a few months, the algae began to smell. The colors didn't look very crisp. In the last week of the exhibition, I publicly harvested, weighed, and bagged the salt, which I sold at below the cost of salt in the supermarket. I liked the idea of harvesting an algae-driven work of art. Above all, I liked the idea of making a complex, utilitarian work that functionally countered the all-too-prevalent notion that "if it was utilitarian, it was not art." (In this instance, calculations indicated that if scaled up, the artwork could produce 18 000 kilograms of brine shrimp per hectare.)

The exhibition ended, and the shrimp farm was removed and in part recycled.

My, Helen's, first performative act in the *Survival Pieces* was to use the brine shrimp to create a feast. There was one little problem, however. No one in their right mind would eat them! The taste was appalling, with a slightly rotting, crunchy, and extremely salty algae-like flavor.

I tried making a fish soup. No luck. Adding capers made the broth a little better. Anchovies made it possible to take a taste, but nobody wanted a mouthful. In a last-ditch effort I mixed the shrimp, capers, and anchovies in a blender, then added chopped chili peppers to make it a bit spicy. During performance mode at art parties, people felt somewhat obliged to taste a dollop on a cracker—but no one asked for seconds!

When researchers at University of California Davis heard about my attempt to make a brine shrimp feast, they asked for my recipe. I asked why, and they said they had gotten a government grant to test brine shrimp as a possible food source for space flight (they also wanted to test it as a possible element in a spaceship purification system). I explained at some length the depth of my failure to make these little crustaceans acceptable to the human palate. Later I heard that they had returned the grant.

Brine shrimp
ready for harvest



Feeding the algae

The right pond ready
for salt harvest,
the left pond ready for
brine shrimp harvest

Harvesting
the brine shrimp

The salt yield

Bagging and weighing:
preliminary to sale
on the street corner



Shrimp farm reproduced
at the museum
Les Abattoirs
in Toulouse, France,
2002



Installation with feasting tableau on the left

Brine shrimp pool

Survival Piece III

Portable Fish Farm

Fish Feast

1971 Hayward Gallery,

London, Great Britain:

11 Los Angeles Artists Exhibition

1972 Palais des Beaux-Arts

Brussels, Belgium

Having successfully completed the *Art and Technology* exhibition, Maurice Tuchman devised a traveling show entitled *11 Los Angeles Artists*, scheduled to open at the Hayward Gallery in London in September 1971, about six months after the brine shrimp piece was completed. He said that the Hayward had outdoor balconies and asked if I would be interested in doing something there, presumably with water and fish. I proposed making a catfish farm, with several three-meter-diameter children's swimming pools as habitat—very inexpensive. I imagined introducing other aquatic species into this ensemble, some of which would be food for the catfish and others that would eat catfish entrails. If *Making Earth* was my first tentative grasp of a whole system, *Portable Fish Farm* was an attempt to do something similar in an aquatic setting. It was to be a modest piece, easy to install and to care for; I hoped that the catfish would mate, thus bringing the system full circle. Presumably small feast events could be designed.

During negotiations for the exhibition, there were rumblings from the Hayward Gallery in London. Edward Kienholz had produced a work called *Five Car Stud*, which was well sized for

the large second floor of the gallery. There appeared to be a problem, however. An apparently quite private discussion had taken place among high-level gallery staff about whether the British public was prepared to see and experience *Five Car Stud*, a tableau that very graphically represented the castration of a black man in the American South.

I remember passing by the group discussing the situation and overhearing a prominent art historian, who sounded appalled at the idea of the piece. It was determined that to save the Arts Council of Great Britain the vast cost of shipping *Five Car Stud* across the Atlantic, it would be replaced with another work. (This decision masked the censorship underlying the refusal of Kienholz's work.) Maurice Tuchman gave me a call and asked if I could produce a large indoor fish farm to fill the space that had been assigned to Kienholz. I said I could.

In early summer, I went to Brawley, California, and met with catfish farmers. I told them I was going to put a catfish farm in a museum in England and needed to know how to grow them, mate them, kill them, and skin them. Brawley is a small

town in the desert just north of El Centro, which is a couple of hours east of San Diego on Route 8; it is a rather isolated community (with a reasonable number of California eccentrics). The farmers asked where I came from, and I said I was a professor at University of California, San Diego. They made it clear that I had to pass a few tests, but then they would be willing to work with me, though I might be slightly mad. (I believe they had the notion that I would popularize catfish farming for them and therefore increase their market.) They showed me how to net, harvest, and electrocute channel catfish, explaining that the fish can live out of water for three or four hours and continue to suffer even when you hit them on the head with a hammer—hence the Humane Society of the United States required electrocution. Electrocution also had another merit: When the catfish died in this manner, they became rigid within a few seconds, and therefore easier to skin. The skinning process was a bit complex, but a good skinner could skin a catfish in less than a minute. Following their lead, I began to skin and skinned and skinned. My hands became sore and developed small cuts, but I could finally skin a catfish in a little over a minute. This built trust, and they taught me more.



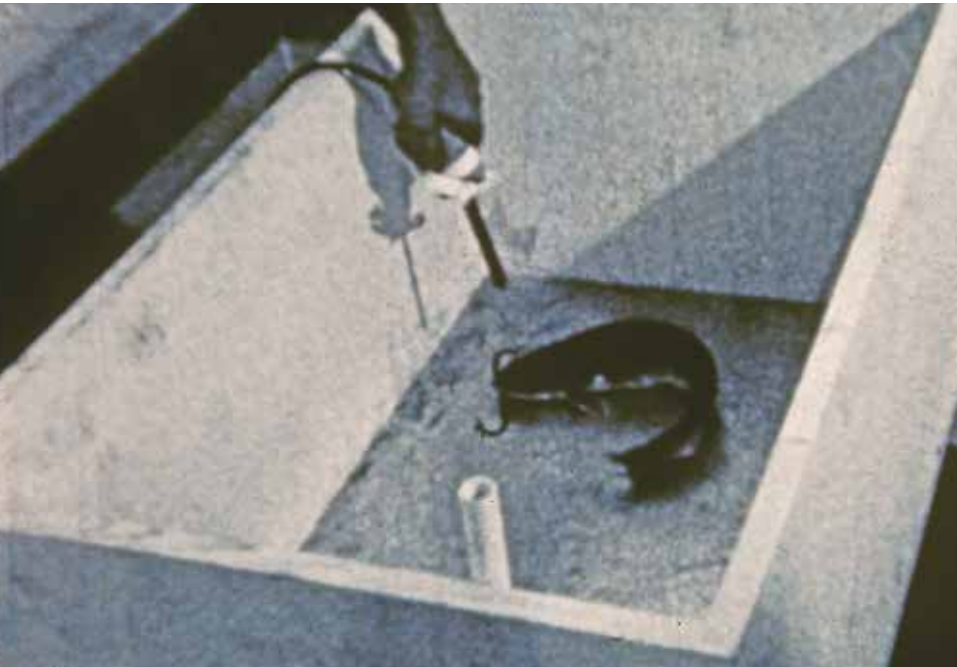
Over the month of June I sketched designs for an execution chamber, a shipping container, and six rubber-lined tanks, six by two by one meters. One tank was for catfish, the others for brine shrimp, oysters, and lobsters. The idea was that each species would grow and act as life support and food for the next. They would overproduce, and that overproduction would be food for people. I designed the drawing of the tank to look as though it might have come from the pages of *Popular Mechanics*, with the notion that people could copy it. Because the work was actually about backyard farming, the drawing attempted (unsuccessfully) to democratize, to bring into everyday life, fish farming as a protein source. The drawing also included a recipe for catfish and hush puppies that Helen had located, which originated from a Southern army cook who made them for the army mess. Both of us found it amusing to generate a poor man's feast, made with river-bottom feeders, to be served to the elite and (sometimes) noble British art public!

An enormous protest began, however, when a drawing of the catfish execution chamber was published in a newspaper. An unfortunate confluence of circumstances had transpired: Breeds of small and elegant catfish were being sold as pets for British household aquariums, and people assumed that these were the same catfish I was electrocuting, skinning, and proposing that the British public eat. A specialized, fetishistic and grossly unacceptable form of animal cruelty was envisioned. The Royal Society for the Prevention of Cruelty to Animals (RSPCA) objected. Newspaper articles appeared in every journal, including the *Guardian*; Spike Milligan, the comic, became enraged and very publicly broke the window of the Hayward Gallery with a brick. Members of Parliament began talking about defunding the Arts Council of Great Britain, to the tune of 15 000 000 pounds.

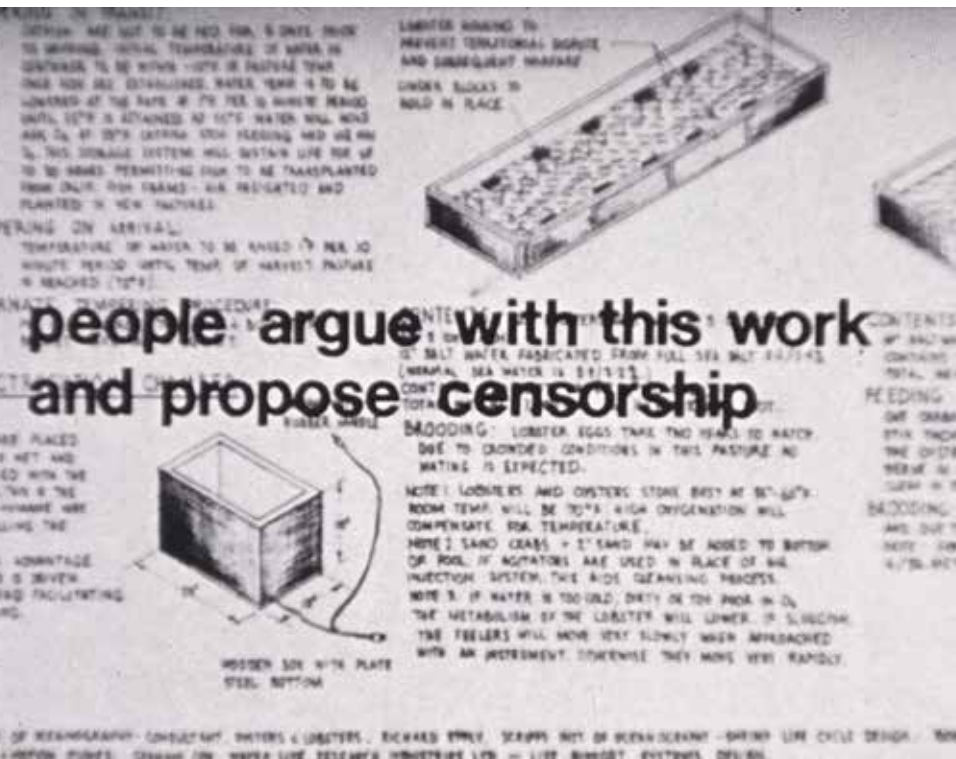
Parliament sent down Lord Arnold Goodman to solve the problem—after all, he had solved the Rhodesian Crisis. Lord Goodman entered the Gallery. I was surrounded by a group of more-or-less supporters, along with museum personnel. Goodman said bluntly, "I see, young man, we have a problem to iron out." I decided not to grant the premise that there was a problem. I replied, "And you think you're the iron and I'm the problem." Silence ensued. Other words were exchanged, and Goodman turned around and left.

Electrocution chamber

Skinning table



From the drawing



I was on British television morning, noon, and night in 30-second sound bites, explaining the difference between little catfish as pets and normal catfish as food. I further explained, often unsuccessfully, that electrocution was required in my country as a humanitarian act. I complimented the British public on their concerns for the well-being of an edible fish from a fish farm, but suggested that maybe we should also be worrying about edible cows and edible chickens, which are invariably slaughtered, often inhumanely. Finally, I began to address the ethical issues that the British were so concerned with, suggesting that if we were going to talk about killing, it would be much more useful to talk about the unethical implications of my country's behavior in Vietnam. I wasn't asked to speak on television very much after that. (Due to all the notoriety, however, I had found myself becoming a little addicted to the attention!)

Fish fillet



Meanwhile, meetings were held; geneticist Maurice Wilkins, physicist David Bohm, and physicist-novelist Charles Percy Snow supported the work on the grounds of “freedom of expression.” But the clincher was Lady Antonia Fraser, who said at a meeting, “What’s all this fuss about? I cull the fish in my own pond with my children, then we skin, cook, and eat them!” Finally, a compromise was struck between the leadership of the museum, the British Parliament, and yours truly. The catfish could be electrocuted according to the standards of the Humane Society of the United States, but only in private, so that the delicate sensibilities of British art viewers, the public at large, and (possibly) innocent children would not be offended. All the fuss died down. Helen’s feast turned into a powerful event. Unfortunately, the catfish did not mate in the tanks, so in the strict ecological sense *Portable Fish Farm* did not succeed.

The feast

My, Helen's, catfish feast, as a performance, was quite successful. I trained museum personnel, and the feast was repeated a number of times.

Some months later, *Portable Fish Farm* was exhibited again at the Palais des Beaux-Arts in Brussels, continuing as part of the *11 Los Angeles Artists* exhibition, which would thereafter travel to Berlin. Newton had redesigned the fish farm, with the idea that local fish should be used in each new venue. The work was redrawn and rewritten for Brussels, in both French and Flemish. The redesign used carp, tench, rudd, and bream, in four tanks. I reinvented the feast, designing a tableau with cooking instruments, giant pots, plates, and preparation tables. Adding vegetables and spices, I created a bouillabaisse variation.

Jane Livingston, the other senior curator of exhibitions at the Los Angeles County Museum of Art (LACMA), was one of the cooks besides me, stirring one of the great kettles. A wonderful aroma came forth and permeated the museum. People coming to the opening gravitated toward the smell, leaving the rest of the exhibition unattended! Tables were set with red-checked French tablecloths, fresh baked bread, and wine. The feast was so popular among the attendees that no food was left.

The performance was not reviewed in the arts section of the newspaper, but my feast was reviewed in the cooking section. I was later told that my modified bouillabaisse was pretty good, if not great—which I took to be high praise. Finally, Larry Bell and Robert Irwin were so annoyed by the attractive power of my soup that they vowed not to show work at any other opening where I was going to create a feast!



Late in the summer of 1971, before we were all to head to London, Maurice Tuchman had taken me to an orchard in the desert, not far from Palm Springs. He was interested in a fog machine being used to help with irrigation. He had the notion that I might fall in love with this machine and create an exhibition for the Los Angeles County Museum of Art (LACMA); he wondered whether I would be interested in making a technological piece that dealt with fog and light. It was a natural enough intuition on his part, considering that *Artificial Aurora Borealis*, which I had made for the *Art and Technology* exhibition, was atmospheric in character and dealt with light and colors.

I walked around the orchard, looking at the fog machine and thinking that I didn't want to do this work, as it seemed too easy—and then I caught a movement out of the corner of my eye. I saw a rather large duck under a tree, with its beak up in the air and a lump of something going down its throat; I found this transaction far more interesting than the fog machine. So, while everybody else was following the fog, I turned around and followed the duck. A few minutes later the duck picked at something, then stuck its beak up in the air, and another lump went down his throat. I slowly moved closer to the duck and then saw that it was eyeing a snail moving along one of the leaves. With a sudden sharp movement the snail was captured and went sliding down its throat. If it is possible to imagine, the duck looked very satisfied!

With a little research I discovered that Southern California, and particularly La Jolla, had a serious snail infestation. The history was amusing, to say the least: In the prior century, a French priest in Santa Barbara had missed his escargot and brought snails over to cultivate for his dinners. The snails were fruitful and multiplied, eventually becoming pests. As far as I could tell, no one had thought of harvesting them. I was curious. I collected some of the snails and fed them cornmeal, as the priest apparently had done. I found out that their systems cleared and they became edible.

Around that time, Larry Urrutia called from the Museum of Contemporary Art San Diego in La Jolla. He'd been hired to curate an exhibition (*Earth: Animal, Vegetable, Mineral*) and asked whether I would do something environmental. I proposed what later became known as the “duck and snail piece” for the muse-

Survival Piece IV

La Jolla Promenade

1971 Museum of Contemporary Art

San Diego, La Jolla, CA



The original garden

A new garden is installed then partially eaten



um courtyard, a square open space of about 12 meters on each side. Snails would be collected from the gardens of La Jolla and fed to ducks who would live in the courtyard, which would also contain a garden of my own creation, including a duck pond. The manner in which the ducks walked around suggested the title, *La Jolla Promenade*.

We bought four ducks from Maggie the Duck Woman, who maintained what might loosely be called a bird farm out in the countryside, on the back roads near Alpine. (She also had a peacock or two, and some geese and pheasants.) Maggie taught us about the care and feeding of ducks. We fenced an area in our backyard and put the ducks in it, collected snails, made a small pond, and watched the ducks' behavior. Helen and I wanted to see if they would in fact eat the snails, and possibly be the answer to the snail problem in La Jolla. They ate the snails. Soon a leader emerged, whom we christened "Top Duck." The ducks laid eggs. With the rough-and-ready experimentation done, we created a garden at the museum and installed the pond, then introduced the ducks into the open courtyard.

Unintended consequences appeared immediately and with regularity. On the second day after the opening the head gardener quit, saying (and I quote), "I'm not going to clean up duck shit!" The ducks ate the snails more rapidly than we could supply them, even though we paid for collection efforts by both Boy and Girl Scouts. By the second week the garden began to look bedraggled. The ducks were evidently supplementing their diet of snails with a diet of garden, which they also perceived as food. Eggs were laid but did not hatch. Algae grew in the pond, facilitated by the continuous infusion of duck effluent.

After a month, *La Jolla Promenade* looked so unkempt that the museum director insisted on buying a new garden from the local nursery; there were only 30 or 40 plants left in our garden, with a



The ducks before the pond was polluted.

The eggs are laid, the garden partially eaten, the seedlings don't grow well.

The Giveaway takes place.

The cinder blocks remain.

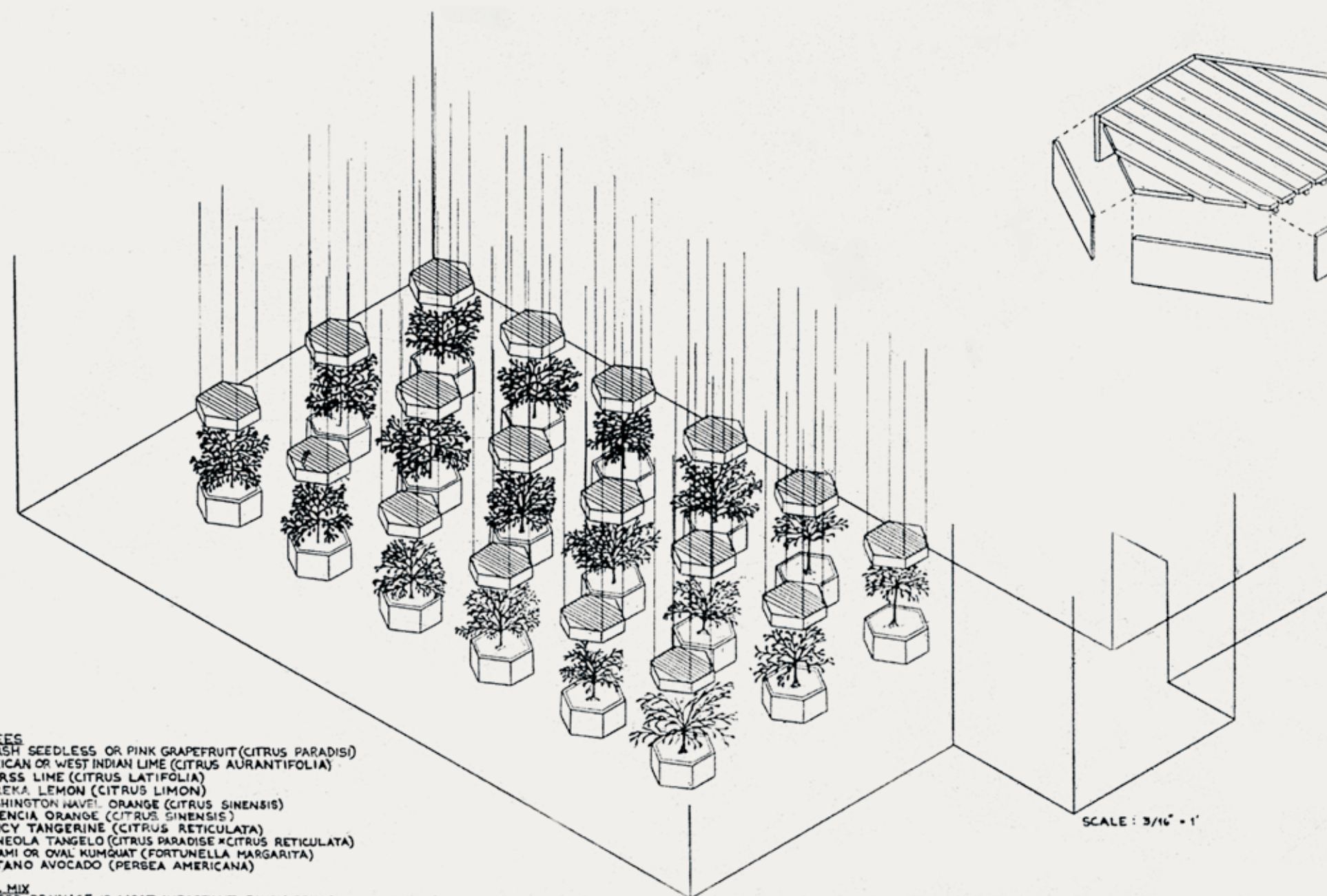
little grass, and his aesthetic sense was offended. I argued that if he bought another garden the ducks would eat that as well, but he said that by the time the ducks finished eating the second garden the show would be over, and it wouldn't matter. Amusing, critical, and ironic newspaper articles began to appear. Clearly, people in La Jolla were not enthralled by our proposition of using a duck population to control a snail population, thereby damaging their carefully groomed gardens. It was an ecological idea gone awry. The concept of ducks acting as snail control, an ecological solution, had a surprising limitation, for the ducks ate the garden they were supposed to protect! This irony, with its aesthetic and ethical implications, was lost on the general public, but through it we gained a gradual understanding that single cause-and-effect solutions have serious limitations from an ecological perspective. Eventually the idea began to form that we needed to learn to work with whole systems.

While Newton was dealing with the intended and unintended consequences of the installation, I, Helen, designed the performance entitled *La Jolla Promenade: The Giveaway*. On the last few days of the exhibition, I put up signs announcing that the exhibition would be given away, piece by piece, to whoever wished to take it. There were the ducks, the pond, cinderblocks, and various remaining plants in rather nice boxes. It was particularly incongruous, I thought, to give away garden and building material that was not pristine to the often wealthy folks of the La Jolla community! But it seems that everybody loves a bargain ... and the price was right!

Nonetheless, nobody wanted the ducks—with one exception. A young boy wanted to take a duck home, and we told him to ask his mother if that would be all right. The next day, his sad face told us that his request had been denied. Nonetheless, he returned to the garden giveaway every day until the last, when, with a smile on his face, he made off with a duck in a box of his own design. The rest of the ducks were given back to Maggie.

SURVIVAL PIECE #5 PORTABLE ORCHARD

SIZED FOR CALIFORNIA STATE COLLEGE AT FULLERTON, ART GALLERY



TREES
MARSH SEEDLESS OR PINK GRAPEFRUIT (CITRUS PARADISI)
MEXICAN OR WEST INDIAN LIME (CITRUS AURANTIFOLIA)
BEARSS LIME (CITRUS LATIFOLIA)
EUREKA LEMON (CITRUS LIMON)
WASHINGTON NAVEL ORANGE (CITRUS SINENSIS)
VALENCIA ORANGE (CITRUS SINENSIS)
DANCY TANGERINE (CITRUS RETICULATA)
MINNEOLA TANGELO (CITRUS PARADISE X CITRUS RETICULATA)
NAGAMI OR OVAL KUMQUAT (FORTUNELLA MARGARITA)
ZUTANO AVOCADO (PERSEA AMERICANA)

SOIL MIX
PROPER DRAINAGE IS MOST IMPORTANT. SANDY SOIL & A CONTAINER WITH GOOD DRAINAGE ARE NEEDED.
1/2 LOCAL SOIL (SANDY LOAM)
1/2 NITRO HUMUS
1 CUP SOIL SULFUR
1 CUP BONE MEAL
1 BAG HUMISITE

PLANTING
FILL CONTAINER HALF FULL WITH SOIL MIXTURE. PLACE TREE IN CONTAINER AND FILL WITH REMAINING SOIL MIXTURE, PACK AROUND TREE. DO NOT COVER ORIGINAL GROWTH LINE OR SURFACE ROOTS, WILL STUNT GROWTH.
NOTE: A 4 YR. OLD DWARF TREE REQUIRES ABOUT 1 CU. YD. OF EARTH AND A BOX WITH 9 SQ. FT. OF EARTH AREA TO INSURE PROPER SPREAD OF ROOT AND LEAF.

FEEDING
TREES SHOULD NOT BE FED FOR AT LEAST A MONTH AFTER TRANSPLANTING. FREQUENCY OF FEEDING WILL VARY ACCORDING TO SOIL AND CLIMATE UNDER MOST CIRCUMSTANCES 3 TIMES A YEAR IS SUFFICIENT.
CITRUS TREES REQUIRE SOIL WITH A HIGH NITROGEN CONTENT AND WITH STABILIZED IRON.
BANDINI CITRUS FOOD WAS USED

WATERING
TREES SHOULD BE ALLOWED TO BECOME SOMEWHAT DRY BETWEEN WATERINGS. SOIL SHOULD NOT BE SOGGY, BUT DRY TO THE TOUCH BEFORE WATERING AGAIN. AFTER DRYING OUT SOMEWHAT, WATER THOROUGHLY, ALLOW THEM TO DRY AGAIN.

LIGHTING
THE TREES REQUIRE 12-14 HRS. OF LIGHT PER DAY. AUTOMATIC TIMERS TURN LIGHTS ON AND OFF AT THE PROPER TIME. THE LIGHT BOXES CAN BE ADJUSTED TO THE DESIRED HEIGHT. THEY SHOULD BE APPROX. 1' ABOVE THE TREE.
SEE CONSTRUCTION, LIGHT BOXES, FOR BULB INFORMATION.
NOTE: THERE SHOULD BE 20-30 WATTS PER SQ. FT. OF GROWTH SURFACE.

POLLINATION
FANS SHOULD BE SET UP TO ASSIST POLLINATION. TREES OF THE SAME BREED SHOULD BE PLACED NEXT TO EACH OTHER. THE WASHINGTON NAVEL ORANGE REQUIRES ARTIFICIAL POLLINATION. WILL NOT POLLINATE BY AIR MOVEMENT.
NOTE: FANS ALSO AID IN STRENGTHENING BRANCHES, RESPIRATION, AND CONTROLLING FLYING INSECTS.

HARVESTING
ALL FRUIT IS READY FOR HARVESTING WHEN IT HAS REACHED ITS FULL COLOR AND CAN BE SEPARATED FROM THE BRANCH WITH GENTLE PRESSURE.

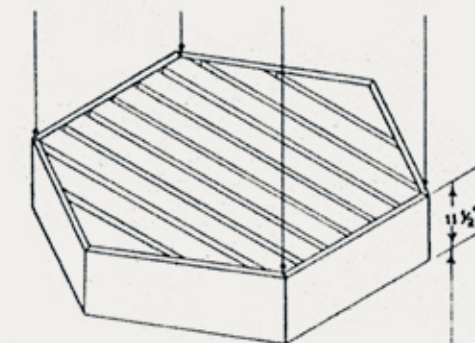
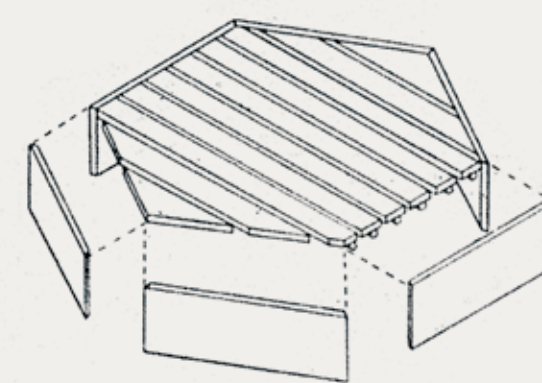
YIELD
TREES WILL PRODUCE LESS IN POTS THAN IN GROVE. A MATURE DWARF CITRUS, POTTED, PRODUCES ABOUT 200-300 FRUIT PER YEAR. THEY TEND TO PRODUCE HEAVILY IN ALTERNATE YEARS.
PROPAGATION
MAKE A CUTTING OF ABOUT 6" OF NEW GROWTH WITH AT LEAST 4 LEAVES. IMMERSE HALFWAY IN ROOTING MEDIUM. WILL ROOT IN PEAT MOSS, STERILIZED SAND, OR VERMICULITE. KEEP MOIST. ROOT BEST AT 60° SOIL TEMPERATURE.
NURSERIES GRAFT ROOT STICK ONTO CUTTINGS. VITAL SIGNS.
OVERWATERING CAUSES ROOT ROT. LEAVES BEGIN FALLING OFF.
TRANSPLANT SHOCK CAUSES LEAVES TO FALL. NEW GROWTH SHOULD APPEAR WITHIN A MONTH.
APHIDS CAN BE CONTROLLED BY WASHING TREE OR WITH BIODEGRADABLE NICOTINE SPRAY.
FUNGUS ATTACKING POINT OF GRAFT SHOULD BE TREATED WITH CITRUS FUNGICIDE.

FEAST
THE FEAST IS A PROPHECY IN THE SENSE THAT 2000 PIECES OF FRUIT ARE BEING USED THAT IS APPROX. HALF THE YIELD OF THE ORCHARD AT MATURITY WHICH WILL BE 4 YRS. FROM NOW.
HELEN HARRISON'S CITRUS BOARD FOR 300: FRUIT COMPOSITE - 10 GAL:
40 GRAPEFRUIT, 120 TANGELOS, 30 LIMES, 240 ORANGES, 240 KUMQUATS (SLICED), JUICE OF 20 LEMONS, 10 CUPS SUGAR, 5 QTS. COINTREAU, PEEL AND CUT FRUIT INTO BITE-SIZE PIECES. SPRINKLE WITH SUGAR AND LEMON JUICE. ADD WATER, MIX, ADD COINTREAU, MIX. REFRIGERATE. ALLOW TO MARINATE AT LEAST 4 HRS.
ORANGE CRUSH - 20 GAL:
9 GAL CRUSHED ICE, 6 GAL FRESH ORANGE JUICE, 2 GAL ORANGE PULP, 25 CUPS ORANGE RIND, 2 CUPS CHINESE 5 HEAVENLY SPICES, 12 CUPS RASPBERRY JAM, 3 GAL. FROZEN ORANGE JUICE, 6 CUPS LIME PEEL, 25 CUPS SUGAR, MIX JUICE AND ICE IN BLENDER, ADD OTHER INGREDIENTS, MIX. THE AMOUNT OF SUGAR VARIES ACCORDING TO THE SWEETNESS OF THE ORANGES.
ORANGE BUTTER - 2 QTS.
4 LBS. BUTTER, 4 CUPS ORANGE PULP AND RIND, 1/2 CUP ORANGE JUICE, 1/2 CUP HONEY, 1/2 CUP KARO SYRUP (LIGHT) CRUSH PULP AND RIND OF ORANGES IN BLENDER.

SOFTEN BUTTER OVER HOT WATER. ADD PULP AND RIND TO BUTTER. WHIP BY HAND. ADD JUICE, HONEY AND SYRUP. MIX. REFRIGERATE.
AVOCADO SPREAD - 2 QTS.
14 AVOCADOS, 4 PRKS. LAURA SCUDDER'S GUACAMOLE MIX, 4 DICED ONIONS, JUICE OF 4 LEMONS, 8 TSP. GRATED LEMON RIND. PEEL AND MASH AVOCADOS, ADD MIX, STIR. ADD ONIONS AND STIR. SPRINKLE LEMON JUICE. STIR AND SPRINKLE TOP WITH GRATED RIND.
SOURDOUGH BREAD - 20 LOAVES, SLICED.
AVOCADO/GRAPEFRUIT SALAD - 5 GAL:
60 AVOCADOS, 40 GRAPEFRUIT, 1 GAL. 1QT. MAYONNAISE, 1/2 CUP CURRY POWDER, 5 CUPS CAPERS (WITH LIQUID), PEEL AND SLICE AVOCADOS, PEEL AND SECTION GRAPEFRUIT. STIR FRUIT TOGETHER, COMBINE MAYONNAISE, CURRY POWDER AND CAPERS. SPOON OVER FRUIT AND TOSS.
BOWLS OF FRUIT
300 ASSORTED FRUIT
100 ORANGES, 100 TANGERINES, 10 LIMES, 30 GRAPEFRUIT, 10 LEMONS, 50 KUMQUATS.

DISPOSITION OF SURVIVAL PIECE #5
AFTER THE EXHIBITION 7 OF THE TREES WILL BE PLACED IN THE COURTYARD (HALF THE SIZE THE INTERIOR SPACE), 6 TREES WILL GO TO THE ARTIST, WITH LIGHT BOXES. 3 TREES WILL BE GIVEN AWAY (WITHOUT LIGHT BOXES). THE REMAINING 12 LIGHT BOXES WILL BE PLACED AROUND THE UNIVERSITY IN OFFICES AND CLASSROOMS WITH NEW GROWTH PASTURES. THESE WILL BE PLANTED AND HARVESTED AS A NEW PIECE TITLED 12 SMALL PASTURES.

NOTE: AN ATTEMPT WAS MADE TO GROW A NEW ORCHARD WITH CUTTINGS TAKEN FROM THE 18 TREE ORCHARD. IT DID NOT SUCCEED.

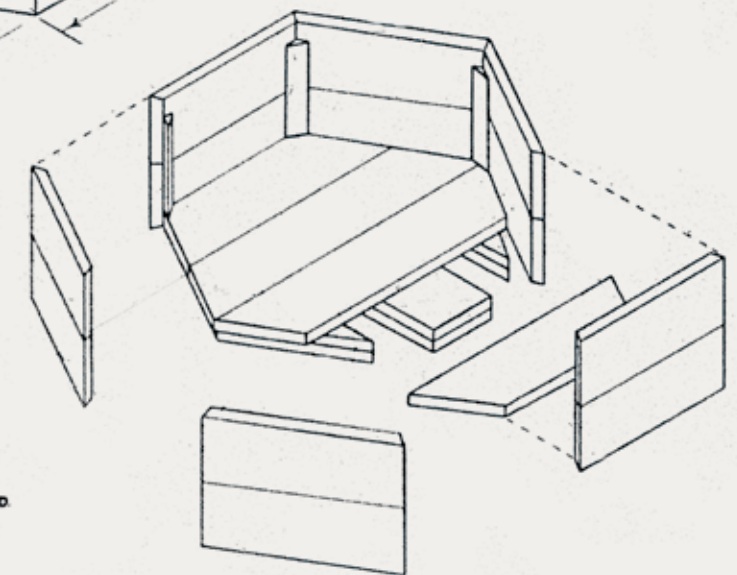
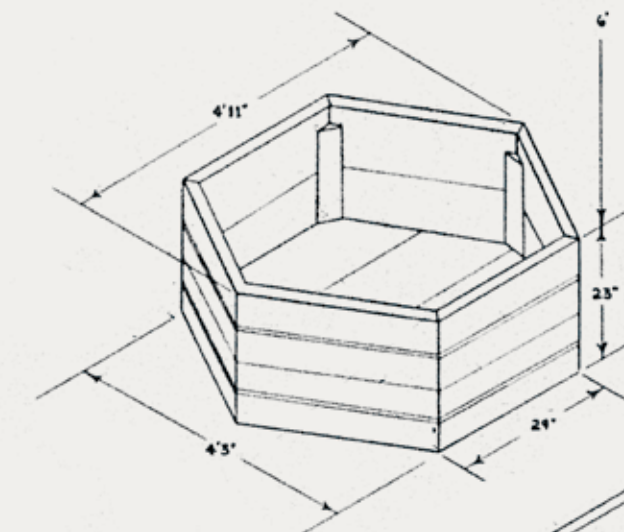


CONSTRUCTION
LIGHT BOXES
CONSTRUCTED OF 1"X12" REDWOOD (SIDES) AND 1"X4" REDWOOD SLATS (TOP). SCREWED AND GLUED TOP HAS 1" VENTS BETWEEN 4" SLATS.
SYLVANIA WIDE SPECTRUM GRO-LUX BULB ARE MOUNTED ON SLATS (STAND-UP SOCKETS).
SIX 4" TUBES AT 40 WATTS EACH.
TWO 3" TUBES AT 30 WATTS EACH.
300 WATTS PER LIGHT BOX.
4 HIGH OUTPUT BALLASTS MOUNTED INSIDE BOX ON SIDES.
NOTE: WIRED BY AN ELECTRICIAN TO THE LOCAL CODE.
SEE DRAWING FOR SURVIVAL PIECE #6 PART 1 FOR COMPLETE INFORMATION ON THE LIGHTING.
SCREW-EYES AT 4 POINTS HOLD CHAINS FOR HANGING BOX FROM CEILING.

PLANTER BOXES
CONSTRUCTED OF 2"X12" REDWOOD, SCREWED AND GLUED WITH WATERPROOF GLUE. TWO 2"X12" SPLINE JOINED TO FORM EACH SIDE. JOINTS ARE BRACED WITH 2"X2"X4" REDWOOD WEDGES. THE BOTTOM IS BRACED WITH 2"X12" REDWOOD LAMINATED TO 4" THICKNESS. BRACING ALLOWS SPACES FOR FORKLIFT. 1" METAL BANDS AROUND BOX BRACE SIDES. DRAINAGE HOLES ARE DRILLED IN THE BOTTOM WITH PANS SLID IN BETWEEN THE BOTTOM BRACING.

NOTE: REDWOOD IS USED BECAUSE OF ITS ABILITY TO WITHSTAND MOISTURE WITHOUT ROTTING. ALL NAILS AND SCREWS ARE IRON OR STEEL TO AVOID COPPER AND ZINC POISONING OF THE SOIL.

SCALE: 3/4" = 1'



Portable Orchard installation, Walker Museum of Art, Minneapolis, 2016

Installation detail, California State University, Fullerton, 1972



In the early seventies in Los Angeles, the “scene” consisted of a loose group of artists, collectors, museum people, and the occasional student who would come together at La Cienega galleries, Los Angeles or Pasadena museum openings, and even at university galleries. At one such opening, Dextra Frankel, the diminutive, smart, and animated director of the gallery at California State University, Fullerton, approached us and asked if we wanted to do a piece for her gallery. We told her that we would talk over the offer and get back to her.

By this time we had invented a tradition in which we started each day by sitting around the fireplace and having our morning conversation over coffee, modeled in part on *The Morning Notes of Adelbert Ames, Jr.* The morning after the opening, we reflected on the drives we had made back and forth between San Diego and L. A. since 1967. Orange County was mostly orange orchards then, but each year there was less orchard and more development. Soon there might not be any oranges left in Orange County. (This was akin to the phenomenon in which one finds no oak trees on Oak Lanes, and not much lake left in communities called Lakeside.) We began imagining a work with portable orange trees; if such a work lived long enough, it might become one of the last orchards in Orange County! Armed with such thoughts, it seemed appropriate, ironic, necessary, and fun to put an orchard in the gallery at California State University, Fullerton. (We expected that placing an orchard in a museum, in the face of rampant development and the death of orchards in the nearby landscape, would be seen as an act of criticism. This did not turn out to be the case.)

Knowing nothing about orchards or growing orange trees, we began actively researching. One of us read soil studies while the other learned about tree types and where they could be bought. We needed to discover the differences between dwarf trees and semi dwarf trees, and what kind of root stock one might trust to grow under lights. (We asked the agricultural extension people what they had to say about all of this, which was not much.) Research showed that a semi-dwarf tree could grow to be 2.4 meters tall and could thrive many years



in 0.7 cubic meters of earth, which answered size and scale issues. The soil needed to have some of the properties of river loam which was on the sandy side and drained well.

We had draftsmen draw up plans for 18 hexagonal boxes one meter tall; made from redwood, each held 0.7 cubic meters of earth. There were also 18 hexagonal redwood light boxes that would hang from the ceiling and hold Gro-Lux bulbs. We went to Durling Nursery outside Escondido and bought a Noah’s Ark of citrus trees: different kinds of orange, tangerine, lemon, lime, and kumquat. The orchard had great visual power in the gallery; the design called for each tree to be one meter from any other tree or wall, and as a result, the figure–ground patterns were varied and rich.

The opening arrived. Part of the experiment was to see which trees thrived and which failed. The lemon trees were happy (especially the Meyer lemon). The kumquats did well. An avo-

cado tree became frantic and lost a leaf a minute. Some trees drooped because they didn’t like the noise; others didn’t like having their diurnal light cycle interrupted.

We heard 30 years later that some of the trees that had been moved outside were still flourishing and bearing fruit. Though the orchard didn’t contain the last orange trees in Orange County, it was virtually the last intentional orchard planted there. An uninterrupted memorial of sorts. A last whisper from a past, barely perceptible in the face of endless development.

For the opening performance, I created a citrus and avocado feast: orange, lemon, and avocado butters; orange and avocado salads; lemon cake; and other creations. There was excitement and good fun, since nobody had tasted a citrus and avocado feast before! But few wanted to taste another one any time soon, as many went home with acid stomachs!

Survival Piece VI

Portable Farm

1972 Contemporary Arts Museum

Houston, TX

2009 Barbican Centre, London,

Great Britain

2013 Contemporary Arts Center,

Cincinnati, OH

In 1972, Sebastian Adler was designing an exhibition for the opening of the big new building of the Contemporary Arts Museum Houston, where he was the director. There would be 10 artists, and the show was simply called *IO*. Lefty (as he was known) had followed our work and was amazed by it. He asked if we would do a work for the show, and said that it had to take up over a 93 square meters, and we should definitely grow things. He didn't too much want a fish farm.

Lefty came to La Jolla to meet with us. It was a Sunday afternoon; we drank a bit, gossiped a bit. (Lefty was basically a formalist; for example, he loved Ronnie Bladen's work. I told him I had shown with Bladen at Brata Gallery, which had been part of the Tenth Street group.) We asked for plans of the space, and said we'd talk it over in our next morning conversation.

It was an easy piece to imagine. We sketched upright pastures and flat pastures; a potato farm and a worm farm; and finally, a portable orchard with the trees in





Helen planting

barrels. If we could have added a fish farm or chickens to provide protein, we would have. Nonetheless, we began to talk about whole-system backyard farming, a countercultural idea that we were closing in on. After a few days we gave the sketches to our draftsmen and began elaborate research on what we could grow. We chose peas, beans, potatoes, carrots, lettuce, tomato, onions, and other vegetables (but not corn, as it grew too tall for the light boxes). We used half of the lights from *Portable Orchard* to grow the potato patch and half to grow the orchard. We thought that as the work matured we could produce a public salad bowl—perhaps a Nicoise Salad, with some tuna fish or a hardboiled egg on top.

But poor Lefty, the show was doomed! We heard a critic talking to a friend while walking through our work; he explained that it was nice to see a garden like this, but the artists didn't know anything about art. Ellen Van Fleet had decided to do an urban ecology piece called *New York City Animal Levels*, with rats and possibly pigeons, and which included cockroaches. We suggested that she be very careful with cockroaches as they had a habit of escaping from any enclosure. She said she would, but she didn't ... and they did. Lefty had to explain to his board of directors why he had imported a New York cockroach infestation for the opening exhibition of their brand new building.

Our work under light grew well: The beans flourished in the upright pastures, and vegetables and greens in the flat pastures—except for the blighted potato patch, which somehow acquired the potato beetle. Salads were made for the public. One enterprising person began growing marijuana next to our bean sprouts, and another planted peyote in our lettuce garden! Lefty's tenure at the museum did not long survive the exhibition.



Upright pastures detail

Flat pastures

Potato patch

Worm farm





Giving the crabs a monsoon with a hose, and mating begins.



With John Isaacks talking about the Sea Grant



Survival Piece VII

The Crab Farm

Scylla serrata (Forsskål)

Which Later Became

the *Second Lagoon* and Initiated

the *Lagoon Cycle*

1972–1973 Pepper Canyon

Outdoor Studio at

University of California, San Diego, CA

Presented at various conferences,

never exhibited

The *Crab Farm* was originally intended as a correction to the *Portable Fish Farm* at the Hayward Gallery in London in which the catfish had not mated in the tanks. Though that piece had been remarkably successful by the art standards we held ourselves to, its success was quite limited by the ecological standards we simultaneously held ourselves to. We felt obliged to do it over again and to “do it right”—whatever “right” was.

In our search for a hearty creature that could live (and mate) under museum conditions, a crab from the lagoons of Sri Lanka entered our lives. Working with the young Sri Lankan herpetologist Ranil Senanayake, we did our best to create a situation that resembled those places in an estuarial lagoon at Nagumbo where they were seen mating. We tell this story in detail in *The Second Lagoon: Sea Grant*. Actually, we had gotten a Sea Grant in open competition for limited funding administered by Scripps Institute of Oceanography for original research we had done, which, in short, was de-coding the mating behavior of *Scylla*.

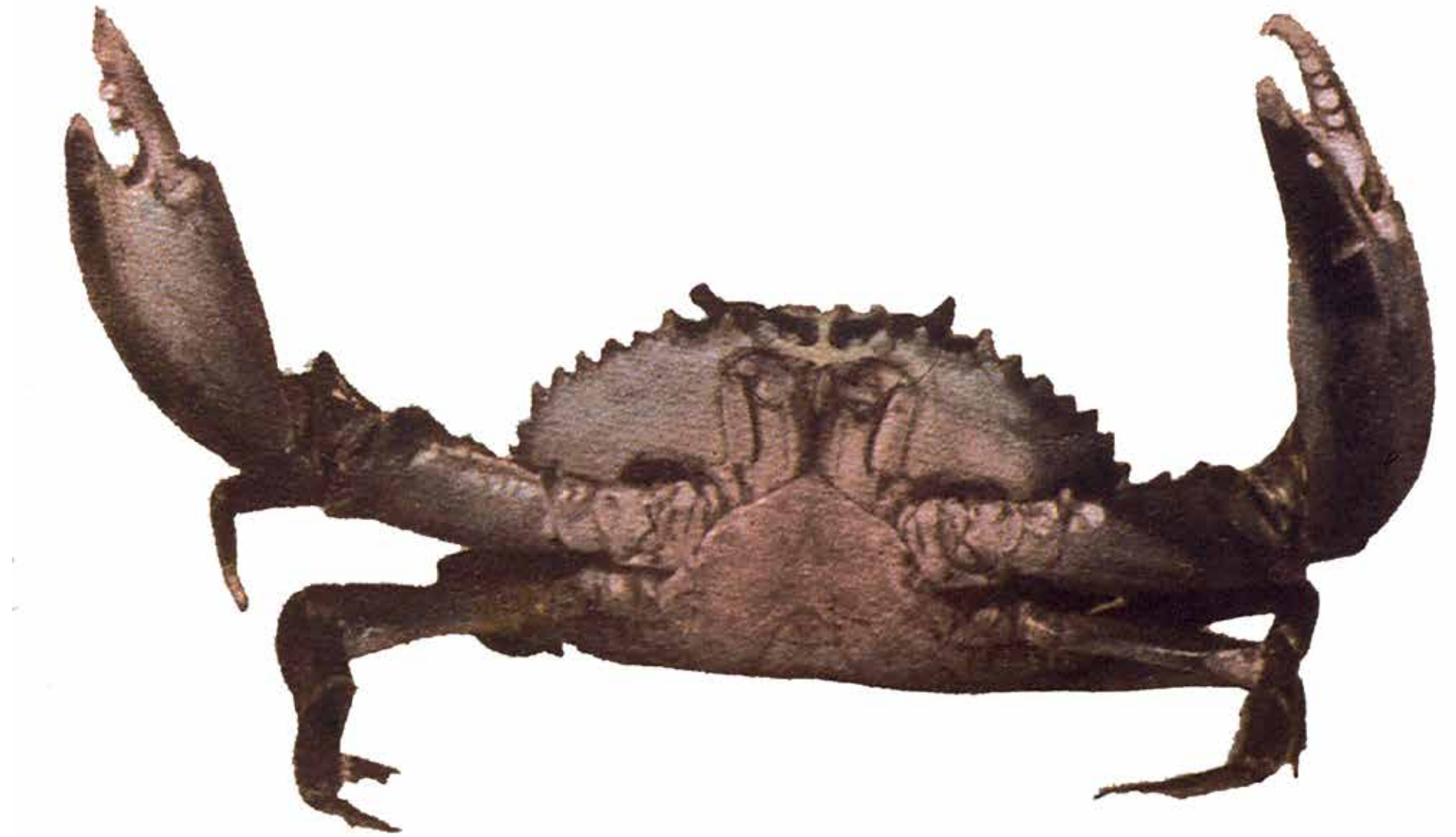
The Sea Grant people had sent down several of their advanced trainees to work with us to make sure that our science was done right. We had named many of the crabs for their behaviors. Top Crab was the biggest most aggressive male crab, and he did all the mating, literally scaring off the other males. The physical mating process was simple, direct, and strangely familiar. Top Crab mounted his chosen female, she then molted, thereafter he turned her upside down and they became connected. This connection impressed us all no end. It lasted over 12 hours. Occasionally he grabbed some food and fed her. We all, rather inappropriately, wondered what kind of crab pleasures were happening over the course of 12 hours. Our *Crab Farm* that operated in a small abandoned schoolhouse in Pepper Canyon on the University of California campus was often an object of curiosity for various people. For instance, tinturing the success we were feeling about Sea Grant, several rather odd forms of rejection took place. Robert M. Galatzer-Levy, the Freudian anthropologist who had just begun working on how the urban planning took place in Kathmandu, was a dear friend. One day he called us to say that he was bringing his



teacher and mentor, Gregory Bateson, to our *Crab Farm* as he thought we and Bateson were running in parallel in our thinking. There was a hush among our students in the *Crab Farm* as the exalted Bateson walked in with Galatzer-Levy. Bateson then walked around the *Crab Farm* and looked in the tanks. He didn't talk to us—he didn't even acknowledge our existence, and then he walked out.

We were walking across the campus after one of those interminable meetings talking to Herbert Marcuse. After a bit he said, "You know, all this ecology work you are doing is really like the women's movement, a form of repressive sublimation." He said the real issue is the class struggle and any other work of this kind is a diversion. I found myself enraged; my mouth opened and I said in a loud voice, "You know, Herbert, from my perspective the über class is the whole human race and the unter class the whole ecosystem, and any damn fool can interrupt the well-being of my unter class with a shovel." We parted uncomfortably. Some years later, at a meeting, we again discussed the issue of über and unter class, Herbert said he had thought about the matter some and we might have a point.

Several weeks later we got a call from Thomas Messer, the director of the Guggenheim in New York. They were thinking of showing *Crab Farm* in the big rotunda. We sent them drawings, they discovered the dead weight of water that the *Crab Farm* required, they feared the floor would collapse, and the piece was rejected. However, 1974 was a pretty active year in other ways. We had just finished the *Crab Farm* and had just completed our global warming work, as well as the *Fourth Lagoon*. Ron



Feldman took us into his gallery along with Buckminster Fuller and Joseph Beuys. We had just seen the coyote work at René Block's gallery. We decided then and there to avoid the shaman look and to avoid the special-artists look and to avoid "shock works" like Vito Acconci under his ramp and instead represent ourselves as a simple "Mom and Pop" operation.

In its second year, among the constant flow of the curious, *Crab Farm* became complex in its ramifications; it became several works attempting to compress themselves into one. In retrospect, it was the basis for a decade of works. But before it became these things, or as it was becoming these things, in a marvelous morning conversation *The Lagoon Cycle* was first spoken. There would be seven lagoons, with seven proposals embedded in them. It would be a complex, many-leveled narrative. The crab would be a central feature, maybe even the hero. *The Lagoon Cycle* would be spoken by two characters, the Lagoonmaker and the Witness—exaggerations of ourselves. Almost immediately, it began to develop a life of its own.



San Diego as the Center
of a World

1974 Ronald Feldman Fine Arts,

New York

Power Gallery of Contemporary Art

at the Museum of Contemporary Art

Australia, Sydney, traveled

During those years, I, Helen, would regularly go to the library and scan the shelves, partly as work (in my role as researcher) and partly for pure pleasure. We had agreed, in one of those amazing morning conversations, that it would be valuable for me simply to wander in the library, to learn in a circle. (My scholarly grandparents, who spoke 12 languages, had a term in Yiddish or German for this.)

One day I came upon a shelf of books that were all concerned with different interglacial scenarios, and what they could mean in terms of future climate. I have a kind of antenna and can almost feel out of a body of books which of them might be most interesting or relevant to a project, without even knowing what that project might be! In scanning I picked out a book by Robert Bryce who argued that we were in an interglacial period, and it was going to get colder; heavy glaciation would return, and the oceans would retreat.

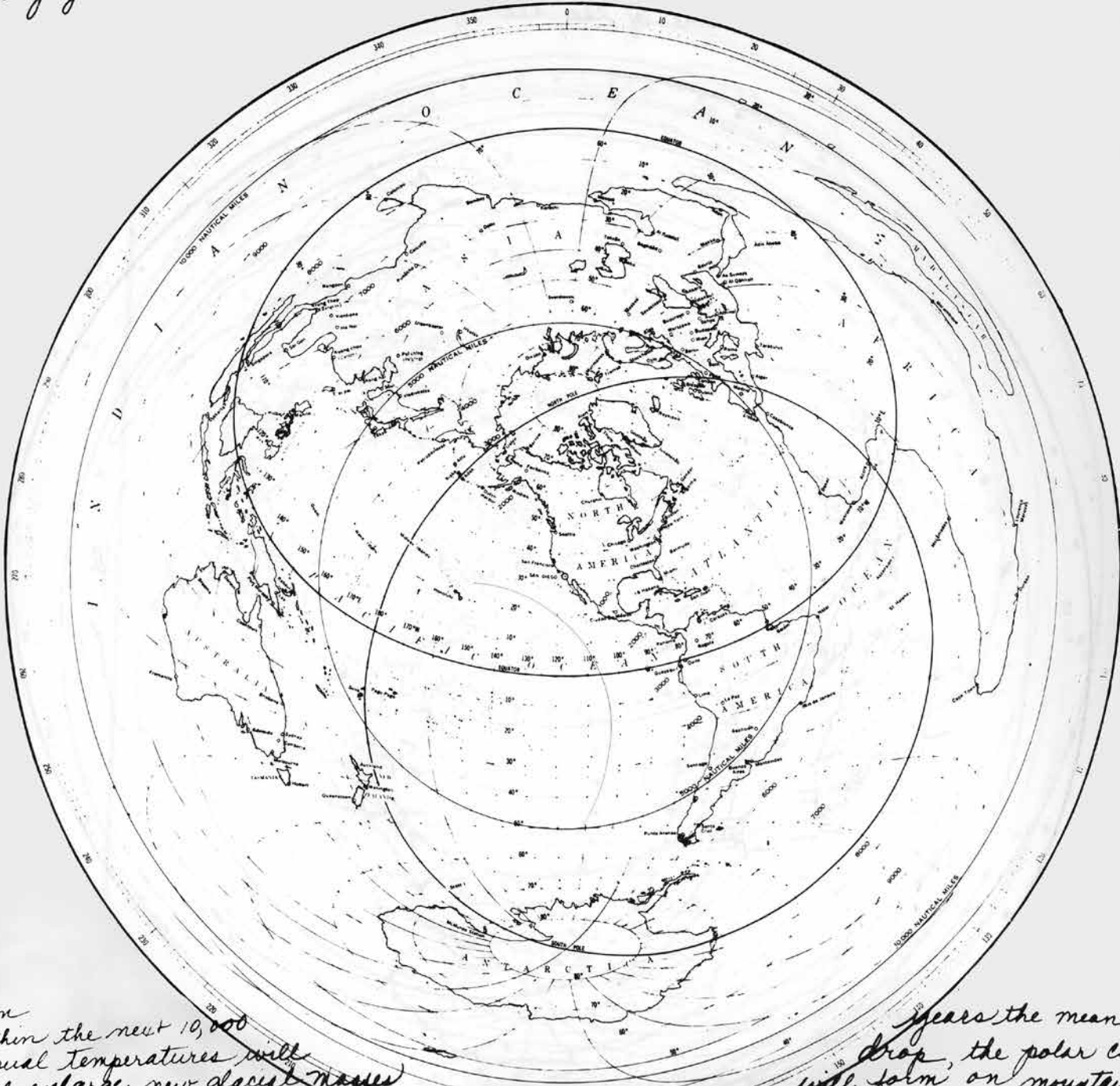
Then, a bit farther down the shelf—into the future—was a book by Gilbert Plass, who made the clear argument that the burning of known supplies of coal and oil over the next 100 years—and mind, now, that this was 1973—over the next 100 years the CO₂ levels would increase dramatically, accelerating the greenhouse effect such that the glaciers would melt and temperatures would rise, as would the oceans.

At that point Newton and I were still into conceptual art, word-image plays, ironies, and the like. Newton suggested a work called *San Diego as the Center of the World* (I said, *Center of a World*). We unpacked the implications of the arguments by Plass and Bryce, and we proposed long- and short-range planning for either scenario, melting or freezing (both of which were disastrous).

This was the last work that we collaborated on in which our roles were discrete, I being the researcher, Newton being the form maker (with the two of us collectively being the poet).

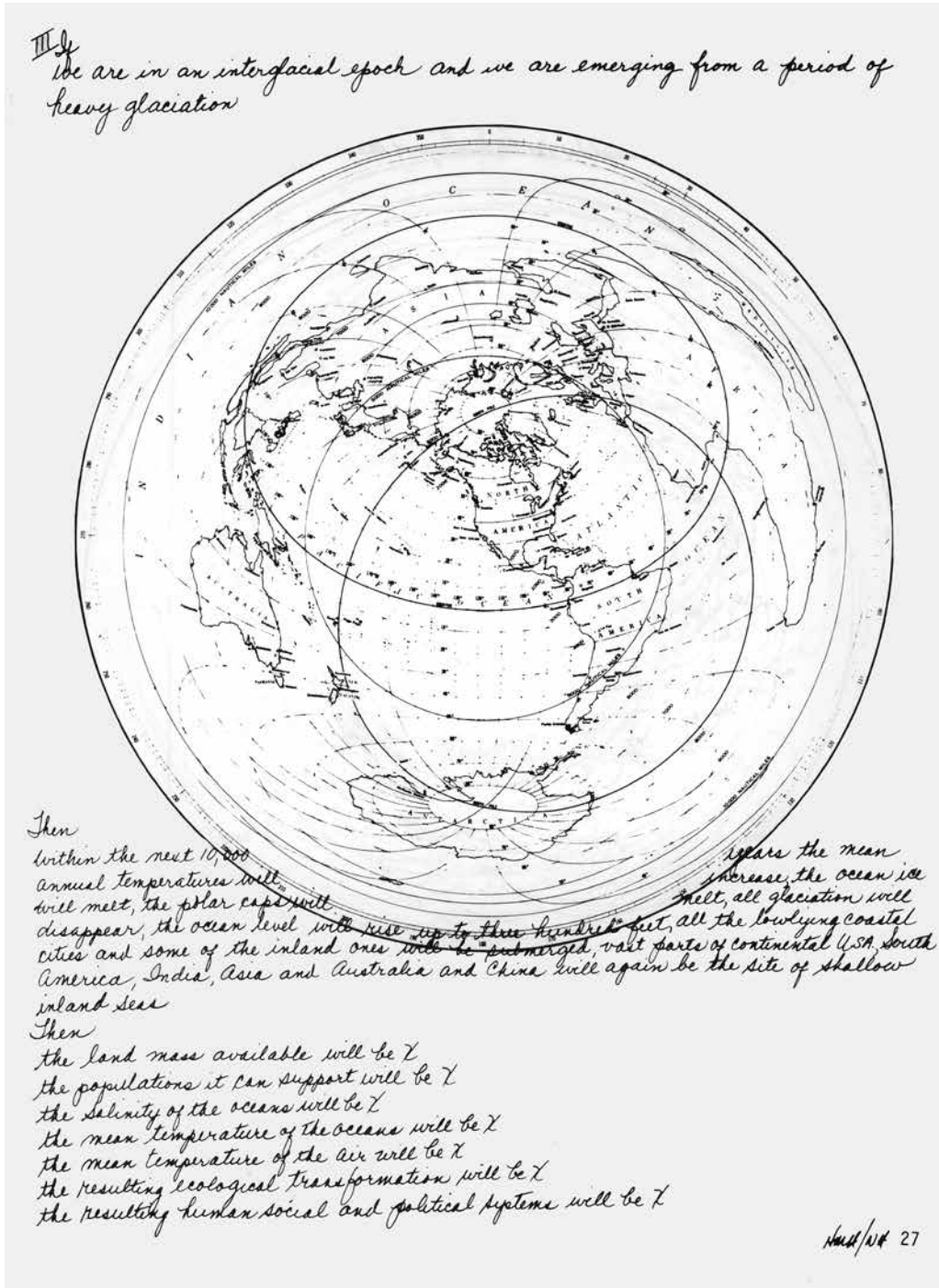
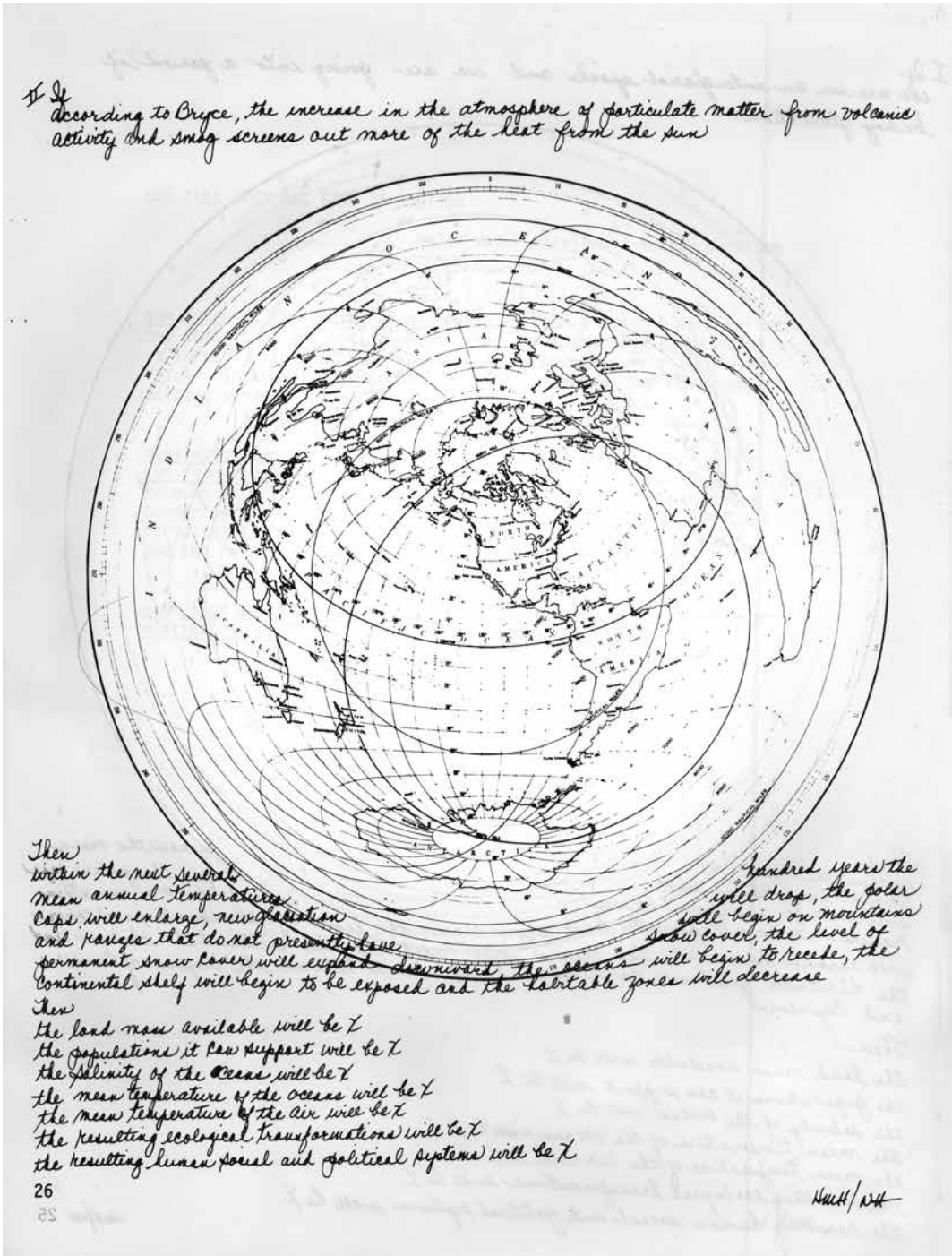
San Diego as the Center of a World, 1973

*I Q
ide are in an interglacial epoch and we are going into a period of
heavy glaciation*



*Then
within the next 10,000
annual temperatures will
will enlarge, new glacial masses
ranges that do not presently have snow cover, the level of permanent snow cover
will expand downward, the oceans will recede to the continental shelves and
the habitable zone will be reduced to the land between the tropics of Cancer
and Capricorn*

*Then
the land mass available will be X
the populations it can support will be X
the salinity of the oceans will be X
the mean temperature of the oceans will be X
the mean temperature of the air will be X
the resulting ecological transformations will be X
the resulting human social and political systems will be X*



It was shown in 1974 in a “solo exhibition” called *Decentering*—the last under Newton’s name alone, and our first at Ronald Feldman Gallery in New York—along with other works (including some early evidences of the *Lagoon Cycle*). Thomas Hess reviewed the show in the *New York* magazine, whimsically commenting on what a learned “witty nut” from California might produce; neither Hess nor Lawrence Alloway (in *The Nation*) mentioned my contribution.

Thereafter, the *Lagoon Cycle* picked up steam, and we soon came to the conclusion that neither of us was any longer the originator of the work. Single authorship seemed an absurdity. Rather, a third artist, operating in the space between us, had been born, and that third artist was doing the work.

1974 was a year like no other. The collaboration had changed and become co-equal. Research was introduced at a much higher level. The first global warming work was done, and the *Lagoon Cycle* was clarified. Narrative, often in the form of storytelling, was introduced into the work, and the proposal form dropped back. Unexpected linguistic inventions began to appear. Large-

scale photography was introduced. Simultaneously, it turned into a situation in which neither of us could remember who did what—and who cared anyway?

This new form of collaboration had begun with both of us making the decision that we would no longer do any work that did not benefit the ecosystem. One of us—who had been an artist from early adolescence on—had to change completely to do this. The other of us—who had been a lifelong teacher, researcher, educational philosopher, and student of psychology and literature—had to change completely to do this. We were convinced that neither of us had the capability to become ecosystemically empowered without the help, encouragement, and dramatically different talents, experience, and tolerance for ambiguity of the other. We began to imagine that there was a third party, a unique co-creator, and that we were assistants to this entity—the real artist, visible only to us. In retrospect, we were also generating a very personal form of metaphorical behavior.

We were teaching each other to be each other, but not completely each other.

Late in 1976, while we were finishing the Venice Biennial work and beginning the *Sacramento Meditations*, we received a telephone call from a senior curator at the Long Beach Museum of Art. They were putting together an exhibition, *Beyond the Artist's Hand: Explorations of Change*, looking for what later might be called social justice positions taken by artists. Would we like to do something? And, yes, there was financial support, but not a lot.

We drove up to Long Beach, only a little over an hour from San Diego. Looking out over the ocean with the museum director, seeing the oil platforms, one or the other of us asked, "Who was here before the oil wells?" The director answered, "The Gabrielino Indians." One of us (or the other) said, "You mean there was a group of Indians here who named themselves the little Saint Gabriels?" He said that as far as he knew, their real name had been forgotten.

Appalled, we began to research the Gabrielino. We discovered that the Native American groups in the area fought wars by singing and were nomadic, living largely on acorns, which they ground in rock mortars and washed in the streams to deacidify, making a kind of flour. They came to the ocean and harvested the mussels, shellfish, and abalone that were so abundant in coastal waters before first settlement.

We also found—and this was well known to anthropologists—that the Gabrielino (and many others like them in California) practiced selective burning. This controlled the undergrowth; as a result, big forest fires didn't happen. It made the earth more fertile and caused to germinate many seeds that required the heat of fire to come to life. In the spring, they could harvest the new growth; they could also harvest the small game that came to eat the growth. They didn't seem to have to work too hard.

So we named our work, which is in two parts, in this very complex way. Part One tells the story of the genocide and ecocide implicit in the Spanish conquest of California and establishment of the missions. Part Two, entitled *Zones of Maximum Safety*, deals with the Gabrielinos' ecological intelligence. The story is recounted from the perspective of the Indians, as told to and then reported by a man named Hugo Reid, who had married a Gabrielino woman. The work literally reprints, on the image, his famous series of 22 letters, first published in the *Los Angeles Star* in 1852.

Meditation on the Gabrielino

Whose Name for Themselves

Is No Longer Remembered

Although We Know They Farmed with Fire

and Fought Wars by Singing

1976 Long Beach Museum of Art, CA

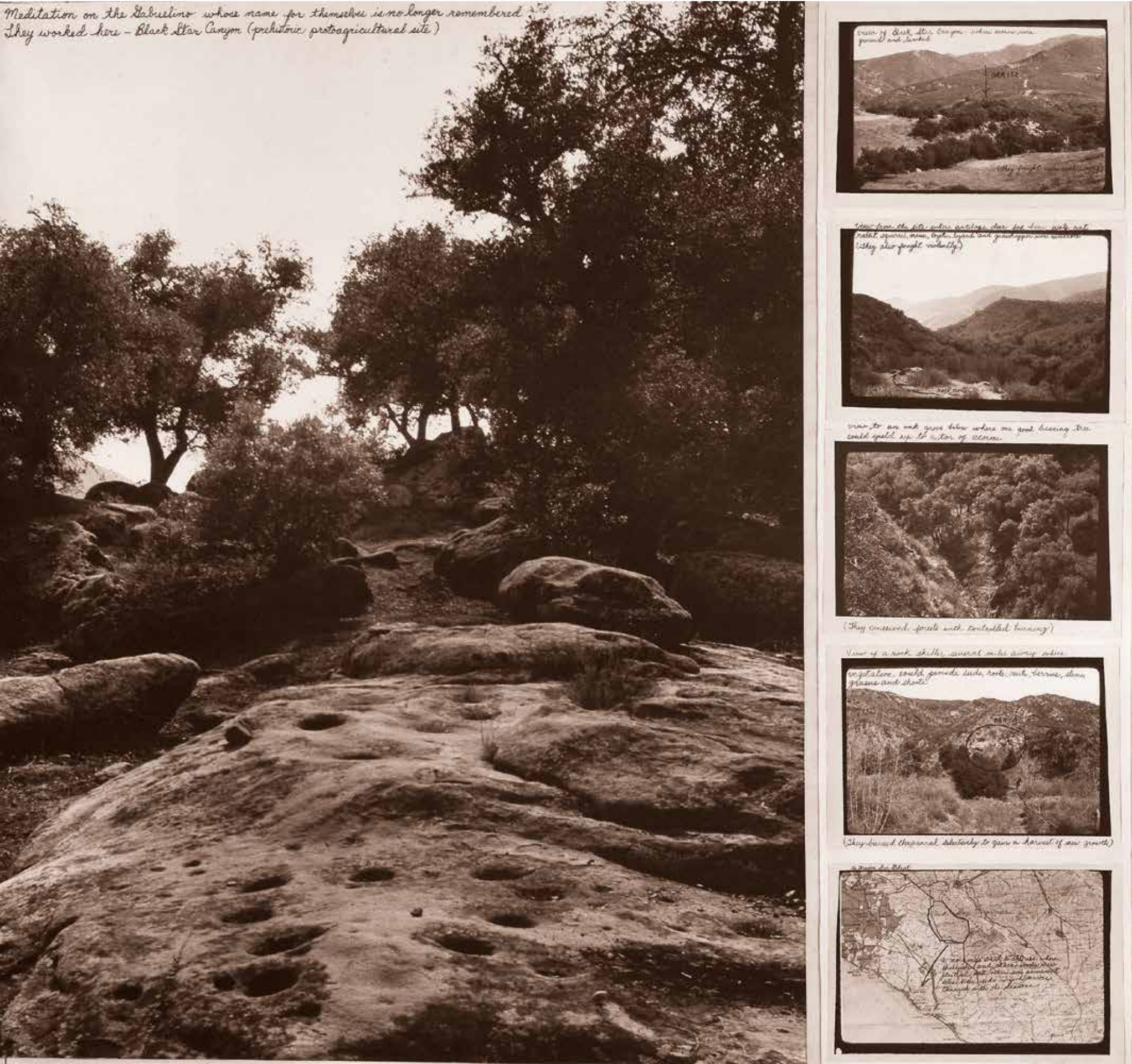
1977 Ronald Feldman Fine Arts, New York

2016 Museum of Contemporary Art

San Diego, La Jolla, CA:

Beyond the Artist's Hand: Explorations of Change

Exhibition



[LETTER NO. XIX.]
New Era in Mission Affairs
On the arrival of Padre Jose Maria Salvacia, cattle were plenty, as were likewise horses, mares, sheep and hogs. Cultivation was carried on to considerable extent, but it was to him that the after splendor of San Gabriel was due. He it was who planted the large vineyards intersected with

A better class of people than the low vulgar soldiers, both men and women, were induced to emigrate from Sinalva and Lower California. They were a great acquisition, as were likewise few Indians from the latter place, who had been well instructed by the "Jesuits" in various arts. The men among the newcomers served as major

Indians of course deserted. Who would not have deserted? Still, those who did had hard times of it. If they proceeded to other missions, they were picked up immediately, flogged and put in irons until an opportunity presented of returning them to undergo other flagellations. If they stowed themselves away in any of the ranchos or enrias, the soldiers were monthly in the habit of visiting them; and such was the punishment inflicted on those who attempted to conceal them that it is rarely was essayed. Being so proscribed, the only alternative left them was to take to the mountains, where they lived as they best could, making occasional inroads on the Mission property to maintain themselves. They were styled *huidobes*, or runaways, and at times were rendered



and the stock of medicines very large.—They were provided not by the pound, but by the quintal! Not in gallons, but in barrels full! Still all the dependence for medical aid (with the exception of midwives) was either on a casual foreigner passing, or on the stupidity of some foreigner employed on the premises. I know not why, but an Anglo-Saxon in those days was synonymous with an M. D. Many an "Estrangero" who never before possessed sufficient confidence in himself to administer even a dose of Epsom, after killing, God knows how many, has at length become a tolerable empiric. One thing in favor of the sick was, that after a lapse of years, the greater part of the drugs lost their virtue.

Indian Alcaldes were appointed annually by the Padre, and chosen from among the very laziest of the community; he being of the opinion that they took more pleasure in making the others work, than would industrious ones! From my own observation this is correct. They carried a wand to denote their authority, and what was more terrible, an immense scourge of raw hide, about ten feet in length, plaited to the thickness of an ordinary man's wrist!—They did a great deal of chastisement, both by and without orders. One of them always acted as overseer on work done in gangs, and accompanied carts when on service.

The unmarried women and young girls were kept as Nuns, under the supervision of an abbess, who slept with them in a large room.—Their occupations were various; sometimes they sewed or spun, at others they cleaned weeds out of the

gardens with hoes, worked at the ditches or gathered in the crops. In fact, they were Jacks or jennies of no trade in particular.

The best looking youths were kept at pages to attend at table and those of most musical talent reserved for church service.

The number of hogs was great and were principally used for making soap. The Indians, with some few exceptions, refused to eat hogs, alleging the whole family to be transformed Spaniards! I find this belief current through every nation of Indians in Mexico. Why should they, without being aware of it, have each selected the hog more than any other animal to fix a stigma upon? It probably may be from its filthy habits; or, can something appertaining to the Jews be innate in them?

At San Francisquito, near the Mission, were kept the turkeys, of which they had a large quantity. The dove-cote was along side of the soap works, and in an upper story, affording plenty of dung to cure leather and skins with.

The Padre had an idea that fiery led Indians to run away, for which reason he never gave either men or women any other clothing (including shirts and petticoats) than coarse frieze (Xerga) made by themselves, which kept the poor wretches all the time diseased with the itch. If any handkerchiefs or cotton goods were discovered among them, the same was immediately committed to the flames.

He was an inveterate enemy to drunkenness, and did all in his power to prevent it, but to no purpose. He never flogged, however, while the

influence of liquor lasted; but put them into the stocks, under care of the guard, until sober. Finding the lash alone was of no avail, he added warm water and salt to the dose, which was given until it ran out of the mouth again! It was of no use, the disease was as incurable as consumption.

Having found out the game practiced in regard to destroying the children born to the whites, he put down all miscarriages to the same cause. Therefore, when a woman had the misfortune to bring forth a still-born child, she was punished. The penalty inflicted was, shaving the head, flogging for fifteen subsequent days, iron on the feet for three months, and having to appear every Sunday in church, on the steps leading up to the altar, with a hideous painted wooden child in her arms!

He had no predilection for wizards, and generally (as some one or another was always reporting evil of them), kept them chained together in couples and well flogged. There were, at that period, no small number of old men rejoicing in the fame of witchcraft, so he made sawyers of them all, keeping them like hounds in couples, and so they worked, two above and two below in the pit.

On a breach occurring between man and wife, they were fastened together by the leg, until they agreed to live again in harmony.

He was not only severe, but he was, in his chastisements, most cruel. So as not to make a revolting picture, I shall bury acts of barbarity known to me through good authority, by merely saying that he must assuredly have considered whipping as meat and drink to them, for they had

goods, and, in fact, everything; besides supplies of sugar, panocha, rice, honey, etc. These goods were fitted up in two large stores for the accommodation, not only of the public, but for the necessities of servants and use of the Neophytes. The females had their leize (xerga) converted into sweat-cloths, and more suitable garments provided them. This measure effected a great change, for now of a Sunday might be seen coming out of church, women dressed in petticoats of all patterns and colors, with their clean chemise protruding from the bosom, with a kerchief round the neck and rebosa round the shoulders; while the men had their pants, jacket, trousers, hat and fancy silk sash. Even the children sported in a white or fancy shirt, with a handkerchief tied around the head.

This was, indeed, a transformation, and one for which they felt grateful. It elevated them to better thoughts and principles, and made them esteem themselves more than probably anything else would have done. Nor did the reformation stop here. The married people had not only sheets provided for their beds, but even curtains. It was the duty of the Mayor-domo to visit each room weekly, and see that every article was kept clean and report accordingly. The Priest paid a monthly visit for the same end.

On coming out of Mass, the whole community was assembled and rations given to families for the ensuing week. Besides, each man received half a pint of spirits, and the women a pint of wine. Panocha, molasses and honey were distributed, and if required, clothing; as also two or three dol-

lars each on occasions.—Although rations were given as stated, yet the Mission provided daily food for the laborers.

The Mission bell, on being rung, roused the Alcaldes from their slumbers, who in loud voice soon set all the world agog. Mass was heard, and again the bell rang to work. At eleven its notes proclaimed dinner, when in they flocked with their baskets to receive *posole* and a piece of beef. *Posole* consisted of boiled beans and corn or wheat. At twelve o'clock they were again warned to their labors, which concluded a little before sundown to afford them time to receive supper, which consisted of *asole* or mush. If a gang were at a distance, a copper kettle and attendant accompanied to provide food on the spot.

After twelve o'clock on Saturdays, soap was distributed, and all the world went a washing of clothes and persons, to make a decent appearance at church on Sunday. Saturday night was devoted to playing *poce*, and with few exceptions, none slept, for whites and Indians, men, women and children, were generally present.

After service, on Sunday, football and races were on the carpet until the afternoon, when a game called by the Scotch "shinty," and I believe by the English, "bandy," took place.—One set being composed of all men and one of all women. People flocked in from all parts to see the sport, and heavy bets were made. The Priest took a great interest in the game, and as the women seldom had less than half a dozen quarrels, in which hair flew by the handful, it pleased him very much. The game being concluded, all went to

prayers, and so ended the Sabbath.

He died in 1833, regretted by all the community, and leaving every one who knew him sad at his loss.

His course was a good one, yet probably the Padre Salvedea's was equally so. It was required in his time, no doubt, and the step from the one to the other had a more beneficial tendency than had he from the first carried out measures such as those of Sanchez. He was succeeded by Padre Tomas Estenaga.

(LETTER NO. XXI.)

Decay of the Mission

The Mission, as received by the Padre Tomas was in a flourishing condition, but in 1834 (I think it was) the Mexican Congress passed a law secularizing all of the Missions, by which each Indian was to receive his share of land, gardens and stock; but immediately on the top of it a change was effected in the general government, and instead of carrying out the law, they abolished it. They, however, secularized them and ordered Administrators to have charge instead of the clergy. These facts being known to the Padre Tomas, he (in all probability by order of his superior) commenced a work of destruction. The back buildings were unroofed and the timber converted into firewood. Cattle were killed on halves with people who took a lion's share. Utensils were disposed of, and goods and other articles distributed in profusion among the Neophytes. The vineyards were ordered to be cut down, which, however, the Indians refused to do.

It did not require long to destroy what years

it morning, noon and night.

Although so severe to the Indians, he was kind in the extreme to travelers and others.—There being so much beef, mutton, pork, and poultry, with fruits, vegetables and wines, that a splendid public table was spread daily, at which he presided. Horses to ride on were at their service, and a good bed to sleep on at night. Whenever ready to start either up or down the coast, horses and a servant were at command to go as far as the next Mission.

Having brought the establishment and every thing connected with it, to the climax of perfection, he had still calculated on doing more. He purchased large quantities of iron, with the intention of railing in all of the vineyard and gardens. But, alas! even Catholic societies are not proof against the "capital sins" they so strongly condemn. Envy and jealousy stepped in and prevailed. He was ordered by his superior to the Mission of San Juan Capistrano. The loss of his favorite hobby capsize his reason, and after lingering for many years in a disturbed religious state of mind, he at length expired, regretted by all who knew his letter and gigantic intellect.

(LETTER NO. XX.)

Better Times

The Padre Jose Bernardo Sanchez had, for some time previous, been a colleague of Salvedea's but attended only to matters connected with the church. On the translation of Padre Jose Maria to San Juan, he became his successor. He was of a cheerful disposition, frank and generous in his nature, although at times he lost his temper with

the strange, unruly set around him.

He was a great sportsman and capital shot, both with rifle and fowling piece. Although no one could complain of Salvedea, in regard to his kind treatment, still there was a certain restraint in his presence, arising from his austerity and pensiveness, which even custom did not erase from the mind. Padre Sanchez was different; his temper was governed according to circumstances. In Ecclesiastical affairs, his deportment was solemn; in trade he was formal; in the government of the Mission, active, lively and strict; in social intercourse he was friendly, full of anecdote, fond of a joke, even to a practical one. Picnic parties were of weekly occurrence and generally held at the Mill, when, independent of a yearling heifer baked under ground, many other good things reigned on the table.

I cannot refrain from relating an anecdote connected with those parties of pleasure, as it shows the relish the old man had for anything ludicrous. A few of the actors are still alive, but the greater part have been gathered with the Padre, to the dust they sprang from.

Don J. M. M., an old Spaniard, who had large commercial relations with the Mission, having a negro cook, called Francisco, who was science itself in all relating to the kitchen, the Priest and M. made up a plan to carry out a joke at the expense of their guests. So having procured a fine fat little puppy, he was stuffed and roasted in a manner that would have tempted the most fastidious epicure to "cut and come again." This was brought on as a last course under the name

of lamb, with an excellent salad to correspond.

All ate of it and praised it much, with the exception of the two concerned in the joke.—After concluding with a glass of wine, the old man enquired of his guests how they relished the Dog? No one would believe it, until the negro made his appearance with the head and paws on a plate. Then a mixed scene ensued, which brought tears into the old man's eyes, while he nearly killed himself with laughter. All, of course, were squeamish, but while the quiet portion retired to ease themselves, in discharging the detested food, the pugnacious remained to fight M. first, and do the other afterward. The Padre eventually procured harmony, but for many a day after, roast lamb and salad were viewed with suspicion by the former partakers of his cheer.

The same regulations which had been observed by his predecessor, were still in force under him, but more lenity was shown to the failings of the Neophytes. Although the lash was ever ready, yet many other modes of chastising were adopted in its stead for minor offenses.

The general condition of the Indians was rendered better, and a more healthy state prevailed even in their morals. Many an Indian who had previously stolen and committed other acts of insubordination, from a vindictive spirit, now refrained from such deeds, through the love and good will held to their spiritual and temporal ruler.

The purchases made at one time seldom exceeded \$30,000, consisting of domestics, bleached brown and printed; flannels, cloth, rebosas, silk

took to establish. Destruction came as a thief in the night. The whites rejoiced at it. They required no encouragement, and seemed to think it would last forever. Even the mere spectators were gladdened at the sight, and many of them helped themselves to a sufficiency of calves to stock farms.

It is not the intention here to give a detail of all that occurred, as our line, as marked out from the first, relates merely to the Indians, and to other persons and things only so far as they are connected with them.

General Figueroa, having been appointed political Chief and Comandant General of the territory, arrived, and his adjutant, Col. Nicholas Gutierrez, received the Mission from the Padre Tomas, who remained as minister of the church with a stipend of \$1000 per annum from the establishment, independent of his synod from the Pious Fund in Mexico.

As a wrong impression of his character may be produced from the preceding remarks, in justice to his memory, be it stated that he was a truly good man, a sincere Christian and despiser of hypocrisy. He had a kind, unsophisticated heart, so that he believed every word told him. There has never been a purer Priest in California. Reduced in circumstances, annoyed on many occasions by the petulance of Administrators, he fulfilled his duties according to his conscience, with benevolence and good-humor. The nuns, who when the secular movement came into operation, had been set free, were again gathered together under his supervision and maintained at

his expense, as were also a number of the old men and women. Everything he got was spent in charity upon those of the rancharia whom he considered as worthy of it and they remember him with gratitude and affection.

The Indians were made happy at this time in being permitted to enjoy once more the luxury of a tiled dwelling, from which the greater part had been debarr'd for so long; they could now breathe freely again.

Administrator followed Administrator, until the Mission could support no more, when the system was broken up. I shall make no remarks here on their administration; it is to be presumed they complied either with their instructions or their own ideas.

The Indians during this period were continually running off. Scarcely clothed and still more scantily supplied with food, it was not to be wondered at. Nearly all of the Gabrielions went north, while those of San Diego, San Luis and San Juan overrun this county, filling the Angeles and surrounding ranchos with more servants than were required. Labor in consequence was very cheap. The different Missions, however, had Alcaldes continually on the move, hunting them up and carrying them back, but to no purpose; it was labor in vain.

This was a period of demoralization. People from Sonora came flocking in to assist in the general destruction, lending a hand to kill off cattle on shares, which practice, when at last prohibited by government orders, they continued on their private account.

These Sonoreno overrun this country. They invaded the rancharia, gambled with the men and taught them to steal; they taught the women to be worse than they were, and men and women both to drink. Now we do not mean or pretend to say that the Neophytes were not previous to this addicted both to drinking and gaming, with an inclination to steal, while under the dominion of the church; but the Sonorenos most certainly brought them to a pitch of licentiousness before unparalleled in their history.

(LETTER NO. XXII.)

First

Having given a sketch of the Angeles County Indians from the time they were the free, natal possessors of the soil, living contented in a state of nature, until these civilized times of squatting and legislative oppression, in which not only they but those bearing their blood in a fourth degree, are included, to the shame of this our country, and disgrace of the framers of such laws, I shall now conclude them, with a very short review of how far their ancient manners and customs remain in force among the handful left of a once happy people.

Their former lodges are not now in existence, and most of the Indians remaining in the county are from other parts—from Santa Ynez to San Diego. A few are to be found at San Fernando, San Gabriel and the Angeles. Those in service on ranchos are a mere handful. You will find at present more of them in the county of Monterey than in this, excluding the three places named above. Death has been busy among them for years past,

We got a letter one day, somewhat official looking, from Pierre Restany, the prominent French art critic. He was interested in the San Diego phenomenon (that being Eleanor Antin, David Antin, Allan Kaprow, ourselves, and maybe Emanuel “Manny” Farber), and he was coming to town. We met him at the airport. Suddenly it was important that we go to the nearest bar. Drinking took place. More drinking took place. One of us got into an argument with him about Immanuel Kant, proposing that Kant’s categorical imperative was a contradiction in terms. (After all, if one was to spend a lot of time thinking about that which was categorical, imperativeness disappeared. Conversely, if something was already that imperative, who had the time to worry about categories?) We said that we understood the intention, that is to say, find a rule, the following of which would save you from doing wrong. But it seemed like an awful lot of work in order to be saved from doing wrong. We liked Pierre. He had evidently written to all of us separately. We brought him around, and he was fascinated by the *Lagoon Cycle*.

A year passed, and in late 1975 we heard from him again. He had become one of the commissioners for the 1976 Venice Biennial. They were creating the artist groupings, including many conceptual artists—Hans Haacke, ourselves, the Antins—and would we do a work? The answer, of course, was yes. Who turns down the Venice Biennial?

At about the same time, Sargon Tont showed up in our studio with a map. (He knew we liked maps.) He said, “Can you believe this? Look at what the United Nations Convention on the Law of the Sea wants to do with the world ocean.” The map presented a hypothetical division of the sea floor, showing how it might look if it were divided along lines equidistant from the closest points of adjacent or opposite coastal states and islands, as a basis for the establishment of exclusive rights to the exploitation of deep sea minerals.

Clearly, the map gave every country that had land at the edge of the waters of the ocean the right to extract minerals from the ocean bottom, fish in any amount—and minerals from the



ocean water, too, if anybody thought about it. Among the many problems that leaped off the surface of this map was who did well and who did poorly. (If your country did not touch the ocean, you were just plain out of luck.) So we redrew the map, putting the corresponding country’s flag in each section of the ocean. We called the work *Wherein the Appetite Is Discovered to Be Endless*; later we added two commentaries, with additional maps. The first commentary, *Wherein the Argument Is Discovered to Be Endless*, points out a few of the anomalies and ironies that result from any politically based system of division that ignores the workings of the ecology. The second, *More on the Endless Argument*, addresses the essential metaphor embedded in the concept of this style of division.

Viewers of the work also found it disturbing and wrote comments, some caustic, some political, some amused.

Wherein the Appetite Is Discovered to Be Endless:
The Law of the Sea Conference,
Venice Biennale, 1976

The Law of
the Sea Conference

Where the Appetite

Is Discovered to Be Endless

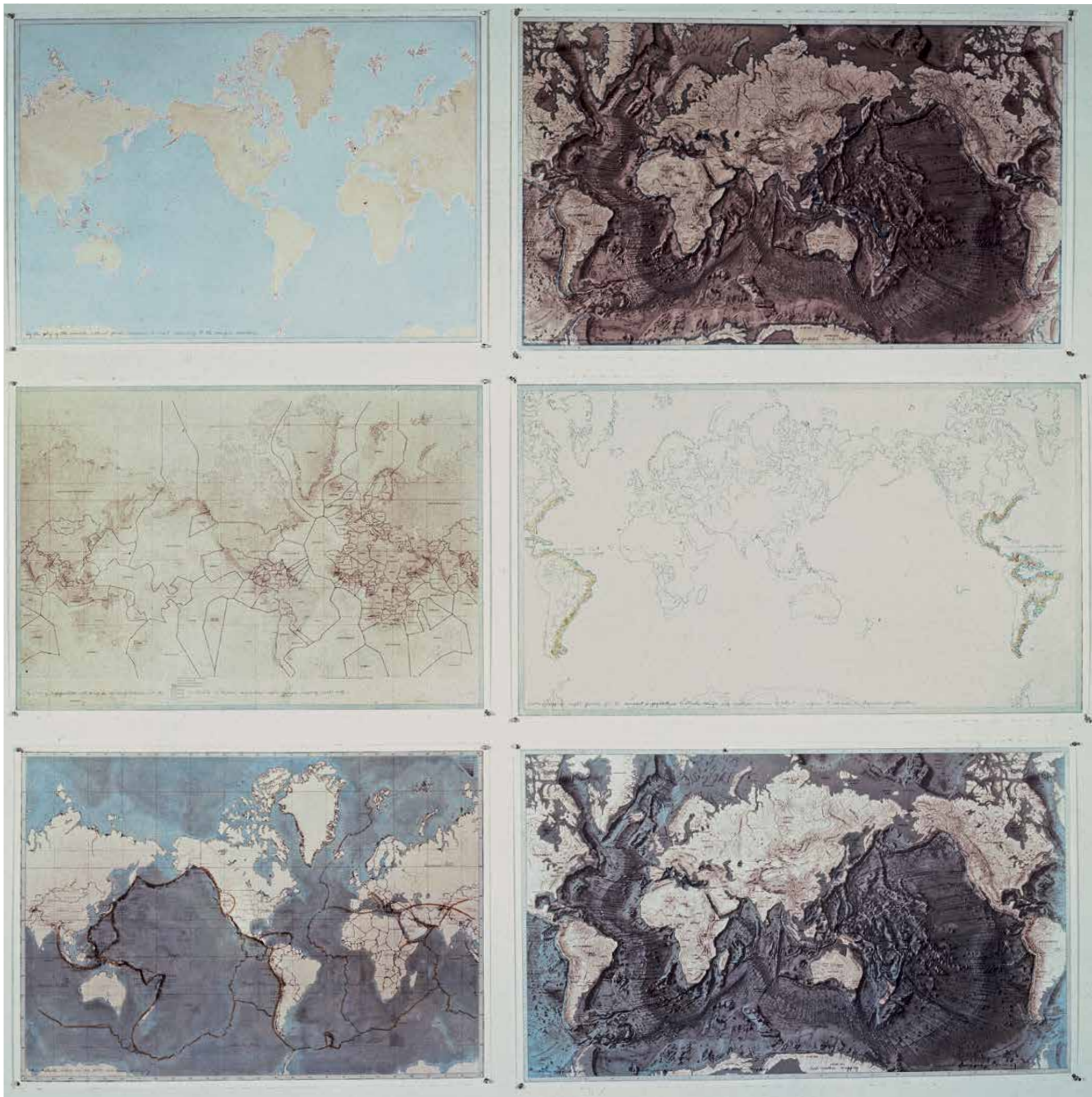
1976 Venice Biennial

1979 The High Museum of Art,

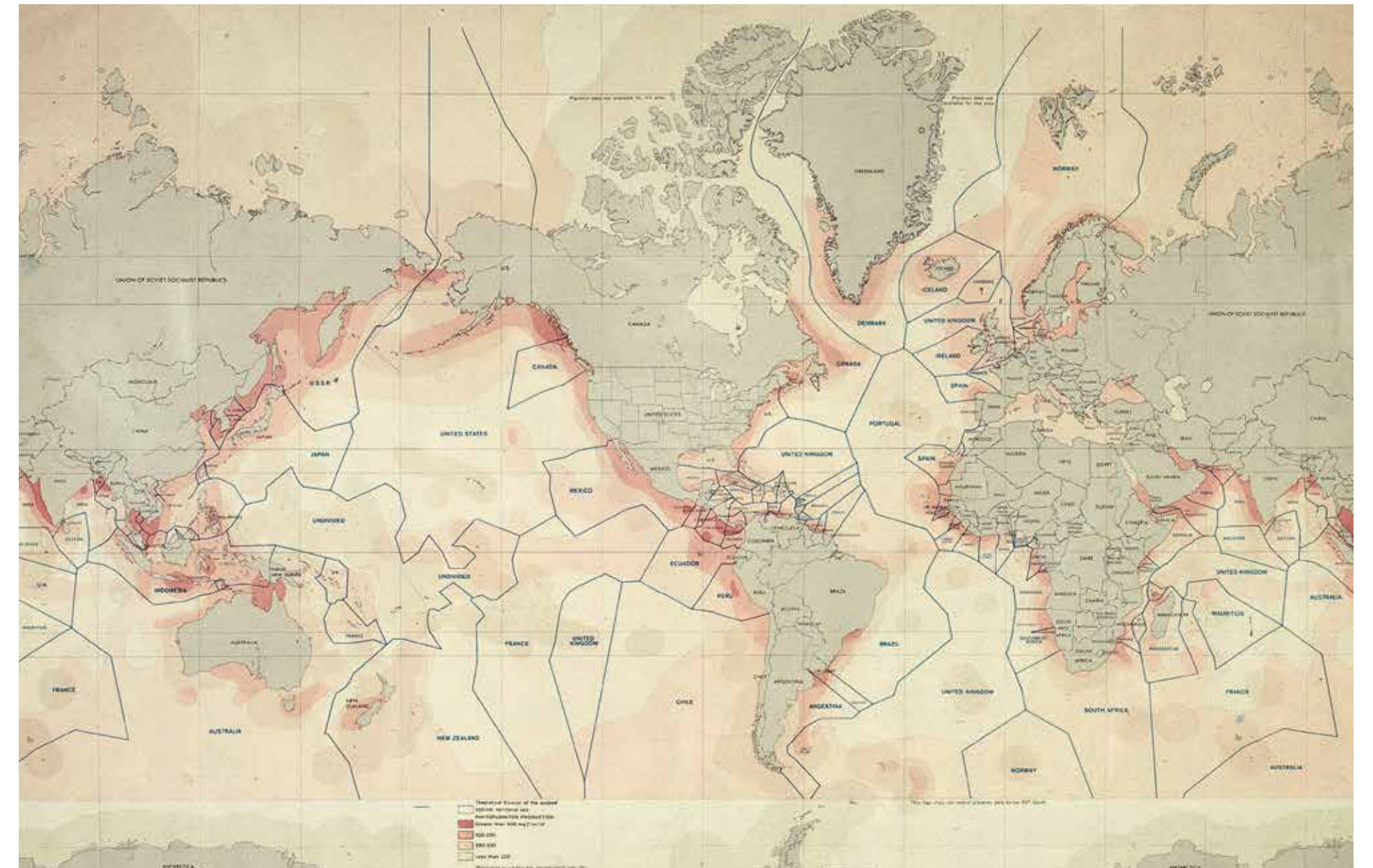
Atlanta, GA

2012 Ronald Feldman Fine Arts,

New York



6 Sketches from *More on the Endless Appetite*



The offending map, where the excessive properties of the *Endless Appetite* become clear, presented for the United Nations Convention on the Law of the Sea in the early 1970's

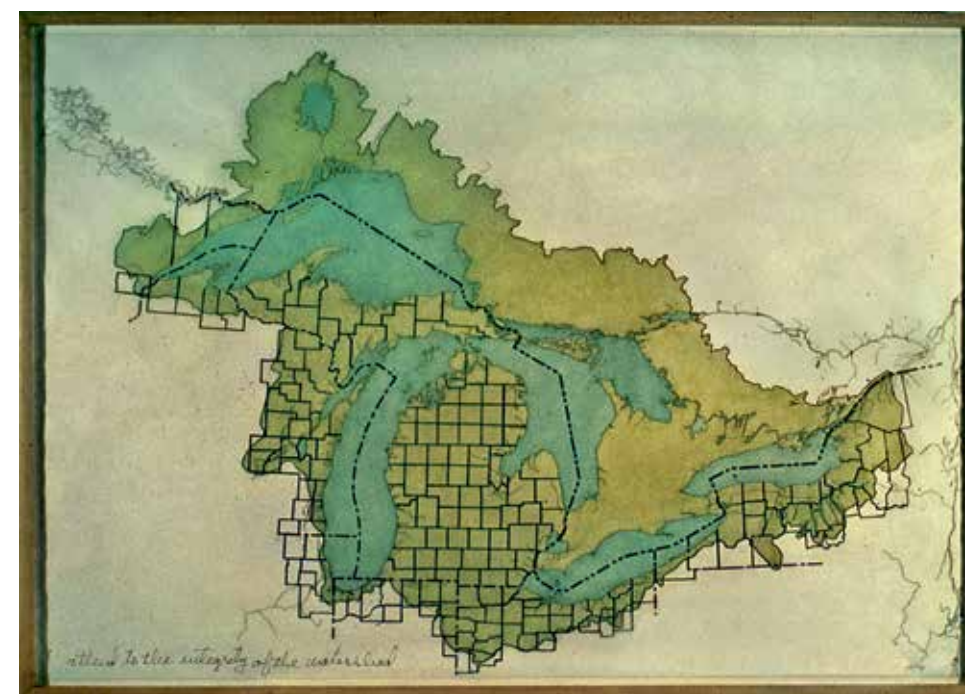
1 attend to the integrity of waters



2 attend to the integrity of land



3 attend to the integrity of the watershed



4 begin again



Meditation on the Great Lakes of North America

1977 Center for 20th Century Studies,

University of Wisconsin, Milwaukee

1978 Ronald Feldman Fine Arts,

New York

1980 *Drawing Number IV: Begin Again*,

exhibited Venice Biennial,

American Pavilion, Italy

We did three meditation works in 1976: *The Sacramento*, *Gabrielino*, and *Great Lakes Meditations*. After the fact, we realized that various poet and artist friends of ours were also doing meditation pieces; still later, we understood that ours were actually scanning and thinking pieces, rather than meditation works. It was in this same period that we invented our fundamental contract: We would go to a place only by invitation; we would accept an invitation only if it included some means for networking into a larger community; we would agree only to go for a week or two at first, to think and research. To earn our way we would sing for our supper, so to speak, by speaking or performing. If an idea of consequence to us came forward, we would present it, and if funding and interest arose, we would enact and evolve whatever concept emerged. We took for

granted that the work would be eco-political in nature because that is who we were as artists. We also took for granted that simply having the opportunity to make the proposals would not be enough to cause them to be enacted.

So in 1976, at the request of Michel Benamou, we went to Milwaukee, to his institute on the edge of the Great Lakes (Center for 21st Century Studies at the University of Wisconsin). After some study on our part, he asked what we wished to do. We commented that the United States and Canadian governments and most of the people in both countries had a seriously bizarre belief: They believed that you could draw on water. We offered to demonstrate; Benamou said, “No, I believe you that you cannot draw on water.” Then he asked again, “What do you have

in mind?” We said, “You know, some lunatics many years ago drew a line across the Great Lakes of North America, as if they could. Then they gave half of the Great Lakes and the Great Lakes Watershed to a country called Canada and they gave the other half to the country you are standing in.” Michel asked for a third time, “What do you have in mind?” We said, “We wish to propose that the people of the Great Lakes Watershed of the United States and Canada withdraw from these two countries and collectively form a Dictatorship of the Ecology.” Benamou liked this idea.

We discovered that waves of pollution in Lake Michigan came from Chicago and landed on Milwaukee’s shores. Yet it appeared that everyone thought you could drink the water. So we first did a performance that began by questioning, “Why

can’t you drink the water? Why can’t you eat the fish?” Annoyed people spoke loudly from the audience, “You can drink the water! You can eat the fish!” From a box, we produced about a 100 cups; we were about 1.6 kilometers from the water. We began to pass out cups to the audience, saying, “Since you can drink the water, by all means, let us go down and drink.” There was a burst of hostility—then there was laughter! A discussion followed about why or how we had gotten ourselves into such a fix that we had to purify the water of such a vast lake. Did they realize that once upon a time—not long ago—Lake Superior, a glacial lake, was so pure that its particulate matter was less than 50 parts per million, but that mining and other forms of pollution had dramatically raised the level? Thereafter, we presented four images,

maps of the Great Lakes variously modified, each supporting in one way or another the proposal that we were making. The proposal vigorously argued, in a semi-poetic text, that the citizens of the watersheds of the Great Lakes of North America should withdraw from Canada and the United States and generate a Dictatorship of the Ecology, for reasons of survival (of both ecosystems and cultural systems). The text began to outline what the dictates of the ecology might look like.

We raised the question, “Would it be enough?” and found that whatever we proposed would not be enough to create such a dictatorship of the ecology. We were told again and again that our proposal was an impossible, utopian proposition. Both the ironies and the critical reflections on systems were lost.

1970's

Meditations
on the Sacramento River,

the Delta, and

the Bays of San Francisco

1977 San Francisco Art Institute, CA

San Francisco Museum of Modern Art, CA

1979 Los Angeles Institute of Contemporary Art

2011 Museum of Contemporary Art,

Los Angeles

et al.



Lynn Hershman Leeson gave us a call. She was coming by the University of California, San Diego (UCSD) campus and wanted to stop in at our studio in the water tank. She said she was running a metaphorical museum or a conceptual museum—not a physical museum, but she had some funding. Since its existence moved from place to place, she called it the *Floating Museum*. She looked at our work and saw the Salton Sea, pieces from the *Lagoon Cycle*, and drawings of watersheds. She asked if we wouldn't do a work that was local to her area, something perhaps on the Sacramento River. So after much talking back and forth about her work and our work, we went up and looked at the Sacramento River and went along its borders, except it didn't look like a river; it looked like a canal, a big canal.

It didn't take long to discover that the California water system for the Central Valley was fed in the main by rivers that come down from the Sierra Nevada, that all but a few of the rivers were dammed, and that 90 percent of the water went to irrigated farming, 2 632 000 hectares of it. But it did take a long time to get a clear grasp of which special interests, big monies, and politicians had collectively demanded and deployed virtually all these waters to the advantage of irrigated farming and to the disadvantage of farmers elsewhere, and to the disadvantage of the earths and waters so deployed, and of the original Japanese whose farms had been confiscated. It was shocking to discover that one could buy 3 700 cubic meters of water, almost 3.8 million liters, for about 25 dollars. And 3 700 to 7 400 cubic meters of water were sufficient to grow three crops per year

in many parts of the Central Valley. This virtually ended the ability of farmers in the East and New England to compete. (There was, however, a really nice unintended consequence: In the abandoned farmlands of the East, the New England forests returned.) The first people to figure out this state of affairs and to raise a protest were the members of a 1973 Ralph Nader study group, who were ignored (as were we, except in the art magazines).

We designed *Sacramento Meditations* as an ensemble of events and images. 10 texts and their corresponding maps form the central image of this work, 14 meters long and two meters high, in 10 parts. Each of the 10 mappings of the state of California consists of a drawing, a satellite photo, a political boundary map, and maps of water resources, irrigable land, and topology.

The work included 11 posters, each beginning with the text "For instance ... if ... " and ending with "What if all that irrigated farming isn't necessary?" These were posted on streetcorners throughout San Francisco by us, Suzanne Lacy and her class at the San Francisco Art Institute, and others. There were also two huge brown and blue billboards that said "Water." Sidewalk graffiti was written in chalk, such as "Somebody's crazy, they're draining the swamps and growing rice in the desert", "Let every community empty its wastes upstream from where it takes its drinking water", and so on. There

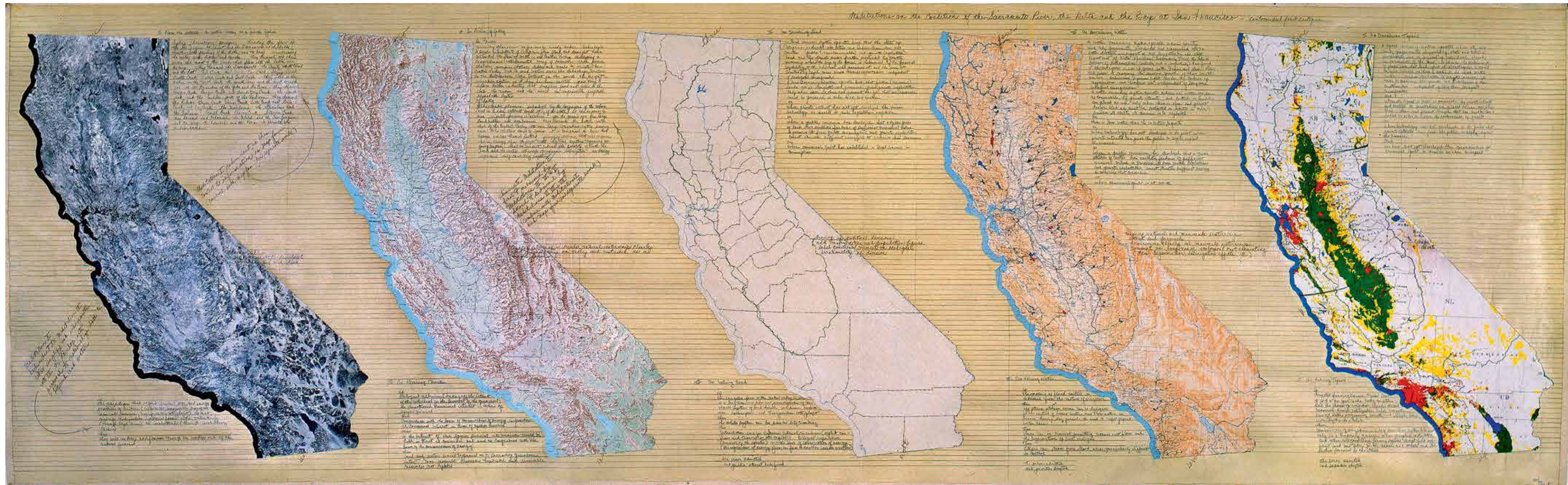


Performing at San Francisco Museum of Modern Art (MOMA), 1977

The 10 texts were designed to be read in two voices, male and female. They were also designed to be read collectively in about 13 minutes or about one minute 10 seconds per image. The discipline set out to answer the question of how much information you could compress and in how short a reading time for understanding to take place of extremely complex eco-political observations, leading ultimately to the understanding that all Central Valley operations—farming, water usage, damming—were a form of extraction operating in indifference to the laws of the conservation of energy and therefore in the relatively short term were self-canceling.

were performances that included the simultaneous but slightly off-beat reading of a four-page bibliography called "Overload." Further, there were several radio spots and a series of bits of "advice" to important water bureaucracy personnel given via the personals column of the local paper. Each bit of advice was derived from the Buddha's eight-fold path and applied to water. For instance: "Dear Ron Robie: Right water thought", "Dear Jerry Brown: Right water action." *The San Francisco Inquirer* stopped our advertising campaign; they didn't want secret messages sent to public officials through their personals column. We thought it was pretty personal—and what was the matter with taking a Buddhist position on water distribution?

The *Sacramento Meditations* owes its existence to six months of research at the University of California, Berkeley Water Resources Center Archives (now in Riverside), which for many years after displayed a set of the original posters. All the information presented that was not public knowledge when the work was first done has since become readily available. However, although 263 200 of the 2 632 000 hectares under irrigation have long since become too salty to farm, and the wetlands at the end of the reversed flow of the San Joaquin have become deadly, and several severe droughts have made people begin to question water priorities ... subsidized intensive irrigated farming continues. Cities are competing for the water and drought is on the way.



Meditations on the Sacramento River,
the Delta, and the Bays of San Francisco,
first sketch, 1976
San Francisco Art Institute



The Ten Meditations on
the Condition of the Sacramento,
the Delta, and
the Bays at San Francisco

I. From the Satellite the Central Valley Is One Farm

Diking, channelizing, pumping
Diverting the flow of the San Joaquin River at Friant and the Sacramento River at the delta
Limiting the flushing of the delta and the bays
Crisscrossing the valley with ditches and canals
They dammed all the rivers and most of the streams that
Flow into the delta and the bays
They dammed the Sacramento River, the Trinity River, the McCloud River and the Pitt River
Fall Creek, Hat Creek, Cow Creek, Stony Creek, Battle Creek
Putah Creek and Butte Creek
They dammed the Feather on the North Fork, the South Fork, and the West Branch,
and all the branches of the Yuba River and the Bear River
They dammed Oregon Creek, Canyon Creek, and French Dry Creek
The South Fork and the Middle Fork of the American
They dammed the Rubicon River, Brush Creek, Silver Creek, Tells Creek, Gerle Creek, and Dry Creek
The Mokelumne River, the Stanislaus River, the Tuolumne River
Angel Creek, Cherry Creek, Sullivan Creek
They dammed and re-dammed the Merced River and the San Joaquin River
The Kings, the Kaweah, and the Kern
To irrigate over 2 632 000 hectares

II. In Praise of Folly

Visionary planners ingeniously using modern technologies to
secure inhabitants of California from flood and drought
have controlled the flow of water in the Central Valley,
developing a comprehensive, interconnected array of reservoirs, dams, power stations,
pumping stations, ditches and canals, to irrigate the Central Valley and to send waters over
the Tehachapi Mountains to the metropolitan water district in the south
The largest irrigation system in history has been created
generating an eight billion dollar industry that supplies food and fiber to the state, the nation,
and the world
an improvable, profitable, expandable system of folly
Technocratic planners subsidized by the taxpayers of the nation (and in hidden interest
gifts by the state) at the expense of non-irrigated farming elsewhere
For the profit of a few large landholders and agri-business

have turned the entire watershed of the Central Valley into one large irrigation system serving
over 2 632 000 hectares of farmland
It is composed of dams that become useless thru silting, a pumping system that will use more
energy than the project creates, a diking system requiring ongoing repair, that in concert
reduce the quality of both the land and the water through progressive salinization and an
energy-expensive self-canceling system

III. On Devaluing Land

A land-division system operates such that the State of California is divided into cities and Indian
reservations, counties, public (nonconsumable) and private (exploitable) land and the private
sector further subdivided by private ownership, where the size of the parcel is determined
by the financial capability of the individual who possesses it and the use is limited by legal codes
biased toward exploitation, independent of long-term ecological consequences

A land-consuming system operates such that public (communal) lands are so designated and
preserved from private exploitation only when there is clear and present danger that
one resource must be preserved in order to exploit another

Or
When private interest has not yet developed the vision,
technology, or market to make exploitation profitable
Or
Where a public consensus has developed that a given piece of land has aesthetic features
of sufficient communal value to preserve it from private consumption, and private exploitation
cannot muster sufficient energies to override that consensus
Or
When communal guilt has established legal barriers to consumption

IV. On Devaluing Water

A water-consuming system operates where county and city governments, subdivided and
reassembled into 32 water districts, in support of and supported by the State Department of Wa-
ter Resources (historically) and the federal Bureau of Reclamation (initially and in perpetuity), have
found it advantageous to use up groundwater basins and dam streams and rivers to
maximize the economic growth of their constituencies, subsuming “riparian rights” under the
doctrine of “appropriation and beneficial use,” independent of long-term ecological consequences



The Ten Meditations

Where all waters are seen as consumable by private interest, and controls or limitations are placed on use only when there is clear and present danger that use must be controlled or limited in order to preserve its ability to continue to be exploited

Or

There is less water than the collective requests

Or

Where technology has not developed to the point where private interests can push the public to safely exploit the resource

Or

Where a public consensus has developed that a given stretch of water has aesthetic features of sufficient communal value to preserve it from private exploitation and private exploitation cannot muster sufficient energy to override that consensus

Or

Where communal guilt is at work

V. On Devaluing Topsoil

A topsoil-consuming system operates where city and county governments, in support of individuals already in possession of the land, to insure the continuance of profit from that land, find it advantageous to commit as much acreage as there is water available or as much water as there is acreage available in order to maximize the growth and fiscal power of their constituencies, independent of long-term ecological consequences

And

Where all topsoil is seen as consumable by private interests and controls or limitations are placed on use only when there is clear and present danger that use must be controlled in order to insure the continuance of profit

Or

Where technology has not developed to the point that private interests can push the public to safely exploit the resource

And

We have not yet developed the consciousness for communal guilt to arise in relationship to topsoil

VI. On Valuing Topsoil

If

Irrigated farming causes topsoil loss of 0.5 centimeters to five centimeters per year in the best of conditions and the process of irrigation degrades the soil remaining through salinization

While irrigation runoff waters progressively salinate and entropy the water system as a whole

Then

Massive use of irrigation is a self-canceling system to be used only as a temporary measure

Then

surplus is depleted and other soil-generating farming systems do not yield sufficient food and fiber for the nation as a whole and collective survival is threatened

The error admitted
and subsidies shifted

VII. On Valuing Water

If

the process of flood control is detached from the motive of irrigation

then

Off-stream storage areas can be designed for the control of excess waters and those waters released during dry periods or used to refill ground water basins

Then dams can be removed permitting normal silt flow and the regeneration of river ecologies

Then citizens can move from flood areas particularly difficult to control

The error admitted
And priorities shifted

VIII. On Valuing Land

If

The irrigated farm of the Central Valley is seen as a long-term net loss and paradigmatic of the overall system of land division, sub-division, exploitation, consumption and transformation into profit

Then

The whole system can be seen as self-canceling

Then

Contradiction emerges between socio-economic paradigm (exploit, consume, and transform into capital), biological imperative (survival of the species), and the laws of the conservation of energy (transfer of energy from one form to another always incurs a net loss)



The Ten Meditations

The error admitted
And public interest redefined

IX. On Revaluing Priorities

If
Biological altruism (trading off the interest of the individual for the survival of the gene pool)
is functional communal interest
in terms of species survival
and
Congruence with the laws of conservation of energy is functional communal interest
in terms of species survival
Then
In the interest of our species survival all resources
would be held in trust as communal and used in congruence
with the laws of the conservation of energy
Then
Land and water would be passed on to succeeding generations intact, nonrenewable resources
husbanded, and renewable resources not depleted

X.
If
The paradigms that inform the present use and energy
practices of culture (exploitation, consumption, transformation into possession, transformation
into profit) do not undergo modification by social forces
either voluntarily (through legal means) or involuntarily (through revolutionary means)
Then
They will undergo modification through the working out of the natural forces (read entropy)

The *Sacramento Meditations* ends with the idea that in its present state the whole
system is in violation of the laws of conservation of energy, and is by its very nature
self-canceling.

The posters were put up
on San Francisco street corners
and in public restrooms
with Suzanne Lacy's
performance class at California
Institute of the Arts.



The original images overlaid
on a Google map of farming
of the Central Valley





1970's Spoils Pile Reclamation

1977–1978

Art Park

Lewiston, NY

In the summer of 1977 the director of Art Park gave us a call. Would we be interested in coming out and doing something?

Art Park was an early example of taking a place that was in bad shape and giving it to artists who would presumably improve it, make it valuable. Basically, Art Park was a spoils pile. There had been a big hole in the ground due to rock quarrying near where the Niagara Power Plant was built. The waste from the building of the power station, mostly concrete and steel, some rubble, was dumped into the quarry until the quarry was filled. Thereafter, a thin mixture of clay was put on top, and occasionally very sturdy grasses showed up. Most of the time, when it was dry, the surface turned into a pattern of thin and thick cracks, reunifying when the rains came. (It was near Love Canal, but we had no idea at that time of the dangerous pollution there.) Artists had been working at Art Park for a while when our turn came. Dennis Oppenheim had cut holes in the bottom of a 190-liter drum full of oil and had an airplane fly back and forth over the almost 16 hectares of the park, making a giant drawing. Alice Aycock was doing something underground. Nancy Holt was making ponds that reflected the Pleiades. Agnes Denes was chaining trees in a symbolic work of eco-criticism. Many others were working there as well.

Our son Josh visited the site with us. We began talking about a reclamation piece that would restore the 16-hectare surface in such a way that things would grow there again. We found the idea amusing, to see if we could make a 16-hectare grass-land/flower field/pasture of some kind, where all the other artists could make work on our work. We would be the field, and they would be the figures within it, speaking in Bauhausian terms.

Josh made a remarkable discovery. He found that all the towns around Art Park, Lewiston in particular, were required by the Environmental Protection Agency (EPA) to rebuild their sewer systems. As a consequence, many truckloads of earth, some sub-soil, and some topsoil were to be carted to a landfill many kilometers away. Through an inspired series of negotiations, Josh got the towns to commit the earth to Art Park. He also got the towns to commit their organic waste. The contractors were ecstatic. Not only did they save money on gas and mileage, but they also got a tax deduction for donating material to a work of art. The Art Park people, thinking that we were talking about only half an hectare or one, gave us permission to proceed.

3 000 truckloads later, the now frantic leadership of Art Park demanded that we cease bringing truckloads of earth there forthwith. We refused, saying we had covered only about 8.5 of the 15.8 or 16 hectares. Therefore, the work of reclamation was unfinished, and they would be left with half a spoils pile and half a meadow. They said they didn’t care. They wanted to know where other artists would put their work next year. Actually, we thought they were fearful of criticism. We said other artists are creative. The Art Park leadership forced the issue. So we called up an old family friend named Lillian Poses, who had been a lawyer to Eleanor Roosevelt and was famous for negotiating difficult labor situations. We told her about our problem. She was an art collector; in her living room were Impressionists of note, even a Paul Cézanne. She decided to come to the rescue of our imperiled work and called up Orin Lehman, who was then the director of New York’s state park system. We asked him for a favor, that he meet with us.

We met on a rather cold afternoon on the road at the border of our *Spoils Pile* piece. He said, “You have 3 000 truckloads here. Is that enough?” We said, “The work is only half done.” He said, “Half a loaf is better than no loaf.” We said, “No loaf would require removing 3 000 truckloads of earth.” Further, we argued that this was the first full-scale reclamation done as a work of art. We explained that it differed dramatically in form, process, and intent from the early Alan Sonfist forest work in the West Village that Lehman commented on. He was unmoved by our arguments. The Art Park leadership was unmoved. All earth deposition was stopped. The next year,

After we gathered and spread seed,
a bio-diverse meadow
grows in the first season.



Over 3 000 trucks came
over several months.

At the end of the first season
growth begins on its own.

Spreading of earths

Helen directs the bulldozers on the
mixing and spreading of earths.



directing bulldozers, we mixed the earth and organic material,
shaping it and smoothing it. The following year, Boy Scouts and
Girl Scouts were organized to collect seed from the surrounding
grasslands and meadows. The seed was scattered and half of
Art Park became a lovely meadow. It was our second meadow
(*Hog Pasture* having been the first).

The signage for the work was designed to operate within the
proposal format of conceptual art, stretching the permission a
bit by being so practical. At that time we were intending to
create a work of reclamation where our hand lay lightly on the
earth. We had the intent of not signing the work. Rather, we
had the intent of becoming anonymous, yielding authorship
with the exception of whatever comment it evoked in exhibi-
tions or critical writing (which turned out to be very little).

The second season's growth
becomes more stable and diverse.

The Lagoon Cycle

On the Order

of Its Becoming

1985 Herbert F. Johnson Museum of Art,

Cornell University, Ithaca, NY

1987 Los Angeles County Museum of Art, CA

1996 La Villette, Paris, France

et al.

Herbert F. Johnson Museum of Art, New York, 1985



Newton Harrison: The *Lagoon Cycle* was not created in sequential order, although it has a beginning, middle, and end. It also has protagonists, antagonists, and a hero that takes the form of a crab named *Scylla serrata* (Forsskål). It is a story told by the Lagoonmaker and the Witness in dialogue form. From some perspectives it behaves a little like a picaresque novel; from others like the storyboards for a movie.

Helen Harrison: It begins with the idea of community—but it is a community of crabs, which indexes to an ecosystem’s community, such as happens in estuarial lagoons. It also acknowledges and compares two cultures: that of the estuarial lagoon at Uppuveli and that of the City of Colombo in Sri Lanka.

If you want to grasp the core differences between the Lagoonmaker and the Witness, read the first and last text in the *First Lagoon*. How they scan what they hold to be important and what they see not at all; the one seeing culture as a context for understanding, the other seeing a crab as the source of his own well-being.

If you wish to understand the narrative, begin at the beginning.

If you wish to understand the beginning, begin with the *Second Lagoon*, then see the *Fourth Lagoon*—which is the first lagoon that we actually produced, for the exhibition in Cologne.

If you want to see a mini-discourse suggesting that the arrow of time goes in two directions, or by inference is multidirectional, read the first text, which asks Who are you? and Why are you my companion?

If you want to understand the argument on the delusions that can become embedded in experimental science, read the *Second Lagoon* which asks whether you can actually put a lagoon in a tank.

If you want to come to grips with the *Lagoon Cycle* as it struggles toward empathy, read the last text in the *Seventh Lagoon* ... but first, read the dream of the Witness, also in the *Seventh Lagoon*.

If you want to understand the *Lagoon Cycle*’s relationship to and commentary on the unintended outcomes of mega-technology, mostly harmful to nature, read the *Fifth Lagoon*.

If you want to encounter the *Lagoon Cycle*’s argument with mega-technology, look to the comparison between the 2000-year-old Sri Lankan water system and the Colorado River water system in the *Sixth Lagoon*.

If you want to come to grips with a love story that begins in opposition and ends in co-evolving empathy, reread the speakings of the Lagoonmaker and the Witness.

If you want to see how the crab, transformed into profit, evokes the problematics of greed and possessiveness, read the *Third Lagoon*.

If you wish to see a country in a state of stress, only months before a war between two cultures emerges, read the *First Lagoon*.

If you stand in the middle of the 325 square-meter *Lagoon Cycle* installation at, say, the *Fourth Lagoon*, and read that text, your understanding of the *First Lagoon* changes somewhat. The *Lagoon Cycle* exhibition is designed so that in encountering any one *Lagoon*, several others are visible from any position.

Finally, the *Lagoon Cycle* is intended to have no completed arguments and many loose ends. It is conversational in nature and explores the nature of conversation. Its expression could be understood as proto-chaotic and its existence as referential to complex systems.

The stories are told in the sequence in which the Lagoons were actually developed. The *Second Lagoon* came first, then the *Fourth*, then the *Fifth*. The *First Lagoon* was not finished until 1979, when we spent almost a month in Sri Lanka. The *Lagoon Cycle* may be read from beginning to end, but the work was actually fabricated starting with the *Fourth* and *Fifth Lagoons*. However, the *Book of the Lagoons*, which follows, has the *Lagoon Cycle* in the order that it was intended to be read from the *First* to the *Seventh Lagoon*.



Second Lagoon Cornell University, Ithaca, New York

The Second Lagoon Sea Grant

Our choice of creature for the *Portable Fish Farm* in 1971 had proved to be problematic. The catfish that were shipped to London from California were wrongly packed, and most did not survive. Graham Cox, an aquarium director, was dispatched to bring a new school of fish, and he did this with amazing skill. Nonetheless, the fish would not mate in the tanks. Graham introduced us to Ranil Senanayake, a herpetologist from Sri Lanka. He told us about a fast-growing, edible, cannibalistic crab in Sri Lanka, *Scylla serrata*, that was very hardy. It was the last to die when the tidal ponds dried up and could crawl across the land to find another pond; it mated in ponds four paces by five paces across and waist high. It was a favorite food of his people, but the foreign fleets were fishing them out.

We got permission via Scripps Institution of Oceanography to import the crabs for study, with the specific restriction that they were not to be released into domestic waters (due to the problems associated with exotic species). In April of 1972, Ranil's mother went to the market in Colombo, Sri Lanka, and collected about 30 live crabs, some still with pegs in their claws. She wrapped them in wet banana leaves, packed them in a cardboard box, and shipped them express. When they arrived, most of them were still alive! We transferred the survivors into two tanks that we had built at the Pepper Canyon facility at University of California, San Diego: four paces by five, waist high. From that point, the *Second Lagoon* was concerned with discovery:

mating, cannibalism, disease, taxonomic identification—the stuff that experimental science is actually all about. We did our best to simulate lagoon conditions in our laboratory. Ranil visited the lagoon at Trincomalee, Sri Lanka and collected and sent to us mangrove seeds, mud suckers, flathead mullet (*Mugil cephalus*), and bottom mud. But in November, the crabs began behaving strangely; they stopped eating and nearly stopped moving. Eventually we figured out that it was monsoon time in Sri Lanka, and the monsoon changed the salinity of the water and enriched the food supply. So we used a hose and fresh water to improvise a monsoon, and almost immediately the crabs became animated and began to behave differently. Soon they began to mate.

Several months after the first mating, an egg mass appeared on the underside of the female's stomach, and she was our first gravid female. We did our best to enrich the water in the tanks so that some of the eggs would move through the many larval molts necessary for a mature juvenile to emerge—and failed. Nonetheless, by simulating the monsoon we had answered questions about the mating behavior of this decapod crustacean that no oceanographers had managed to answer. Later we learned that a couple of scientists (from Hawaii and Australia) had jointly brought larvae to first juvenile molt; it was nice to know that our work had such a useful fit with other research. The stakes, however, turned out to be much higher than simply making a museum installation. Japanese and Russian fleets were fishing out the lagoons in Sri Lanka and many

other places; *Scylla serrata*—otherwise known as the poor man's food—which had once been abundant, were disappearing, and the population was at risk of collapse. We began envisioning a work of art that was a work of restitution, with ethical implications. We would create a protected environment in which the crabs could mate, and then release the gravid females back into the lagoons of Sri Lanka, replenishing the population. There was no political will elsewhere to protect them from being harvested to extinction.

Sargon Tont was an oceanographer at Scripps and the assistant to John Isaacs (also at Scripps, and director of the University of California Institute of Marine Resources). Sargon told John that we had decoded the mating behavior of *Scylla serrata* (Forsskål). John whom we knew well from earlier projects and from committee meetings at the university, came by the Pepper Canyon studio, looked at the work, and told us that we had just outdone a similar lobster project. He asked how much our work had cost, and we explained that we'd spent less than 15 000 dollars. The lobster project had received a 300 000 dollars California Sea Grant, but they had not gotten the lobsters to mate. John said, "Why don't you go for a Sea Grant, and do it right?" Our first application was returned to us—which is perhaps not a surprise, given that such grants are normally reserved for marine scientists, and not artists. But the following year, with a rewritten application, we were awarded a grant to study *Scylla*. "Doing it right" turned out to be working with a group of Sea Grant trainees and repeating our accomplishments a number of



Fourth Lagoon Herbert F. Johnson Museum of Art, New York

times in order to prove that what we had done was replicable, therefore meeting the requirements for “respectable” science. After doing the required repeating and note taking, we sent in our results, which were published in the prestigious *Sea Grant Law and Policy Journal*.

The Fourth Lagoon On Mixing, Mapping, and Territory

Dieter Ronte and Evelyn Weiss, curators from the Kunsthalle in Cologne who were looking for California artists for their exhibition *Project '74*, had come to look at *Crab Farm*. We promised them that we would do a fish-farm work for the show. We were looking to expand on what we’d done in the *Second Lagoon*. We had just finished our first conceptual sketch for the sequence of the *Lagoon Cycle*, with Sri Lanka being the *First lagoon* and Sea Grant the *Second*. The *Third Lagoon* took shape as a response to an imagined question: How much would a crab hectare cost, and how much would it earn? The *Fourth* and *Fifth Lagoons* would have something to do with the Salton Sea.

The *Fourth Lagoon* was the first one begun intentionally as part of the cycle. In a way, it was also the final correction on the *Portable Fish Farm*. The idea was to find a place where we could design a work on the ground; where there was water (both salt and fresh), land was cheap, and the temperatures close to tropical. This turned out to be on the shores of the Salton Sea, a shallow, saline lake in the Salton Sink area of the Colorado Desert in Southern California whose great attractions were that land



Los Angeles County Museum of Art (LACMA)

was selling for 120 dollars or less an hectare, and fresh water was available from the nearby All-American Canal for 20 dollars an hectare, or about 6.6 dollars for a million liters. We decided to scale up the crab farm and design a polyculture system on the shores of the Salton Sea. The design consisted of a sequence of gravity-fed ponds in which the waste of crabs in the bottom pond would nourish algae in the top pond which in turn would feed clams and mussels whose waste would nourish oysters in the middle pond, with the cockle and clam and oyster becoming the food for the crab. The overage would be harvested, with the harvest acting to preserve the system.

The *Fourth Lagoon* which was subtitled *On Mixing, Mapping, and Territory* not only mapped a polyculture system onto the Salton Sea but reframed the photography into the mapping and the mapping back into the photography, at the same time making clear that all this activity was happening at the base of the Chocolate Mountains, designated as a bombing range for a nearby Air Force base.

Though the Salton Sink has alternated between being a lake and a desert for hundreds of thousands of years, the modern-day Salton Sea was created at the beginning of the twentieth century by an accident in the process of controlling the Colorado River for irrigation; since then, it has become poisoned by agricultural wastes. The *Fourth Lagoon* developed as a flat-out argument against the monoculture paradigm that dominated the Coachella Valley, and within which the hundreds of square kilometers of the Salton Sea resided but did not flourish.



Fifth Lagoon La Villette, Paris

The area was socially desolate, consisting of docks and houses in small communities that may once have flourished but now were just remnants. Who, after all, would want to live and work with an agricultural sewer adjacent to a bombing range? With this realization, a new question emerged: If the Salton Sea was poisoned, could we find a way to clean it? This became the subject of the *Fifth Lagoon*.

The Fifth Lagoon From the Salton Sea to the Pacific From the Salton Sea to the Gulf

In 1975, John Goodyear invited us to Rutgers University to put up a piece in their exhibition *A Response to the Environment* and to talk to students. We offered the *Fifth Lagoon* which was in part funded by a University of California, San Diego (UCSD) research grant and in part by the Rutgers honorarium. In our first version of the *Fifth Lagoon*, we proposed to cut an input-output channel from the Salton Sea to the Pacific Ocean or through the Colorado River delta to the Gulf of California. Water would be exchanged through a system of pumps and pipes, and the salinity and pollution of the Salton Sea would decrease, so that it would become in effect an estuarial lagoon that could support a large-scale crab farm.

One day, as the exhibition approached, we were contemplating the three 2.4 meter-by-2.4 meter images on the wall that were then the *Fifth Lagoon*. They didn’t look so great to us: unclear in some ways, unfinished in others. Eleanor Antin had the studio



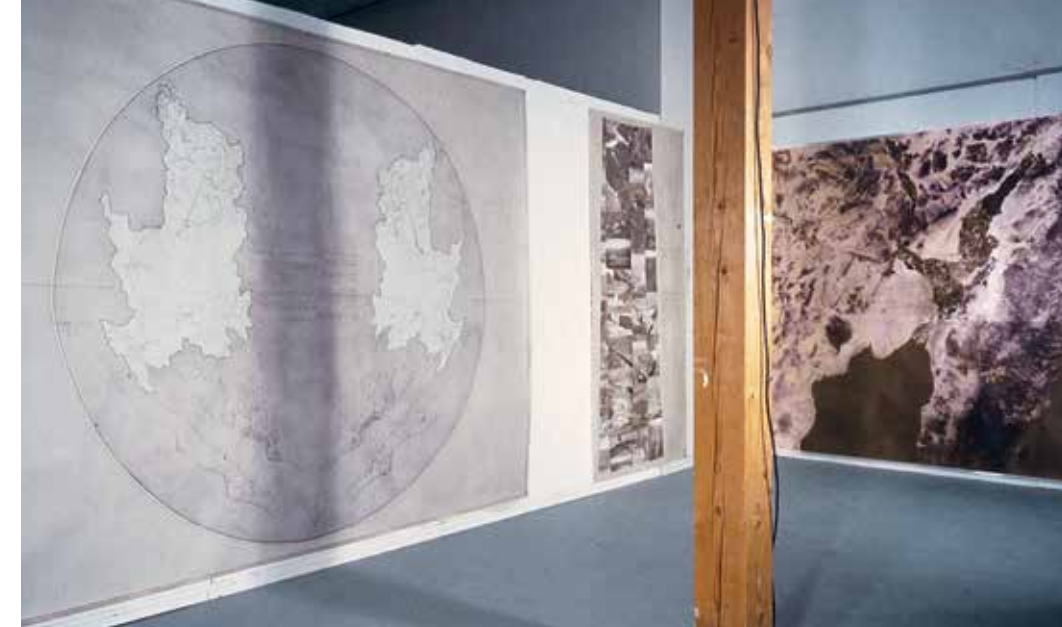
San Diego Studio

across the hall and was working away on one of her ballerina pieces; David Antin, the poet and art critic (and UCSD colleague, like Eleanor), often passed by to look and talk. So we asked him what he thought. “David, this work doesn’t look good enough to us. Will you give an opinion?” He spent about five minutes reading it, got close, backed away, and then began to laugh. “You call this work the *Fifth Lagoon*,” he said. “How many people in the world do you know who are making lagoons?” We replied that we were the only ones we knew. “Then how would anybody know that this was not your best lagoon?” Convinced, we sent the piece off to Rutgers, and everyone thought it was pretty good work—in fact, some were amazed. After the exhibition, when we brought the work back to San Diego, we rolled it up and made an entirely new lagoon, and then were satisfied.

It was late 1976. We were living in a large sprawling house in Del Mar on the beach. The telephone rings. A voice with an Italian accent says he would like to come down and discuss the *Lagoon Cycle*. I reply that of course he can come, and set a date. A week later a very large limousine pulls up to the house. Out steps the Italian critic who reintroduces himself as Carlo Amato. Then out steps an older man, perhaps in his late sixties. He says his name is John. I, Newton, pull the Italian critic aside, thinking he is the most important; I, Helen, pull the older man aside, knowing better. It turns out that this is John Kluge, the president of the multi-media conglomerate called MetroMedia, which produces rather original shows that feature characters like Archie Bunker and at the time supports the oceanographic research of Jacques



Third Lagoon Los Angeles County Museum of Art (LACMA)



Sixth Lagoon Ronald Feldman Gallery, New York



La Villette, Paris

Cousteau. We bring them to the studio. Kluge looks at the *Fourth Lagoon* and then reads the *Fifth Lagoon*. He is actually understanding them! There is kind of a joke in the *Fifth Lagoon* text and Kluge laughs at it. Carlo turns out to be Kluge’s art buyer and consultant. He had seen the *Fourth Lagoon* in 1974 at an exhibition in Cologne and concluded that John who has a degree in geology and was interested in ecological issues might want this work. Kluge who loves the scale and complexity that we work with has his lawyers make us a contract. There were seven *Lagoons*. MetroMedia contracts to buy the *Lagoon Cycle*, *Lagoon* by *Lagoon*, as we produce them. Kluge is a profoundly considerate patron. He instructs us to charge enough money so that we do not get into trouble at the end. John is known to have a golden touch. He comes to visit the studio to check our progress once a year, sometimes more often. Each time, it is in a bigger airplane. Finally, at the completion of the *Lagoon Cycle*, John shows up in a 747: very Air Force One. Two years later, after the arrival of our patron for the *Lagoon Cycle* John Kluge, the voices of the Lagoonmaker and the Witness were formally introduced. In the resulting new version of the *Fourth Lagoon*, it is the Witness who convinces the Lagoonmaker that the Salton Sea waters are too polluted and salty to function as habitat for the vast crab farm that the Lagoonmaker desires. And of course it had been the Lagoonmaker, taking the role of a megalomaniacal technologist, who proposed in the *Fifth Lagoon* to cut a channel either to the Gulf of California or across the mountains to the Pacific and flush the Salton

Sea with fresh seawater while flushing the polluted waters into the ocean. In the second version of the *Fifth Lagoon*, the Witness poses the questions that lead to the abandonment of the scheme: Who will flush the ocean? Who will flush the gulf? Nevertheless, our proposal to make the Salton Sea into a giant fish farm seemed so attractive to others that it was eventually forwarded to Governor Jerry Brown’s office, with the idea of enacting it on the ground. Because we had concluded that it was an environmentally unethical work to carry out, we forwarded the Witness’s questions to the governor, in order to forestall any action on our former proposal.

The Third Lagoon The House of Crabs

While we worked on the *Fourth* and *Fifth Lagoons* (and other projects), we continued to pursue the question of the *Third Lagoon*: How much would a crab hectare cost, and how much would it earn? Along the way, we met or were approached by many people with ideas for commercially exploiting such a project. Years later, as the *Lagoon Cycle* took its final form, the *Third Lagoon* was created from the stories of these encounters, followed by our response in which we arrive at a new understanding of the nature of the estuarial lagoon. The first story in the *Third Lagoon* concerns a man named Ted Hartley. We met him at a party in 1974, and he said he had a house in North Hollywood with different levels that cascaded down a hillside, the first level being his house, the second a ten-

nis court, and the third “a place waiting for something to happen.” He was fascinated by our stories of the crab, their mating, and Sea Grant. We said we were looking for a place to make an outdoor lagoon and wanted to experiment with how the crabs would behave in the outdoors and respond to the L. A. smog. After several meetings, a deal was struck. He would supply the land and cover the costs of building. We would supply the crabs, the expertise, the design, and the filtration system; our part of the work would be funded by the residues of Sea Grant monies. Collectively, we would create an outdoor piece that would be a work of art and science, behaving in part like an estuarial lagoon on his land. He would have the benefit of a complex work of art, and we the benefit of evolving our studies with the crabs. Over a few months—without the benefit of city inspection—we built a curved shape, 12 meters long by 3.6 meters wide, that reads, from one perspective, as a section of a river. It was two meters deep at one end and 0.6 meters deep at the other. The bottom was gravel with a lot of limestone, on top of tubes that filtered the water. Working with Ranil Senanayake, we seeded the structure with 163 juveniles from the lagoon at Negombo, Sri Lanka. We were particularly interested in cannibalistic behaviors. One day, Ranil came to us and said that he would no longer work for Hartley. “Hartley’s treating me like a servant!” Ranil cried. Ranil was an original Sri Lankan: the great-grandnephew of Don Stephen Senanayake who had agitated for independence and become the first prime minister of the new country. We explained to Hartley that he was lucky to have a representa-

tive of such a celebrated Sri Lankan family at work on what we were by then calling Hartley’s Lagoon, but Hartley just couldn’t handle the information. A few days later, in an article in the *Los Angeles Times*, Hartley claimed that he had discovered a crab called the “Asian Red” while on a trip to the tropics, and that he had Southeast Asian experts working on decoding the mating and cannibalism behavior which he intended to patent! Suddenly, Helen, Ranil, and I had become “Southeast Asian experts” in the service of the master entrepreneur Ted Hartley, and Scylla serrata (Forsskal) had become “Asian Red”! We were appalled by what to us were manipulative acts of bad faith, but evidently to Hartley were normal business practices. Ceasing all communication, we abandoned the work. Because we were still in the early stages, however, we had not yet gone over a critical piece of information: to control cannibalism, at least seven hiding places of diverse sizes were required, on average, per crab. A few months later there was another article which talked about how problematic it was to attempt to produce a crab farm. Apparently someone had attempted it, starting out with many small crabs but ending up with one very large crab who had eaten all the others. This very large crab had become dissatisfied in its habitat, climbed out of the pond, and ended up in the neighbors’ backyard, terrifying them! Some years later, in a meeting with the architect Jon Jerde, we learned that he had bought Hartley’s house, found the pond, and filled it in.



First Lagoon San Diego studio

The Sixth Lagoon On Dialogue, Discourse, and Metaphor

John Kluge, our patron, who flew in with Carlo Amato every year to see how we were doing, had just made his first 2 billion dollars. (Rupert Murdoch had evidently called him for a meeting, walked into his office, and without much palaver offered John 200 million dollars for his 20 television stations—in other words, 10 million dollars a station. Kluge sat smiling for a while, then looked up and replied, “Rupert, you left a zero off.” Murdoch said, “You want 2 billion dollars?” and walked out. Some months later, he offered the two billion!)

The subject matter for the *Sixth Lagoon* was the Colorado River watershed. We were scaling up: The *Fourth Lagoon* had been a proposal for a fish farm by the shores of the Salton Sea, with a small section of the sea itself as visual field; the next step was the *Fifth Lagoon*, which took the whole Salton Sea as a visual field, with the water production of the All-American Canal as the subject matter.

In the *Sixth Lagoon*, the Salton Sea shrinks and the whole Colorado River watershed becomes the figure; the violation of the river is the subject matter. The *Sixth Lagoon* was going to be a comparison between the Colorado River system, its water use and water policy, and the Sri Lankan river systems and their use and their policy (the subject of the *First Lagoon*).

So we asked John and Carlo if we could do both the *Sixth* and the *First Lagoons* simultaneously. MetroMedia agreed, though a little reluctantly. They preferred getting one lagoon

at a time, sort of like getting one episode of *All in the Family* at a time.

We had recently taken a break from the time-consuming task of creating lagoons in order to do the *Sacramento Meditations*. That work gave us the lens through which to look at both the Colorado River and the Sri Lankan water systems, and compare them. The Colorado did not fare well in this comparison.

To design the imagery, we used satellite photography for the Colorado and then made a drawing by hand of the whole river system, 2.4 meters tall.

We had Bob Bucknam fly the Colorado River and photograph every dam and diversion, then compared what modern industrial engineering did to the Colorado and what the 2000-year-old Buddhist influence and Roman engineering did to the Sri Lankan river systems.

It was astonishing to behold. So much forgetting had taken place; so much arrogance had infected modern design processes. Ethics and empathy for place had disappeared, replaced by a vast evolving system of resource extraction.

Sri Lankans had created flood control, water conservation, and water distribution systems by digging canals parallel to its rivers, and storing extra waters during flood time in depressions in the land (called tanks or reservoirs) utilizing earthen dams. It was labor-intensive. Buddhist monks controlled a system whose object was the well-being of the communities they served. By making one river behave as two rivers (through the canals), ecological values were doubled.



Conversely, the Colorado had been dammed and re-dammed, its ecosystems marginalized. So much water was taken from it that it no longer reached the Gulf of Mexico, negatively affecting the estuarine life there as well as the Mexican habitat that survived by grace of the river along its way.

We had subtitled the work *On Dialogue, Discourse and Metaphor* but had only a moderately clear idea of what a metaphor was. Then George Lakoff showed up on our doorstep. He was a linguist from Berkeley and was studying metaphor; he said, “What better place to learn about metaphor than from artists who use it all the time?” (After he visited with us he went up the hill a bit to visit with Eleanor and David Antin, and after that headed to Solana Beach to meet with the poet Jerome Rothenberg.) We talked about the way artists use metaphor and became friends, following each other’s work ever since.

Meanwhile, in our morning conversations, the Witness had posed the question in the *Fifth Lagoon*: Were we to flush the pollutants from the Salton Sea into the Pacific Ocean or the Gulf of Mexico, who would flush the ocean? Who would flush the gulf? The Lagoonmaker, now understanding that single-purpose mega-technological solutions bring unintended and often catastrophic long-term outcomes, evolved his character in such a way that from the *Sixth Lagoon* forward, the Lagoonmaker and the Witness speak in one voice.

Nonetheless, the *Sixth Lagoon* ends in a somewhat complex back-and-forth discussion of the cost of belief, which in its own way becomes a metaphorical cascade.

The First Lagoon The Lagoon at Uppuveli

With MetroMedia funding we were finally able to spend a month in Sri Lanka in 1979. We found lodging in Colombo, walked the streets, talked to many people, and listened to many stories. After our first week there, Upali Senanayake, Ranil’s father, took us under his wing. Upali was known as the Mahatma Gandhi of Sri Lanka. He took us to many villages and explained the tank and irrigation system which was 2000 years old and still worked well. He had spent his adult years trying to preserve village life, holding that a step back to the past was really a step forward into the future. He was much loved, but younger people (particularly in the government) felt him impossibly old fashioned.

We were sitting at a bountiful breakfast one day at his home. Around the table were people from Madame Bandaranayake’s government. The Minister of Environment was talking about the Victoria Dam on the Mahaweli River and the whole list of good things that would come from it, including electricity. We asked if Sri Lanka, which had only about 15,000,000 people on the whole island, was really short of electricity, since we certainly hadn’t noticed it as a problem! He said that they did have enough electricity for Sri Lanka to survive in the modern world they needed to modernize, maybe even constructing a nuclear power plant. We, fresh from our studies of modernization and its destructive properties (particularly along the Colorado River), spoke about the harms of creating dams, wrecking the



Seventh Lagoon San Diego studio

ecology of river systems, covering Tamil villages with water, and disrupting many lives. He said it was the cost of modernization, politely inferring that we were Luddites.

We were struck by how powerfully the sense of superiority of one group over another had embedded itself in the majority; they talked about the Tamils as second-class citizens. A newspaper reporter interviewed us the next day, asking our opinion of the proposed dam, among other things. We said they shouldn't believe the words of the foreign experts who told them they would help the Sinhalese people modify themselves to become modern. The headline in the following day's paper read "Foreign Experts Say 'Don't Believe Foreign Experts'!"

We traveled the country, meeting and talking with many. One of our journeys took us to the lagoon at Upouveli, where our crabs had come from. We met the fisherman. He wanted to know why we were interested in crabs mating, thinking us somewhat peculiar, until we explained that it was for scientific reasons.

Since we had mentioned in our first text that the *Lagoon Cycle* was a ten-year moment, it did not seem strange to us that Sea Grant and the *Second* and *Third Lagoons* happened five years before we visited the original lagoon. And it also did not seem strange to us that we had begun a story in the middle ... and toward the end, we were creating the beginning.

We continued our wanderings through Sri Lanka with a guide, who was a dancer and friend of Ranil's. Cedric took us to Kan-

dy where we stayed in the Queen's Hotel and were treated a little like the British Raj (although our accents were wrong). One rainy night, Cedric took me (Newton) to the Temple of the Tooth, which I misheard as the Temple of the Truth! This misunderstanding led to a very funny story in the *First Lagoon* which I refer to as "The Tooth and the Truth." We wrote our stories in short form in the *First Lagoon*, giving voice to many people. The *First Lagoon* leaned heavily on our sociologist friend Aaron Cicourel's approach to ethnomethodology. However, we also included, in some detail, the conversion story of Upali which was complex, being poetic, political, and spiritual. (Anthropologists later told us that the *First Lagoon* gave the best picture of Sri Lanka months before the civil war broke out, simply by speaking stories told to us by folk of a country only moments before war. We had come to believe that the Mahaweli Dam was one of the precipitators of the war in Sri Lanka.)

One day, after our return from Sri Lanka, Ranil visited us from Davis, where he was getting the very first PhD ever awarded in ecology. It was finally being acknowledged as a discipline, even though there was no overarching theory (which is how most disciplines knew that they were disciplines). We asked Ranil why he did not go back to Sri Lanka; did he not have responsibilities, given his family history? He said they might try to make him a minister, and he was not a good administrator—and, more importantly, he didn't want to become the victim of the "rubber



tire." "What's that?" we asked. He described how a person was tied up and immobilized, then put in the center of a gasoline-filled rubber tire lying on the ground. Then the gasoline was lit.

The Seventh Lagoon **The Ring of Fire, The Ring of Water**

By 1980, we had been plugging away on the *Lagoon Cycle* for close to seven years. The *Sixth Lagoon* was finished, as was the *First*. We decided to push the metaphor and take a risk.

In a morning conversation—a relieved morning conversation, as the *Seventh Lagoon* was reluctant to come forth—we completely yielded voice to the artist between us. That is to say, neither of us considered ourselves the artist anymore; by this time, both of us had come to believe, without any doubt, that a third entity co-created by us was the real artist. Because this entity didn't have hands, it could hardly sign anything; no one could see it. People thought it was whimsical of us, perhaps a little Dada or, as Dick Higgins said, "Fluxus-like," to make the argument that an "invisible artist," immaculately conceived by the pair of us, could possibly create this behemoth of a work all about lagoons and metaphors, with stories nested within stories.

After all our studying and art making, the artist between us made a prophecy and an intuitive leap that the earth would soon warm, and began to imagine what a warmed earth would be like, and to imagine how the Lagoonmaker and the Witness would respond

were they to live long enough to experience the melting of ice and the rising of the waters. In that "now", the real artist (with the two of us as assistants) spoke, saying: If the Pacific Ocean is understood as a vast, stretched estuarial lagoon, then all the rivers flowing into it nourish it by the outfall of the fresh water tongues enlarged or shrunk in response to the tide. The moon certainly had a big voice in this last estuarial lagoon, and the two characters re-clarified; the Lagoonmaker, seeing the Pacific as an estuarial lagoon framed by the ring of fire, and the Witness, dreaming in "stone space." The characters move in a contradictory frame, operating simultaneously as grounded and as in a dream space. They debate the existence of the ego, arguing that the buffalo has efficiencies that the tractor that replaces it is completely obtuse to. The Witness takes, for a moment, the position that technology does not like that which is not itself.

Finally, the artist, who is neither of us and all three of us, goes to France and buys a large French map. All American maps have the North and South American continents in the middle, whereas the French map has the Pacific Ocean in the middle. The artist then decides to draw a line at the 100-meter level, imagining all ice has melted, the oceans have risen, civilization is under stress, and ecosystems are under stress. The artist asks: Will you help me when the ocean rises, while I help you when your lands, covered with water, can no longer produce? If we achieve this, then as the oceans rise gracefully we can withdraw with co-equal grace. So ends the *Lagoon Cycle*.

The Lagoon Cycle

Book of the Lagoons

1985 Herbert F. Johnson Museum of Art,

Cornell University, Ithaca, NY

1987 Los Angeles County Museum of Art, CA

2011 Orange County Museum of Art,

Newport Beach, CA

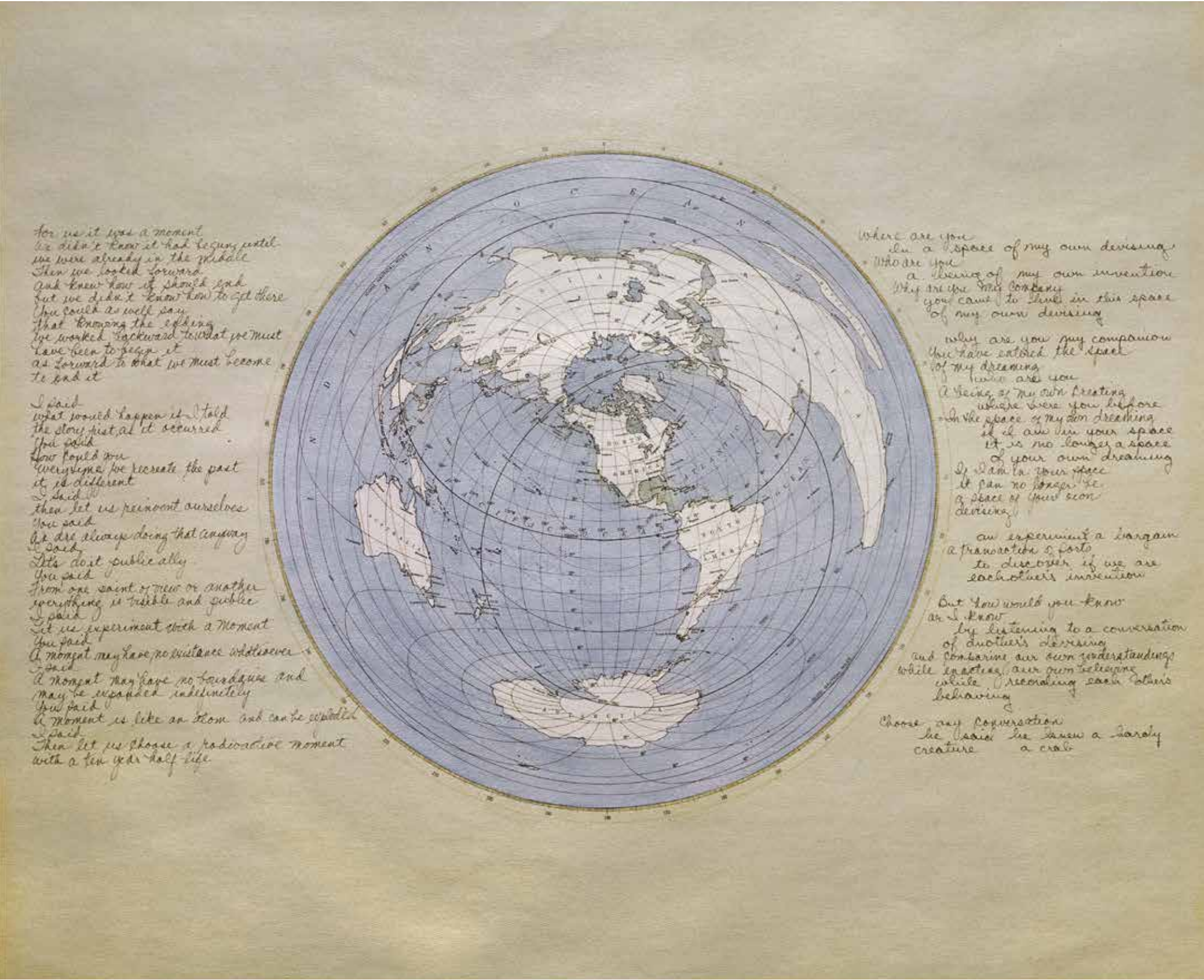
2012 Berkeley Art Museum and

Pacific Film Archive, CA

et al.



The *Book of the Lagoons* happened as a consequence of our MetroMedia patron John Kluge's realization that the scale of the *Lagoon Cycle* was such that it could be shown only at museums, and could we make a quarter-sized model that could more easily be seen by many. After making a few half-, quarter-, and even third-sized pieces, nothing worked. Finally we came to the conclusion that we had to turn the whole *Lagoon Cycle* into a hand-made book, and that this hand-made book would be approximately one-fifth size, using the original imagery but the entire work needing to be recomposed. It turned out to be 45 images with the original text unchanged. We set out to make 30 copies, but only managed about 20. To do this we set up a book team, somewhat like a medieval scriptorium, and did almost 1000 pages all by hand. The core insight was that the big *Lagoon Cycle* surrounded those who encountered it. The book was designed as an intimate experience where the reader literally commanded the imagery. Oddly, although the images changed a bit, the text remained the same. John's request that it be seen by many became true as the book has been exhibited frequently.



The Opening

The First Lagoon The Lagoon at Uppuveli



he said
he knew a hardy creature
a crab and supposed it
could live under museum
conditions

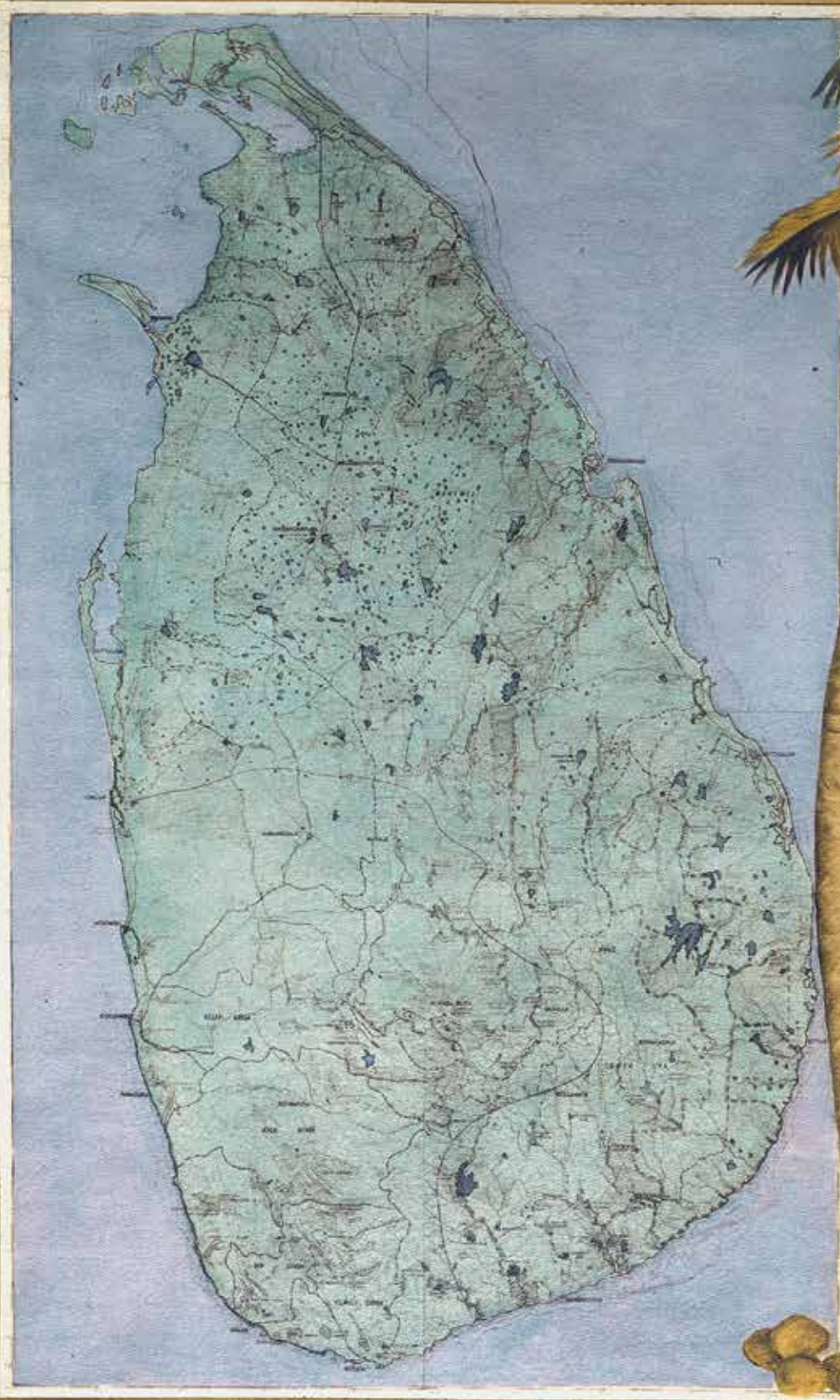
he said
it would need warm waters
to grow in equatorial light
cycles and some hiding
places further it could live
out of water for up to five
days yes it tasted good
to him and was a favorite
food among his people

he said
it mates in small places
and laid in the mud in
and among the mangrove
roots in the lagoon at
Trincomalee and responsible
it was the last to die
when the tidal ponds
dried up often crawling
over land to find better
water or burrowing in mud

he said
he had seen this crab in
dirty water and clean
water in the shallows
and much deeper in 65°
water and 75° water and
in almost fresh water
and it had a strange
relationship to the mangrove
roots which he did not
understand

he said
it was a scavenger
eating almost anything
often its own kind and
gave up and grew limbs
rapidly it was easy enough
to catch if you knew how
but could bite off a finger
if you did not

he said
fetched us some crabs and bottom
mud mangrove seeds and
water
I thought I can grow a crab
I can even make a lagoon
to grow it in
I will be a lagoonmaker



He said
to me from
Sri Lanka
the oceans
lagoons
the about
all then

He said
the lagoons and the ocean are being
fished and by European fishing
boats who bring some fish to the
world market and sell the rest
back to the people in peace

He said
the coconut provides most of the neces-
sities of life yet to get western money
they are exporting coconuts

He said
the fishermen can no longer afford to eat the
fish that they catch because the tourist ho-
tels pay so much for them

He said
the 3,000 year old water system of tanks and
irrigation ditches is disappearing with lack of care
and being abandoned and replaced by modern
dams and reservoirs

He said
that for almost 3,000 years Sri Lanka has
practiced one of the purest forms of Buddhism
and this is symbolized by the old flag

He said
that Sri Lanka has always been the rich-
est nation in Southeast Asia but moderniza-
tion is impoverishing the people while
ruining land and water and destroying
the rainforests

Finally he said
Why don't you go to Sri Lanka and
see what is happening for yourself
And I thought
I will go to Sri Lanka and meet the
Lanka and the people and listen to
what people say
I will behave as a waitress

from the National Heritage Trust

I thought of him as speaker for the flag
He said
Once I was a wealthy playboy and sportsman and I traveled
the world in search of pleasure One night in the Copacabana
night club in the city of New York I was struck by a vision of the old
flag of my country It was a revelation It struck a chord of Buddhist
teachings From that moment on my life took a different turn and I
have spent it explaining the meaning of the flag listening to priests
and villagers alike that we may live according to its principles

He said
The symbols are the symbols of the lion Our old flag represents us
very far every line has a meaning Look at the color of the
flag It is red and yellow Yellow is symbolic of wisdom and it
derives its symbolism from the color of the Buddha robe The Buddha
when he had obtained enlightenment wrapped himself in the cloth
that had covered the bodies of the dead The Buddha in those days
may have been bathed in saffron which was used as a disinfectant
The saffron dyed the cloth the Buddha wore and it became
yellow The yellow cloth became identified with the Buddha and
with his wisdom which encompasses both life and death
So yellow became the color of wisdom while red became the color of
life Let us for our blood our energy our hate our passion our love
our revolutions our desires

He said
the red ground within the yellow border represents man's in-
stincts contained within the frame of wisdom The four yellow
triangles for the four virtues which the Buddha set as all of
tailed enlightenment represent the four symbols of enlighten-
ment Respect for life compassionate action altruistic joy and
the gravity of that sublime state of mind as you contain within
your the discipline of wisdom

He said
the lion represents society and the sword is the instrument
of protection of society

He said
the sword has three sections the first the butt or handle stands
for the basis of society the second the hand guard stands for the
guidance of society the third the blade stands for the protection
of society

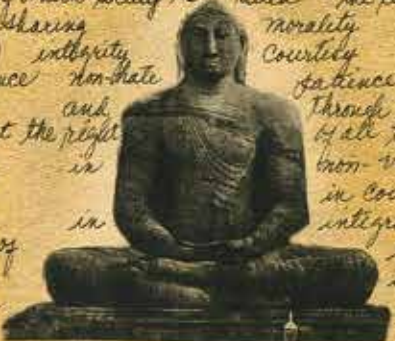
He said
look at the butt the basis of society the three points on the

bottom stand for the law of dependent origin birth
life and death the four petals extending from the butt
represent the fact that every living thing has a form
and a name The four petals soil land water birth
and death represent man's birthright Just as he
being living has a form and a name so he has the right
to land to water to birth and to death and no one
may deprive man of these

He said
the handguard represents the guidance of society the avoidance
of extremes either of ownership or of profit based on the
knowledge of trusteeship

He said
all that you own is your body all that you own is your
knowledge and experience

He said
this is the basis of the ten royal codes of conduct the in-
strument by which society is ruled the code for the
rulers sharing of talents integrity morality restraint
non-violence non-hate patience and non-
revenge and we protect the right of all to exist in
non-hate in non-violence in non-violence in
restraint in courtesy in integrity in recog-
nition (of talents) in sharing the basis of
morality This is the basis of the basis of
sovereignty for any society of human beings
These have my revelations Mastering them is my life



And I said
In my world we find reason to manipulate both
birth and death and do not hold anyone's
right to land or to water as sacred Instead we
value life liberty and the pursuit of happiness

And you said
Nor do we value non-revenge but rather the
right to exact it through the instrumentality
of the law



from the hotel in Colombo

It was hot. Although the street scenes were exotic the hotel was unconditioned international in style as well as in name. The beds were narrow wooden cots low to the floor and there was no television set. However, once inside the hotel there was little to alarm me that I was halfway across the world. I began to sort my impressions and list what people had told me.

A merchant said
This is not India. You won't see many starving people.

A taxi driver, passing a cart pulled by two white bullocks. In his forty years old Morris Minor said
There wasn't any snow here forty years ago - or twenty or when I was a boy. But today you can see the haze settle over the city.

A stranger remarked during a downpour
Don't worry about the monsoon rains. No matter how wet you get. Minutes after they stop you'll be dry.

A wealthy friend said
I still eat fish rather than air conditioning. New isn't always better.

A young student said
The words called Sri Lanka Sinhala meaning fortunate encounter and that's where the word serendipity comes from.

A second student added
Also the word Lanka means resplendent land.

His mother said
Men lead their lives here and women lead theirs. The lives are very different.

A diplomat added
Unlike your western countries young lovers do not display affection in public.

A traditional dancer said
There is no European dancing here except in clubs for foreigners. Hopla who dance that way here are considered limbo-dancers.

An actor said
Our stories center around family conflicts or poor couples with demons. A triangle might involve husband, wife and mother.

I noticed
The fruits and vegetables were wonderful and varied and always fresh. But the best of the food was the hot, as the weather. An hour's walk. The hot consist of fried fish & chutney - eaten with fingers - 10 hot chutney to 1 hot fish.



And I saw that outside of the city life in Sri Lanka was all about animals.



and bicycles and weapons and



cars. And all about hands pushing and pulling and flailing.



and working and digging and not much about machines.



from the temple on the rock and the village nearby.

Always. I felt out of scale. The people appeared to be either very tiny or very tall and slender. Water buffalo and brown slender shoulder high elephants not much larger. Dogs never came above my calves.

A friend said
This temple is built upon a rock. To save arable land for farming and for grazing.

Our guide added
The village, the tanks and the temples were once a mutually supported coherent system with all the people working part of the year to maintain the tanks and all thereby entitled to a share of the water and a share of the product of the tanks. In those days he was very hungry.

Another friend continued
Even though our population has doubled in these last years we've had twice this many people before in our history and there was always enough food.

A doctor chimed in.
It isn't that there's a shortage of food even now particularly in the country where so much fruit grows wild. But there is a shortage of protein. Since fish has become so expensive and the villages no longer grow enough rice.

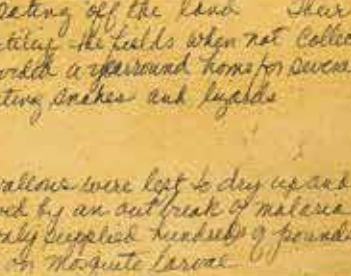
Our guide said
There is a trust that is working to reestablish the village system and it has three thousand or more villages and temples that have returned to our traditional ways using the tanks and willows that served so well in the past.

The people of the trust say
To step back into our past is a thousand steps into the future.

And I wondered
How far back. No one ever mentions the aboriginal peoples who lived here before the Ceylonese. And still exist in the jungle in small numbers.

A friend of the trust informed us
Once every village such its lowest ground as a wallow for its water buffalo who supplied protein in the form of milk as well as labor for plowing and plowing. They harvested it and used it freely eating off the land. Their waste and dung in turn built fertility. The fields when not collected at for fuel. The wallows they provided a spawning home for several species of catfish and various eating snakes and lizards.

The doctor added
When the lizards were imported. The wallows were lost to dry up and the fish died. This would be followed by an outbreak of malaria. It seems the fish in the wallows not only supplied hundreds of pounds of protein but they also provided a mosquito larva.



from the temple of the tooth at Kandy

It was a room of mirrors. My friend and guide shared an impression with me. We were not bored at carrying an impression of ourselves. It reminded him of life under colonial rule. So he asked me to carry his impression. I carried it on my shoulder. Unprotected. I got wet. He said he preferred it that way. He said
There are only minutes left until closing time.

once inside the temple guide spoke
The temple is sacred. It is the temple of the tooth. Buddha's tooth. (and I heard truth Buddha's truth)

he said
The glass is bullet proof. The cabinet is made of silver. The offerings alone it are worth millions of rupees.

and I asked
What exactly is in this cabinet that is so marvelous.

he answered
When the tooth is of course. (and I heard truth)

it is sacred.
In you ever open this cabinet and reveal the truth (and he heard the truth) and save every ten years.

for now I am a asker. and he said for ten years there are great processions in the streets with bejewelled elephants and marvelous celebrations.

how many people can see it. I asked. he said
several thousand an hour perhaps 20,000 a day.

and I said
you mean you keep the tooth in a guarded room in a silver box behind bulletproof glass with millions of rupees worth of offerings above it and you reveal it to about 20,000 people once a decade.

once a decade is the custom. he said
after all we must protect it.

I said
if it is the truth and you keep it behind bulletproof glass controlled from your seat bar left here.

my friend and guide took my arm and said quickly.
it's closing time. it's time to go.



from the Queen's Hotel at Kandy

The hotel was situated a massive relief of a massive building. Magnificent wooden floorway high carved ceilings and doors that were open top and bottom to the breeze. Well-lit covered in the hallways.

Our friend and guide said
Kandy was the last bastion of the Sri Lankan king. You have seen their old lion flag. But when the king died, the lion means the people of the lion.

A man in the lobby said
Although our ancestors were fierce warriors we are a peaceful tolerant people. Look at all the mosques and Hindu temples and Catholic churches.

A diplomat added
We are a peaceful country. We had a

before the birth of Christ. Our last war called the British. There's a lot of our country in the library at Colombo.

Our guide said
In the past two

thousand or so years we've had many invasions from India as well as from the west. For instance the 10th century and the 13th century. But the people here are different.

Another friend said
When the British came from the west they found the great library at Kandy and all the other books. We have lost most of the other books. Including the engineering methods of the last centuries.

The diplomat added
When the British came from the west they found the great library at Kandy and all the other books. We have lost most of the other books. Including the engineering methods of the last centuries.

Our guide said
If you want to know what it was like under the flag when the hotel was a home of war. Look at the. Each called the Lion. The Lion.

and a forest. A forest of a massive building. A complex system of interconnected things about the nature of reality and civilization. It's a forest of control and order. It's a forest of things that define themselves by their ability and not themselves in themselves.

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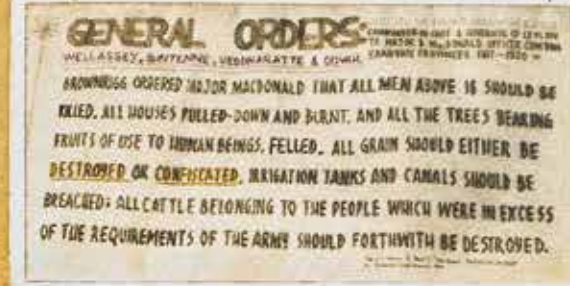
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From the government office at Nawala

As in any bureaucracy it took time to find out how to get the information I wanted. But after a time of searching I met people who would speak freely.

One water department official said the tanks can be found all over the country. Many of them have been neglected and are in disrepair. The largest is 10 miles long by about 4 miles wide. They were built on the principle of stream storage and were shaped to the contours of existing depressions in the land. It was parry that his department was repairing this system and attempting to replace it with modern dams and reservoirs.

My guide said the tanks are natural catchment basins. Really just depressions in the land, walled off at one end. The water, made of earth, may be 10 feet thick at the base and up to 60 feet high. Much silt gets to let out the water as needed. It took the cooperative effort of most of the population to keep them in repair. But the materials were free and the growing of rice depended on the water.

An historical legend says in the 5th century A.D. when King Datuana was overthrown by his son Kassapa, the son demanded of his father the king all of the royal treasures. The king took his son to the treasury and it was empty. So then took his son to the great tank outside the capital, the tank at Anuradhapura, and waded into it and filled his hands with water. Turning to his son the king said this is my wealth, my treasure, and the wealth and treasure of us all. The son disbelieving led his father killed.

Another official said in the 11th century A.D. King Vashaba built eleven large tanks but many others had existed for hundreds of years before that. No one knows just when the first tanks were built or who engineered them and our old libraries are gone. Burnt down during the colonial conquest.

A friend said everybody has such respect for "foreign experts" here they've even bringing them in to plan our new water system. He's been really looks to see the long term pollution and the other problems that these experts using western technology had produced in their own countries and the ways they have made of their own water systems.



He said follow the river and the rains which lead



to the great tanks in the highlands and



then through channels and canals with



locks and bumps to successively



smaller tanks and finally to the paddies



from the house of friends

An advisor to the president said we don't have enough money to fund all the basic research that we need.

Another advisor to the president said I suppose we will have to acquire nuclear technology to keep up. But I don't know how we can find it.

An American pediatrician said the medical schools in Kandy used to be first rate but something has gone wrong and you can't trust the training of recent graduates.

A leftist said Lanka is being shot of money into the country but most of it is spent in this internationally known hotels and shops and goes right out again.

A friend said this is the only real city in Sri Lanka although the present hotels start to look like small ones. It's as if new towns are being built all over to support a tourist industry.

Another friend said when the French, German and Dutch tourists started coming on chartered tours, husband after husband would bring down at the great children to watch them scramble for money. Now our children have become conditioned to beg from foreigners.

I noticed a well dressed grandfather clutch as he said I'm sorry when his three or four year old grand-son ran towards us with outstretched hands.

A friend said when the tourist hotels serve fish or crab no one else can get any.

Another friend said tourism is saving our country. We need it.

Another journalist said tourism is ruining the country. We need to discourage it.

An old Buddhist monk told me I am afraid the next big war will be a jihad between the Muslims and the rest of the world.

A senior advisor to the president asked how much tourism is really good for the country and what can we do about it now anyway.



He said if you want to have about the same quality of the lagoon at Negombo and



back to the fishermen there, some may boats and some may double the shallow. Then that go to the east coast to the lagoon at Trincomalee and speak to the fishermen there.



all. He said go to the lagoon at Negombo. Go to the great bridge north of Trincomalee and look for the fishermen. Nets hang there. Look down from the bridge over



the flat place. You will see masses of mangroves. Large and small and even some people drying up.



So if you can find the old fishermen there, he knows how they do it.



The fisherman although puzzled answered questions as best he could after finding out we didn't want to buy crabs.

Yes he said. He had caught crabs and prawns here all his life and the nets hanging from the bridge were his. He didn't hold a boat. Until the deepest waters were only about 10 feet deep. There were fewer crabs than there used to be but he got more money for them and what else could he do?

He said he caught the bigger ones in the middle of the lagoon. Those are the shallowest. More shallow and often disappeared into the mud.

He said he had occasionally seen them nesting after the monsoon. Most often, the rocks under the bridge or hidden amongst the mangrove roots.

He said why would you ask such a question?

And yes, the the biggest crab he had ever caught was about 100 pounds and somewhat rotten. Fish was the best bait and the prawns which up each year before the monsoon came again. But he continued to catch some in the small ponds that remained.

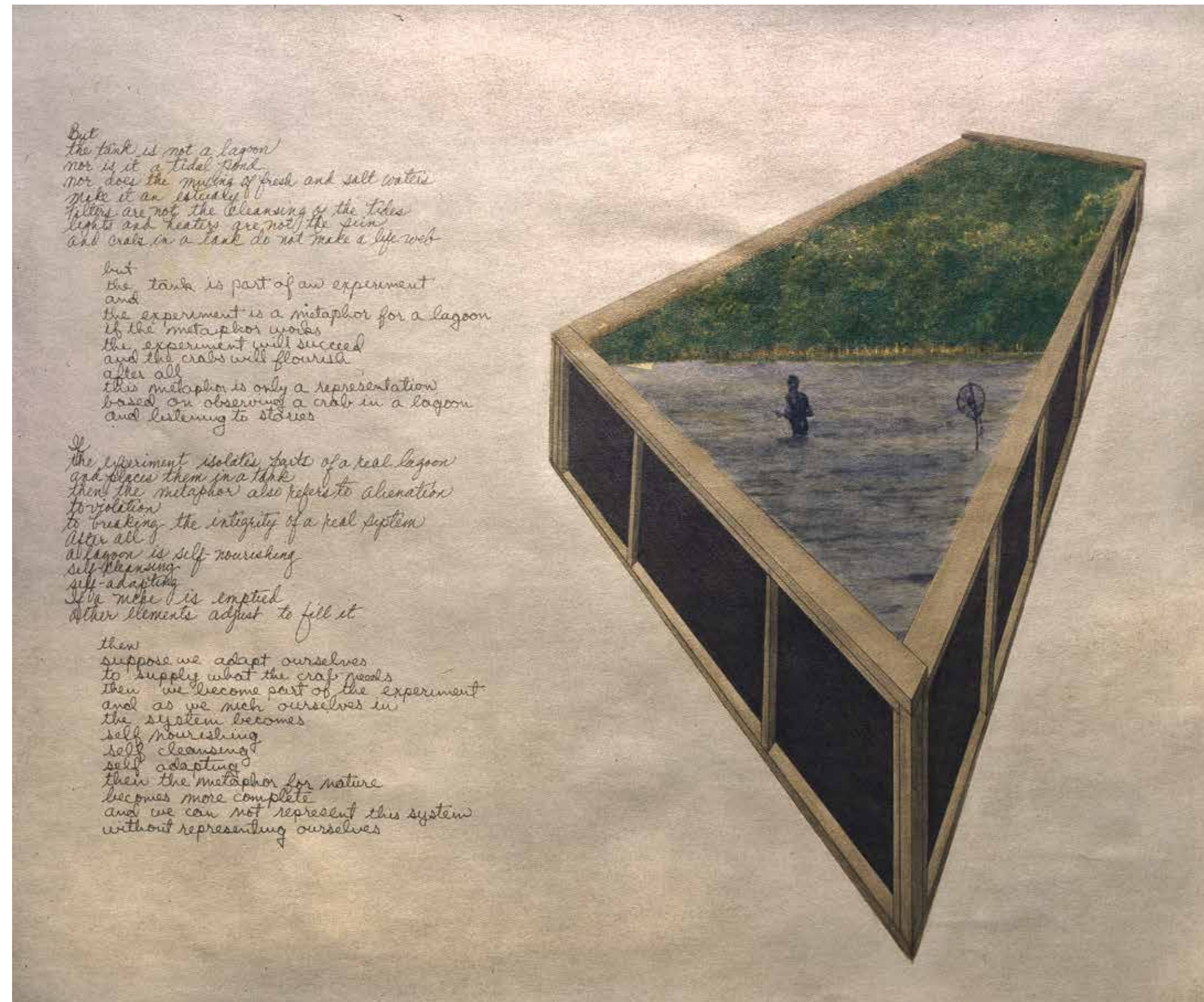
And yes, the best time to catch them was early morning or late in the afternoon. Said they did most of the day. And he had said them in ponds as small as four by five feet or even less.

So I thought I can make a tank four paces by five paces and wait long. I can make a light cage and tune it to equatorial light and keep it at equatorial temperatures. I can make a bottom filter that changes the water as the tides.

And I thought how will a crab know it's not a lagoon.



The Second Lagoon Sea Grant



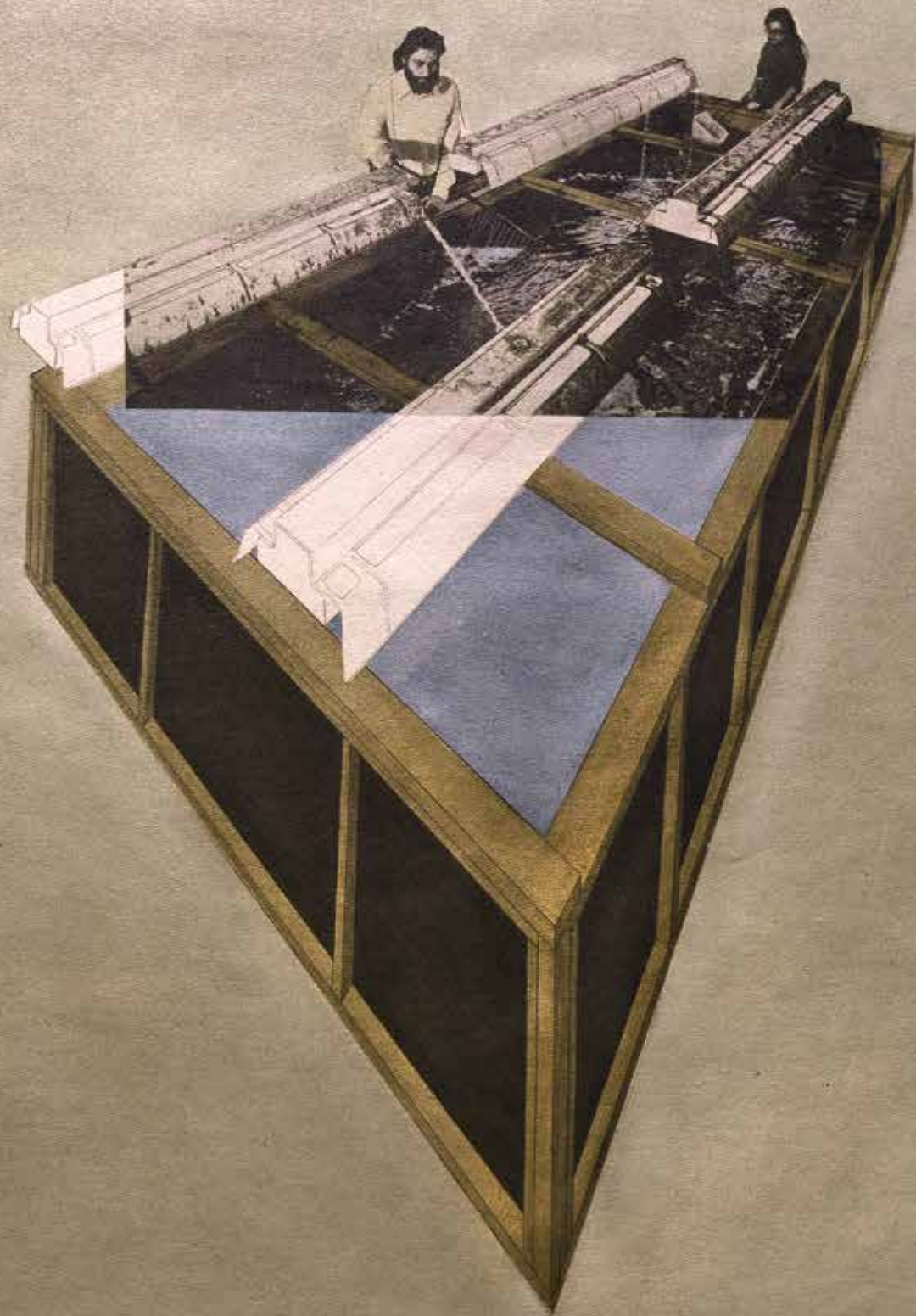
remember
this crab is very special
it has evolved high tolerance to stress
it breeds quickly and survives
like all of us
by improving its existence
at best it can
with the materials at hand
it will adapt and may thrive
as do some of us
when alteration and change
become the requirement for continuing

But an experiment is a fragile system
and anything may go wrong
the electricity may fail
the tanks may break
disease may enter
or these elements may not balance

remember
a metaphor can be a powerful instrument
if we believe it
if we enact it
it will develop a life of its own

But
a metaphor can be a fragile instrument
an improvisation born of discourse
of observation
and anyone may change or reinterpret it
for any reason

yet the metaphor for nature is a strong metaphor
an arrogant metaphor
a treacherous metaphor
an improbable metaphor
a playful metaphor
a dangerous metaphor that draws attention away
from the destruction of habitat
a valuable metaphor that will lead
to the regeneration of habitat
But it's only a tank
the crab doesn't know it's only a tank
yet when we feed them they look up
so already they behave differently

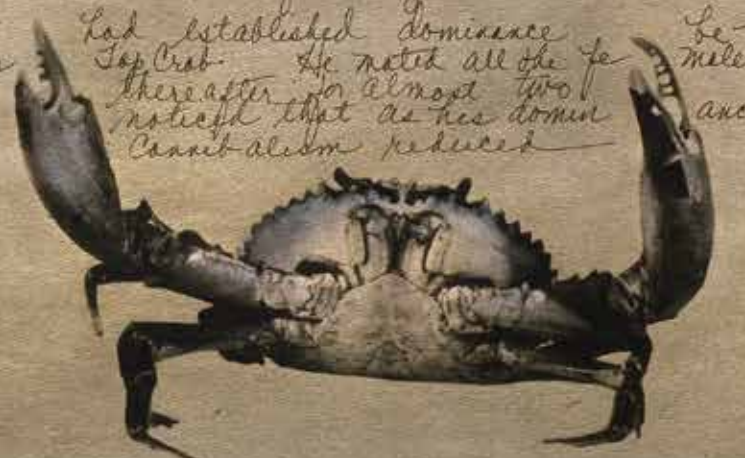


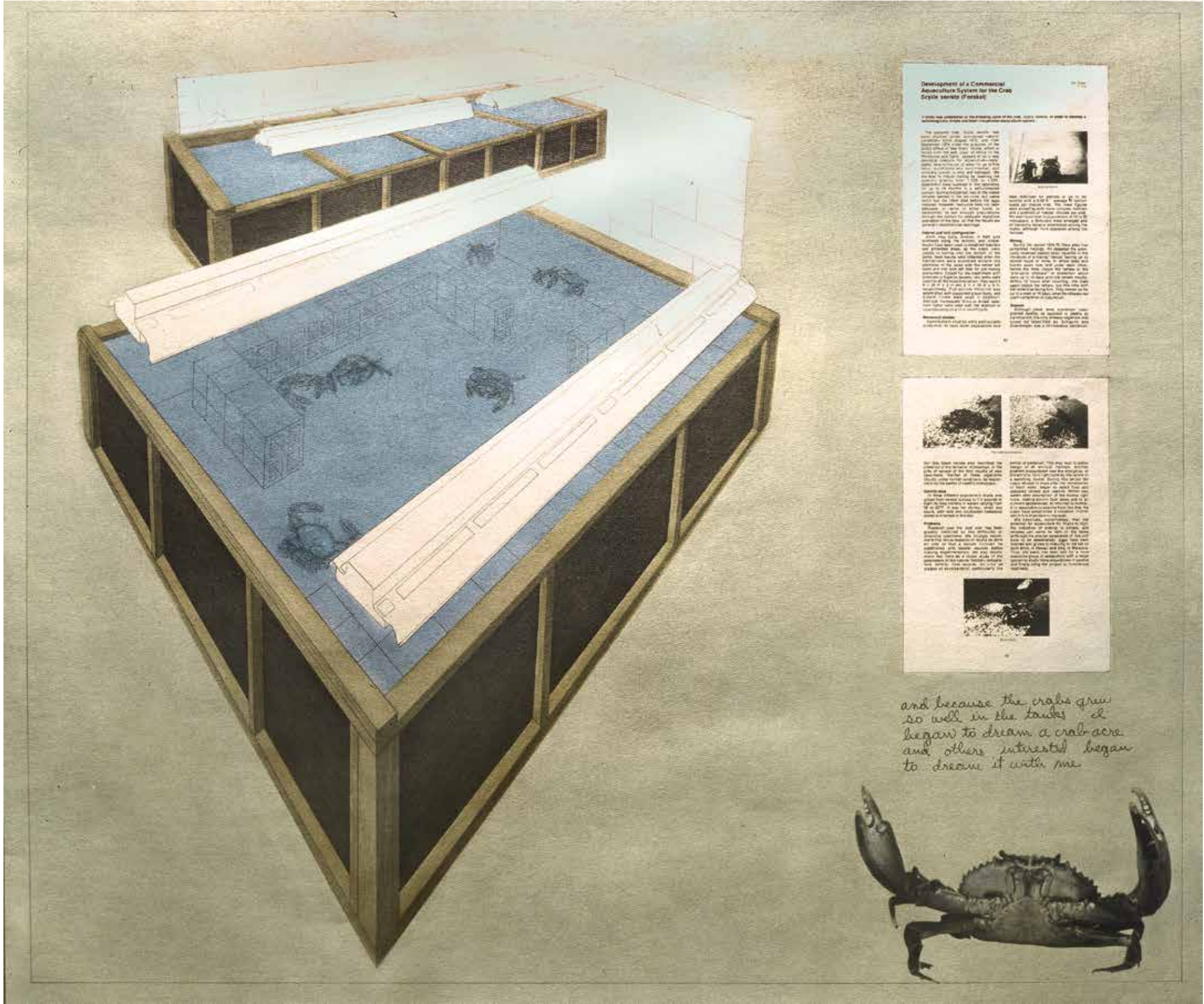
It was August
The first shipment of crabs arrived from the marketplace in Colombo with
fresh in their claws and wrapped in fast banana leaves
and packed in a cardboard box. They had been en route
for almost five days and most of them still lived.
Those we ate were delicious. Those we experimented
with were hardy.

It was November
One day the crabs began to act strangely.
They stopped eating our food.
They stopped eating each other. Most
movement ceased. Search behavior ceased.
Challenge behavior ceased. They sat with
folded claws. The mood was depression
of the absence of well being. The metaphor
of absence was compelling. We began to
search for what might be missing and
discovered it was monsoon time in Sri
Lanka and that a monsoon changes the
salinity of the coastal waters and chokes
the food supply. So we imported a mon-
soon as best we could with fresh water
from a hose. And within minutes the crabs
started to behave differently. They began to
move around excitedly swimming over each other
and under each other backing into corners
spreading and measuring claws challenging
and counter challenging in groups of two
or three.

After many mock battles the largest male crab
ended the chase mounting the back of the largest
female and beginning an elaborate courtship
display on her back and embracing her with his claws
even gathering food for her and feeding her until she
became ready to moult. Then guarding her until
her new skin hardened into shell then flipping
her over and again mounting her for the long
involved protracted act of mating.

The male that had established dominance
came known as Top Crab. He noted all the fe-
males thereafter for almost two
years. We clarified
Cannibalism reduced
Se-
miles
ance





**Development of a Commercial
Aquaculture System for the Crab
Scylla serrata (Forsk.)**

A study was conducted in the laboratory of the author, 1971-1972, in order to develop a commercial system for the culture of the crab Scylla serrata (Forsk.).

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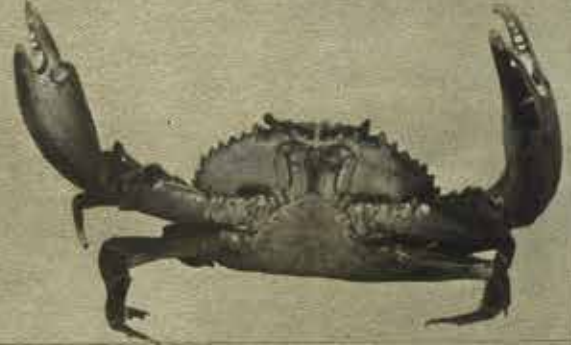


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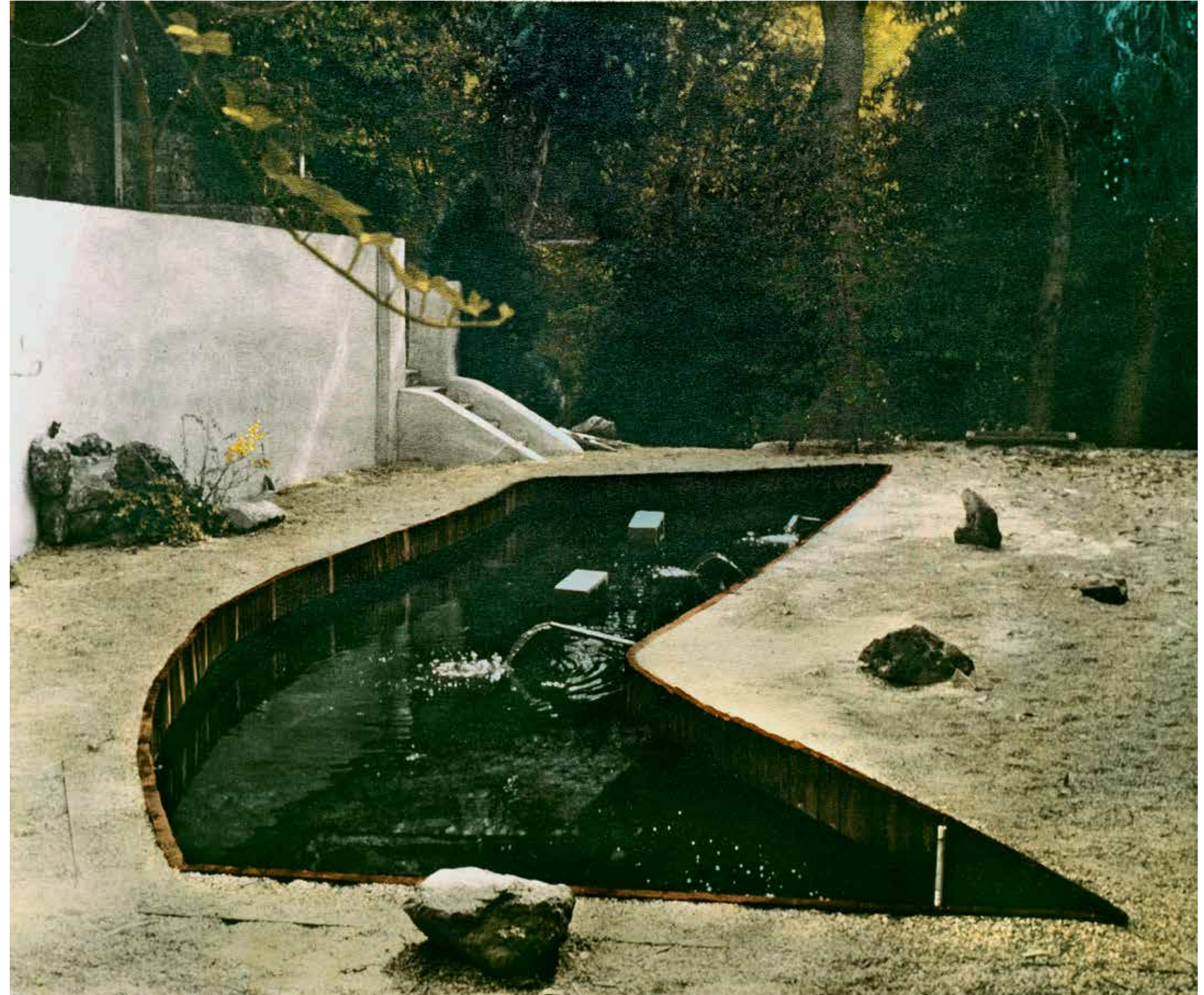
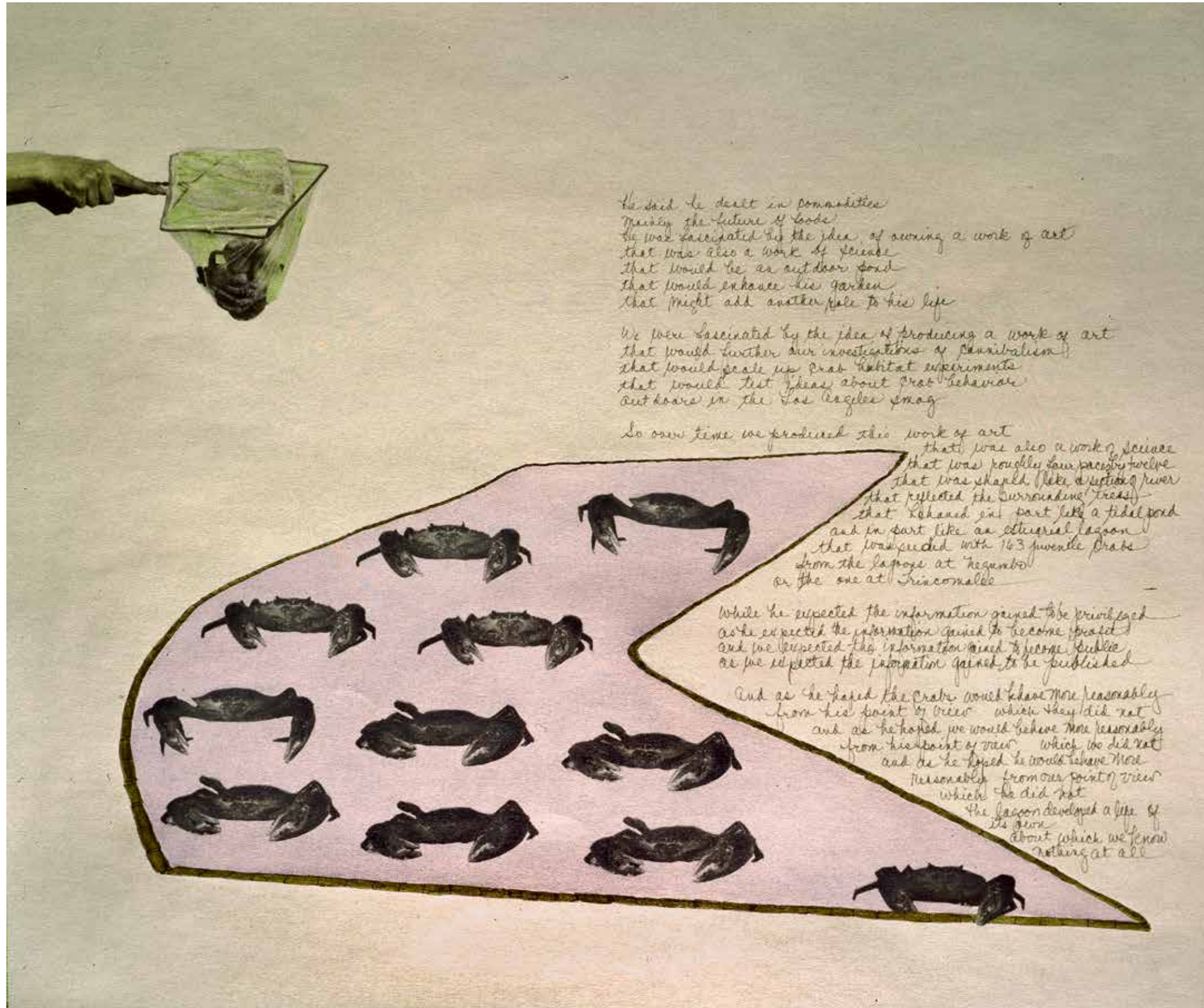
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and because the crabs grew
so well in the tanks I
began to dream a crab-aria
and others interested began
to dream it with me.



The Third Lagoon The House of Crabs



He was part of a commune at Wood's Hole that was working with whale skeletons. He said I hear you have a trouble creature a crab. He said he was forming a cooperative venture here and he wanted to combine his research on shrimp with ours on the crab in order to generate systems that could produce food properly.

We said we were interested. We gave him all our information on the crab. After a long wait we asked to see his installation. He said that some of that information was privileged. He never called us back.

He was a scientist who worked in third world countries for governments and wealthy individuals solving biological problems related to agriculture. He said I hear you have an exotic creature a crab which might be farmable under technologically simple conditions. He visited the tanks he reflected on the crab here. He said he would like to work with us. He would try to raise funds to make up the experiments.

He sent us a letter of confidentiality, then postcards from Saudi Arabia and Iran. But he never called us back.

He published a newspaper for the Los Angeles Asian community. He said I hear you have a tasty creature a crab. He said he knew our crab well. Crab was a favorite food in his native Thailand as well as in neighboring countries. He was certain that many of his associates in the restaurant business would be interested in locating a dependable source for this crab. Therefore, he would consider assisting us with the development of a crab acre. He asked us to perhaps in a week for further discussion.

The day before our appointment there were headlines in the Los Angeles press stating that a local Thai boss had been shot and killed in his office by person or persons unknown.

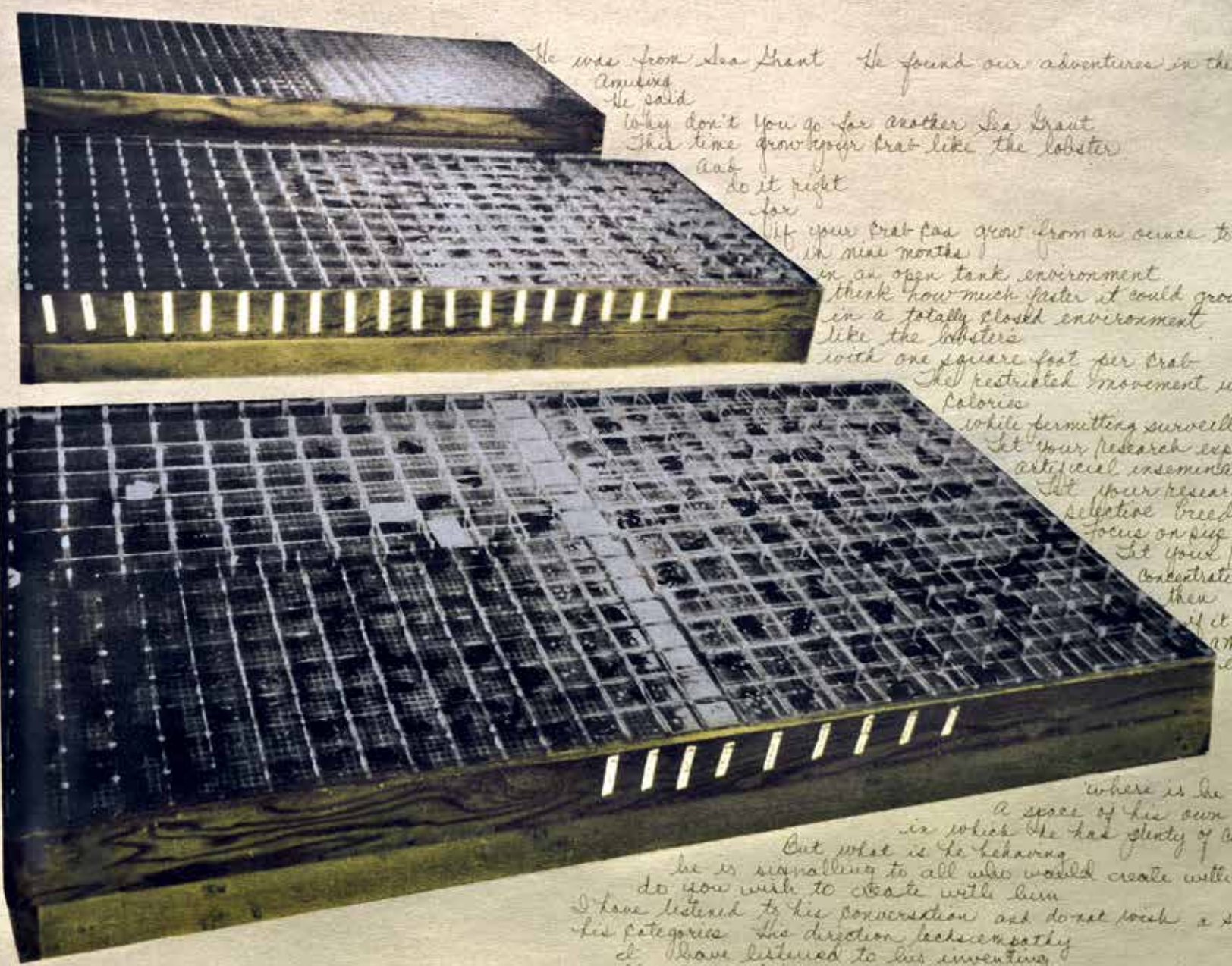


He was a scientist working with electricity on fish. He said I hear you have an interesting creature a crab. However to develop your crab acre you need more precise statistics. He offered to join with us to get a grant from the local utility company to use the warm water effluent from their Southern cooling ponds to let us experimental tanks outdoors by the ocean.

We met with two men from the utility company. They took our information. They debated the proposal for nine months. Finally they said no.

He was an accountant who worked with tax structures. He said I hear you have a profitable creature a crab which might offer shelter or tax shelter to money. He said he had clients who were doctors and needed such a shelter particularly in December. His group of doctors wished to feed a project that could loose money now and as a consequence save money in April. But they also wished to be assured that someday there could be considerable profit. And asked if we could produce an array of figures for him to ensure his desires were congruent with our system.

So we thought about what an amazing invention a tax shelter is. An improvisation that makes you lose and lose gain. And did the calculations. But we never called him back.



He was from Sea Grant. He found our adventures in the marketplace amusing. He said Why don't you go for another Sea Grant. This time grow your crab-like the lobster. And do it right for.

If your crab can grow from an ounce to a pound in nine months in an open tank environment, think how much faster it could grow in a totally closed environment like the lobster with one square foot per crab.

The restricted movement will conserve calories while permitting surveillance. Let your research explore artificial insemination. Let your research explore selective breeding. Focus on pig and docility. Let your research concentrate on control then.

if it is successful market will emerge.

where is he speaking from a space of his own devising in which he had plenty of company. But what is he behaving. he is signalling to all who would create with him. do you wish to create with him. I have listened to his conversation and do not wish a signifier in his categories. His direction lacks completely. I have listened to his inventing. his moment is too narrow to play in. Then choose another conversation.

an estuarial lagoon is the place where fresh and salt waters meet and mix it is a fragile meeting and mixing not having the constancy of the ocean or the rivers it is a collaborative adventure its existence is always at risk

heavy rains can increase its size and boundaries increasing nutrients while decreasing salts

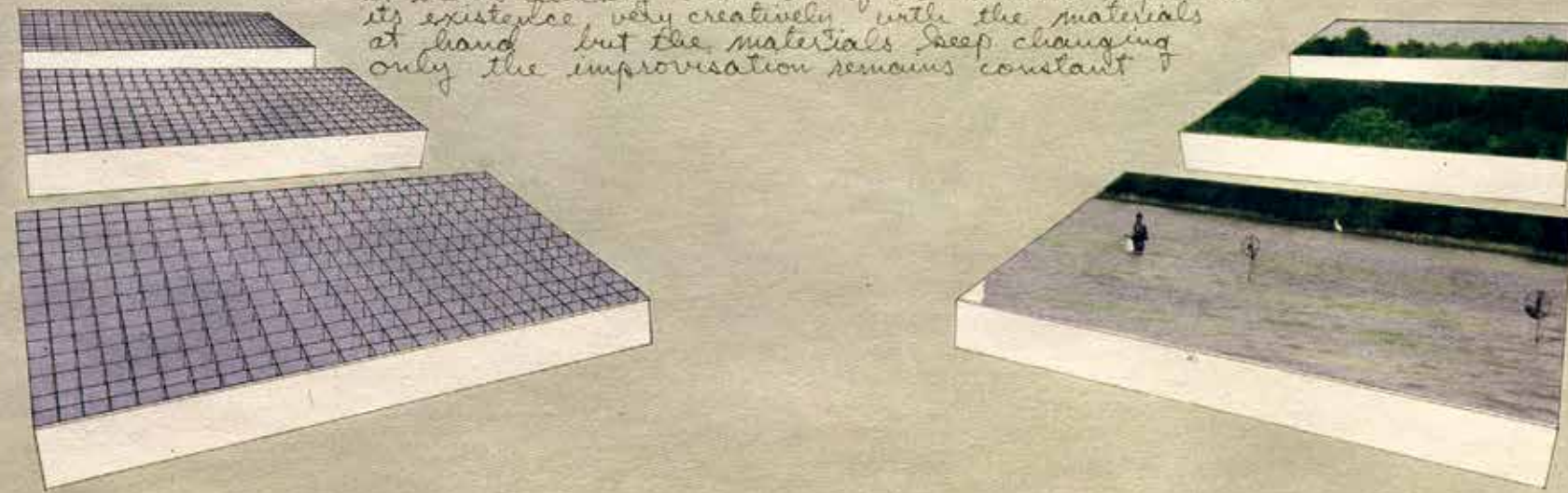
forest fire then rain can set up the conditions for heavy silting and a lagoon can turn first into a mud flat then into a swamp

if the day is warm the waters being shallow warm quickly if the night is cold the waters being shallow cool quickly

life in the rivers the lakes and the oceans where the properties of water are more constant is less stressful

but life in the lagoons is very special it has evolved high tolerance to the stresses that come about from sudden changes in fresh and salt water and temperature and available food for the life web

life in the lagoons is tough and very rich it breeds quickly like all of us it must improvise its existence very creatively with the materials at hand but the materials keep changing only the improvisation remains constant



Is it worth forgetting what he said
he is not trying to suggest that we work with containers and play within boundaries but his choices are peculiarly inflexible and oddly serious

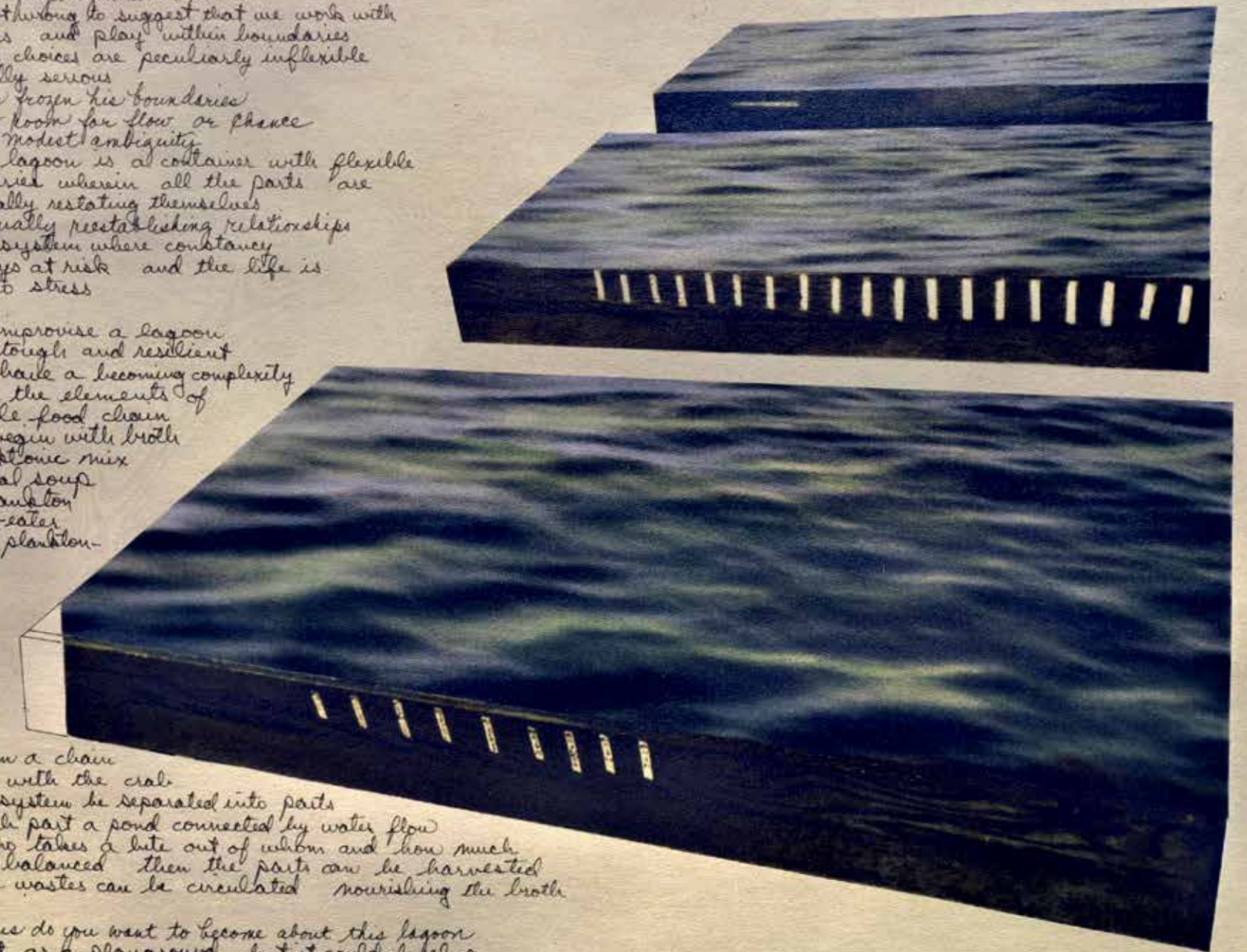
And he has frozen his boundaries leaving no room for flow or chance or even a modest ambiguity

Now a lagoon is a container with flexible boundaries wherein all the parts are continually restating themselves and continually reestablishing relationships it is a system where constancy is always at risk and the life is turned to stress

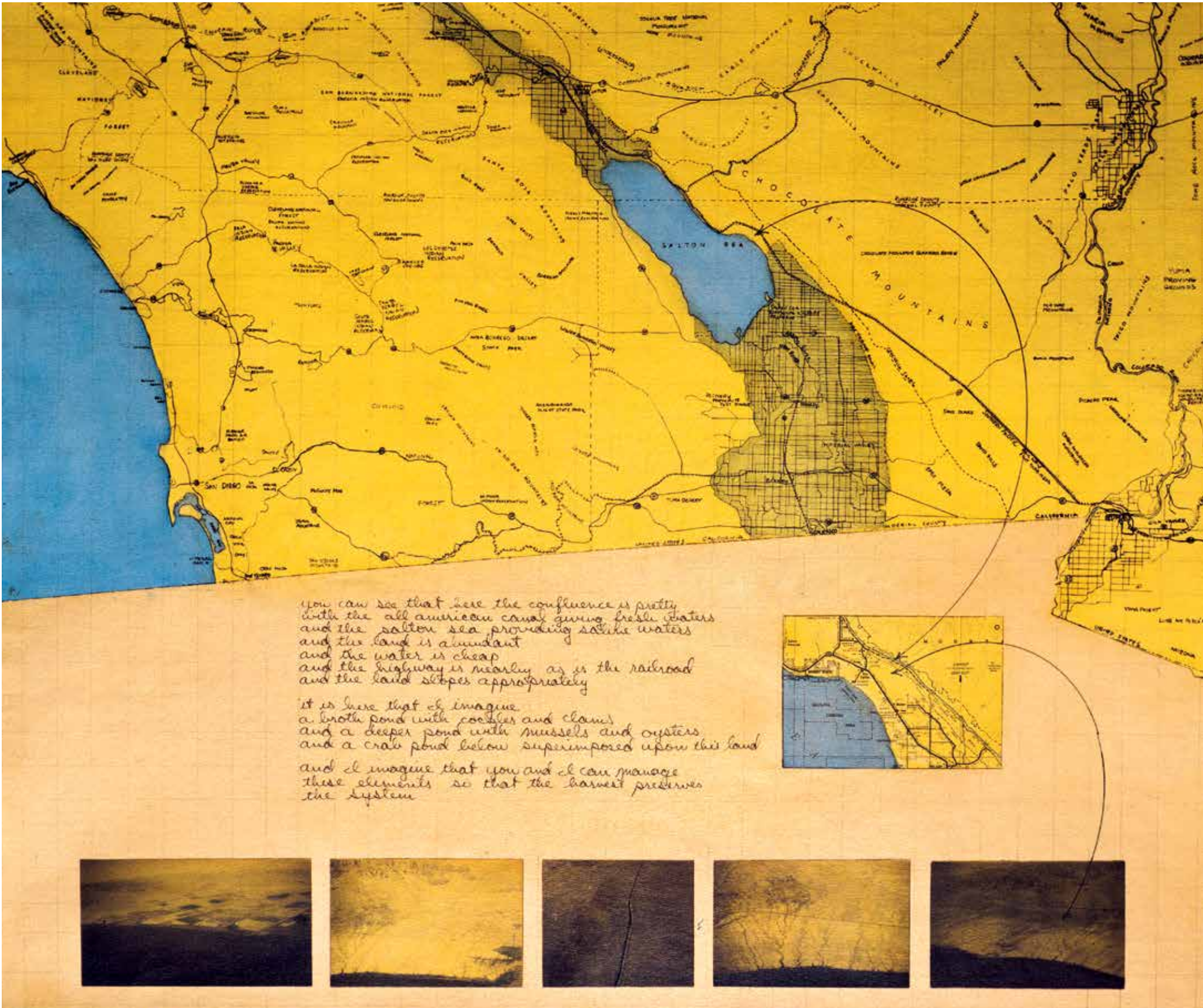
let us improvise a lagoon that is tough and resilient let it have a becoming complexity find me the elements of a simple food chain let it begin with broth a planktonic mix a primal soup thus plankton plankton-eater eater of plankton-eater

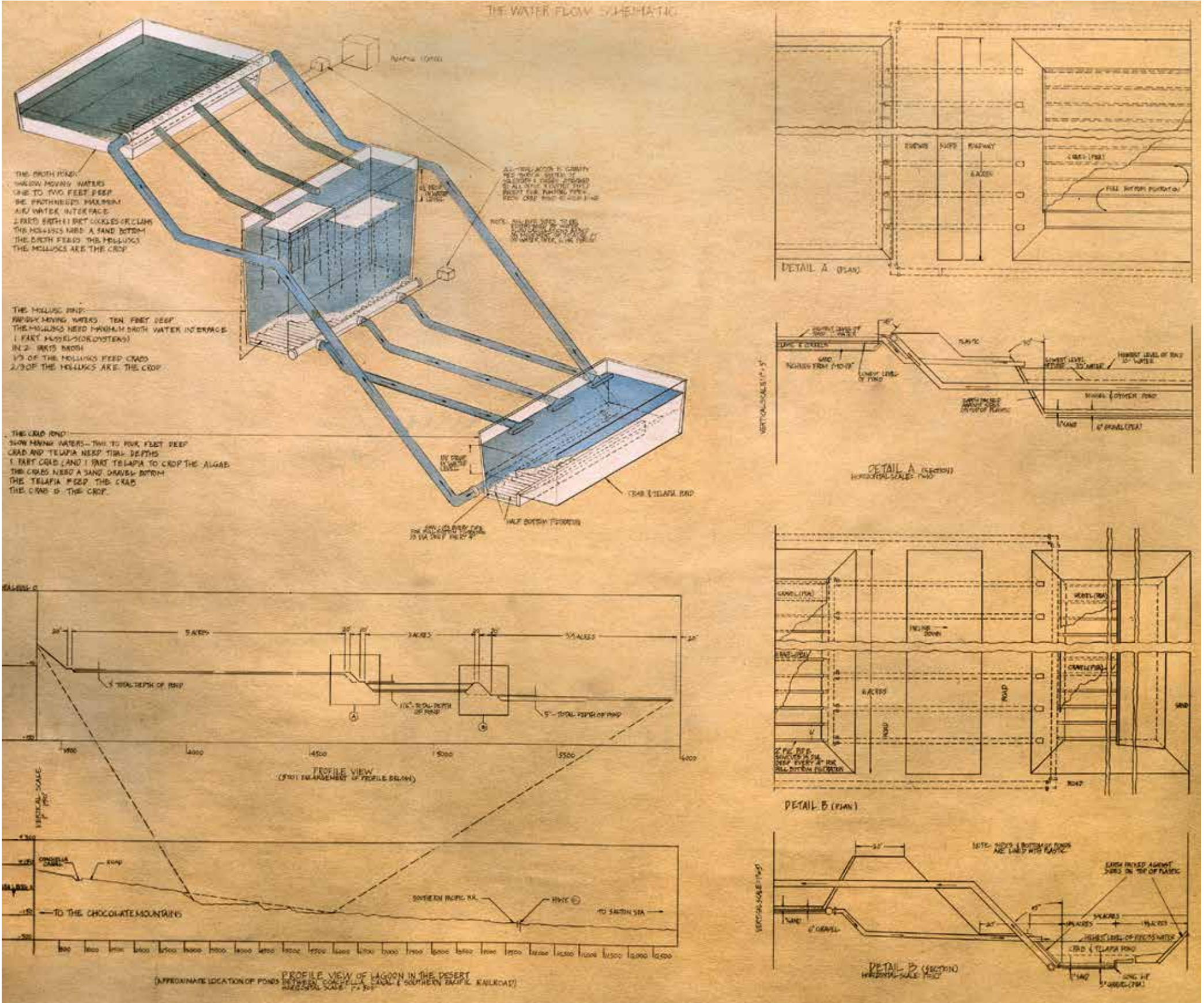
will form a chain ending with the crab let the system be separated into parts give each part a pond connected by water flow then pull a bite out of wisdom and how much can be balanced then the parts can be harvested and the wastes can be circulated nourishing the broth

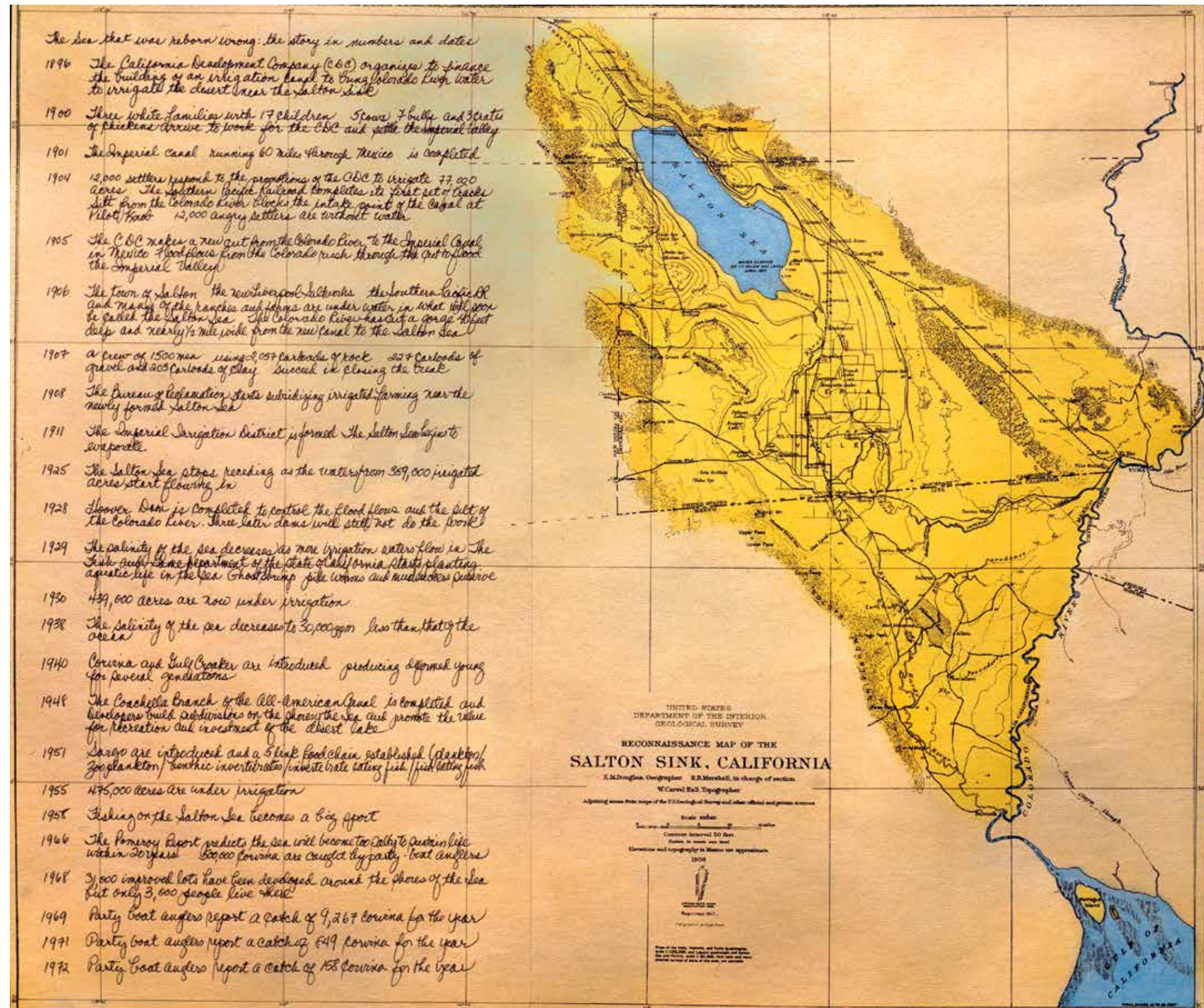
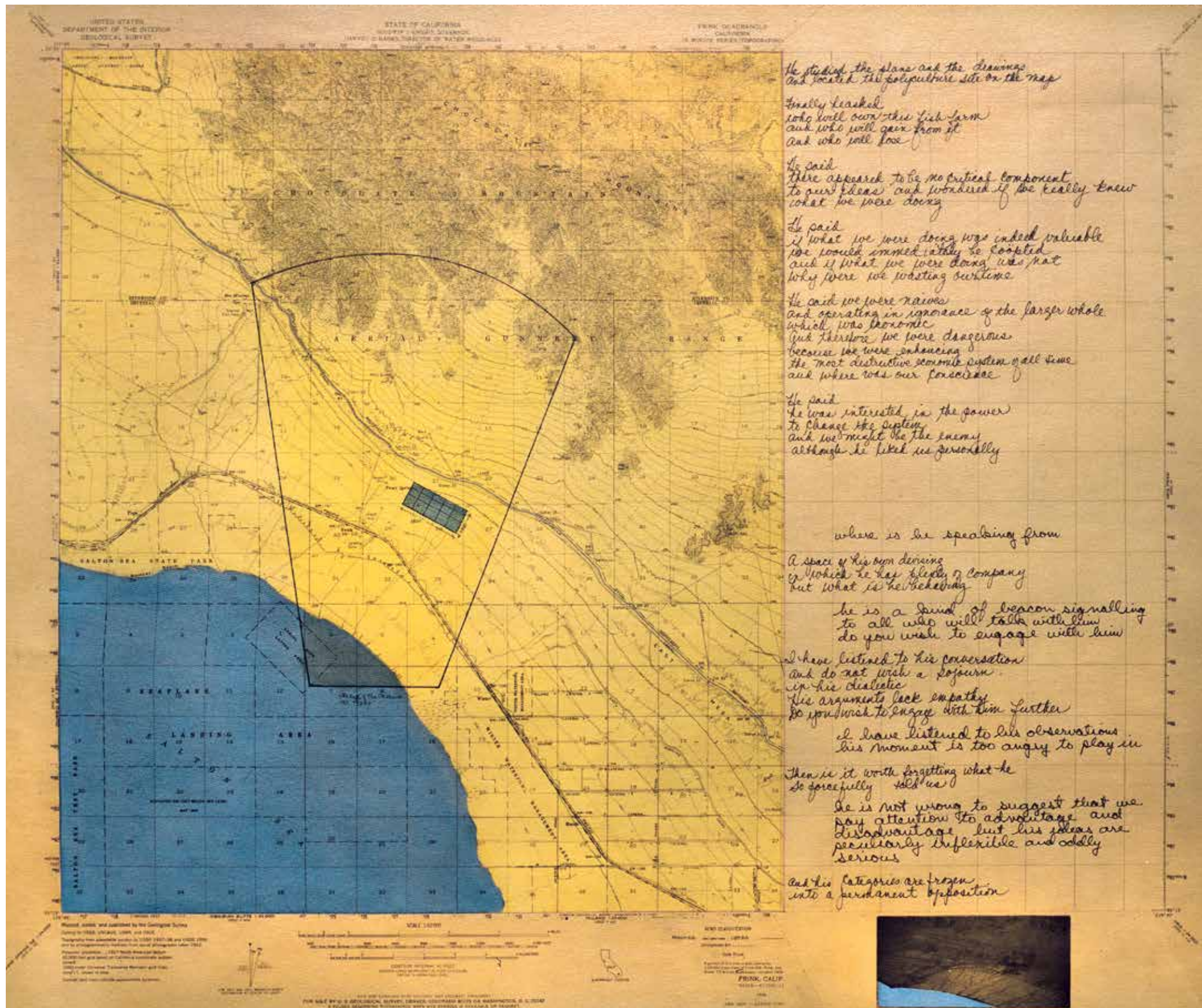
How serious do you want to become about this lagoon I see it as a playground but it could develop a life of its own If the key to the system is broth then the key to creating the system is a pretty confluence of land and fresh and salt waters



Fourth Lagoon On Mapping, Mixing, and Territory

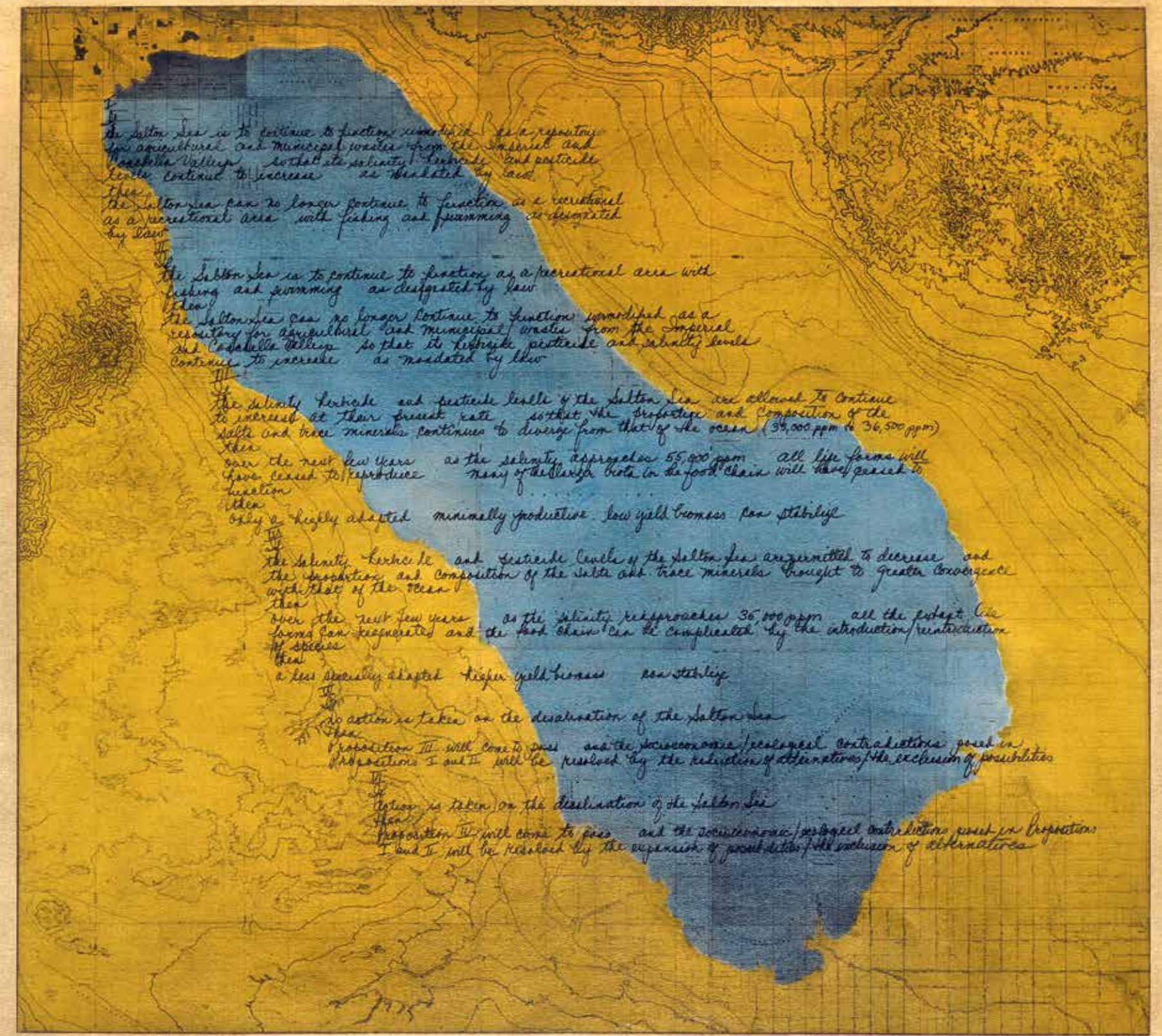


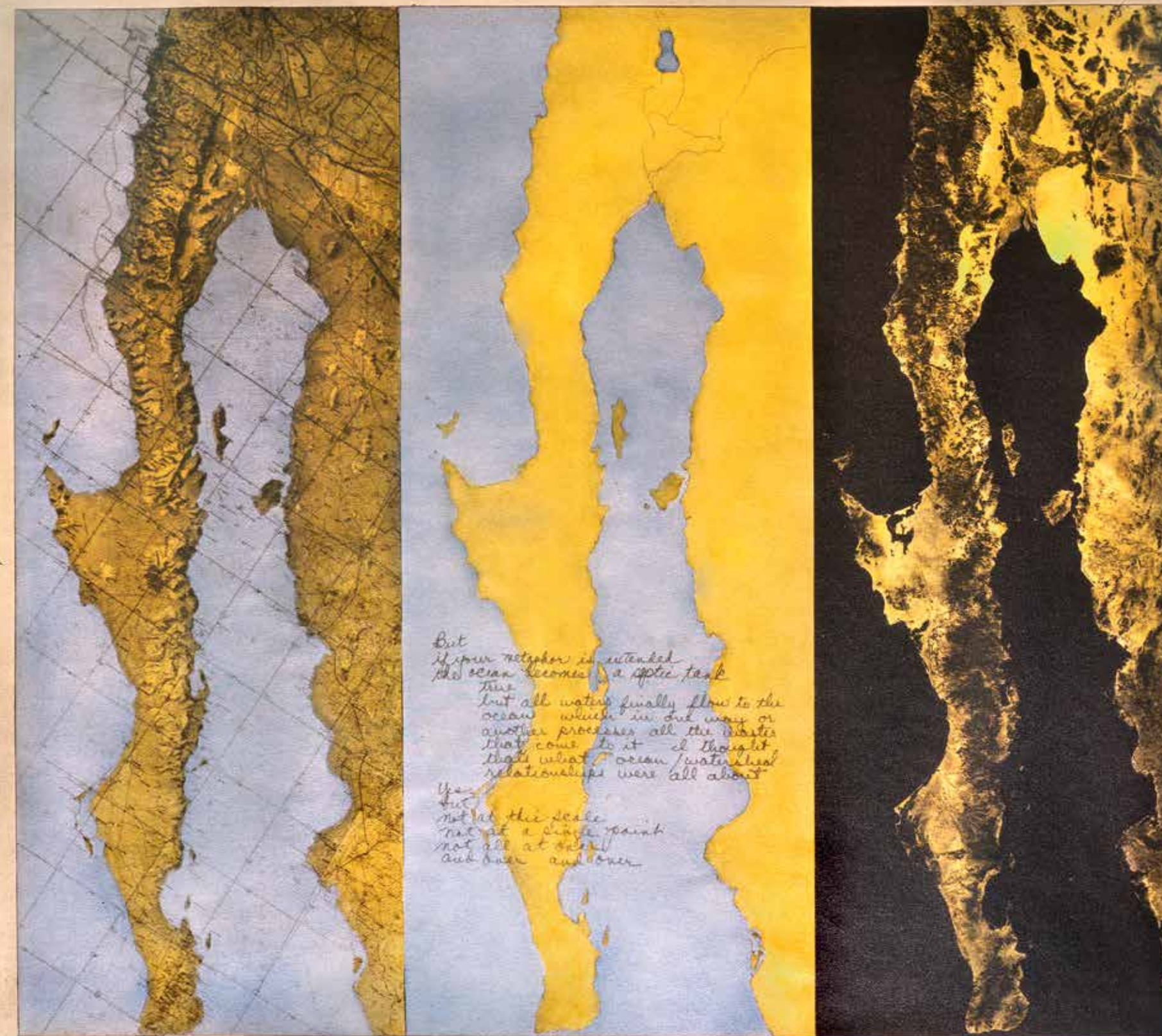




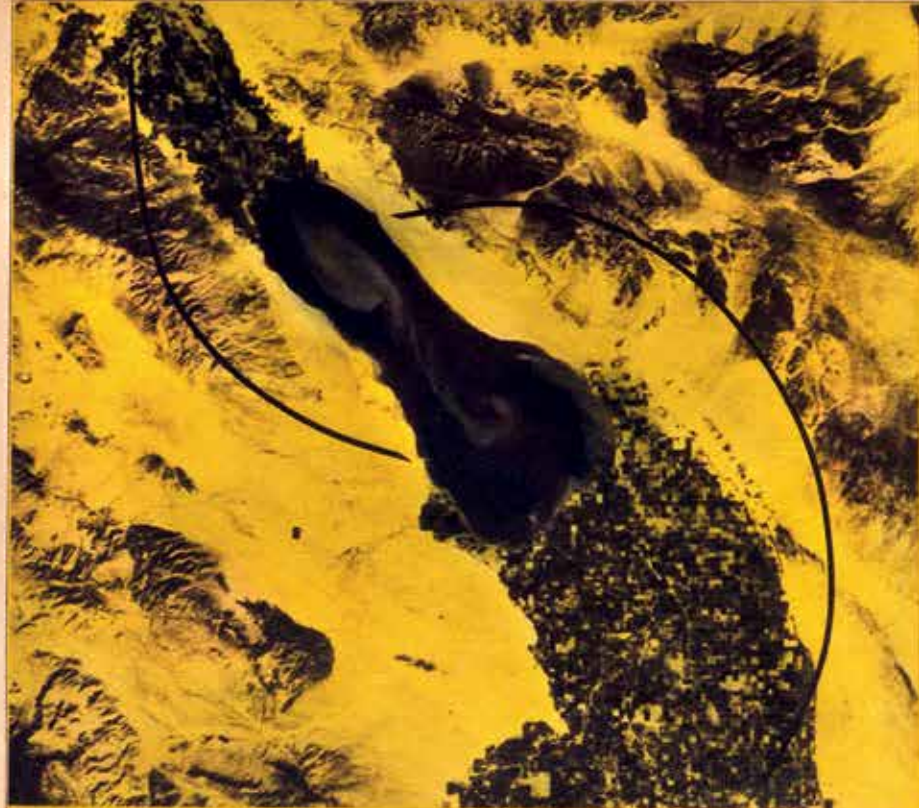


The Fifth Lagoon From the Salton Sea to the Pacific From the Salton Sea to the Gulf





if this



Indeed
you can transform the Salton Sea
but where
did such a curious notion
come from
As I tipped the map
in another direction
looking at the Salton sea
in relationship to Baja
and the mainland
and the gulf
an image emerged
of the Salton sea
as a diseased bladder
for a moment
I imagined myself a surgeon
inserting a catheter
and generating an artificial
urethra

or this

then that



or that

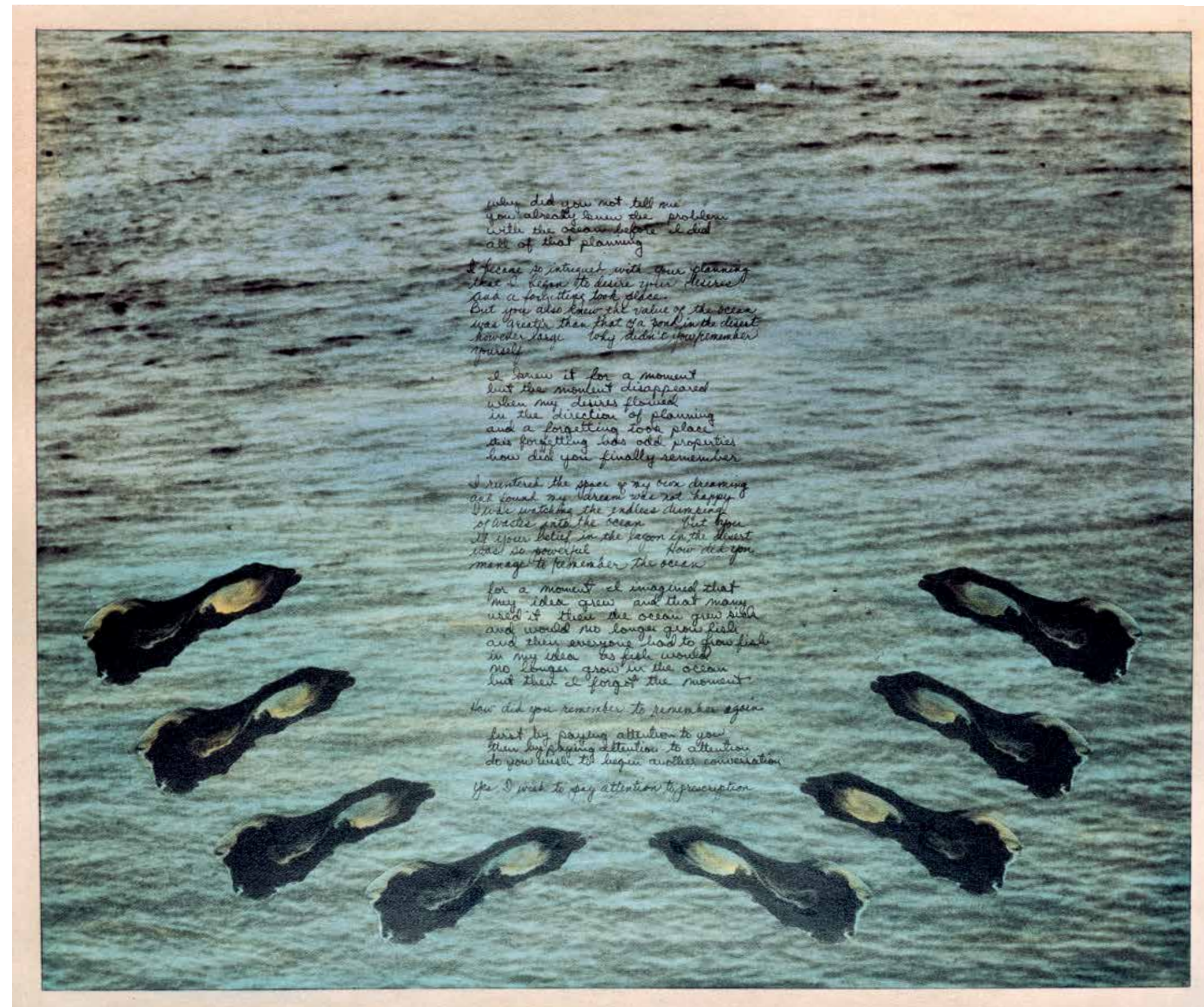
for
if you flush the Salton sea
and make it into an estuarial lagoon
with locks and pumps
in the input-output channels
put northward to the Pacific
or southward to the Gulf
then
360 square miles of corrosive water
contaminated with herbicides
pesticides, minerals and metals
will be transferred to the Pacific or the Gulf
and as long as the oriented agricultural catheads
pollute the contamination
then
who will flush the ocean
who will flush the Gulf

therefore
not this



or this

The Sixth Lagoon On Dialogue, Discourse, and Metaphor





For instance
 it for millions the fresh waters of the Colorado
 and the salt waters of the Gulf
 have been in dialog encompassing the farm
 and disputing the southern boundary of the delta
 the salt laden Colorado dropping its load
 and extending the delta
 the Gulf with its twenty to fifty foot tidal forces
 washes the delta away
 but slowly retreating before the massive silt load
 and if
 this discourse has been interrupted
 to divert the waters of the Colorado elsewhere
 then
 advantage has been given to the tides of the Gulf
 which will once more slowly fill up the delta
 to again reclaim the Colorado irrigated farmlands
 of Mexico
 and of the Imperial and Coachella valleys
 and
 disadvantage has been given
 to that vegetation which had adapted
 to the intermittent flow of waters
 and to all parts of the life web
 dependent upon those parts
 already disadvantaged
 while
 Advantage has been given to
 Phoenix Arizona the Sonoran plains
 the Gila River and such cities as Nogales
 Sonoita Tucson San Diego Riverside
 and their respective states and counties
 and all of their populations and industries
 Pay attention to the fact of the giving
 of advantage and disadvantage



Pay attention to the flow of waters
 Pay attention to the integrity of
 the waters flowing
 Pay attention to where
 the waters desire to flow
 Pay attention to where the waters are
 willed to flow
 Pay attention to the flow of waters
 and the mixing of salts
 Pay attention to the flow of waters
 all mixing with earths
 attend to the integrity of the
 between earth and water
 the watershed is an outcome
 attend to the discourse between
 earth water and man
 interruption is an outcome
 pay attention to the meaning of
 the nature of such discourse
 and the nature of the meaning
 of interruption after all
 a discourse is a fragile
 transitory form
 an improvisation of sorts
 and anyone may divert a discourse
 away from into another possible
 direction if they do not retain the
 present state
 Pay attention to changes of state



For instance

the flow of waters of the Colorado River system has been interrupted by dam after dam which demand of the river that it generate electricity and serve as a source of potable water for the cities outside the watershed while requiring the river to act as a power for agricultural wastes when the state of the river has been changed and that change must regenerate back through the system

Q. The flow of waters has been made to behave like rain to irrigate millions of acres of arid land then the state of the land has been changed to give advantage to that which would not naturally grow and disadvantage to that which did



Q. The state of the waters has been changed to disadvantage that which evolved in the flowing waters and to advantage recent forms such as urbanization and industrialized agriculture

then since a steady output of industrialized energy must be spent for the maintenance of these forms and the energy is electrical and of high voltage and the energy is hydraulic and of high cost concomitant beliefs have evolved that these recent forms are valuable and self-maintaining and necessary for the maintenance of life but will bring

pay attention to the cost of relief



for instance of the flow of waters within the Los Lunan tank system has been operating for more than 2500 years utilizing descending in the land for all stream storage and gutting sloping canals to bring water from larger tanks to smaller tanks and smaller tanks again through the villages to the paddies but if the water in the ponds serves for daily bathing and washing and as a source of potable water and as sanctuaries for fish and animals for bird and plant life then over time the tank and canal system has become niched into the ecology and the state of the land has been minimally changed giving advantage to such historic forms as villages and farms while not disadvantage the rivers in the routine life there although a steady output of manual labor must be spent in order to sustain the system the energy spent is collaborative and the force the energy spent is harmonic and of low cost therefore concomitant beliefs had not evolved that high energy high energy systems were valuable and useful and necessary for the maintenance of life and will bring

pay attention to the cost of relief



with gentle slopes

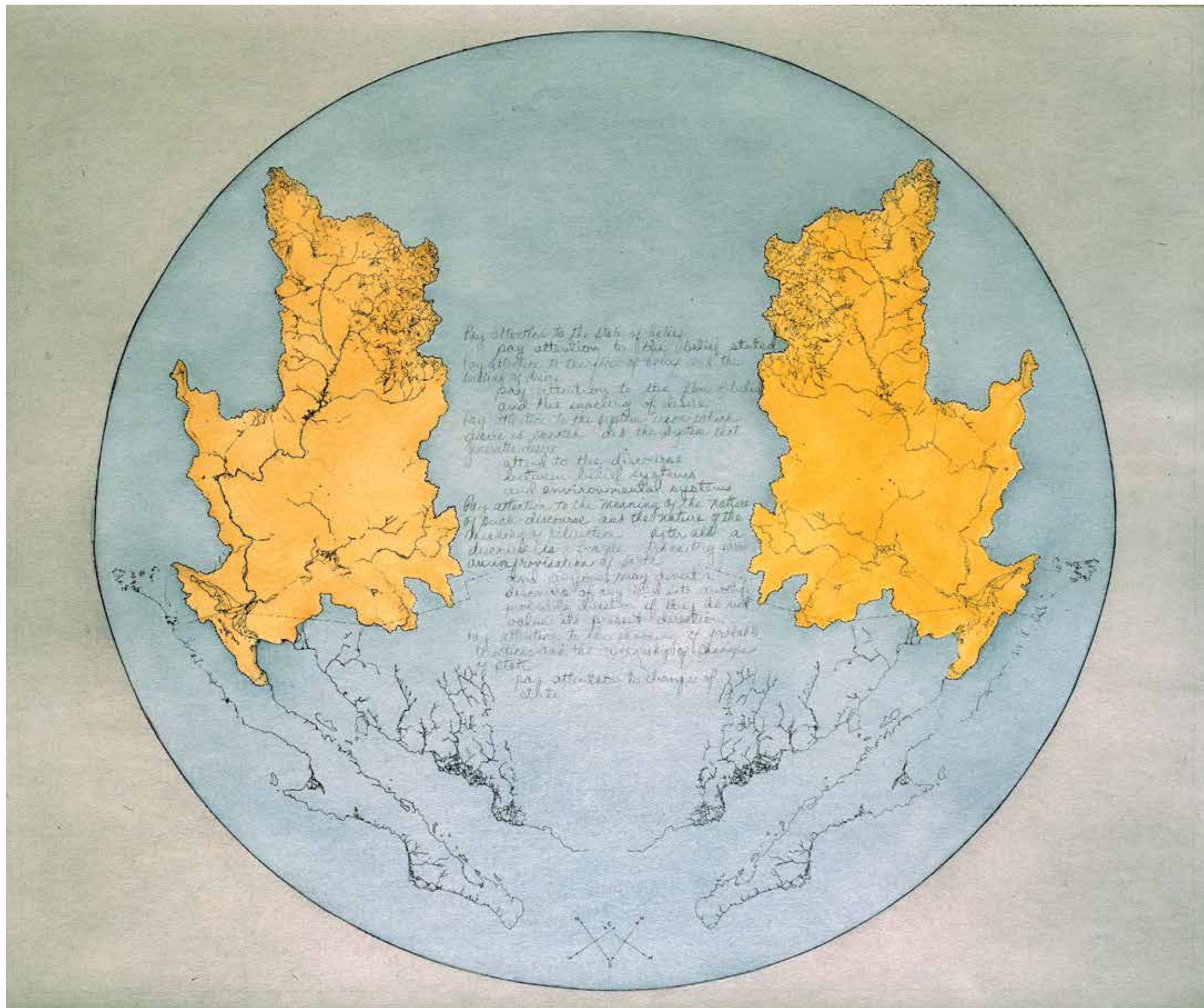
to regulate flow

where open into channels

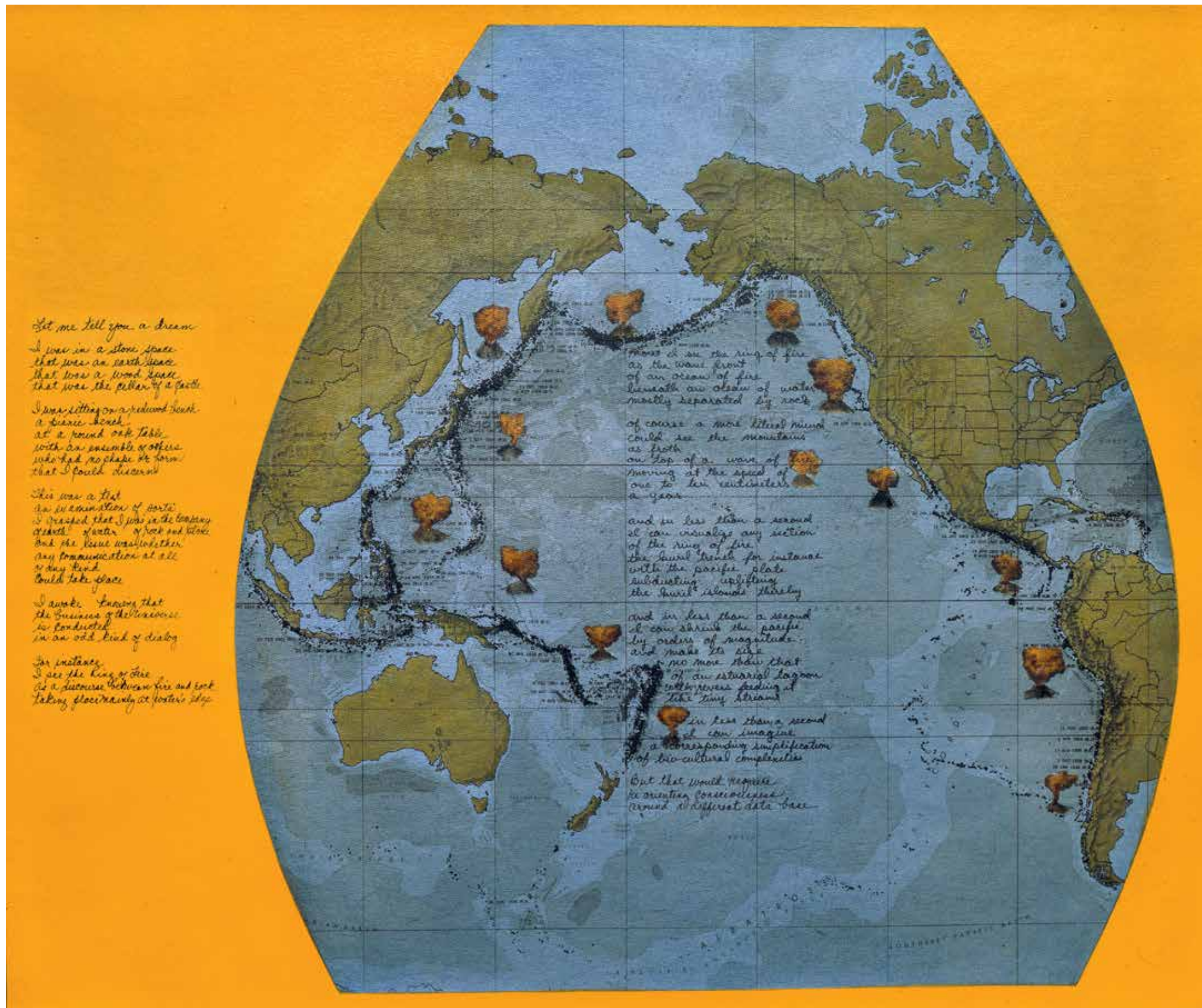
with pumps and locks

which fill the paddies

to successively smaller tanks



The Seventh Lagoon The Ring of Fire The Ring of Water



Do you desire to begin another conversation
the I that at any moment
may answer yet
is itself a peculiar invention
which appears at birth
and disappears at death
This I is a peculiar conversation
adopted at birth
and relinquished at death
it is invisible
but not indivisible
it is a theory
a convenience
an improvisation
a metaphor
this I like a moment
may have no existence whatsoever
This I like a moment
may be expanded indefinitely
like any moment
it may break into many moments
Often I have the feeling that I am
in many places at the same time
My consciousness may be intermittent
yet with the simultaneous so brief
that awareness seems continuous
My present may well be intermittent
or improved it
by successively reframing moments
with such speed
that now seems continuous
and I desire
to begin another conversation.

sometimes a forgetting takes place
and I fall into monology
repeating myself endlessly
falling into monology is pleasant
it is hearing continuous approval
expecting continuous applause
Yet such falling into monology
will all parallel
as the energies available
are consumed
then a forgetting again takes place
and I remember that dialoguing
is very pleasant
and that being in dialog
is self nourishing
self cleansing
self adapting
yet how can I be in dialog
with that
with which with whom
I have no points of similarity
develop smoothly
and construct patterns of similarity
thereby
Yet
the business of today
does not encourage poetry
nor consciousness of mind
rather the business of today
encourages replacement and change
it is conducted
as a technological monology
spoken so rapidly
that the consequences of an improvisation
most times
cannot be seen at its inception

Sometimes I dream of the water buffalo
in its wallow in Sri Lanka
the one that ran about the gasoline engine
and is being replaced by the tractor
Now that tractor cannot replace itself
nor provide milk nor stomp weeds down
nor produce fertilizer and just with its chug
yet this tractor would say
the tractor is a bold invention
an improvisation that will enhance
the state of farming it is more efficient
it can cover more ground in a day
it is modern and cheap and it has
brought people into the technological domain
Yet in some places
the buffalo and its wallow still continue
their thousand year old discourse
their collaboration
and as the consequences of replacing their discourse
into a technological monology
will be a further subtraction of possibilities
for some will be the fish
that eats the shrimp while the shrimp provide
while itself serving as a source of protein
and some will be the woman eating seeds
that live on the wallow's excrement
while fertilizers will be added
and insecticides and herbicides
and the refuse will disappear
although the tractor is not added to the land
and the buffalo will yield to that tractor
although the buffalo is really
more efficient and its dialog with land
more fruitful
Clearly there is something about technology
that does not allow that which is not itself
yet this is not a necessary condition
this unfriendliness to the land

One moment we heard the ocean singing increase in heat increase in water	decrease in ice decrease in land
Sea into water static change	water to sea change of state
increase in heat decrease in water	increase in ice increase in land
Melt at the south pole means ice into water	ice at N. not water to sea
so increase in heat increase in water	decrease in ice decrease in land
Hence all the ocean's whys and I am the temptation to your questions for you are the discovery of my existence and everybody knows that ice is water or water to ice are changes of state upon hearing this we look at present world maps and draw a provable world The issue was difficult was said that if all the ice melted the ocean level would rise 660 feet how does it rise so fast in water at the 660 foot level we thought about how the land would shrink the oceans grow	

and
the water will rise slowly
at the boundary
at the same
rate as the boundary
cooling rate
moment by moment
ok over
altogether
all at once

It is a graceful drawing
and pathos
this response
to the millions of the victims of fire

and
as the waters rise slowly
in the Red Sea, the South Sea,
the Indian and the Atlantic
the ocean gives
will redraw themselves
as will the currents and tides

And
over time gracefully
this rising tide will flow
as every piece
that once flowed down
to the sea.
And
like fresh water tongue
will wash
before the silence of the east

the salt goes
up the salt Lawrence
the Columbia the Amazon
the Hudson the Ohio
the Mississippi
the White Nile and the Nile
the Congo the Don
the Danube
and the Rhine
the Seine and the Loire
the Rhone the Elbe
and the Nevers
the Garonne the Rota
the Tago
the Adriatic the Tyberis
the Tiber the Arno
the Ganges
the Indus the Volga
and the Orinoco
the Lake of Ladoga
the Niger the Volta
the Murray the Mekong
and the Pearl
the Southwestern
the Mackenzie the Yukon
and all the rivers
known and unnamed

And the good place
That lies hidden upon
And reach upon
will become the ^{new} ^{camp} ^{college}
be held for Scotland House
Or shallow inland sea



and the tropics
will become uninhabitable
and the far north
will become temperate
And fire, ice, wheat and peace,
blasting, disease, and war,
And all the grass and starchy roots
known and unknown
shall have to grow elsewhere than now
and must like
barren and barren
Mauve and unmauve
will have to go elsewhere than now
As last part of the lecture, preboard
of "World" changes.
And facts of Europe
near the North Sea
And north of Europe near the Amazon
and China in the east
and Russia in the north
India in the southwest
and other bits of Asia, Africa,
Polynesia, Melanesia,
Australia, and even Japan
will join the growing sea.

And in this new beginning
You continuously rebeginning
You will need me
When my lands can no longer produce
And I will house you
When your lands are covered with water
and together
we will withdraw
at the waters rise



The *Lagoon Cycle* was ultimately designed as a 49-meter-long mural in 60 parts, divided into seven open-ended, interconnected spaces, *Lagoons One* through *Seven*. It had gone through fire and flood. A medieval-type scriptorium was in process, with students working to make the *Book of the Lagoons*. The *Lagoon Cycle* was finished. It was 1984.

In 1985, the *Lagoon Cycle* opened with a beautiful catalogue at the Herbert F. Johnson Museum of Art at Cornell University. It took up three floors; over 464 square meters. The director, Thomas Leavitt, brought Clement Greenberg to see it. Evidently Greenberg liked it (we wondered whether we should tell anybody, since we didn't like Clement Greenberg). John Kluge and Ronald Feldman invited a bunch of people to come to the opening, mostly distinguished people. John Kluge flew them up from New York to Ithaca in his 747. Everybody liked being flown to an opening in a 747—very presidential. We performed the work, speaking it and reading it to small groups.

A week after the opening, the painting of the ancient Sri Lankan flag that we had made for the *First Lagoon* was ripped off the wall, slashed with a knife, and carried away. Witnesses saw two people running down the hill away from the museum with it. It turned out that the Tamils were offended by the Sinhalese flag in the *First Lagoon* (which told the Upali Senanayake story of discovery, revelation, and transformation). It was the first time any work of art of ours had been seriously attacked. We made a new flag.

Sitting at dinner with John and important others, his representative Clive David suggested that we make a grand presentation, with oceans rising out of the *Seventh Lagoon*. That is to say that we hype it, make it into a spectacle. We asked if he wanted to sell seats ... and then said no thank you—foolishly arrogant on our parts.

In 1987, Maurice Tuchman gave the *Lagoon Cycle* a solo show at the Los Angeles County Museum of Art (LACMA). It was well received by many. The critics found it boring because of all the reading that was required. We found the critics ecologically illiterate and their response, therefore, inevitable.

In 1995, Jacques Leenhardt, the French critical theorist, asked us if we would not put the *Lagoon Cycle* in an exhibition called *Villette-Amazon* the following year, in Parc de la Villette, which had formerly been a giant slaughterhouse outside of Paris. We compressed the piece into 325 square meters. (It looked good anyway.) Jacques did a beautiful French translation; theater people did readings from it. Germain Viatte, then director of the Musée National d'Art Moderne in Paris, brought his staff around. He wanted to acquire the piece, and his staff agreed that it would be a marvelous acquisition.

We called John Kluge and asked if he would donate it. We calculated its value at about 130 000 dollars per lagoon, or 900 000 dollars for seven lagoons if you rounded it out. Several weeks passed; we were sitting at home—the Musée National d'Art Moderne had agreed to value it at 900 000 dollars—and the telephone rang. "Hello, this is John calling. I hope you don't mind," he said, "but 900 000 dollars for the *Lagoon Cycle* is too low. I need it to be evaluated at 1 100 000 dollars."

We called Germain Viatte. He said, "The Museum staff is amused, but we will evaluate it at that price." John says yes. We say yes. The National Museum says yes. The work, already in Paris, is rolled up and repacked in its seven crates. It moves to the Centre Pompidou storage facility. Several months later, Germain Viatte yields the directorship at the National Museum for another directorship. The next director disliked the *Lagoon Cycle*, and it has remained in storage to this day.

Afterstory

Baltimore Promenade

Two Lines of Sight

and an Unexpected Connection

Comprise a Promenade

for Baltimore

1981 Maryland Institute College of Art,

Baltimore, MD

1982 Washington Project for the Arts,

Washington DC

1985 Wenger Gallery, San Diego, CA

et al.

It was 1980. I (Newton) was at the National Endowment for the Arts in Washington, DC, reviewing the Crafts Program while I (Helen) was on a sculpture panel there. Fred Lazarus, the director of the Maryland Institute College of Art, was at the same time on a panel for the National Endowment for the Humanities. Knowing we were also in Washington, he contacted us and said that they had some problems in Baltimore. Would we review the urban planner’s design for the city? There was unrest—meaning the possibility of rioting, as the black community in the center of the city felt excluded from the domain of urban planning. People felt too much money was being spent on the redevelopment of the harbor; they felt they could hardly even find a way to the harbor with so much building going on. There were a lot of abandoned homes in Baltimore as well. It was all very confusing.

The city plan, from our perspective, was appalling. It was about filling in the open spaces between the buildings, referred to as “interstices.” This decoded as building more big block buildings, many of which were government-assisted housing for the poor. So we went on a walking tour of the center of the city. Our first recommendation was to fire the Planning Department, as they had not acquainted themselves with the value of street life. The suggestion could not be taken seriously, but Fred invited us to come to Baltimore and do what we always did, which was to think, respond, and maybe propose.

After about a week on the site, it became clear to us that the planners had broken up the promenade systems that had been created by people over time. We were acutely aware of the function of promenades, having lived near and spent time on the great promenade streets in Florence, Paris, and even New York. We concluded that the planning community, indifferent to a notion such as how people actually behave on the ground, had broken the promenade and therefore set up the conditions for further alienation of street life.

We worked with a group of students from the Maryland Institute and met with many people, connecting well with Mayor William Schaefer and the urban development department. After further walking the streets, we came up with the following text which became the guiding metaphor for both, the gallery installation at the Maryland Institute (and, later, at the Washington Project for the Arts) and the citywide performance that followed the opening.



Thus we said,

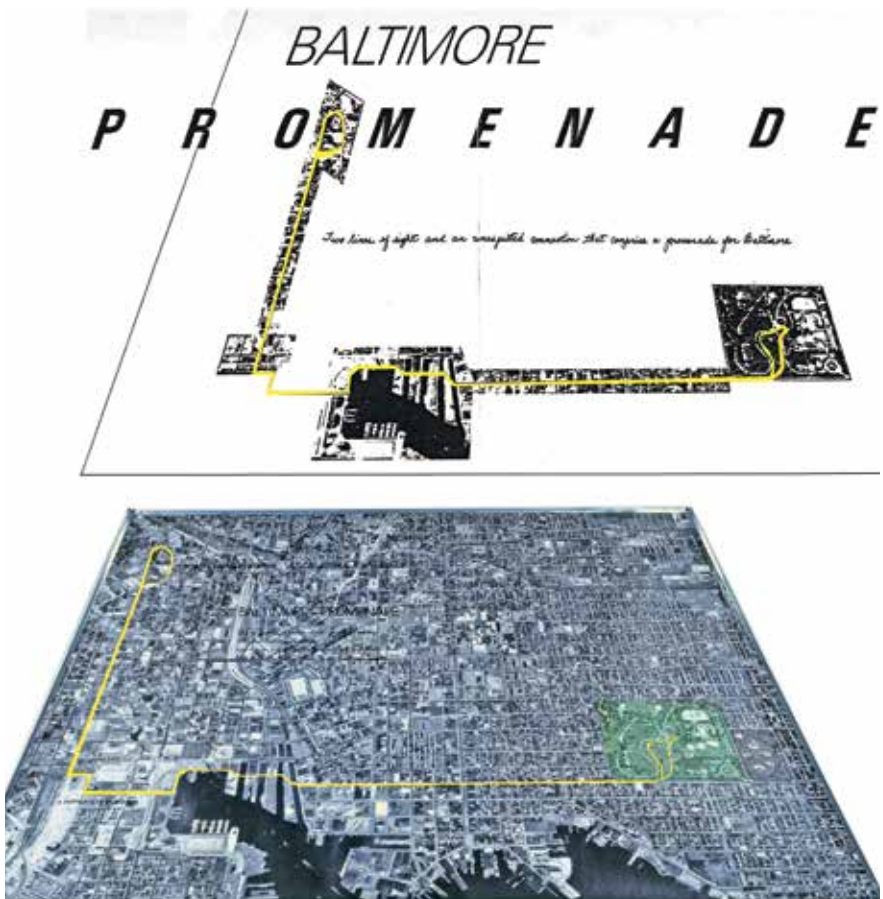
A promenade is both an activity and a place, a stage on which people in a community meet and mix. It is a leisurely meeting and mixing, having a different purposiveness and tempo than daily activities in a workplace.

A promenade is marked by people physically tuning to common movement and rhythm. A promenade is an activity common in all urban ecologies, a basic homeostatic or self-regulating mechanism by which the community as a whole maintains awareness of the individuals who compose it and by which the sense of community is reaffirmed collectively.

A promenade is an arena in which the communal drama can be publicly enacted, an arena in which to experience constancy and change, to define self and group in the context of society and time.

A promenade locale builds slowly from a first settlement; sometimes it is simply a main street speaking its patterns and its origin. A promenade always forms part of an unspoken consensus.

In times of abrupt change, a city can lose its psychological center and the promenade is displaced. The reasons are many, often economic. The result of this loss is always lessening of value, quality of life, and sense of community. As the loss becomes clear, its consequences are manifest and solutions may be sought.

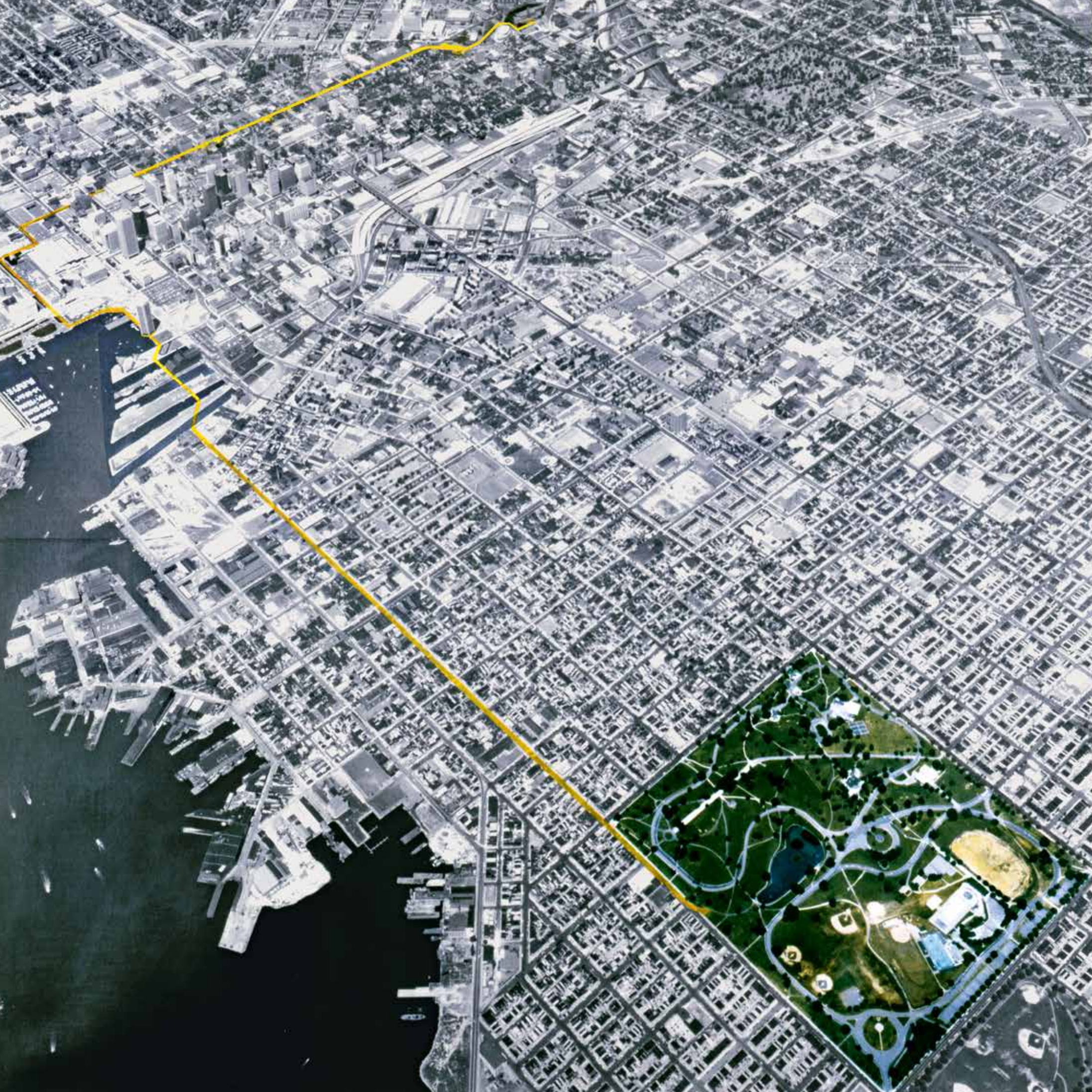


Two Lines of Sight
and an
Unexpected Connection
Comprise
a Promenade for
Baltimore

Therefore
with our students
continuing our walking talking program
street by street
we made a proposal
for Howard Street
a connection from Mount Royal
Center to the harbor
By closing
both Park Avenue and Preston Street
to traffic between Howard and Cathedral
Then
co-joining
the parking lot between Symphony Hall and the
Bank of Maryland Insurance Company
with the streets and planting it as green space
And then
establishing
a common terrain between
Symphony Hall and the Mount Royal Station
so that
a powerful physical center can be generated and
cultural activities given
common ground
Thus
a meander from Mount Royal Station through the
green space around Symphony Hall
will echo the meander near the harbor and
the meander around the lake in Patterson Park
Thus
Mount Royal Center will be
to Howard Street as Patterson Park is
to Eastern
And
of equal importance this reformed
Mount Royal Center becomes both
terminus and beginning place
for the regeneration of Howard Street
thus setting the stage
for a cultural corridor

From the perspective of Howard Street





Exhibition details, Maryland Institute College of Art



We did the same kind of analysis for the harbor, and thereafter for Eastern Avenue, which crossed seven ethnic neighborhoods, terminating in the small Olmsted-designed Patterson Park.

To prove our point, we commissioned an airplane flight that boxed the compass, photographing downtown at a skewed angle. We blew up the 25.4-by-25.4-centimeter negatives to four 2.4-meter-square images and one 2.4-by-five-meter image. Then, we drew our promenade proposal on them and created the installation. Our images had sufficient detail that each viewer could see and even touch their own house.

Fred had remarkable capabilities as a strategist. Before the opening of the exhibition, he arranged for every major newspaper in the Baltimore area to have a different story about this work. This successfully brought the public into the discourse. The mayor's office agreed with our proposal to design the promenade and to make a citywide performance. Thereafter, we all promenaded the design.

Artists lead walk to tie city together

It wasn't just a walk, it was a concept

Mayor Schefer joins crowd at Mount Royal Stadium for a promenade through the city.

Seeing the city from a new angle



One of the images in the many newspaper articles that documented the promenade actually caught some of the extreme excitement on the streets. Dramatic headlines had attracted an estimated several thousand people.

The sense of community was profound as if our work was publically approved. The urban planning director, walking with us, committed 15 million on the spot to develop Howard Street according to our plan.

From the perspective of Patterson Park



Howard Street construction in process



Completed



Promenade construction in process



Completed

The mayor's office got behind it beyond our expectations. Marching bands from both local schools and local organizations were put together; a multitude turned out; politicians used the performance to campaign. The promenade began at the Maryland Institute College of Art, where the exhibition opened. We told stories and read poems about the city to the audience who ranged from students to everyday folk to the movers and shakers in the city. Above all, there were people from the many groups we had met and consulted with and in various ways been influenced by. Mayor Schaefer showed up with a horse and carriage. Churches along the way served food to the passersby. The spirit was wonderful. People tuned to one another in their walking. The sound of the promenade was quiet, a sort of low rumble of people quietly talking to one another and looking and stopping at shops along the way. We had discovered that a typical act of promenading, from a walking perspective, should not take more than 20 minutes; moreover, there needed to be adventures along the way. There were to be three promenade segments: from the Maryland Institute to the harbor along Howard Street, then across the harbor and the new Harborplace marketplace to Eastern Avenue, thereafter along Eastern through the seven ethnic neighborhoods to Patterson Park, each section requiring about an 18-to 24-minute meander. The outcome was interesting. The head of urban planning let us know that we had gifted the city with more valuable thinking than any of the developers or planners they had worked with over the last decade; on the spot, they committed another 15 000 000 dollars to complete a promenade section by redesigning the street from Harborplace along Howard Street to the Maryland Institute College of Art and the other civic institutions. They also agreed to

put our work into the city plan; the whole Planning Department liked it, comparing it to the thinking of Jane Jacobs. An unnecessary street near the Maryland Institute College of Art was removed, as we called for, thereby increasing the parkland and making it a more physically unified area. This included the Maryland Institute College of Art, the Opera House, and Symphony Hall, as well as a dinner theater, and it was renamed the Cultural Corridor. Thereafter, the whole of Howard Street was restated by the addition of a four-block proposed bus mall into the kilometers-long north-south promenade. The east-west axis was initiated when a small bridge at the harbor was shifted, thereby offering a line of sight from the harbor to Patterson Park along Eastern Avenue. The one of us said, "From the edge of the harbor, the trees at Patterson Park shone green. From the edge of Patterson Park, the tip of the aquarium sparkled like a jewel." This area has also been called for redevelopment. (However, to our knowledge, redevelopment is still more rumors than material and on the ground.) We concluded our stay by making an argument that through zoning, tax reduction, and other means, gentrification could be resisted and people could stay where they lived, letting neighborhoods remain intact.

Finally, though we considered ourselves storytellers of a specialized kind who were generating a new urban narrative that would underpin more humane urban design, we were treated by most, particularly the Baltimore Planning Department, as an odd species of urban planner, one part Jane Jacobs and another part too eccentric to categorize.

Fortress Atlanta

1983 Visual Arts Building and

Gallery at Emory University,

Atlanta, GA

1985 Ronald Feldman Fine Arts,

New York

In 1982, historian, critic, and curator Clark Poling called from Emory University in Atlanta. He said they were doing an exhibition and symposium called *Rethinking Human Rights*, and asked whether we would be willing to invent a piece with this as subject matter. He said our companion in this would be Hans Haacke (a close friend of ours) who would also do such a piece; we were each to get 3 500 dollars for this work. We didn't think we could do justice to the idea for that amount of money. Neither did Hans, who dropped out. Clark said we could have Haacke's money, for a total of 7 000 dollars. We went to Atlanta and began to walk the streets on our standard premise—to go there, research, explore, think, and respond.

Peachtree Street, the great shopping thoroughfare, was like any good shopping street. All the big and little stores were there. It had a reasonable promenade. You could feel wealth—or at least economic sufficiency—exhibited by most of the people walking on the street, although we did not notice many people who were black. Downtown Atlanta was a different cup of tea. Walking the rest of the streets downtown in the late afternoon, almost twilight, was scary. Few people were walking; those who did walked quickly, not looking at one another. Parking lots and other vacant lots were fenced by barbed wire. Buildings had only one entry. The second-story university library had bars on the windows and looked like a prison. There was a feeling of alienation on the streets. There were no parks that we could see, nor places where people could gather. The bus stops were lonely. There were not many trees. There was little color. Instead, there was single-entry big building after single-entry big building. The down-

The center of the city of Atlanta appears to have been designed in violation of the right to assembly.

town felt guarded, self-protective, and fortress-like, part by part. Not far from downtown, we found Martin Luther King Jr.'s church on Auburn Avenue and walked by his house several blocks away. We photographed and photographed. Walking back into town again, a work came to mind. It was simply a renaming of the city. We called it *Fortress Atlanta*.

We thought the architecture of the city was clearly in violation of the First Amendment which guaranteed the right of assembly. (To be precise: Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the Government for a redress of grievances.) How could you assemble in a town with no parks and with barbed-wire parking lots, single-entry buildings, and bars on the windows of the university and the libraries? It was as if the design parameters for the center of the city had embedded in them an implicit instruction to create a place where riots couldn't happen or, if they did, they would be easy to control. To prove the point, we commissioned a flight photographing the city from above. The bifurcation caused by the freeway seemed to enhance the fortress-like properties, and up close you could see the barbed wire. So we outlined the freeways in gold on one image and the single-purpose buildings in gold on another. The pattern was unfriendly. The perimeter of the city also appeared to be under assault from a strange ivy-like exotic growth called kudzu; we saw it wherever we went. No matter how well people removed it, it regenerated. A certain lassitude ensued, and people gave up. Nonetheless, like everywhere else, the wealthy neighborhoods and even the middle class neighborhoods were attractive. There was an odd disjunction between the pleasant aura of the neighborhoods and the fortress-like properties downtown.

The exhibition was at Emory University. We also presented the work in a large auditorium filled with university people, people from the community, architects, and city planners. Their response was interesting. The planners and most of the white folk didn't really know what we were talking about. Among the black folk, we could see heads nodding in affirmation and nodding, and one loud voice said, "You sure got that right." A few years later, we received an article from an Atlanta newspaper and a letter from an architect expressing the idea that amelioration proposals were being written in response to the fortress-like properties of the center of Atlanta. We have not been invited back. We do not know the outcomes.

Fortress Atlanta Sketch

1
A city of towers
Defendable entry by entry
building by building
street by street
We are assured that some people live there

2
A city of barbed wire and fields of fire
Parking lots with controlled entry
Defendable space by space
street by street
tower by tower
We are told it is a pleasant and friendly city

3
A city of streets interrupted by overpasses and underpasses
railroads constructions and walls
with clearly defined lines of supply
A city defendable at its core
A city where freeways and walled railways
command the perimeter like a moat
We are assured the metaphors are unintentional

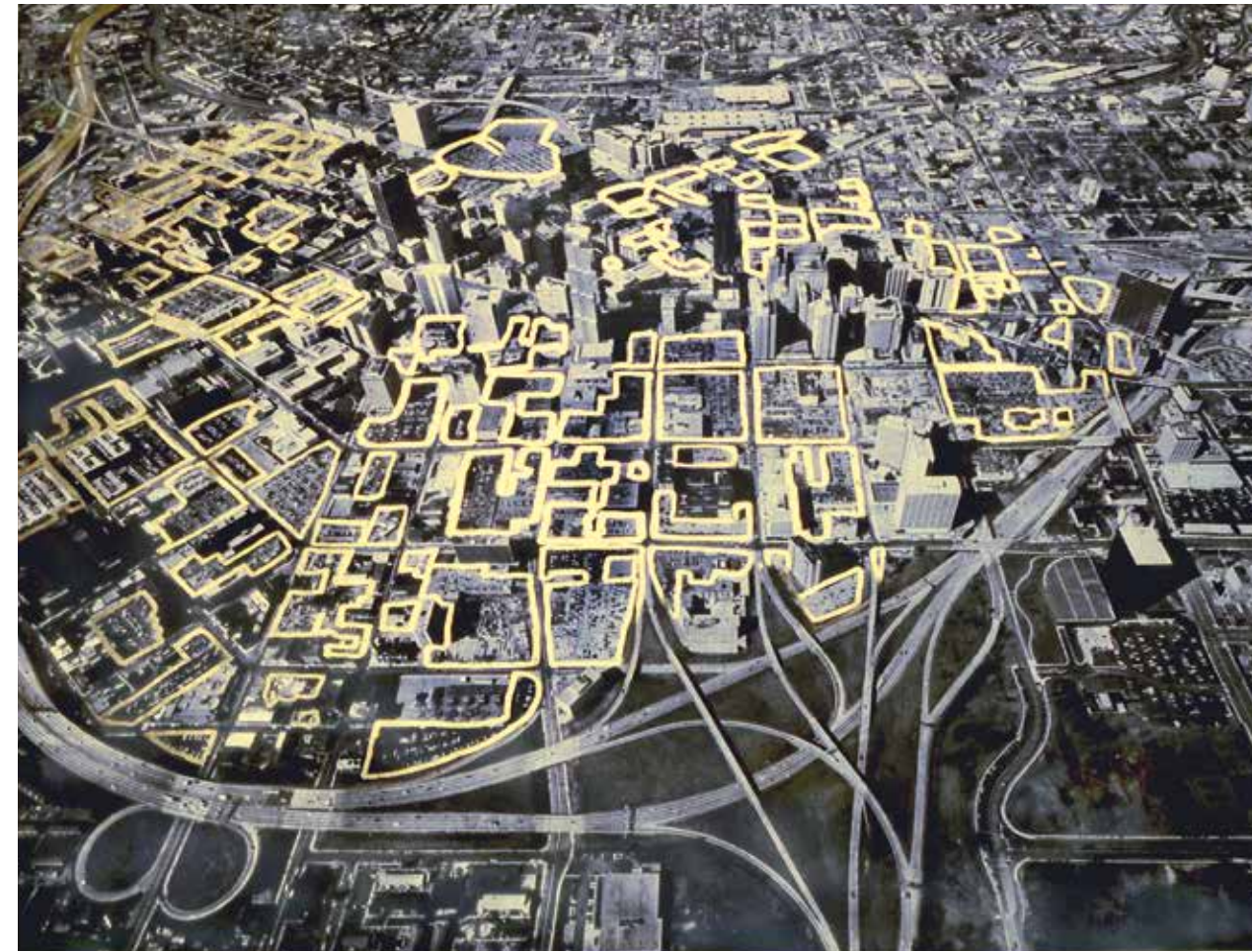
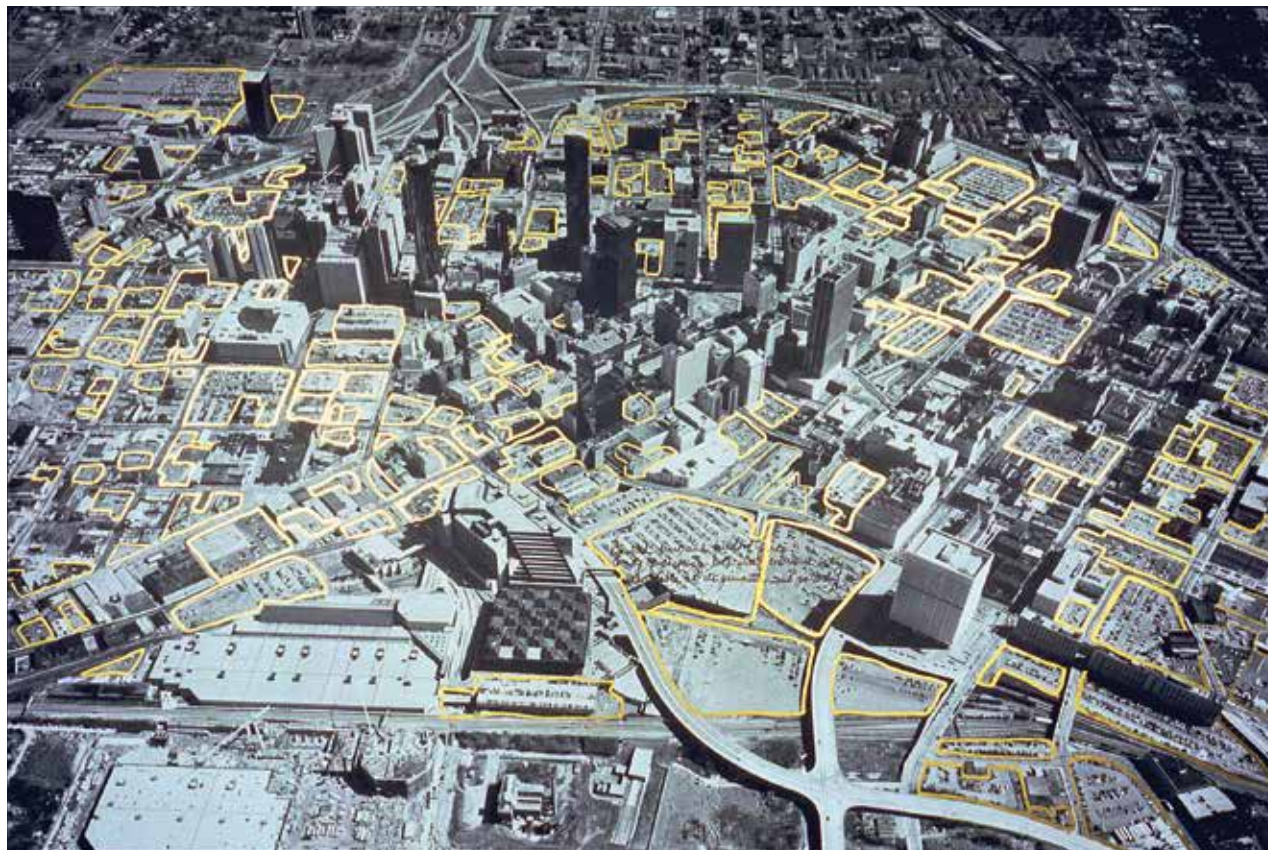
4A
A city where the struggle between the person on foot
and the man in the car
for the rights of passage on the streets
has been decided in favor of the automobile

4B
A city where much of the public street activities
have been moved indoors to defendable
commercial private spaces
And such public freedoms as the rights of assembly
and the right of passage on the streets
has become subsumed
under the laws of behavior on private property

Parking lots with barbed wire fence



Buildings with one entrance



Where the parking lots and single entry buildings are assembled as a coherent but unfortunate whole



Where the city is bifurcated by a freeway

Barrier Islands Drama

The Mangrove and the Pine

1982 The John and Mable Ringling

Museum of Art, Sarasota, FL

1983 Hirshhorn Museum and

Sculpture Garden, Washington DC

1985 18th São Paulo Biennial, Brazil

et al.

In 1982, Michael Auping called from the John and Mable Ringling Museum of Art in Sarasota, Florida. He had in mind an exhibition to be called *Common Ground: Five Artists in the Florida Landscape*. The artists were Hamish Fulton, Alan Sonfist, Michael Singer, and us; there would be a catalogue. He said there was funding and asked if we would do a work for the exhibition. We told him we would come there, do research, talk to different people, especially politicians and ecologists. We also made it clear that the object of this activity was to enable us to come to grips with the environment and to be networked into the community. We offered no guarantee to do a work, but if a work did emerge, which we thought likely, we would certainly do a piece, probably an installation, for the exhibition. Moreover, the company was interesting.

Exploring the environment in Sarasota, we became intensely aware of the presence of the Gulf of Mexico. There were long sandy beaches and sea walls. There were the Barrier Islands, like Longboat Key and Sanibel Island. The function of the Barrier Islands was to be barriers to currents and tides, which seemed obvious. We were told that at one time the mangrove swamps were everywhere, but many of them had been drained and those remaining were endangered.

Walking the mangrove swamps it was difficult navigating the roots. We noticed a strange kind of pine-like tree that mingled with the mangroves, reaching the water’s edge. We went out in a boat and it appeared that wherever this type of pine tree reached the water’s edge, after displacing the mangroves, it fell over in the wind. Its shallow roots made a pinwheel shape. The falling-over topsy-turviness of this process made a hole in the wall of mangroves. It was not a pretty sight. We were looking at a very slowly enacted drama whose subject matter was loss.

On investigating this pine tree, we found it to be a shallow-rooted Australian exotic called Casuarina, brought over to beautify the landscape about 80 years ago. This tree, commonly known as the Australian pine, did not have any friends in the Florida ecosystem. It could not find a niche. This pine tree didn’t have any enemies either, so there was nothing to stop it. Its only limitation was coming to the ocean’s edge where, being unable to withstand the wind, it fell over.

Mangroves, being ancient native citizens of the area, had remarkable properties. Their roots actually extended deep into the ground, holding back the ocean, holding back the waters of the bay, and acting as a nursery for oceanic creatures and bird life. So while inconvenient for economically minded development, the mangrove swamps were very convenient for everything that was not development. Helen photographed the water’s edge from a boat with her Mamiya, and we did a work entitled *The Mangrove and the Pine*, subtitled, *You Can Never Tell When an Aesthetic Decision Will Ruin the Landscape*. With



two other works this made the museum installation, collectively called *Barrier Islands Drama*; neither of the other two had the force of *The Mangrove and the Pine*. (One was a comparison of sea walls and tree walls. The other was about the islands, with the refrain, “Islands come and islands go according to the waters and their tides.” It was expressed in eight 1.2-by-two-meter panels, with photographs of sea grass appearing then disappearing on sand bars, which themselves appeared and disappeared.)

The Mangrove and the Pine was published in Sarasota’s Sunday paper. It turned out that many others were worried about the Australian pine, and our piece in some measure encouraged people to gather and press the legislature to outlaw the tree and remove it from the landscape.

Somebody asked, “Exactly how much influence did your work have?” I said or you said, “Who knows? If it is important to you, go down to Sarasota and make a study. Let us know the outcome.”

Studio Installation



Commissioned by
The John and Mable Ringling Museum,
Sarasota, Florida

The Mangrove and the Pine

The native mangrove commands the beach
Extending the edge
Increasing the habitat thereby

Take Longboat Key for instance
Where
That pushy shallow-rooted immigrant
That exotic graceful pine from Australia
Colonizes behind that many-rooted
Earth-holding mangrove
Colonizes behind the oceanic nursery of mangrove roots
When
Displacing the mangrove
Gaining water’s edge
It topples in the wind

It’s lovely to walk among the pines from Australia
Almost to the water’s edge
It’s not so lovely to walk among the native mangroves
Almost to the water’s edge

2
Barrier Islands come and go
Responding to the currents and the tides
Increasing or decreasing habitat
Protecting the mainland at the edge

The native sea grass commands the beach
Resists the wind
Holds the ground
Maintaining habitat nearby

Take Sanibel Island, for instance
Where
That shallow rooted pine from Australia
Colonizes behind the native sea grass
And gains the edge
Then
Displacing the sea grass
It topples in the wind
Losing habitat thereby

3
Colonists displace the mangrove
Freezing the edge
Reducing habitat thereby
By concreting the islands at the shore
Deepening and widening the channels
Altering the actions of the currents and
The tides
Exposing the mainland at the edge

Therefore
Seawalls replace treewalls
Reducing habitat thereby
On the Barrier Islands
Off the Florida Gulf Coast

The pine
attacking the edge
Sea grass
protecting the edges



Sea grass first protecting,
and then not protecting

Sea wall



Hard wall



Tree wall

Where the one is forced endlessly
to yield to the other



Soft wall

Where it can be understood that between development at the water's
edge and the Casuarina's movements toward the ocean, the mangrove,
experienceing something like a pincer movement, retreats



Guadalupe Meander

A Refugia for San José

1983 San José Museum of Art, CA

1985 University Art Gallery,

University of California, Irvine, CA

1985 Ronald Feldman Fine Arts,

New York

We came to San José at the request of the San José State University and the City Council for the Arts to make a proposal for the city. We kept crossing and re-crossing small bridges with clusters of trees showing green beyond them as we went from one place of opportunity to another. Finally we parked on one of the little bridges. It was at most a ten-minute walk from the center of town. We found ourselves looking at herons feeding in a small river lush and overgrown in the early autumn afternoon. We said to the gallery director that we found the river interesting and spent the rest of the day walking its banks and photographing them, counting the bridges, and walking from one to another. We said, "Let a riverbank be built such that the cityscape disappears for the walker and city time dissolves into wander time. Let a riverbank be built that meanders along the Guadalupe River and serves as a green spine for the city and serves as a refugia for plants and animals and a refuge for the water." And so we proposed a walk, *The Guadalupe Meander*, which would echo the meander of the river and follow its banks through the city, moving along and across the banks from Highway 17 at the airport to the Highway 280 interchange.

We said,

Let there be access to the river at every bridge.

Let the riverbanks be extended by 15 meters on each side wherever possible and as redevelopment occurs.

Let additional space accrue to the banks here and there and where exigencies of the situation dictate less.

Let the equivalent of the space lost accrue to the river elsewhere.

Let the dams that withhold the waters make controlled releases throughout the dry months and let the water district add such waters as might be needed to keep the flow going for a large part of the year.



The performance,
a river walk—many came.



In 1983, upon first seeing herons feeding in a little river
next to the San José Center For The Performing Arts only blocks from downtown,
we realized that this river, despite all odds, was still alive, so **we wrote**:

TO THE MAYOR AND THE CITY COUNCIL
CAN IT BE YOU HAVE FORGOTTEN YOUR RIVER?
THERE APPEARS TO BE NO COMMENT ON IT IN YOUR CITY PLAN
THIS RIVER THE GUADALUPE RIVER WHICH MEANDERS NEGLECTED
BY THE OUTSKIRTS OF YOUR CITY CENTER ALMOST FORGOTTEN
PURSUED BY DEVELOPMENT ON ALL SIDES CROSSED AND RECROSSED
BY FREEWAYS AND FREEWAY EXITS STRESSED BY THE FLIGHTPATH
TO
THE AIRPORT
THIS RIVER INTERESTS US
WE PROPOSE A WORK WHICH WE WILL CALL THE GUADALUPE MEANDER
A REFUGIA FOR SAN JOSE. TO DO THIS WORK, THE RIVER WILL NEED TO
BE
CLEANED BY GREATER RELEASES AT ITS HEADWATERS, DREDGED
WHERE SILT BUILD UP
HAS DAMMED THE FLOW, HAVE ITS ECOLOGY RESTORED, ITS BRIDGES RESTATED
A SERPENTINE WALKWAY DESIGNED FOR ITS BANKS AND EXTENSIONS
MADE TO THE
REFUGIA AREA WHEREEVER THERE IS VACANT LAND.

“THEN THE REFUGIA WILL BE TO THE CITY AS A HEDGEROW IS TO THE FIELD”

There was much interest in our proposals, so the museum officials and the city officials agreed to go for a planning grant from the National Endowment for the Arts (NEA). The city officials wanted to see what we would do with the river. The museum wanted to see our work as an installation, so they agreed to support a full-scale exhibition of our ideas. The museum staff did all the discussion with the NEA. The museum staff wrote the grant proposal with city input. The museum staff decided, however, that the city staff should type the final application. The museum staff felt, however, that the city staff should administer the grant, although they would be happy to assist. The secretary in the appropriate city department felt that it was not her job to type the application and insisted she was too busy. The city officials decided that the museum staff should type the grant, although they would be happy to assist and sign in all the appropriate places. The conflict continued for a year and was never resolved. We met again with the Arts Council and told them our proposals for the river. We met with the city officials and told them our proposals for the river. “For example,”

we said,

Let a floodplain for the floodflow of the Guadalupe be established.

Let it be a park and ecological preserve bounded by the Guadalupe Expressway to the East, Coleman Avenue to the West, Highway 17 to the north, and the railroad to the south.

Let the perimeter of the floodplain be raised.

Let it be patterned with hillocks and valleys and ridges, highs and lows so at floodtime the hills would appear as islands, and the ridges as pathways between them.

Let the landscape become a preserve planted with oak and other natives of the floodplain. Let the excess waters of the Guadalupe enter, channeled by dam diversion levee and stormdrain. Let there be such other plantings as to encourage percolation.

Looking from the bridge
near City Hall
seeing the heron



Development begins.



Under the bridges
the river still did well.

The Guadalupe Task Force was formed from the appropriate members of the business community, and several months later they sent out a call for proposals for a master plan for the river. They sent out a notice that they would take applications from appropriate and interested parties to plan the river and would like all appropriate applicants to kindly submit their names and a list of their competencies and previous projects and a proposal. We thought, wouldn't it be appropriate for the artist to assemble the team and choose the landscape architect and choose the city planner and civil engineers and the hydraulic engineers and the architects? So we did. As many others answered the request for proposal (RFP), in it

we said,

"A river is a medium for a discourse between life forms which exist in mutual support."

In 1987, we finally saw the new city plan for the river and realized that, although they had taken our language of meander and park and refuge, the city had decided that they could do so and still put the river in concrete. Thus, where the herons used to feed became concrete platforms with steps and trees planted in neat holes, and **we wrote:**

TO THE MAYOR AND THE CITY COUNCIL
CAN IT BE YOU HAVE FORGOTTEN WHAT A RIVER IS?
THERE APPEARS TO BE NO SPACE FOR ONE IN YOUR PLAN FOR WATER FEATURES
THEREFORE WE PROPOSE THAT
IN THE LAST AVAILABLE SPACE FOR A PARK IN SILICON VALLEY
THE SPACE BETWEEN THE RAILROAD TRACKS
AND THE AIRPORT
BETWEEN THE GUADALUPE EXPRESSWAY AND COLEMAN AVENUE
THE SPACE UNDER THE FLIGHTPATH
WHERE ALL BUILDINGS ARE CONDEMNED
LET A MODEST RESTITUTION TAKE PLACE
LET A NEW RIVERBED BE CUT
A NEW MEANDER FOR THE GUADALUPE WATERS
THAT REPLACES THE LENGTH OF RIVER TO BE PUT IN CONCRETE
LET THE OLD CHANNEL REMAIN AS NOW PLANNED FOR FLOOD
CONTROL
BUT LET THIS NEW SECTION OF RIVER BE THE MEANDER AND THE
REFUGIA
THAT THE OLD RIVER ONCE WAS AND COULD AGAIN BE

"AND THE REFUGIA WILL BE TO THE RIVER AS THE HEDGEROW IS TO THE FIELD"

San Diego Round

Through Air,

on Foot,

across Waters

From 1984

Presented at conferences,

but never exhibited



In 1984, several teams of architects were formed by the architectural community of San Diego, seeking ideas that would add value to the city. We were asked to join, so we had a large aerial photo of the city made and began to meditate on it.

The question we posed to ourselves was this: Is there a way to see San Diego as a whole place? Is there a way to have, within an hour or two, an experience of the diversity of it? In other words, could we make a new kind of amenity? By this time the new shopping center by Jon Jerde, a marvelous place, had been built and would soon open. The Arts District was booming, a Convention Center was on the books. A large middle-brow downtown population was growing, hotels had shot up around the waterfront, the airport was enlarged, the navy presence was shrinking a little bit. That is to say, a lot was happening.

San Diego had a river that most had forgotten. It had an outfall at the edge of the city, in the valley that had once been a great farm and



had now become a shopping center. A series of artificial lagoons had been created to the right of the outfall. They were beautiful from the air. Twentieth-century capitalism was hard at work, and growth was the name of the game. San Diego was beginning the change from a small town of 40 000 or 50 000 to a region of several million. In the late seventies we could see this wanting to happen. Within the maelstrom was all this activity, all this desire, this virtually stupefying reach for growth and reach for wealth. What kind of a work of seeing could we add?

At the edge of San Diego's great park, Balboa Park, is Sixth Street. It is a 20-minute walk along Sixth Street from the lower edge of Balboa Park, bordering the Arts District, to the harbor. We began to imagine making a small inlet at the bottom of Sixth Street where one could place a vaporetto and weave through the harbor seeing the city from beyond. (A vaporetto is one of those marvelous "people ferries" that populate the Venetian canals.)

A GRAND ROUND FOR SAN DIEGO

Imagine a grand canal along Mission Valley that extends from Route 5 in the west to the stadium in the east that is simultaneously an urban fantasy and a flood control measure. Imagine the small

canal section necessary to connect Mission Valley to Mission Bay and thus connect Mission Bay directly to the San Diego harbor.

Imagine a promenade from the harbor up Sixth Avenue along Balboa Park to University Avenue where an aerial tram would run west of Route 163 but roughly parallel to it, extending down the canyon across Route 8 and part of Mission Valley, to the Mission Valley Canal.

Imagine a vaporetto moving from a new harbor at 6th Avenue with stops along the way, through the MCRD channel to its most easterly terminus, then along a new channel

through the present parking lots to meet the Mission Valley Canal, or through the canal extension to Mission Bay.

One may begin the grand round anywhere.

If you examined all the parking lots that separated the harbor from the San Diego River, you could imagine cutting a canal through them. So we designed a canal that would not take up many parking places but that would allow a vaporetto to move through and get to the San Diego River. There were tall buildings up from the San Diego River to the east, including one that was home to the *San Diego Union* and the *San Diego Tribune*. We began to imagine an external elevator going to the top of those buildings, and a tram with cable cars traversing the valley and the city and landing in Balboa Park. One could then traverse the Park and walk down to Sixth Street, pick up the vaporetto, and do it all over again.

Basically, *San Diego Round* was designed as a public amenity, setting out to counterpoint the dirty development. It was rejected as it was not feasible to generate profit from it (and increase the tax base thereby). It appeared that a sense for the “commons” as a public good, an addition to the well-being of the community as a whole, had no place in the great city of San Diego. We never did another work there.



Arroyo Seco Release

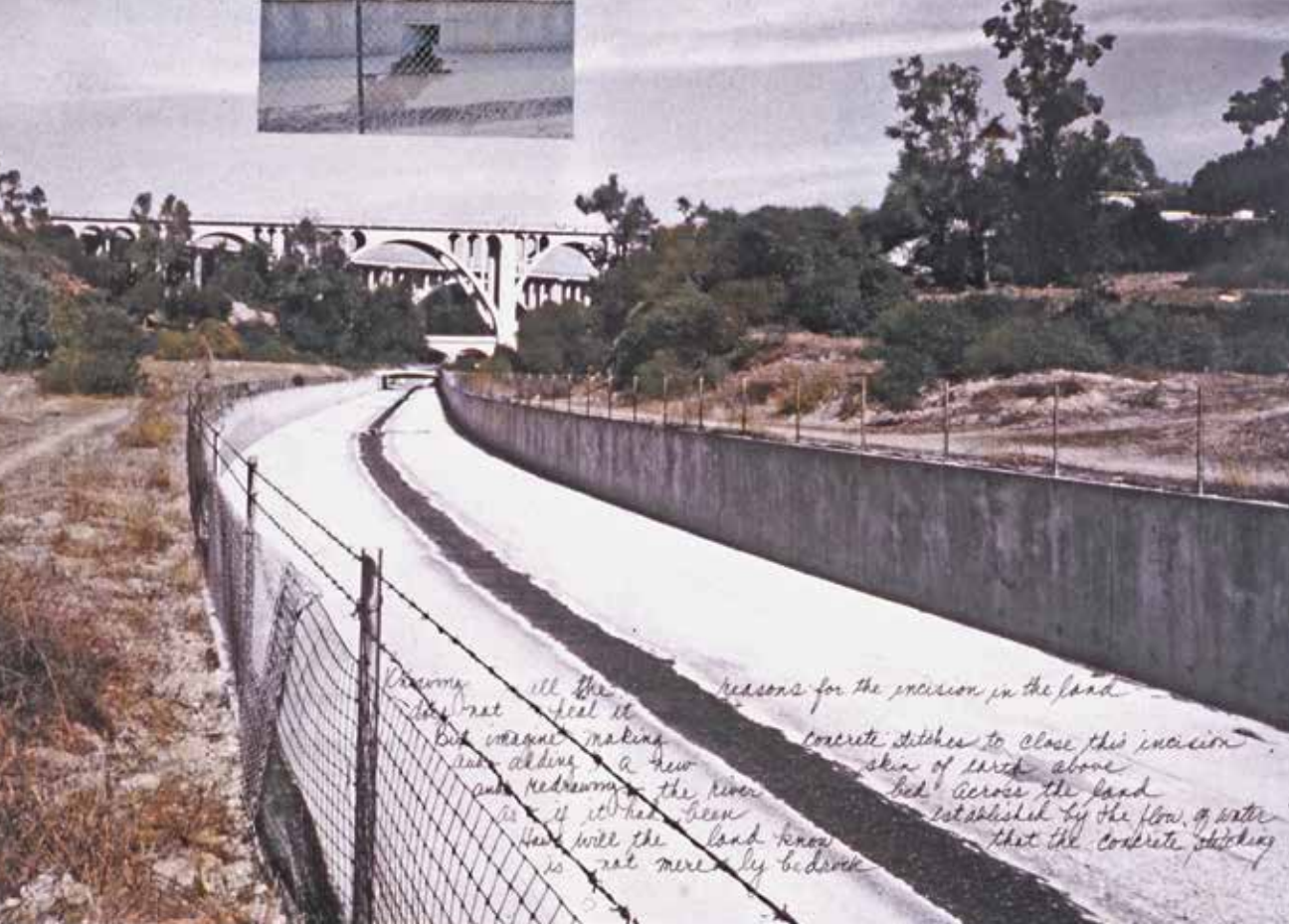
A Serpentine for Pasadena

1985 Baxter Art Gallery,

California Institute of Technology,

Pasadena, CA

It was 1984; several ladies from the headquarters of the Garden Club of America called from Pasadena. They had seen our *Sacramento Meditations* at the Ronald Feldman Gallery in New York some years earlier. They invited us to come to Pasadena; maybe we could do a work there. We had associated the Garden Club with the Daughters of the American Revolution, thinking of them as a rightwing political body as much as promoters of gardens. They assured us that they were the “Western” Garden Club, which, as everyone knew, was quite different from the “Eastern” Garden Club. It turned out that they were genuinely and ecologically concerned for their community, not just for the use of pretty plants and gardens. They immediately took us to the edge of the lower Arroyo. Looking east, one could see the Devil’s Gate Dam; looking west, one could make out Los Angeles. Looking down, however, one could see the 15-meter-wide, three-meter-deep, well-fenced flood control channel literally cutting the Arroyo in half. They looked down and saw something entirely different than we did. They said, “Isn’t it beautiful?” Evidently, they had gotten so used to looking at the Arroyo and the beautiful canyon slopes that surrounded it that they had erased the flood control channel in their minds. “No,” I replied or you replied, “it’s not beautiful, it’s appalling! The Army Corps and California Flood Control have chopped the Arroyo in half!” They said, “But that’s the flood control system,” as if it were inevitable and normal, a necessary state of affairs for this once-beautiful canyon. And you said, or I said, “Who is speaking for the Arroyo?” Almost immediately, we made a decision not to grant that the canyon’s flood control channel was either a good idea or a necessary condition. It was a revelation in a way.



So we decided to be the voice of the canyon as best as we could and wrote the following text. (Later, in 1987, it was read on the radio to an audience of several million people; we were told that some people took permission to begin restoring the Los Angeles River from this impassioned moment.)

What has been done can be undone
One Arroyo is every Arroyo
One dam is every dam
One channel is every channel
What has been done can be questioned
What has been done can be redone

Let a grand restitution take place
Let the process of flood control
Be separated from the destruction of rivers

Imagine every channel in the LA Basin
Covered
And land remade green
And low-flow streambeds established
Where the logic and the will exist

Then new walkways to the sea could be developed
Land added easing crowded terrain
And new public space engendered

Then ribbons of green will run down to the sea
And birds and small life return
As sanctuaries are formed here and there

If you stand on the Colorado Street Bridge
You can image this restitution for the Arroyo

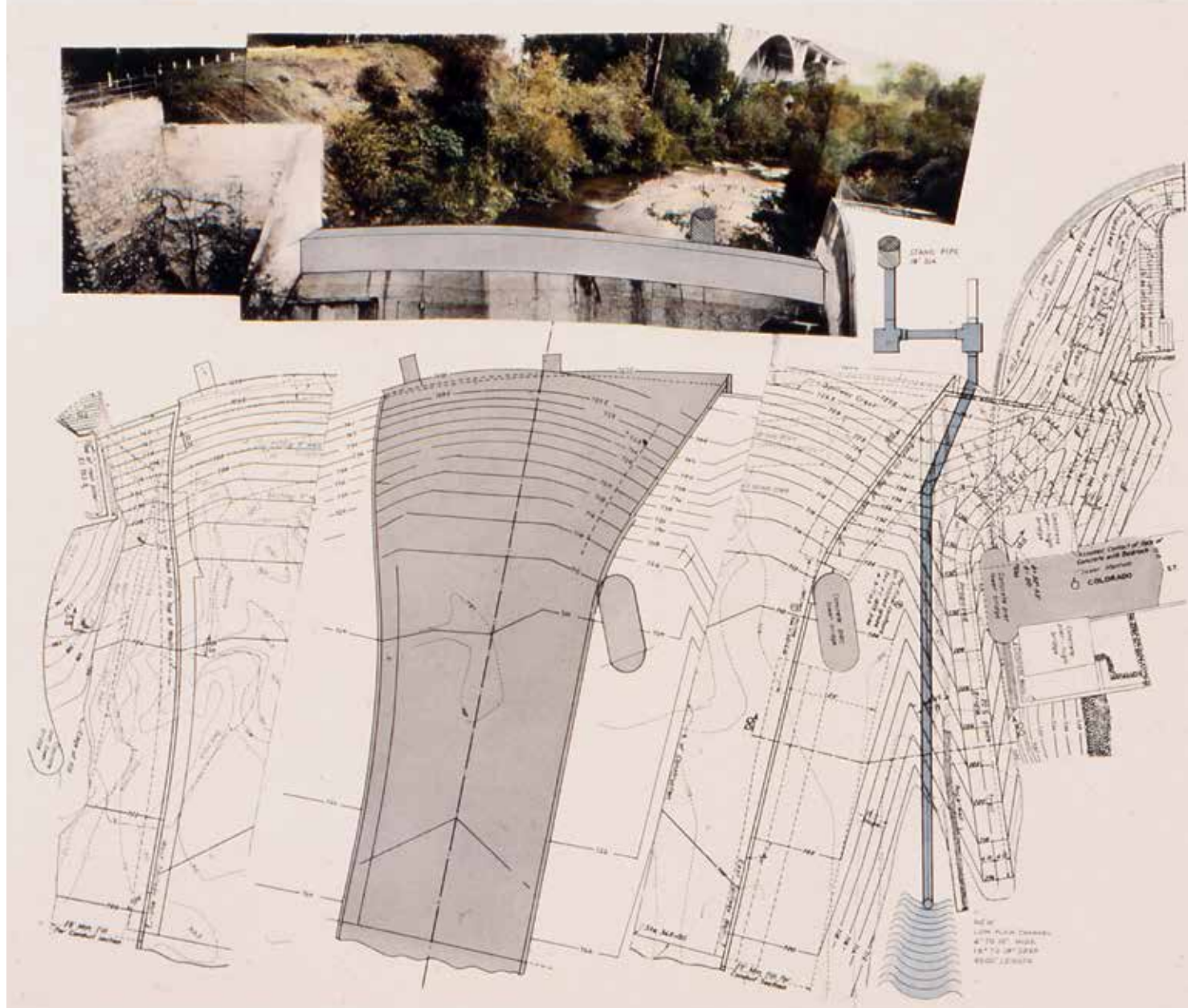
If you fly high enough
You can image the same
For every stream and river in the basin

There was a metaphor embedded in the structure, or rather, a metaphor that had an array of entailments (to use George Lakoff’s terminology). Apparently, to the designers, flood control meant the destruction of rivers. Thus, an entailment was, “Flood control is the fragmentation (or at least division) of arroyos.” So we began to reflect on how one might decouple flood control on the lower Arroyo from the destruction of the river that wished to flow through it. After all, the powers that be were looking after everything but the well-being of this arroyo. There are about 14 hectares of flatland in the lower arroyo; if the hillsides are included, it becomes 29 hectares. If you add the space under the bridges and the freeway, it is close to 32 hectares, this urban reserve. In the mind’s eye, if you remove the channel, then a fragmented domain of almost 32 hectares becomes continuous and has the properties of a park in parts, the properties of a refugia in other parts, and even a wildish look on the hillsides. Yet there is no way to restore the canyon to its original state. When you look at the old drawings of the making of the channel it is clear that the original stream bed is gone, as are the virgin stands of sycamore and oak that can be seen in old photographs; parts of the bedrock were even chipped away to make room for the concrete channel. Further investigation shows that the soil to the east was moved to the west as fill for the new ground plane, and vice versa. The canal could not be subtracted—but it could be covered, making a tunnel for excess waters to flow through and new stands of sycamore and oak planted at a new streamside, where new habitat could be established and a new unity could replace the old division.

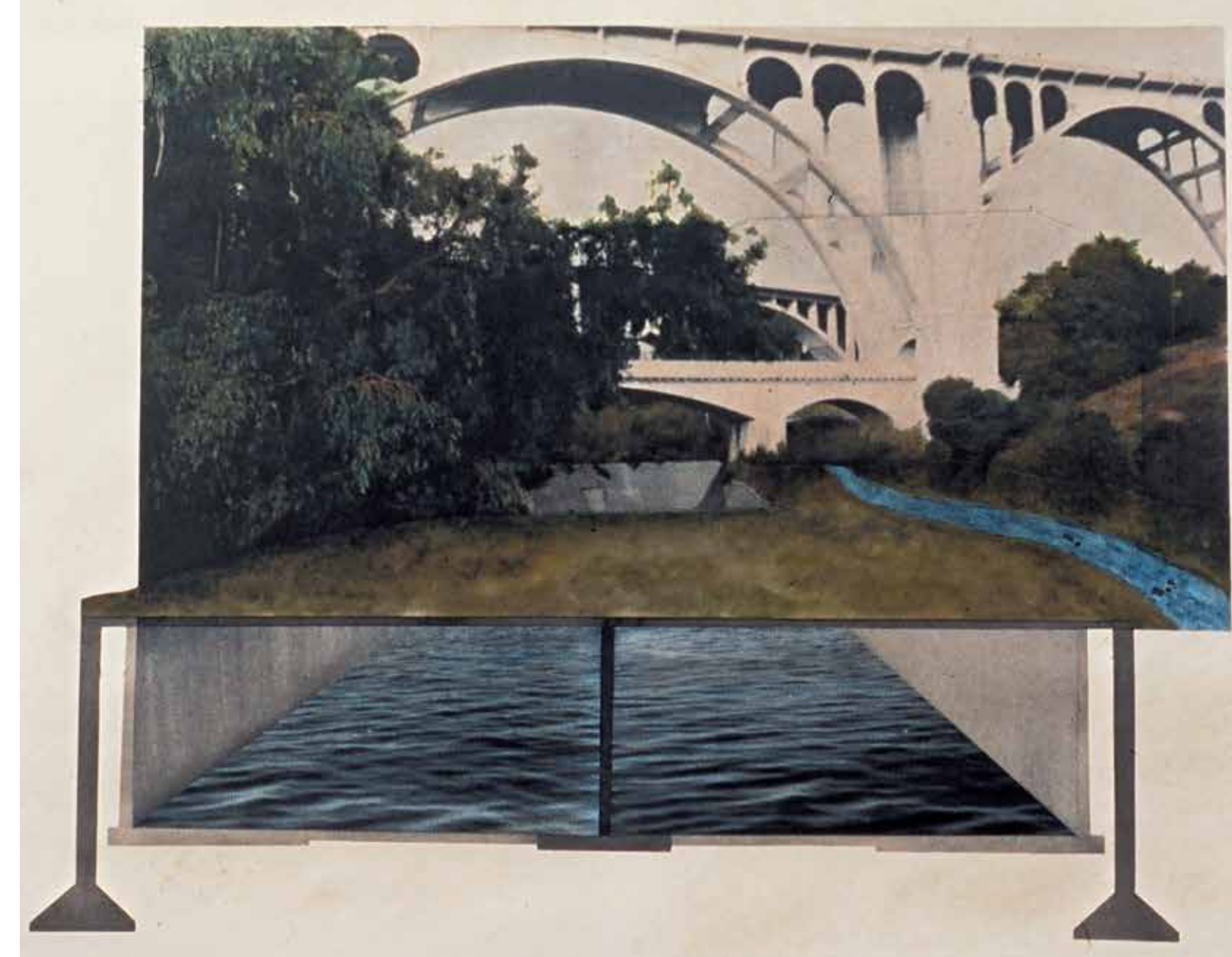


Where we discovered that over 90 percent of the Los Angeles river system was channelized and from an ecological perspective little could be done

There appeared to be two choices for how to go about decoupling the process of flood control from the destruction of rivers in that place, the lower Arroyo, below Devil's Gate Dam. The best choice would be to simply break down the walls of the channel and fill it with earth, unifying the canyon floor, and then let the flood come as it would, fill the canyon as it would, drain off as it would, and let a floodplain ecosystem emerge as it would. But none of the people who had a voice in this matter would agree to such a notion. So we made another design, proposing to cap the canal and put earth above the cap, reunifying the ground plane and making the canal into a tunnel for the excess waters to go through. We included in the design an overflow valve that let a low-flow stream form along the surface of the Arroyo during flood times. We had our civil engineer cost this out. The total was a little less than 11 million dollars. This cost seemed modest enough for stitching the incision together, re-establishing the stream, and bringing this unique public space into a new coherence.



Conceptual sketch



Jay Belloli, then curator, showed the work in the Baxter Art Gallery at the California Institute of Technology. The most peculiar visitor was a man in his eighties who was very angry. He said he was an engineer, the original designer of the canal, and that this canal, along with others, had saved the city of Los Angeles from flood by controlling waters often traveling in excess of 68 kilometers per hour, moving out to sea. He said our proposal was dangerous; he said, "I'm going to make some telephone calls."

Conceptual design for low-flow stream and bringing the waters underground while connecting the surface plane

Breathing Cubatão

1985 Ronald Feldman Fine Arts

New York



It was 1984, late in the year. We got a call from Berta Sichel, a Brazilian curator who worked in Spain and whom we knew and liked a lot. One of the nice things about Berta was that she had a sort of spontaneous even improvisatory sense of what was a just thing to be doing socially. Nobody at that time that we knew was using the term “social justice.” Berta said she was putting together, with another curator, a presentation for the 1985 São Paulo Biennial and were we interested. It turned out that she wanted one of our ecological works and that it needed to take up maybe six to 7.6 linear meters of wall. We proposed a short form of our Sarasota piece, a mere six or so meters long in four or eight parts, depending on how you counted, could be shipped in a rolled tube, not very expensive. To save money, I flew with the work. Helen was putting up work elsewhere and so did not come.

It was nice finally being in the São Paulo Biennial. 15 years earlier, György Kepes had invited me, Newton, to do a work for the 1970 São Paulo Biennial, maybe it was 1969, I forget. I was exploring technological subject matter at the time. I asked him how tall the room was. He said it was 15 meters tall, so I invented an 18-meter-long liquid crystal thermometer that went 1.5 meters on the floor, 1.5 meters on the ceiling, and 15 meters on the wall. The liquid crystals turned color as the temperature rose. Everybody loved this piece. One day I got a call from Kepes; he and the majority of the artists wanted to pull out of the American section because of the fascist, repressive, and violent government that was doing terrible things to the people. I said this was a bad mistake. We Americans should go there and make the most wild and expressive, counter-repressive exhibition we were capable of doing. If we withdrew in protest it was only a gesture, and the regime would probably be glad to see us go. I was voted down. The Americans withdrew, so the 1985 Biennial somehow was a redress of an unfortunate history.

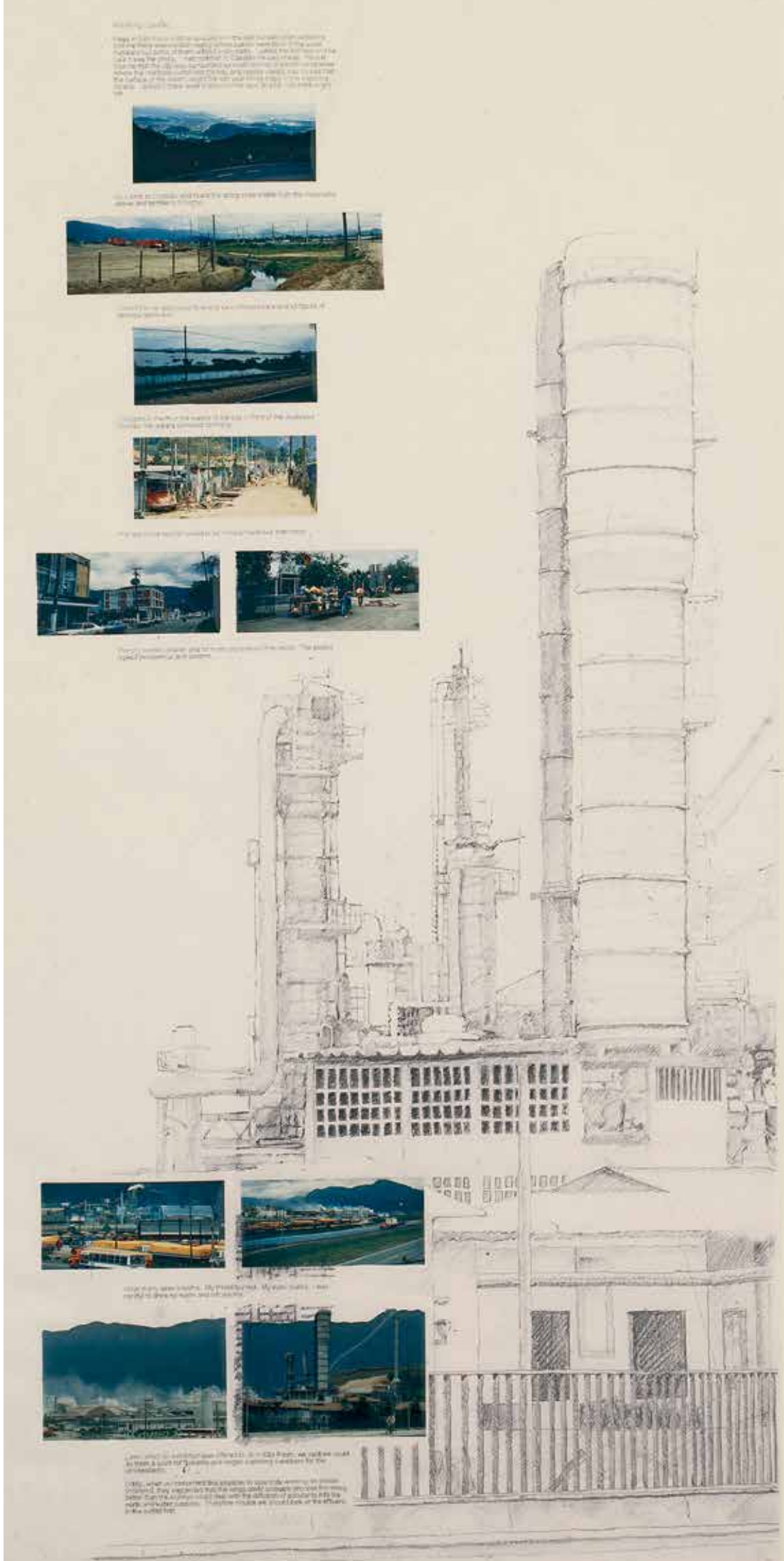
The exhibition went up in a very large building that was once an automobile museum. Everyone had enough space. The most interesting work was by John Cage who drew great crowds. Everybody knew everybody. Pierre Restany, the French critic, was there. We were having dinner together with Pontus Hultén and half a dozen other notables, many of whom had themselves made large international exhibitions like this Biennial. In fact it was Restany and Hultén who 10 years earlier had invited us to the Venice Biennial. There was a lot of talk around the table: the show had missed the boat; it didn’t

have a central theme; the show was a dispersal piece; nice to see an exhibition without a central theme. Some of the work was too low in quality; nice to see a show with such diversity of quality and risk-taking on the part of the curators, and so on and so on.

A week passed, all the excitement died down, everybody was going back except those who were going to Rio, because you could have a hell of a time in Rio, did I want to come? I didn’t think I would have a hell of a time in Rio, I was starting to miss Helen and the children. I asked my young assistant, who was a photographer, where the worst place in Brazil was and let’s go there instead. She said in her opinion and that of many others, the worst place in Brazil was Cubatão. She said there were six or seven oil refineries there. The sky was beautiful from the many smoke stacks but it smelled awful. She said a short while ago one of the canals that ran through the favela was so polluted by oil residue, it caught fire and people died. She said life was cheap and the government paid each family where there was a death about 20 dollars. She said a life ought to be worth more than 20 dollars. She said this four or five times.

I rented a car. It took a little less than two hours to reach the coast-line and to look down upon the city of Cubatão with its smoke stacks from a high view site where we parked the car on the hill-side above the city. There was wind coming in from the sea. I took deep breaths—it didn’t smell too good. We drove down the mountainside and stopped at another view site only a few kilometers away from the city. I took deep breaths—it smelled worse. We drove through the city’s street. There were shockingly few people. I took more deep breaths—the air was terrible. But the streets were clean and the buildings freshly painted. We stopped at a beautiful public library and asked about the pollution and the deaths. We were told everybody was paid very well. We turned and left.

A few weeks later we visited several friends at Scripps Institute of Oceanography, only a few minutes’ drive away from the University of California, San Diego art department in the water tank where we worked and spoke to the people who were doing serious smog research. We asked what should one do about the air in places like Cubatão? We asked what about scrubbers of the smoke stacks—you know, the conventional questions everyone asks. We were told that yes, the lungs are a problem, but far more important was to clean the waters as the kidneys were a worse problem.



Devil’s Gate

A Refugia for Pasadena

Retitled by the Gabrielino Indians

Hahamongna State Watershed Park

1987 Downtown Gallery,

Los Angeles ArtCenter College of Design,

Pasadena, CA

Grey Art Gallery, New York University, NY

It was 1987 when Ernie Messner gave us a call. One of the directors of the Santa Monica Mountain Conservancy, he had a voice in the park system in Pasadena, at the foot of the Santa Monica Mountains. He asked if we knew anything about Devil’s Gate Dam which needed to be reinforced because it was an earthquake risk, and about the 146-hectare debris basin behind the dam, with Oak Grove Regional Park at the edge and NASA’s Jet Propulsion Laboratory adjacent. He said that he liked the way we thought, and that he had been one of the keen supporters of our work in the lower Arroyo, just below Devil’s Gate Dam.

So monies came, and we began an elaborate research. We discovered that the purpose of the basin was to stop debris (consisting of various earths and rock) from going downriver. This was, a priori, a terrible idea: if you stop debris from going downriver, you starve the beaches of sand. So right away we were amused by the idea of a great dam holding up debris that ultimately was required to replenish sand on the endless beaches of Los Angeles. There was the special irony—very California, very Army Corps, and very absurd—of spending vast amounts of money to hold back sand that would normally go to the beaches, and then using trucks, again at great cost, to ship sand back to the beaches.

It turned out that there were a few little problems with the existing scenario. Over a million cubic meters of debris, mostly sand and loam, had filled up part of the debris basin over a 30-year period which meant that if a vast flood came, it would overtop the dam. Another small problem which no one wanted to talk about very much then (and they still don’t), was that the Jet Propulsion Lab had dumped toxic waste in these 121 odd hectares. Yet another problem was that the dam blocked the coyotes from going down to the lower Arroyo, which they had historically done; as a result, gophers (now having no enemies) had made walking in parts of the Arroyo both dangerous and difficult. The unintended consequences of this approach to the flood control issues were so many and so complex that we decided to put all our efforts into simply choosing what to do for the debris basin in its present state.

The design we came up with enlarged Oak Grove Regional Park by taking 300 000 cubic meters of earth from the basin bottom and piling it up in such a way that it added several hectares to the park. Simultaneously, it added depth to the debris basin, increasing its water-holding capacity. The Jet Propulsion Lab had bootlegged a parking lot in the upper end of the debris basin bottom, so we proposed to pile the earth



on top of that parking lot and make a new slope, enabling a new bottom space to happen. If we made the slopes intelligently enough, the coyotes could move along them and find their way to the gophers in the lower Arroyo. (We were not sure whether the public would like coyotes as much as we did; they might view them as an annoyance, whereas we saw them as a useful part of the chain of predation.) The final part of our design, which created a new vision and a new narrative for the region, was to turn a series of existing percolation ponds into a series of waterfalls that led to a percolation lake in the bottom of the dam. We put islands in the center of the lake as a bird sanctuary.



But,
It is possible to separate
the process of flood control
from the destruction of rivers
and riverine ecologies

It is possible to separate
the process of flood control
from the creation of debris basin dumps

It is possible to reconstruct debris basins
bringing back habitat

It is not difficult to combine
the process of flood control
with the generation of new semi-wilderness
and urban ecologies

Nor is it difficult to combine
the process of water conservation
with the generation of new riparian habitats
If

we value generating a new state in nature
that co-joins the urban
and the semi-wilderness ecologies
while benefiting flood control
and storing waters against future need
protecting habitat endangered elsewhere
and adding parklands

Then
It is neither difficult in the short run
nor expensive in the long run
to put these ideas into effect in
Devil's Gate Basin

That basin and dam
designed to catch debris
hold water
and percolate water down
to the Raymond Basin Aquifer underneath

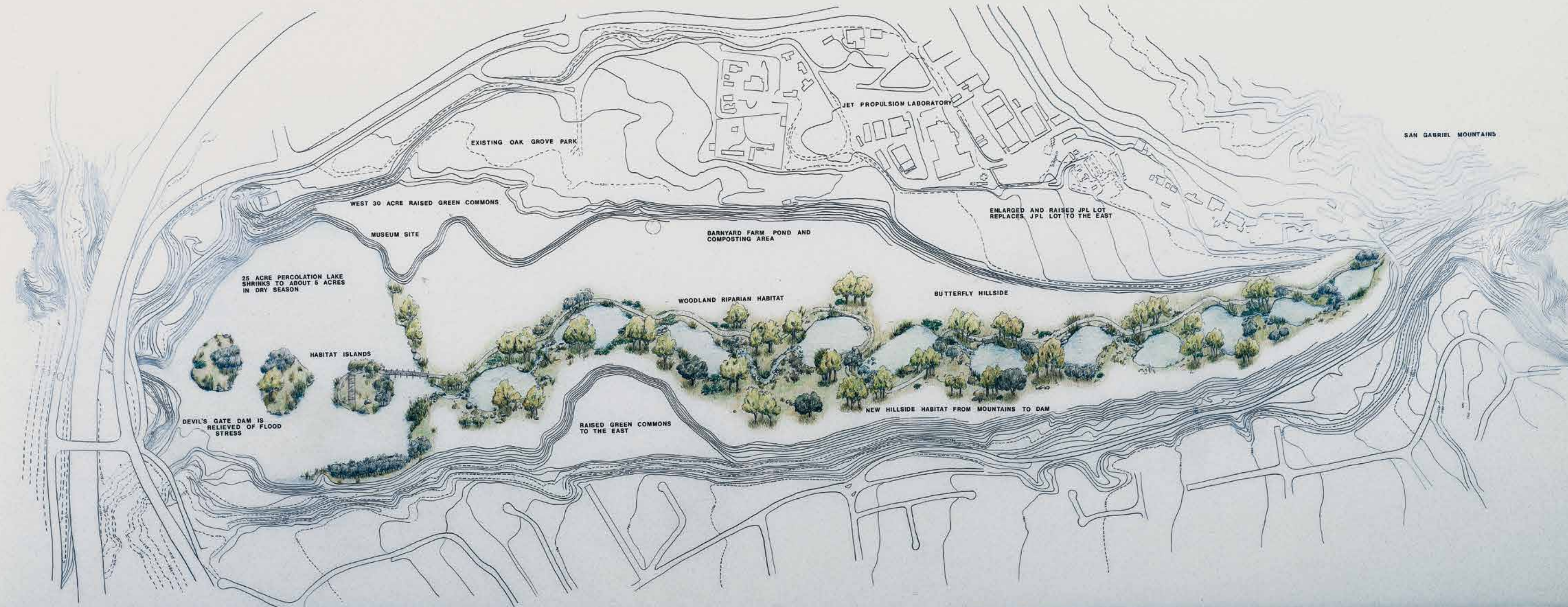


Model of
the first
debris basin
re-design,
five-by-two
meters

This being public land, many parties were competing for its use—to make a baseball field or a golf course, for example. But one day, the phone rang, and a voice that we did not know asked if we would come to the opening ceremonies for the Hahamongna State Watershed Park, as we were the originators. I said or you said, “There must be a mistake, we never originated a place called the Hahamongna State Watershed Park.” The voice, still unidentified, said that the present chief of the Gabrielino Indians, upon seeing our work for the Devil’s Gate debris basin, said that we had restored a sacred place for them without our even knowing it! So Oak Grove Regional Park was to be given a new name. It would be called *The Place of the Laughing Waters* (which is what Hahamongna means in their language). We went to the opening, spoke, and were welcomed and became part of this uniquely felt ceremony.

As far as we know, there was a marvelous outcome from this work. In 1988, the city adopted our plan and imagery and gave it to an engineering firm to work out. The firm’s plan looked terrible and completely missed the sensibility and meaning of our work, and the city rejected it! Sometime around 1990, the city held a big competition, again referring to our design for doing the debris basin. We competed and lost; a landscape architect won. However, the money to do the work could not be assembled and nothing was done. Finally, 25 years after we initiated this work, a reasonable succession ecosystem has formed in the Devil’s Gate debris basin.

“Sometimes, to do nothing is to do something.”



Final drawing for the Devil's Gate debris basin entitled *A String of Pearls*

In 1985, we got a series of letters from Manfred Schneckenburger who suggested that we fly over to Kassel, Germany, spend some time in the environment, and come up with a work for documenta 8. Manfred had a master plan having to do with different artists covering various aspects of a conceptual terrain. Joseph Beuys and the ongoing project of *7000 Oaks* would be eco-symbolic (with a touch of Rudolf Steiner in the background). Hans Haacke would stand for political activism. We would be the ecological activists. Andy Warhol would be the pop figure. John Cage was part of the ensemble as well, representing chance operations. (We were particularly happy about the inclusion of Cage; four years earlier, after he had decided to stop smoking, he sat us down in a small room and did a half-hour performance on why we should stop smoking, which we then did!)

This was an invitation we had thought would never come. Schneckenburger had been one of the young curators for *Projekt '74*, a mini Documenta held in Köln in 1974, in which we showed our Fourth Lagoon. The 2.4-by-five-meter image was an aerial shot of the Salton Sea, well situated between Alan Sonfist and Agnes Denes. A wonderful ensemble of artists were included in *Projekt '74*: Nam June Paik, Daniel Buren, Douglas Davis, Vito Acconci, and many others. The catalogue was robust! However, there was a glaring absence. Hans Haacke's work, *Manet Projekt '74*, a critique of the museum director's apparently unethical acquisition of a painting by Édouard Manet, was refused. In reaction, Hans opened his work across the way in a commercial gallery. There was a lot of talk about repression and the like, so Daniel Buren chose to do something about it. He glued photocopies of Haacke's panels over his own work on the walls of the museum—and a very powerful glue it was! Evidently, the museum director, enraged at this travesty, with the assistance of his secretary, tried to remove the images in the middle of the night and made a mess of it. We all thought it hilarious to imagine them scraping away in the middle of the night without success. Meetings were held. Four artists (including Sol LeWitt, Carl Andre, and Robert Filliou) pulled their work from the show. Douglas Davis turned his work to the wall, as did Nam June Paik, as did we, as did an Italian artist whose name we have lost. We offered to organize a strike, since we knew how to do such things from our earlier protest works in the antinuclear and antiwar movements. The idea was rejected. Daniel Buren had an appointment the following day for an exhibition elsewhere. Others said that such a protest would guarantee they would never be invited to Germany again. It took a little over 10 years for enough forgetting to take place and our work to mature and change enough for an invitation to come our way again.

Between late summer of 1985 and June of 1987 (when documenta opened), we spent a lot of time in Kassel on an intermittent basis. Our project manager (and soon to be good friend) Manfred Langlotz was wonderful to work with. We investigated the city. It had been a playground for the Gestapo in World War II and a core of Nazi activity because it was so quintessentially German in its architecture, its formation as a town, and its relationship to its river and the farmlands around it. As a consequence, Kassel was firebombed, and when the American forces set up operations there it was a destroyed place.



Kassel Works

1987 documenta 8

Kassel, Germany

2015–2016 re-created for

UTOPIEdocumenta

Stadtmuseum Kassel,

Germany



Kassel Works was an installation on the second floor. As a centerpiece work, it occupied the ceiling and a walkway that connected two rooms. Installations included the stork's nest and a dead oak tree from Joseph Beuys *7000 Oaks*.

Each of the three spaces carried a different element of the narrative and all shared aerial photography as a unifying element.

We became friends with Lucius and Marie Burckhardt; Lucius was a well-known and thoughtful radical urbanist and scholar from Switzerland. Over dinner one night, he told us an astonishing story. He asked if we knew why Kassel had its irrationally broad street that took a circular route around the city, both beginning and ending at the Fulda River. We didn't, aside from noting that it was ridiculously broad for such a small town, with so few places to cross from one side of the street to the other. He explained: After the firebombing, Hitler ordered the rebuilding of Kassel around a very broad street. This street was designed so that Hitler and his motorcade, with troupes and pageantry following, could more or less promenade the city. So plans were carefully drawn up. When the American commander came in, he called in what remained of the leadership of Kassel and said the place needed to be rebuilt. Hitler's plans were presented to him, but the commander said he would not do Hitler's plans and ordered new ones. Several months later, new plans were presented to the American commander. They were the same plans, but with Hitler's name erased and the date changed! And that is why Kassel looked as it did some 40 years later.

We discovered that Kassel also had other odd properties embedded in its design. For instance, it had turned its back on the Fulda River. You could not see it from the town. All buildings faced away from the river. Across the river was the Messeplatz fairground, which, before the bombing, had been part of the urbanity of Kassel, with many small houses, apartments, and stores, and lots of charm. By this time Manfred Schneckenburger was starting to send signals that he didn't too much like what we were doing. It had become clear that we were creating a work for Kassel and not for Documenta. We began our work with two questions, which would later become the centerpiece of our work at the Orangerie. The first was about bio-indicators. Originally, Kassel had storks; a stork's nest on a roof indicated that the surrounding soils were healthy and that the rodents and insects that storks needed for survival were abundant. We asked, "What happened to the storks?" So Manfred Langlotz found a stuffed stork—slightly the wrong kind, since it was black and white and most of the storks in that region were of a somewhat different color, but we decided that a stork was a stork, and put it in the show. (Before so doing,

however, we left it in the director's office for a while, hoping he would become curious and that we could talk about bio-indicators, but he did not.) Our second question asked, "Why has the city turned its back to the river?" After all, at one time people had gone down to the river for their water, to wash, to drink, and to swim. We designed a series of six *Kassel Works* using aerial photographs, architectural drawings, and texts. They were concerned, in part, with reconnecting the city to the river, with a new walking bridge as a connection. In the work, the fairground was redesigned into a wetland water purification system, so that at least in one place people could go down to the river and drink directly. In those moments, we were also outlining a new meander that would humanize the streets of Kassel, releasing them from the straightjacket of Hitler's promenade. Moreover, this meander would to some degree make the countryside available to the city.

One day our project manager Manfred walked into the work space with a dead tree. It was about 2.7 meters tall without any leaves; some roots were there (mostly free of dirt), and the

tree trunk was about as thick as the handle of a shovel. It was a pretty bedraggled-looking artifact. He said, "Do you know where I got this tree? I pulled it up from the ground. It's one of Joseph Beuys's *7000 Oaks* that had died." Immediately, we attached it to the wall. By then we had been made repeatedly aware of the Director's displeasure with our work. There were various other elements to the project. However, the process of installation was a terrible experience. We had only half a day to install, as our area was the last to have been painted. The work had both physical and conceptual problems; in retrospect, we felt that it was too complex for the exhibition and would have been more powerful if we had had more time in the space. Nonetheless, the ideas were clear, and those who understood it responded very positively. Schneckenburger and the exhibition team were annoyed at us for two reasons (soon to be three). The first was that to see the exhibition at the Orangerie you started at one end and moved through in a procession-like manner. However, when you got to our work, you had to have spent significant time in Kassel to understand it, or else you had to go back to the city to get what we were talking about. In our

minds, we were creating a work for the city, and the exhibition at Documenta was incidental to it; it hadn't occurred to us that we might be interrupting a procession. The second reason was that he didn't think the work was visually powerful enough.

Feeling somewhat depressed on the first day of the opening, we heard a helicopter land outside the Orangerie. A few minutes later we were told that the president of the Federal Republic of Germany, Richard von Weizsäcker, was doing his obligatory visit to documenta. After walking through the first half of the exhibition, he entered our space, looked at the pieces, and looked at the images on the ceiling, which were aerial images of the ground. He picked up on the ironies, the planning, and the criticism. Meanwhile, Schneckenburger was trying to hurry him through our piece. Von Weizsäcker addressed us. He said, "I know what you are doing here. You are objecting to the bad planning in Kassel after World War II and you are proposing to see this place differently." He then said, "Before I was president, I was mayor of Berlin. We need to get you to Berlin. The city would benefit from your perspective; in fact, it needs you." Meanwhile Schneckenburger, clearly angry, was trying to pull the president away from our work. A photographer asked the president and us to shake hands—you know, one of those moronic handshaking pictures. We looked at one another and agreed, nonverbally, that we weren't about to shake hands for a photo op and continued talking like human beings. Meanwhile, the director was once more pointing out what else there was to look at, and led the president away. Unbeknownst to us, others had heard the president's suggestion that we work in Berlin, and as a consequence we were later given the Deutscher Akademischer Austauschdienst (DAAD) fellowship to work in Berlin, which we did.

Before our departure from Kassel, the head of city planning invited us for coffee. She explained that the city would neither accept nor act upon our proposed work. She later became the head planner of the city of München and invited us to do a work for her new city, but it never happened.

38 years pass. We receive an e-mail from Harald Kimpel, a German art historian and critic who is putting together an exhibition selected from the whole history of Documenta, which was actually created every four years from the late 60's to the present. It was the 60th Anniversary of Documenta and the show was about unrealized projects. He called it *UTOPIEdocumenta*. He said that our never-executed piece was an intervention in the city of Kassel and of great importance for the topic of the exhibition. We were amazed. More importantly, Manfred Schneckenburger, the Director who had been so critical of us, saw the exhibition, and being a man of great spirit, was delighted to have been proven wrong.

KASSEL WORKS I
ON THE CENTER WHICH IS

PENALIZED
IN WINTER AND IN RAIN
BY ITS STRUCTURE
LESSENE
BY DETACHMENT
FROM ITS HISTORY
IMPRISONED BY THE BARRIER
OF THE PERIMETER
IMPOVERISHED
BY THE UNIFORMITY
OF INFORMATION
AND THE BREVITY
OF ITS CENTRAL AXIS
THREATENED
BY THE SIGNIFICANCE
OF THE ABSENCE
OF THE STORK

KASSEL WORKS II:
A FORGETTING HAS TAKEN PLACE

THE CLOSER THE PRESENT CENTER
COMES TO ITS PLACE OF ORIGIN
THE MORE OBVIOUS THE BARRIERS
BECOME TO THE RIVER
THAT EMPOWERED IT
AND THE TERRAIN FROM
WHICH IT SPRUNG

KASSEL WORKS III
IF
A PEDESTRIAN BRIDGE WERE BUILT
ACROSS THE STEINWEG
FROM THE CORNER
OF THE TRÄNKEPORTE
AND
THE PATH TO THE RONDELL
ON THE RIVER
ENLARGED
REVEALING THE EXCAVATION
OF THE SECOND RONDELL
AND
THE BRÜDERKIRCHE RESTORED

THEN
COMMUNICATION
WOULD BE REESTABLISHED
BETWEEN PAST AND PRESENT
AND THE CENTER ENRICHED
THEREBY

KASSEL WORKS IV:
EXPLORING A PERIMETER
THAT ENDANGERS
THE CENTER
IF
A WIDE PERIMETER ROAD
SURROUNDS THE CENTER
REDUCING
PEDESTRIAN CROSSINGS
TO A FEW TUNNELS AND LIGHTS
WHILE SERVING AS TRAM ROUTE
AND DIVIDING NEIGHBORHOODS

THEN
ONE PURPOSE IS SERVED
ABUNDANTLY
AT THE EXPENSE OF OTHERS
MORE VALUABLE
TO THE WELL BEING
OF THE CENTER

MANY KNOW THIS
AND MANY KNOW
WHAT TO DO ABOUT IT

KASSEL WORKS V
A NEW MEANDER

IF
IN A SINGLE GESTURE
IN A SINGLE MOVEMENT
IN A SINGLE ACT
THE STEINWEG IS BRIDGED
AT THE TRÄNKEPORTE
AND THE FULDA
AT THE RONDELL

THEN
THE CENTRAL AXIS
IS RECONNECTED
TO THE ORIGINAL CENTER
TO THE RIVER
THAT NOURISHED IT
AND THE TERRAIN
THE MESSEPLATZ
THAT
WAS THE SECOND SETTLEMENT

IF
THE BRÜDERKIRCHE
IS ENHANCED AND REOPENED
THE SECOND RONDELL
FURTHER REVEALED
AND
A NEW CITY MUSEUM
LOCATED
IN THE RUINS
OF THE GARNISONSKIRCHE

THEN
A HISTORICAL REMEMBERING
CAN BE PART
OF THE PHYSICAL BEING
OF THE CENTER
AND THE CENTRAL AXIS
GAINS DIRECT COMMUNICATION
WITH THE FULDA
AND THE TERRAIN BEYOND

KASSEL WORKS VI
A GARDEN OF
EXTREME MEASURES

THE CENTER'S DENIAL
OF THE FUTURE
IS COMPREHENSIVE
THERE ARE MANY SIGNS
THE ABSENCE OF THE STORK
IS A SIGN
THE DAMAGE TO THE TREES
IS A SIGN
THAT THE TREES
FIND DIFFICULTY

TAKING NOURISHMENT
FROM THE EARTH
IS A SIGN
THAT YOU CAN NO LONGER
DRINK DIRECTLY
FROM THE RIVER
IS A SIGN
THAT YOU CAN NO LONGER
TRUST THE RAIN
IS A SIGN
IF

THE SIGNIFICANCE
OF THESE SIGNS
IS TO BE MADE CLEAR
TO THE CENTER
AND RESPONSIBILITY TAKEN
FOR COUNTERSIGNS

THEN
ON THE MESSEPLATZ
THE TERRAIN
OF THE SECOND SETTLEMENT
ITSELF THE PLACE
OF FIRE AND FLOOD
WE PROPOSE
A NEW GARDEN FOR KASSEL
A GARDEN OF EXTREME MEASURES

WHEREIN
THE EARTH
WOULD BE EXCHANGED

FOR A CLEAN EARTH
AND A METHOD
FOR PROTECTING IT
FROM RAIN
INSTALLED
AND A METHOD
OF PROTECTING LIVING THINGS
FROM RAIN
INSTALLED

WHEREIN
A NEW STREAM
WOULD BE DRAWN
FROM THE FULDA
AND PURIFIED
BY NATURAL PROCESSES
SO THAT YOU
AND I
COULD GO DOWN
TO THE RIVER
AND DRINK DIRECTLY

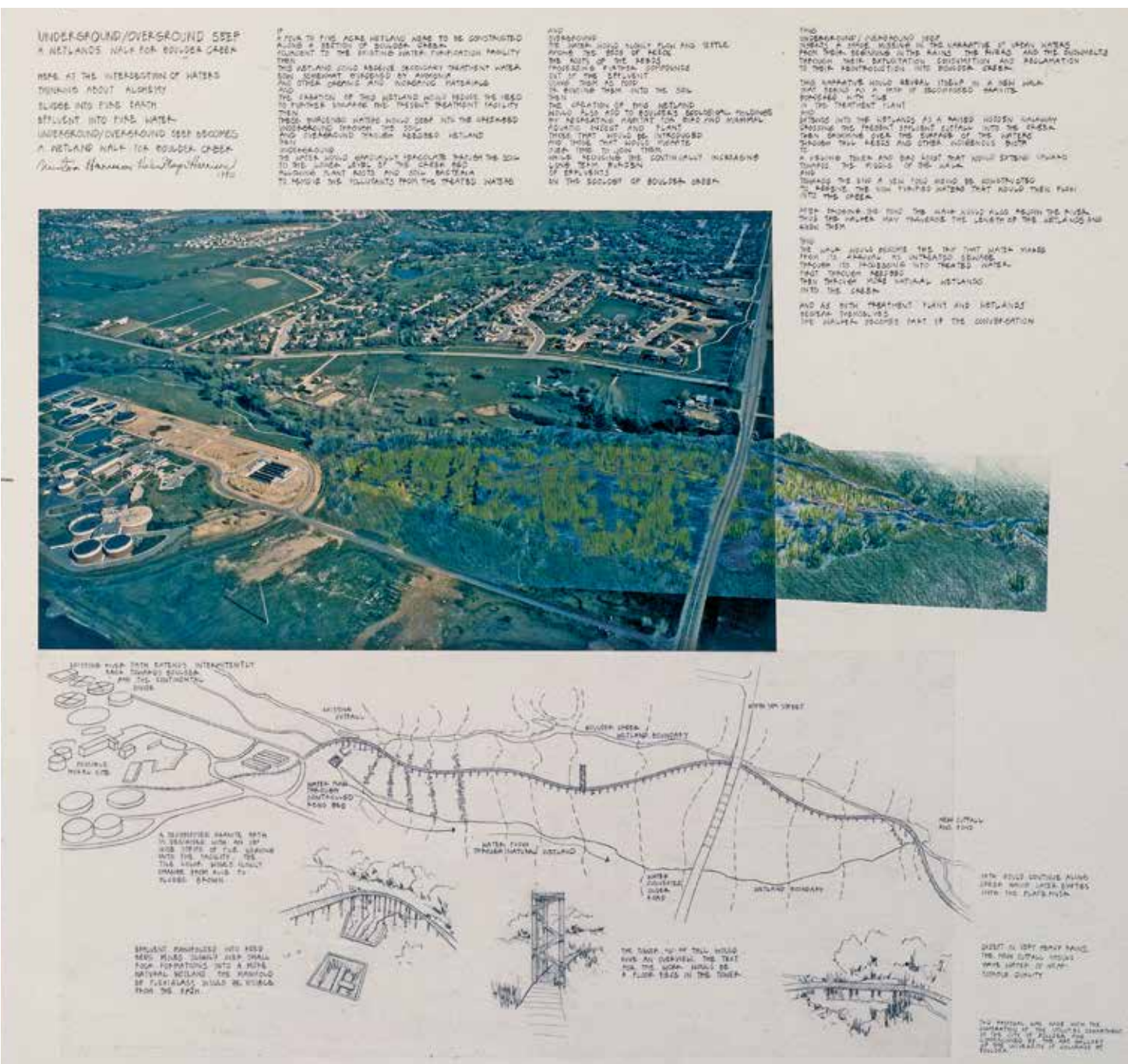
WHEREIN
A NEW ECOLOGY
WOULD BE INVENTED
OF SWAMP
WET MEADOW AND DRY MEADOW
FOREST AND STREAMSIDE
GENERATING
EXTREME ECOLOGICAL ADVANTAGE
FOR LIFE AT THE MARGINS
CO-EQUAL
THEORETICALLY
TO THE EXTREME DISADVANTAGE
FOR LIFE AT THE MARGINS
ELSEWHERE

THEN
THE CENTER
AND THE COMMUNITY
THAT ENGENDERED IT
CAN KNOW
THE PROBABILITY OF
PHYSICAL WELL-BEING
IN THE FUTURE

It was 1988, and it seemed we were running back and forth to Europe a lot. We got a call from the University of Colorado, Boulder—would we come out and give a talk, look at students work, and if a project came to mind, they were interested. One of our students from San Diego was in graduate school there and helped generate the invitation. We followed Boulder Creek as close to the source as was possible and drove the Rocky Mountains to obscure small communities. The Rockies are a powerful place; in fact it’s easy, even comfortable, to feel extremely small traversing them. We were surprised that there was no walk along Boulder Creek, which traversed the town, so we made and presented a quick sketch to see what would happen. The sketch argued, visually, that a wonderful serpentine walk was available to be designed in and about the creek. We left for a few months to go to Germany, and coming back we found that local landscape architects were making designs for a creek walk. Either there was an amazing synchronicity at work or we had had an unexpected influence on the landscape architecture of the community.

Abandoning the creek idea, we met with the mayor and told him we were interested in the sewer system of Boulder and had some ideas for what to do with it. He said, “Why do you have to do anything with it? It works well enough. The waters going from the purification ponds to Boulder Creek are clean enough.” We showed him some pictures we had taken of the outfall from the sewer plant into the creek, perhaps 0.8 kilometers below the city. The waters were heavy with particulate matter from the processing plant, and we had some ideas for what to do about it. We had been interested in following through on an idea that we had initially proposed in documenta a year earlier. It was the form of a question: Could we take the sewage outfall that had undergone primary purification and was clean enough to go into a river but still burdened with particulate matter, could we invent an ecosocial space useful to people and many other species whose purpose was, through root zone purification in tandem with surface purification, to polish waters into a state of purity?

We were immediately introduced to the person in charge of the system and proposed the work *Underground Overground Seep*. It was sort of a walkway that took the walker from dirty water to clean water, through something like an 8-hectare property that we designed to become a nature reserve, if our plans were followed. It was agreed to move forward with them. We left briefly to finish coursework for our university. On returning to Boulder, we found that our friend and supporter for this project had accepted a job in Seattle that was more adventurous and paid him a bit more. Our concept, well enough published in the magazines, was abandoned.



Dreaming the Yarkon

River Alive

From 1989

Presented at conferences,

never exhibited

It was two o'clock in the morning when the phone rang. I (Helen) kicked Newton and told him to answer the phone. He said, "Why don't you answer it?" I said, "It might be one of the kids is in the hospital!"

So I (Newton) answered the phone and the conversation went something like this:

"Hello," a voice with a strong foreign accent said, "is this Mr. Harrison?"

"This is Mr. Harrison, what can I do for you?"

"We hear you do rivers!"

"That's true, what's the matter with your river?" (still asleep).

"It smells bad!"

"How long has it been smelling bad?"

"25 years."

I finally woke up.

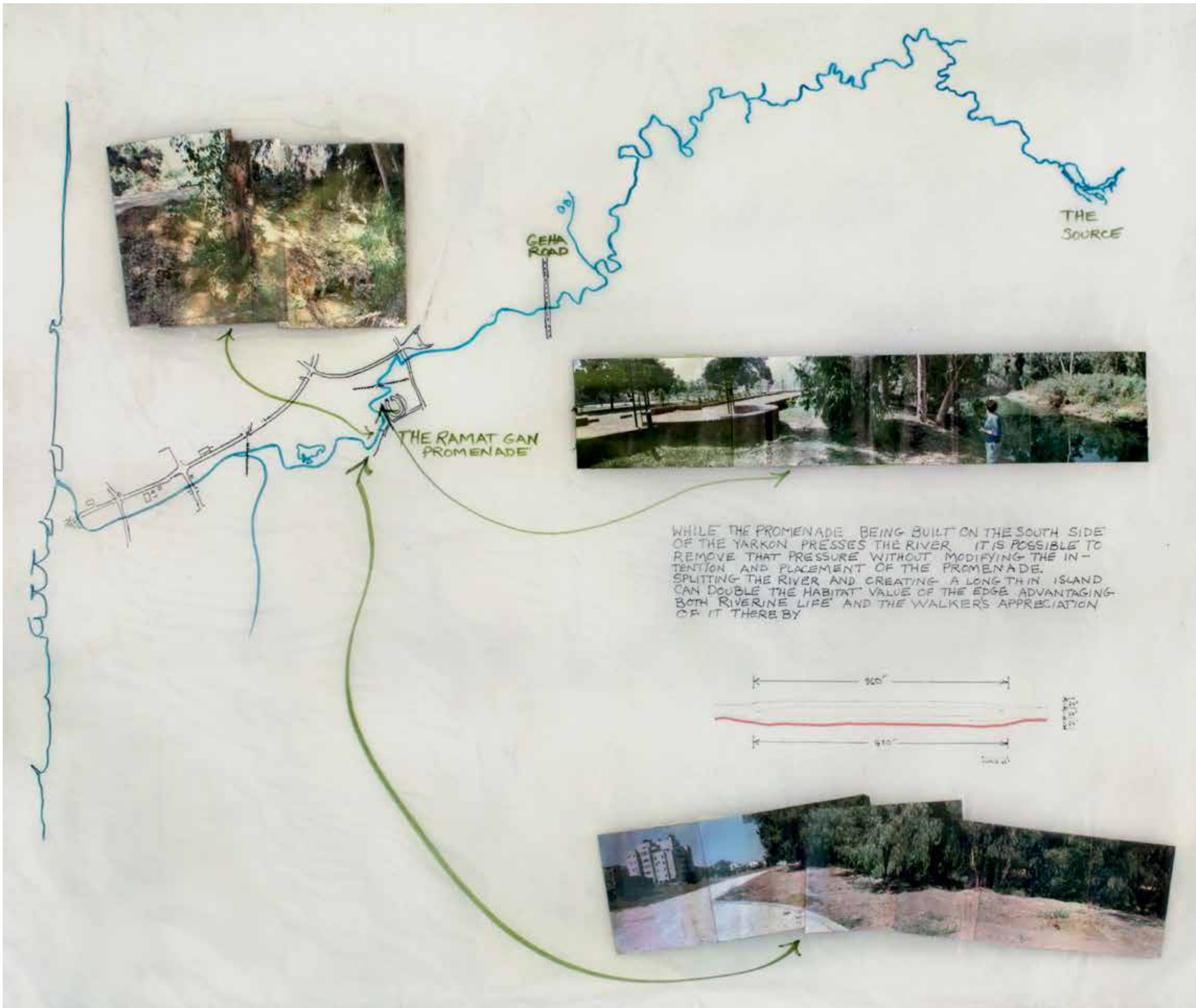
"Where are you calling from?"

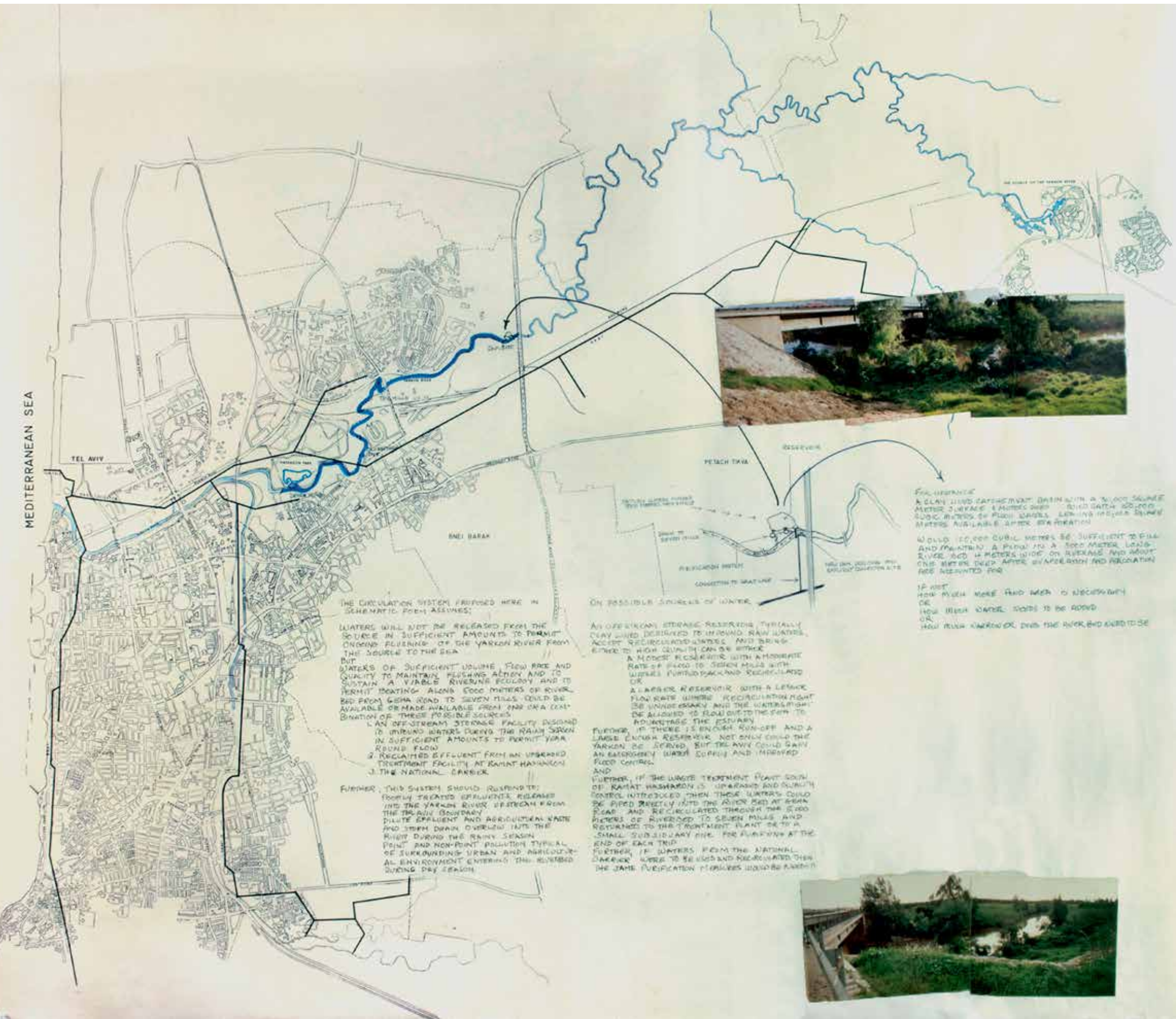
"The mayor's office in Tel Aviv."

"So, tell me about your river—and what is its name?"

He said his name was Hanan Ben-Yehuda and immediately began talking about the Yarkon River and its problems. The Yarkon River begins from upwelling springs near Tel Afek (Antipatris), a fortress in the desert built by King Herod, 13 or 14 kilometers from Tel Aviv, and is the only year-round river that begins and ends in Israel. The larger part of the water had been taken and transferred, by pipe, to the Negev Desert, where it was used for irrigation. In due course, the remaining river channel was treated as a drainage ditch, and farmers and small towns used it to carry wastewaters through Hayarkon Park along the edge of Tel Aviv and out through wetlands into the Mediterranean. This unsightly situation also smelled bad—so bad that the mayor's mother had had to move from her apartment several blocks away. Could we, as artists, do something about it, since no one else evidently could or would?

The phone call and request were evidently an outcome from an event the prior year in documenta, when Nazi signs and propaganda appeared on some city walls in Kassel. The Jewish artists (ourselves included), who were five or six in number, got together to work out a protest. The Nazi propaganda was quickly removed and the protest had no further need to develop. However, we got to know the Israeli artists and particularly liked Dani Karavan. Dani had seen us work out a purification system for the Fulda River while at documenta and had suggested to the mayor of Tel Aviv that we might be able to address this problem with the Yarkon. Hence the middle-of-the-night phone call: "We hear you do rivers!"





So we were flown to Tel Aviv from Berlin, where we were working at the time, and put up in a very tall hotel. We spent much of the first day exploring the city—particularly the Yarkon River and its movement through Hayarkon Park.

Hosted by the Tel Aviv Foundation, we were then brought to Mayor Shlomo Lahat’s office. He was the former Major General Lahat, but now everyone called him “Cheech.” The door to the office opened and the great conductor Zubin Mehta emerged. As we were invited in, however, any notion that this was going to be a cultural experience was immediately corrected.

Cheech said, “So you’re the artists who are going to fix my river!” and then began to swear. “Those sons of bitches, those miserable bastards, those cretins, they’ve sent their shit downriver and it smells so bad that my mother had to move out of her apartment because of the odor! So tell me, Harrisons, what are you going to do about my problem?” I had an epiphany. I said, “The Yarkon enters Tel Aviv at the bridge over Geha Road, which is the perimeter of Tel Aviv.” I continued, “Let’s build a dam there and send the shit back to the farmers.” A great smile appeared on his face. “Aah, a military solution! You’re hired.”

We were introduced to an ecologist named Avital Gasith, who thought our ideas were somewhat interesting, but didn’t think much could be done. Then we were introduced to an engineer who kept repeating a strange mantra—it sounded like this: The solution to pollution is dilution. This was said many times, as we argued that dilution wasn’t going to happen; that if it did happen, it would probably be insufficient; and that many changes needed to be made, particularly where the purification of waters was concerned. We became enemies on the spot, but he remained polite.

We had asked for an airplane flight over the Yarkon to take aerial photographs. It was explained that the camera and film would have to be handed to a censor who would cross out anything critical to the defense of Israel. Before I got into the plane the pilot asked, “Do you know how to use a weapon? Are you carrying a gun?” I said, “Yes, I can use a weapon, I’ve been through basic training, and no, I am not carrying a gun. Why should I?” He said, “How would you defend yourself if we are shot down or have to land in enemy territory?” We took the flight, some photographs were useful, most were censored—but simply seeing the terrain was very useful. And we were not attacked or shot down.

We were put together with the Project Manager, Avram Zakai. He loved our dam idea. He said he was the head of the sewage systems of Tel Aviv. He asked us if we would generate or support the design of a tube

to carry the sewer waters from the Yarkon Channel at Geha Road to the sewer system on the outskirts of Tel Aviv, where they could process it. It was a wonderful idea and we proceeded to do so. Avram told a story that during the 1967 war the Israelis had acquired a destroyer, and he, being an engineer, was assigned to be the captain. First to figure out how to run it, then attack and defend with it. But then the war ended. Although that first proposal was accepted and enacted before we got much further with Avram, he developed cancer and died.

A new team was formed. Our various other concepts were rejected by inaction. The best idea which was to divert a small amount of water back into the streambed from Tel Afek and thereby create a low-flow stream ecosystem was also ignored. From our perspective, the most original part of the work was a design we made for the edge of the river opposite Tel Aviv, which had soccer fields behind it. Since the edge of Tel Aviv had canalized the river on the city side, we made a design for the more open land across the river by using inlets and mini-islands in such a way that one side of the river, ecologically speaking, would undertake the function of two sides, one of the many mini compensations we had tried and so often failed to get enacted on the ground.

It was odd working in Tel Aviv. Everyone seemed to know everyone else. We noted, from time to time, that some Israelis treated Arabs as second-class citizens. One day, Dani told us there was going to be a peace march in front of the Tel Aviv Museum of Art. We told him that we had a lot of experience with antiwar activism in the early sixties and looked forward to seeing how the Israelis went about this kind of thing. 50 to 75 people gathered in front of the Tel Aviv Museum of Art. There didn’t appear to be any signs, nor was there much noise. Several speeches were made. The police presence was muted. The group disbanded after an hour or two. It became clear that if peace was on people’s minds, not many were prepared to do anything about it.

Working on the Yarkon River was a completely different experience from working on the Sava River (which happened pretty much in the same time period). In the former Yugoslavia, our poetics were much valued; in Israel, our normal way of working was not valued at all. In fact, the local museum curator made clear that the work we were doing was not good enough to be exhibited, although his wife, who was a designer, could improve it. So we pretty much put aside the poetry and, instead, wrote a rather cold and extended document that was intended as the basis of a regional master plan.

The Proposal In Summary
On the Sources of Fresh Water

There are five seemingly obvious solutions to the problem of obtaining water for a rebirth of the Yarkon River.

1 The first is utterly simple, requiring a minimum outlay of money and materials but requiring a reversal of national priorities that is unlikely at this point. It is the release of enough water from the source at Herod's Fort to maintain a constant flow in the Yarkon riverbed all the way to the mouth at the Mediterranean Sea. This would solve the problems of stagnation and salt water encroachment, although it would not obviate the need for the diversion of agricultural wastewaters and effluent from the riverbed. It is, however, likely that this alternative will be rejected on the grounds that food production in the Negev Desert and other uses for fresh water have a higher priority.

2 The second solution is to take waters from the National Water Carrier (about 400 000 cubic meters are presently being taken by Hayarkon Park). If we assume there are 5 000 meters of riverbed from Geha Road to Seven Mills, averaging one meter deep and five meters wide, it would take about 25 000 cubic meters of water to fill this riverbed. Assume an evaporation rate of about two meters annually. Assume a riverbed lined with clay and rock as needed to avoid areas of extreme percolation, and thus, a percolation rate of no more than two meters annually. Under these conditions the requirement from the National Water Carrier would be only another 100 000 cubic meters annually or about a 25 percent increase (these figures are of course speculative).

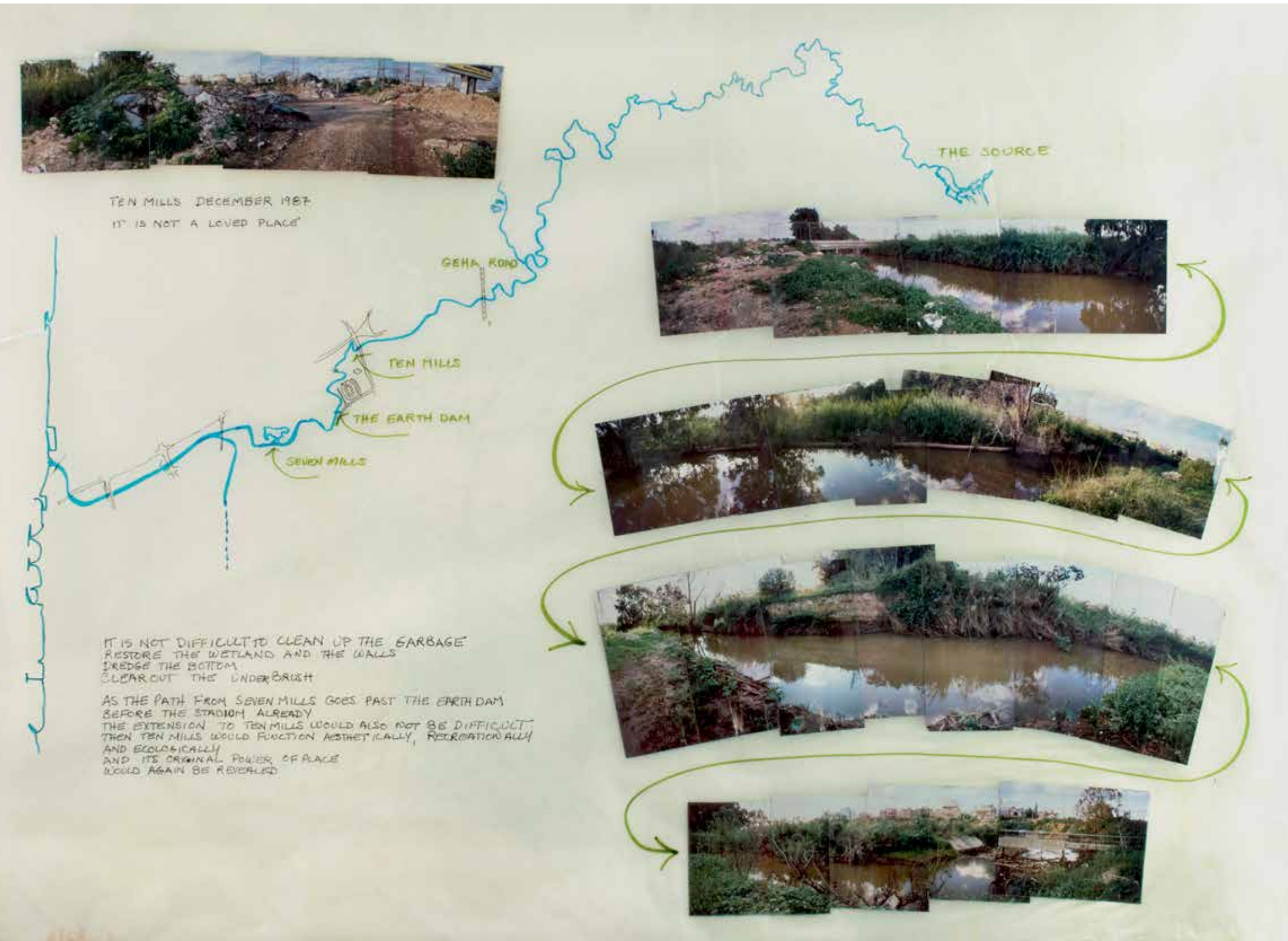
In actual process after the initial inflow, waters would be gathered at Seven Mills and piped to Geha Road, where they would be purified to remove urban pollution during summer and dilute effluent after winter flooding, with additional waters add-

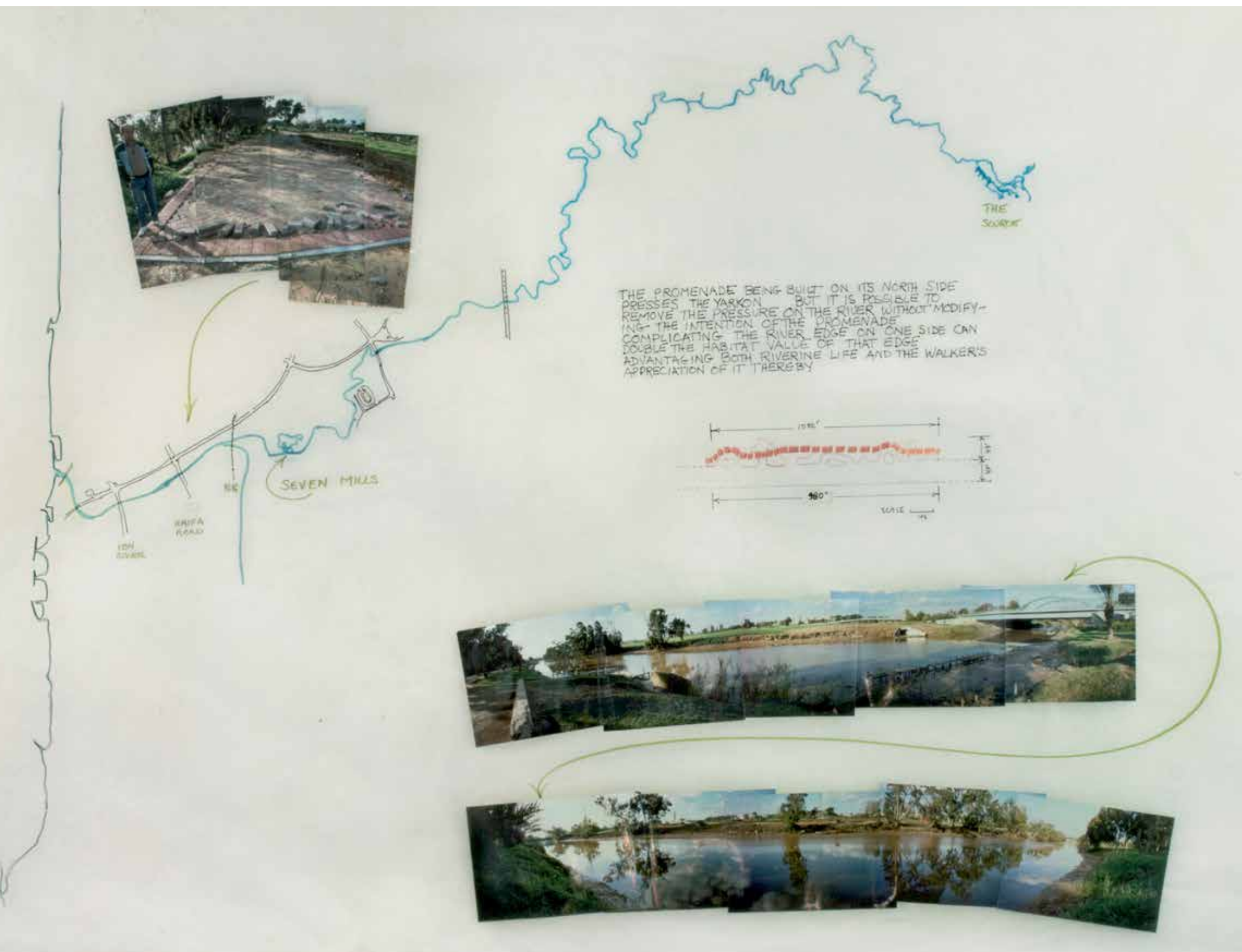
ed from the National Water Carrier as needed. The advantage of this possibility is the ease with which it could be enacted and the minimal cost. We request the feasibility of this idea be evaluated to see whether the needed water would greatly exceed our initial estimate or other disadvantages not immediately apparent emerge.

3 The third solution is to use the effluent from Ramat HaSharon. We are informed that approximately 4 000 cubic meters per day are processed by this facility, about 1 400 meters northeast of the proposed dam site (where the Yarkon River crosses Geha Road near the Tel Aviv border). We are informed by Avram Zakai that this facility could be rebuilt and the effluent waters purified sufficiently for boating and the establishment of a working ecology. The obvious advantage of this option is that no fresh waters will have to be diverted from the National Water Carrier. It may be possible to connect a recirculating system directly from Geha Road to the Ramat HaSharon facility, thereby rendering unnecessary the construction of a separate purification system at Geha Road. It would also offer a future possibility—that of piping high-quality water from that facility to Hayarkon Park for use when the whole Yarkon is restored.

The possible difficulties are that the cost of acquiring, upgrading, and managing that facility might be prohibitive, and it might take a long time to organize and construct; or the waters there, even though incompletely purified, may already be spoken for. We request a cost analysis on this alternative—acquiring and upgrading the facility and developing and maintaining the recirculation system. We also request a time line for this option.

4 The fourth solution is to take effluent directly from the D.R.A.T. collector itself. This would require establishing a purification system near the Geha Road sufficient to meet the river's needs.





The advantage would be that Tel Aviv would be reusing waters that there is no other call for, that would otherwise go to the purification plant south of Tel Aviv. The system would need to process enough water to supply the river.

The disadvantage would be the cost of constructing a new purification system that would have to deal with solid wastes as well as effluent. We request a cost analysis on this option, including the cost of land construction and maintenance.

5 The fifth solution is to employ waters that are presently unspoken for, the rain and the natural floodflow. To employ these waters, an offstream catchment basin, 30 000 to 40 000 meters square and four to six meters deep, could be designed to catch approximately 180 000 cubic meters of floodwaters annually. This catchment basin could be associated with a purification system on a larger scale than that which would be needed if waters from the National Water Carrier were used, but a far more modest scale than if untreated effluent waters were used. This system could catch the first floodwaters and so spare the ecology from shock, as these first waters are those most burdened with impurities; it would probably be less costly in the long term than paying for waters from the National Water Carrier. The disadvantages would be the costs for acquisition of land and for the construction and maintenance of the catchment basin. During years of extreme drought, the flow of the river could be either reduced or supplemented by water from the National Water Carrier.

We believe the preceding proposal is the most environmentally provident way to bring the Yarkon River back to life. However, we would suggest beginning by recharging the river with water from the National Water Carrier and using it as backup until the floodwater catchment system is in place. This would be the quickest way of recharging the river with fresh waters, and the river would not then be directly charged with effluent, which some people find objectionable.

A Promenade for Tel Aviv Toward a Poetry of the Whole

The promenade along the Mediterranean Sea from the old harbor at Yaffa across the Tel Aviv ocean front should be extended to connect with the Yarkon, and to continue thereafter from the salt water inlet to Ten Mills and to Geha Road. This would offer a journey of continuous changes from the Old City of Yaffa along oceanfront, estuary, park, and stream, to Seven Mills, then on to Ten Mills and the new dam site at the border of Tel Aviv.

The distance as the crow flies from the ending of the present harbor promenade and the bridge where the urban and park promenade might reasonably join is about 500 meters. We recommend developing this connection first, since the redevelopment of the harbor may take considerable time to accomplish.

After submitting this plan, we suggested that there was room in Israel for a lot of development, and an attenuated city could be made along the sides of the Yarkon. Moreover, there were many urban forms that would be useful as references. We had been thinking that if such a design were acted upon, then settlement of the occupied territories, which was causing so much conflict, could stop. No one was interested.

After submitting our draft proposal, we left Israel and heard nothing more. About 12 years later, we heard from Israeli artist Shai Zakai that Dani had told her our work was done 10 years too early. Helen thought Dani meant 20.

So be it.

Trümmerflora
on the
Topography of Terror

1988 Martin-Gropius-Bau,

West Berlin, Germany

1991 Ronald Feldman Fine Arts,

New York

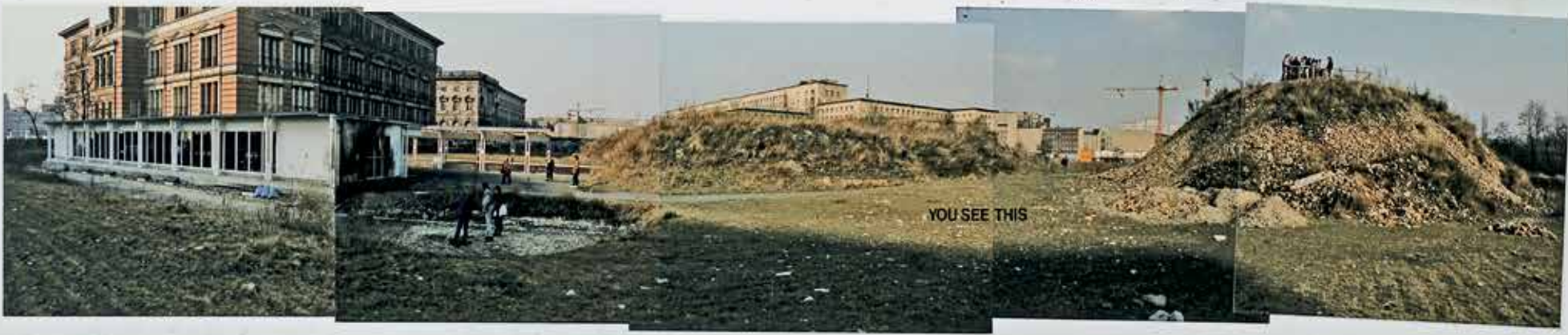
In 1988, we were awarded a DAAD (Deutscher Akademischer Austauschdienst) fellowship to live and work in Berlin for a year—in part on the recommendation of Richard von Weizsäcker, former president of the Federal Republic of Germany, who had liked our work in documenta. We accepted on the condition that we could work for two years, six months each year. We lived in former nurses' quarters in Kreuzberg; from the back windows, we could look over the Wall into East Germany. Looking down, we could see a group of Gypsy-like wagons occupied by counterculture folk. One of the intellectuals we met explained what the government had figured out: About 10 percent of the population would not or could not function in normal jobs, so the government gave them a modest living and those monies fed back into the economy, either directly or indirectly in the form of a second, underground economy that paid no taxes. Looking out the front, we could see Oranienplatz, which was large. The Turkish population occupied one edge, the bourgeois German population occupied another part, while the students and artists (like us) wandered through at will. When summer came, two different cultures sunbathed in each other's presence, but behaved as though none were there



The site covers eleven acres. There is flat ground. There are two rubble piles and a parking lot. There are trees and paths of a sort. There are remnants of the old foundations here and there amidst peeling signs. There is a small white barracks type building labeled Topographie des Terrors. The site is bounded on two sides by a chain link fence. On the third side there is an ensemble of buildings, some open space and then the Martin Gropius Bau backing up against the Berlin Wall which bounds the fourth side. The ensemble of buildings begins at the intersection of the



Stresemannstrasse and Anhalterstrasse at the old Stresemann Cafe, with the ruins of the old Anhalter Bahnhof. Something awful happened here





The Berlin Wall viewed from the site not far from the art school that was used as Gestapo Headquarters with the basements for severe interrogation

At one of the DAAD parties we met Jörn Merkert, director of the Berlinische Galerie on the top floor of the Gropius-Bau. He invited us up. Looking out from his window we could see the whole *Topography of Terror*: the trees, the parking lot that shouldn't be there, the foundations for many of the bombed-out buildings, a few bits of wall remaining, the little white building, and two large piles of rubble that were remains from the rubble collected from or near the site during the bombing of Berlin, 45 years earlier. I said or you said, "Jörn, you are gay." He said, "Yes." "Jörn, the people down there would have prosecuted and possibly killed you. In their design for the final solution, being Jewish, they would have killed us for sure." He said, "Yes." I said or you said, "Let's not grant this site in its present state." He said there had been a competition and the team that won the competition had proposed to copy a multitude of the documents that represented the administrative center of the Third Reich, which this place had been. They would take these documents about concentration camps and numbers and costs and labor, cast the documents in bronze, and cover the whole site with them. But nobody wanted to do the work, even though it had won the competition. So the site was still left open.

We spoke to Joachim Sartorius, director of the DAAD, and asked for funding for a work that we called *Trümmerflora on the Topography of Terror* and its neighbourhood. He and Jörn, from their respective institutions, together put up the money.

We studied, from an ecological perspective, the rubble that had been created by the explosions of the large bombs. Often it was an admixture of earths, reaching as much as eight to three meters deep, with brick, mortar, wood—and the occasional body part—as the main ingredients. This rubble had a peculiar property: Seeds of species long disappeared from the environment often were brought to the surface, and some germinated. The rubble piles developed into flower fields (sometimes with small trees), hence the term *Trümmerflora* (which translates to our term "rubble flowers"). It became clear to us that we could redesign the site around the phenomenon of the rubble flowers, spreading the rubble to mark the foundations of the demolished buildings. The

old arts and craft school (whose basement the Gestapo had used for torturing people), the hotel where Himmler would work, and Goebbels's propaganda ministry were all there in memory, with the foundations as a remainder. The work proposed the placing of rubble on top of the foundation of each building. Each former structure would be present in the form of a narrative, and each foundation would be filled with rubble and overtopped by growing rubble flowers. We had in mind to design a memorial that was not a monument, as what had happened there was so complex that we didn't think a monument would make sense of it all. Then we proposed the removal of the parking lot to allow the Trümmer forest that had formed at its borders to take over and make this a Trümmer Park. Thereafter, we proposed—but suspected it was too complex—a small building exactly mirroring the existing building (which contained the imagery from the concentration camps), and this new building would be simply a "naming and saying" room, where over the course of years the name of each person would be spoken: each person who had been in the camps, as far as could be determined, whether destroyed or among the few survivors, the names cycling endlessly. Thereafter, we began the proposing for the site:

This four-part work proposes an interactive memorial that is not a monument. The first part is the *Trümmerflora*, or rubble flowers, made of the materials of the site itself and of those that find their way to the site without human agency. The second part is the signage, which would tell the story of the history of the site during the Nazi period, location by location. The third part already exists in a small wooden Quonset hut on the site, called the *Topography of Terror*, where the story of the activities of the Gestapo, from its inception in the early Nazi party, is told in word and image. The fourth part would exist in a room yet to be built next to the *Topography of Terror* building, which would duplicate the building's shape but not its contents, serving instead as a memorial to the victims.

The site: The Martin-Gropius-Bau is on one border of the 4.5-hectare site addressed by this work, the Berlin Wall behind it. Prize-winning architectural housing developments are on the other sides. The ruins of the former railroad station, the Anhalter

but themselves. Among the Turkish people, the women were mostly covered up and wore scarves; the younger German women, with or without boyfriends, were topless. Some women sunbathed without any clothes at all. It was as if the European and Turkish cultures were blind to each other.

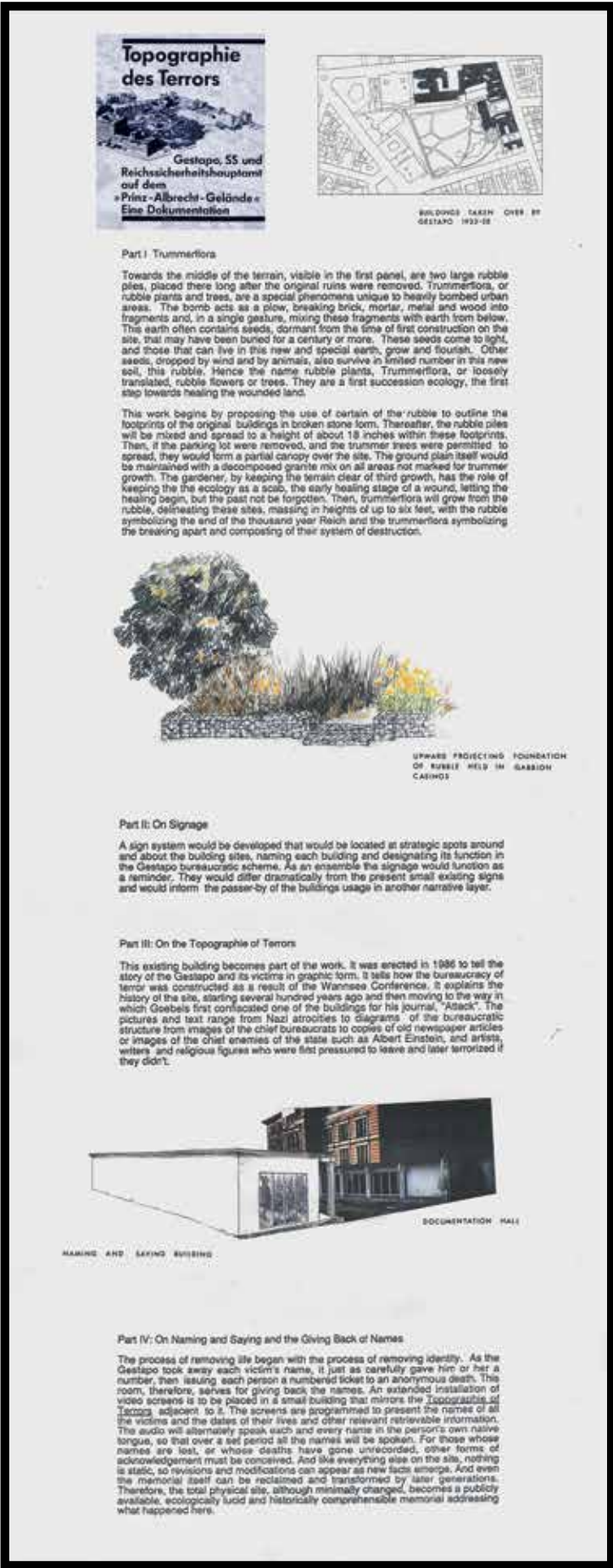
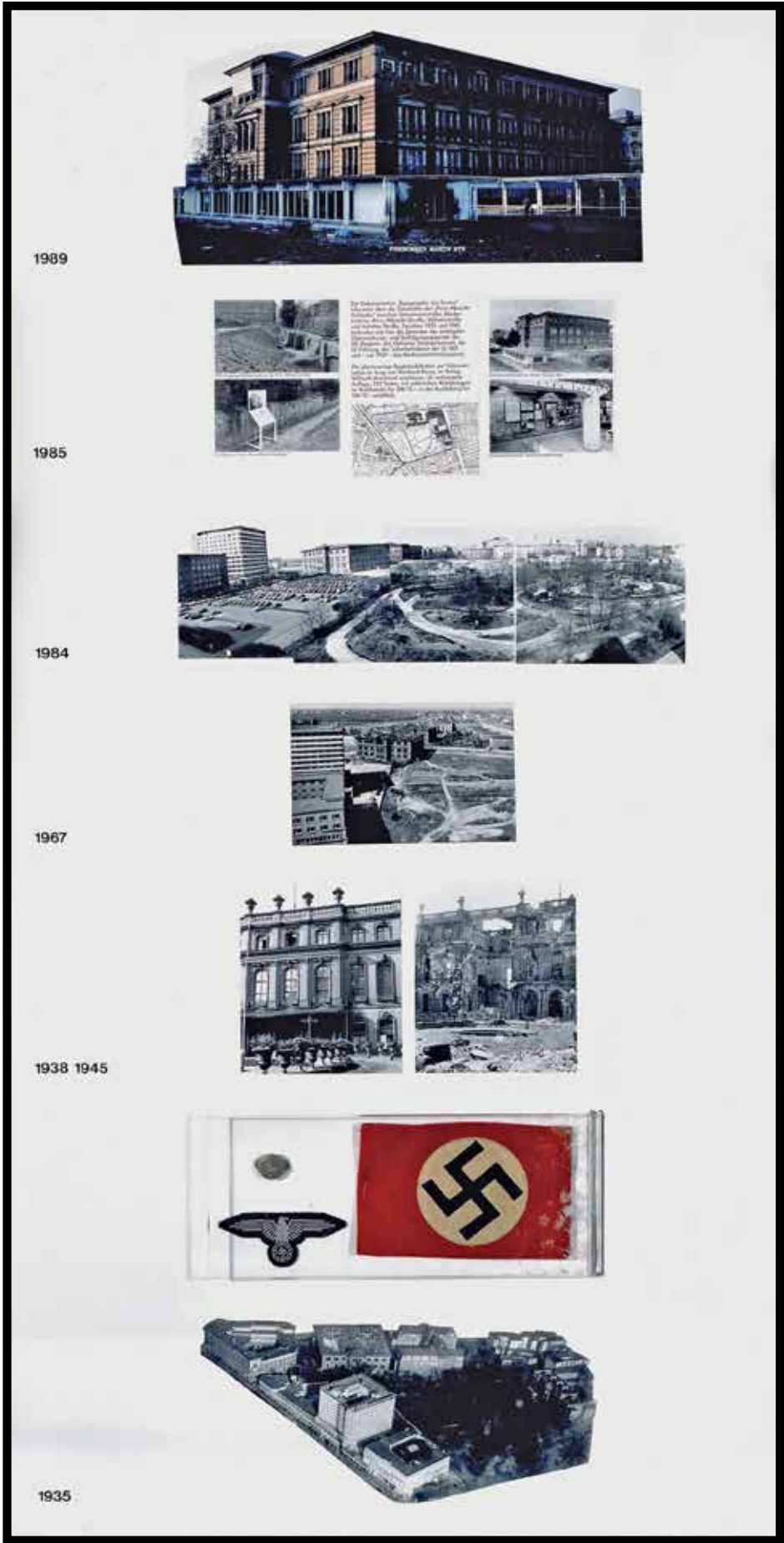
Every few days, we drove to the DAAD headquarters for meetings of one kind or another. Each time, we passed a very depressing place, not knowing exactly what it was. It consisted of a parking lot, trees, and two large rubble piles; the great Martin-Gropius-Bau museum was on one side, the Berlin Wall on another. On the site, in an open space, was a small white building, not unlike a military barrack. One day we stopped and went in. A sign said, "Die Topographie des Terrors." In this building were photographs of the concentration camps and the history, in brief form, of the Third Reich. Some of the history was about this site,

which had been the center of the bureaucracy of Nazi Germany. Around the perimeter of the approximately 1.6 hectares were the basements of destroyed buildings that had been Heinrich Himmler's center of operations, a former famous hotel (the Prinz Albrecht Hotel), the old arts and crafts school (which was occupied by the Gestapo)—even Joseph Goebbels's Propaganda Ministry was quite near, in the Wilhelmstraße. The Prinz-Albrecht-Palais had once held the cafeteria, had been occupied by Reinhard Heydrich and his team who planned the deportation of 20 or more millions of Slavs to the middle of Asia. The idea was to remove half of the Slavic peoples from their own lands in order to create Lebensraum, or "living space," for the German peoples. We walked out after our visit there silent, both of us shocked by a particularly poignant picture of the last survivors of the Jewish uprising in the Warsaw Ghetto, among them a young boy looking directly in the camera. All of them would be transported to concentration camps.

Bahnhof, are across the street. Most of the original buildings on this site were taken over by Heinrich Himmler as headquarters for his Gestapo, Storm Trooper, and Secret Service (SS and SD) operations. Thus, the place became the organizational and planning center for the bureaucracy of terror that enacted the Nazi ideology. This place was also the bureaucratic center for the death camps and the labor camps developed by the Third Reich to enact policies of extermination during the period of its existence from 1933 to 1945.

Toward the middle of the terrain, visible in the work, are two large rubble piles, placed there long after the original ruins were removed. *Trümmerflora*, or rubble plants and trees, is a special phenomenon unique to heavily bombed urban areas. The bomb acts as a plow, breaking brick, mortar, metal, and wood into fragments and, in a single gesture, mixing these fragments with earth from below. This earth often contains seeds, dormant from the time of first construction on the site, that may have been buried for a century or more. These seeds come to light, and those that can live in this new and special earth grow and flourish. Other seeds, dropped by wind and by animals, also survive in limited number in this new soil, this rubble. Hence the name rubble plants, *Trümmerflora*, or loosely translated, rubble flowers. They are a first succession ecology, the first step toward healing the wounded land.

Part I: This work begins by proposing to use rubble to outline the footprints of the original buildings in broken stone form. Thereafter, the rubble piles will be mixed and spread to a height of about 46 centimeters within these footprints. Then, if the parking lot were removed and the Trümmer trees permitted to spread, they would form a partial canopy over the site. The ground plane itself would be maintained with a decomposed granite mix on all areas not marked with Trümmer growth. The gardener, by keeping the terrain clear of third growth, has the role of maintaining the ecology as a scab, the early healing stage of a wound, letting the healing begin, but not letting the past be forgotten. Then, *Trümmerflora* will grow from the rubble, delineating these sites, massing in heights of up to two meters, with the rubble symbolizing the end of the Thousand-Year Reich and the *Trümmerflora* symbolizing the breaking apart and composting of their system of destruction.



Part II: The memorial unfolds thereafter as an interactive narrative utilizing a complex system of signage and text that would be located at strategic spots around and about the building sites, naming each building and designating its function in the Gestapo bureaucratic scheme. As an ensemble, the signage would function as a reminder. The new signs would differ dramatically from the small existing signs and would inform passersby of the building's usage in another narrative layer.

Part III: The existing building, Documentation Hall, becomes part of the work. It was erected in 1986 to tell the story of the Gestapo and its victims in graphic form. It tells how the bureaucracy of terror was constructed as a result of the Wannsee Conference. It explains the history of the site, starting several hundred years ago and then moving to the way in which Goebbels first confiscated one of the buildings for his newspaper *Der Angriff* (The Attack). The pictures and text range in content from Nazi atrocities to diagrams of the bureaucratic structure, from images of the chief bureaucrats to copies of old newspaper articles, to images of the chief enemies of the state, such as Albert Einstein, and artists, writers, and religious figures who were first pressured to leave and later terrorized if they didn't.

Part IV: The process of removing life began with the process of removing identity. As the Gestapo took away each victim's name, they just as carefully gave him or her a number, then issued each person a numbered ticket to an anonymous death. This room, therefore, serves for giving back the names. An extended installation of video screens is to be placed in a small building that mirrors the *Topography of Terror* adjacent to it. The screens are programmed to present the names of all the victims and the dates of their lives and other relevant retrievable information. The audio will speak each and every name, in that person's own native tongue, so that over a period of time all the names will be spoken. For those whose names are lost, or whose deaths have gone unrecorded, other forms of acknowledgment must be conceived. And like everything else on the site, nothing is static, so revisions and modifications can appear as new facts emerge. And even the memorial itself can be reclaimed and transformed by later generations. Therefore, the total physical site, although minimally changed, becomes a publicly available, ecologically lucid, and historically comprehensible memorial addressing what happened here.

And the parking lot is replaced by the extension of the Trümmer forest. And the *Trümmerflora* grows from the foundations of the Third Reich administration around the perimeter of the park, from the Gestapo headquarters in the former arts and crafts school building to Goebbels's propaganda ministry. And the Prinz-Albrecht-Palais is noted as Heydrich's office which designed the deportation of millions of Slavs into the steppes of Asia. And finally elsewhere, vast storage plac-



es exist that are the records of all this activity soon to become a very odd place of study.

The piece was first shown in an exhibition at the Martin-Gropius-Bau called *Gedenken und Denkmal* which dealt with the various monuments from World War II. Ours was a memorial that was not a monument. In fact, we argued that “if a better idea came up you could recycle the work, move the rubble back into the two original piles, and use the site for another purpose.” It was not done.

One day, we found one of our assistants sitting on the studio floor surrounded by papers; he was both laughing and crying at once, if that is possible. He said that he had just found a letter from Goebbels to his doctor, instructing him to go immediately to the Russian front; once there he should collect the heads of Jewish Commissars and carefully preserve them. The doctor was to immediately bring these heads back for Goebbels’s collection of skulls. Goebbels had written that this particular kind of head would provide the best examples of the racial type.

We were told that our proposal was discussed in the Berlin Parliament. We were told that if the Jewish community liked the work, it had a good chance of happening. We were told that the young people in the Jewish community liked it very much. We were told that the leader of the Jewish community had the authority to make the decision; he rejected the work entirely, saying that what had happened on the site—the organizing group that had helped enact the policies of terror—was so appalling that it should be wiped from the face of the earth. That is, it should be wiped from living memory—that housing should be built on the site, as though nothing had happened there at all.

A little over 20 years, later the Germans built a museum and memorial on the site of the *Topography of Terror*. The eerie and uncanny experience that we and so many others had experienced, that something awful had happened there, was obscured. The site had been effectively sanitized.



The site

The site becomes the memorial.



The model



Looking toward the Austrian Alps from the bridge in Ljubljana

Atempause für den Fluss Sava

A Breathing Space for the Sava River

1990 Moderna Galerija, Ljubljana, Slovenia

Muzej revolucije naroda Hrvatske,

Zagreb, Croatia

1991 Art Tech Nagoya Biennial,

Nagoya City Art Museum, Japan

et. al.

While we were in Berlin on our DAAD fellowship, the Wall was still up, and the island mentality was strong. We were among a couple of dozen people invited to Berlin that year to enrich the culture. We had no idea how one might go about the business of enriching a culture; in fact, the culture in Berlin looked considerably richer than the one we had just come from in San Diego.

We asked the Director of the DAAD, Joachim Sartorius, to find us the smartest ecologist in Berlin. His name was Hartmut Ern. Herr Professor Doktor Hartmut Ern. (We immediately became Professors Harrison.) We met at the Botanical Gardens. He explained that he had once been Research Director of the Botanical Gardens, but had been demoted to Public Relations Director. He was very angry about this demotion. We had checked him out and found him to be one of the most knowledgeable botanists at least in that part of Europe, an exquisitely informed person. We didn’t have to ask him why he was demoted; he told us straightaway. When he came to the Botanical Gardens, he found that 3 000 species were misnamed. A profound offense! He sent an order forth to the gardeners to correct the names. The gardeners went on strike. They were definitely not going to change 3 000 names. A solution was found. Leave the names in place, and remove the critic. That was the story of Herr Professor Doktor Hartmut Ern. We offered sympathy for his travails; actually, we were shocked. We asked him what he thought of West-Berlin’s habit of sending its garbage to East Berlin and paying them to process it. (East Ber-

lin’s way of processing this garbage was to release much of it into the Spree River, which flows back into West-Berlin.) We thought we had an amusing work to do in relation to that—somewhat lightweight, but definitely amusing. Ern gave us a contemptuous response. Nothing important was happening in Berlin, ecologically speaking. “The most important work to be done,” he said, “is to assist a nature reserve in the process of being developed in Yugoslavia, right outside of Zagreb.” He had studied our work in documenta, Pasadena, and Florida. He wanted us to help with the nature reserve. He thought that, with a little education, we could be useful. He would spend a few days supplying this education. He immediately arranged our trip and where we would stay and spent four days with us. The education was formidable. He understood the place, its history, the social context, the biology, and the farming methodologies, both ancient and present, and, above all, the local politics. On our last day together, he took us through a number of the backyards of the houses on or near the nature reserve. The houses were of pinned oak frame construction, very old. Every yard had a big plum tree. Every plum tree produced a quantum of slivovitz, the traditional local fruit spirit. Each backyard was peopled with an elderly lady, generally wearing a babushka. Each woman had made an original variation of this drink, which we were required to drink and then compliment. We parted company with Herr Professor Doktor Ern definitely under the weather.

During this process of learning and exploring, we were put in touch with the major players (from an ecological perspective) in the region. Over time, the cast of characters who involved themselves in our work grew; the person who helped us most was a graduate student named Martin Schneider-Jacoby. We carefully examined the nature reserve, known as Lonjsko Polje. It was basically a small fourteenth-century village on the edge of a floodplain that was several hundred square kilometers in area. Lonjsko Polje was the home of many endangered species. The farming processes were ecologically tuned to the environment and the identity of the floodplain had been preserved, as it had once been part of the no-man’s-land between the Austro-Hungarian and Ottoman Empires.

We were well-enough funded, but in a very odd position. The nature reserve which we had committed to assist was absolutely not in need of our assistance. It was evolving beautifully. We congratulated everybody and said how pleased we were to see what was happening and how much we had learned and began to look around for what else we might do that was useful, and wrote the opening text almost immediately. We found ourselves ruminating on whether one could compare the indeterminacy kind of questioning in Richard Feynman’s sum-over-histories with the indeterminacy of what was happening or might happen with the Sava River.

This first influence of Feynman-type thinking on our work came from a quote by the physicist Freeman Dyson, “Dick Feynman told me about his ‘sum over histories’ version of quantum mechanics. ‘The electron does anything it likes.’ he said. ‘It just goes in any direction at any speed ... however it likes, and then you add up the amplitudes and it gives you the wave function.” I was fascinated by the idea of what one might discover if one could locate a place of constancy, if a river moved all over the place and applied it to the Sava River in our first dialogue. I, Newton, then said, “The river is like nature, or for that matter, a proton. Its existence is part of a large discourse. And its discourse, like any discourse, is the sum of its improvisations at any moment, and therefore the direction of its becoming is theoretically invisible.”

I, Helen, suggested that Newton put aside issues of indeterminacy and considerations like “summing up histories,” better to put creativity into the physical well-being of a river at risk.

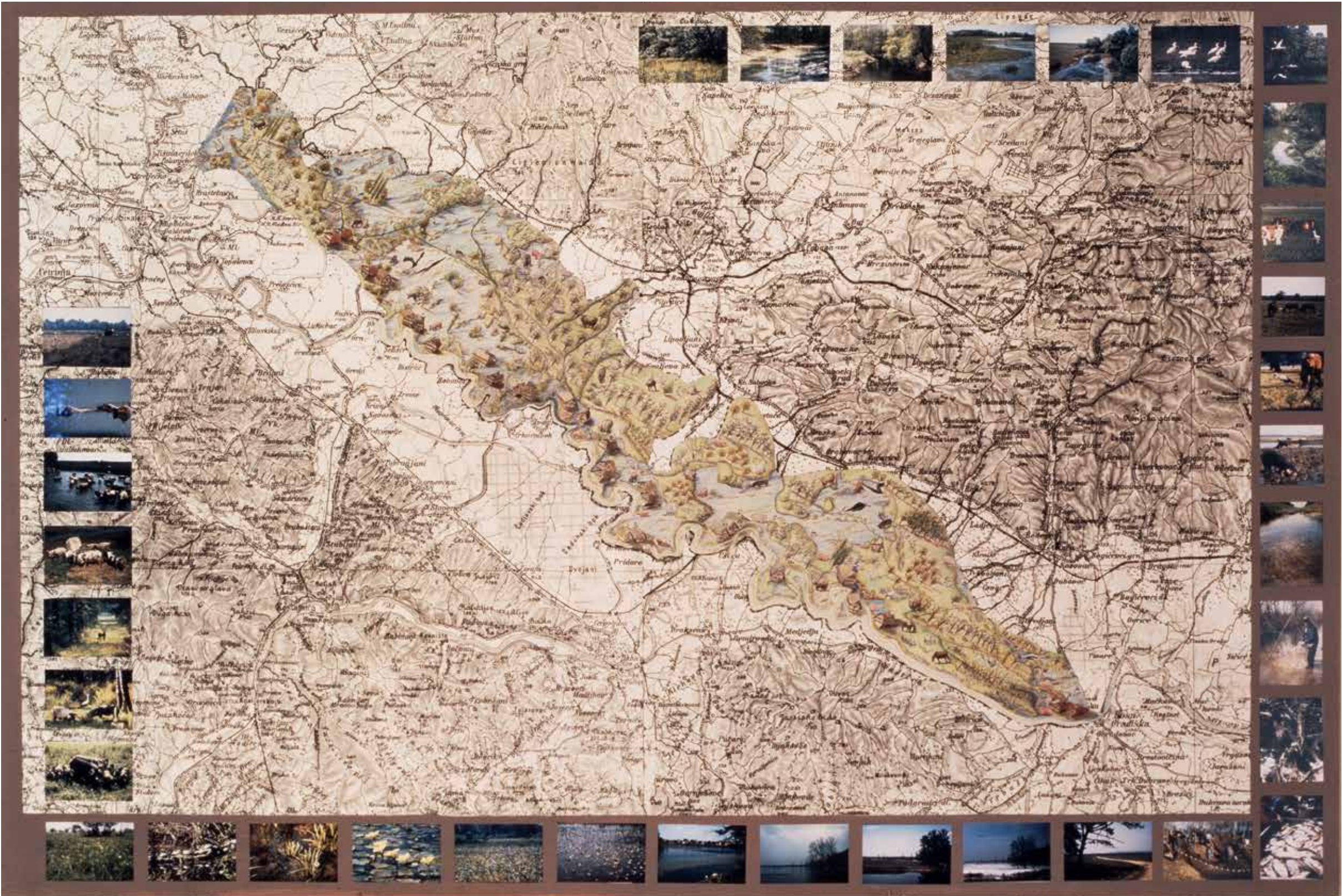
She was right, of course, and I had no way of doing the science that would have permitted me to average histories of unpredictable behavior, nor could I construct an argument that for a river it might be a good use of time.

Although for Feynman, it was a revelation.

The Sava watershed drawn from a Michelin map with the nature reserve



The nature reserve map, roughly 100 years old, with a diversity of species and life pictured around it



Lanscapolia
with
the waters
drained



Lanscapolia
partially
flooded



During
flood time



So many
species in
each other's
presence



Spoonbill
flock



A small dam



The cattle
population
in the Sava



Wild deer
in a
fire break



Understanding of the unique ecological properties in this early farming system takes place when one sees what happens as the tractor mows field after field, with the stork and other bird populations following, picking up on the insects and small game that rise up from the field during the act of harvesting. Much of the small game and insect life escapes the stork and moves to the next field and the next. Since it takes a month for the tractor to cover several hundred hectares of field, the process of food gathering for the winter is also the process of securing the biodiversity of the whole. It is the story of a complex system. It is the story of the maintenance of a complex system that does not know that it is a complex system but does know that the maintenance preserves it.

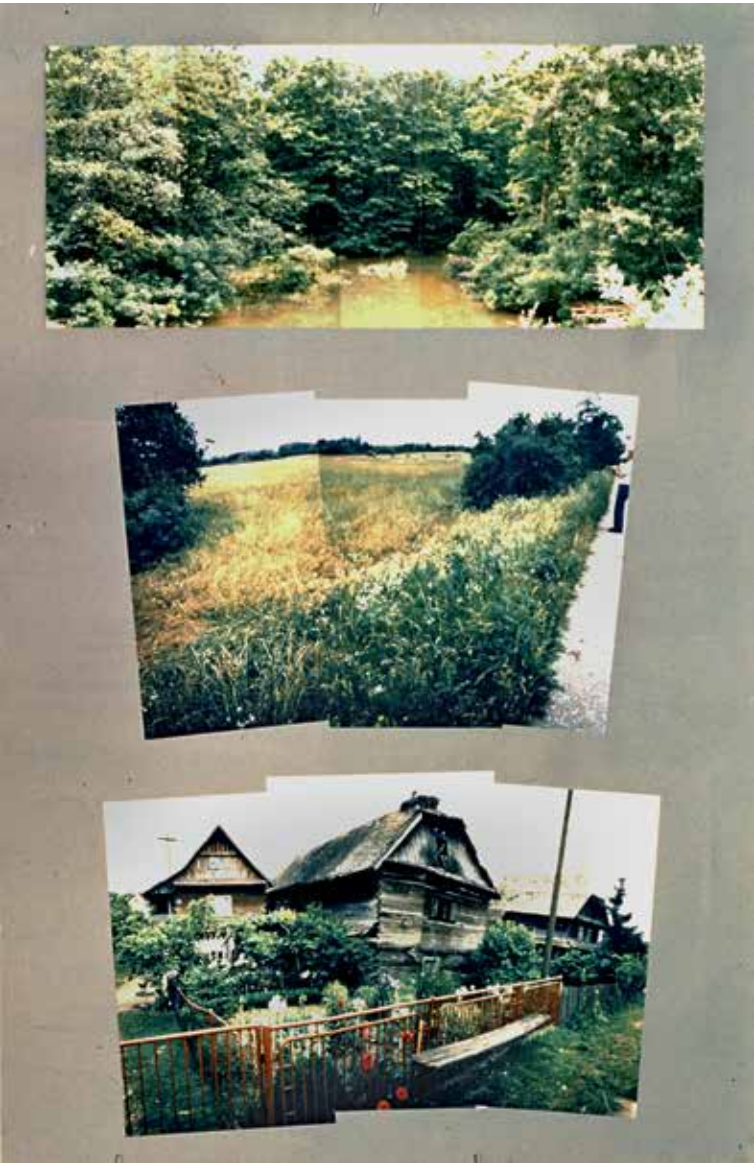
It turned out that the nature reserve as a whole was somewhat in danger. It existed toward the upper end of a 5 000-square-kilometer industrial farming operation that took up much of the land that was then Yugoslavia. The area was in good part the floodplain for the whole Sava River drainage basin. A large fertilizer production plant was producing nitrates and nitrites, with much concomitant pollution. We met with the directorship of the fertilizer factory. They were amazed that artists were concerned with the negative effects of heavy metals on the environment. In fact, they had, as we could see, a large lake, about a kilometer square, with the pH of battery acid—perhaps we in America could use it? At the same time, the nature reserve was surrounded by factory farming whose wastes impacted the nature reserve, its floodplain, and its wetland oak forest. So we decided to do a work for the whole Sava River, with an emphasis on purification.

The interconnection between the village, the farming, and animal husbandry



The beginning text starts with a question:

I said
Do you value this river the Sava
You said
Not in its present state nor do I value
the state of the discourse around it
I said
Any state has value
You said
Then do you wish to join the conversation
I said
How do I know anybody will listen



You said
How do I know we will say anything worth listening to
I said
Even if we say anything worth listening to
will it be remembered for more than a moment
You said
Remembering and forgetting are in their totality
the sum of human understanding
I said
Then about and around this river
a forgetting is taking place
and a rich history is disappearing
and a very limited present state is appearing

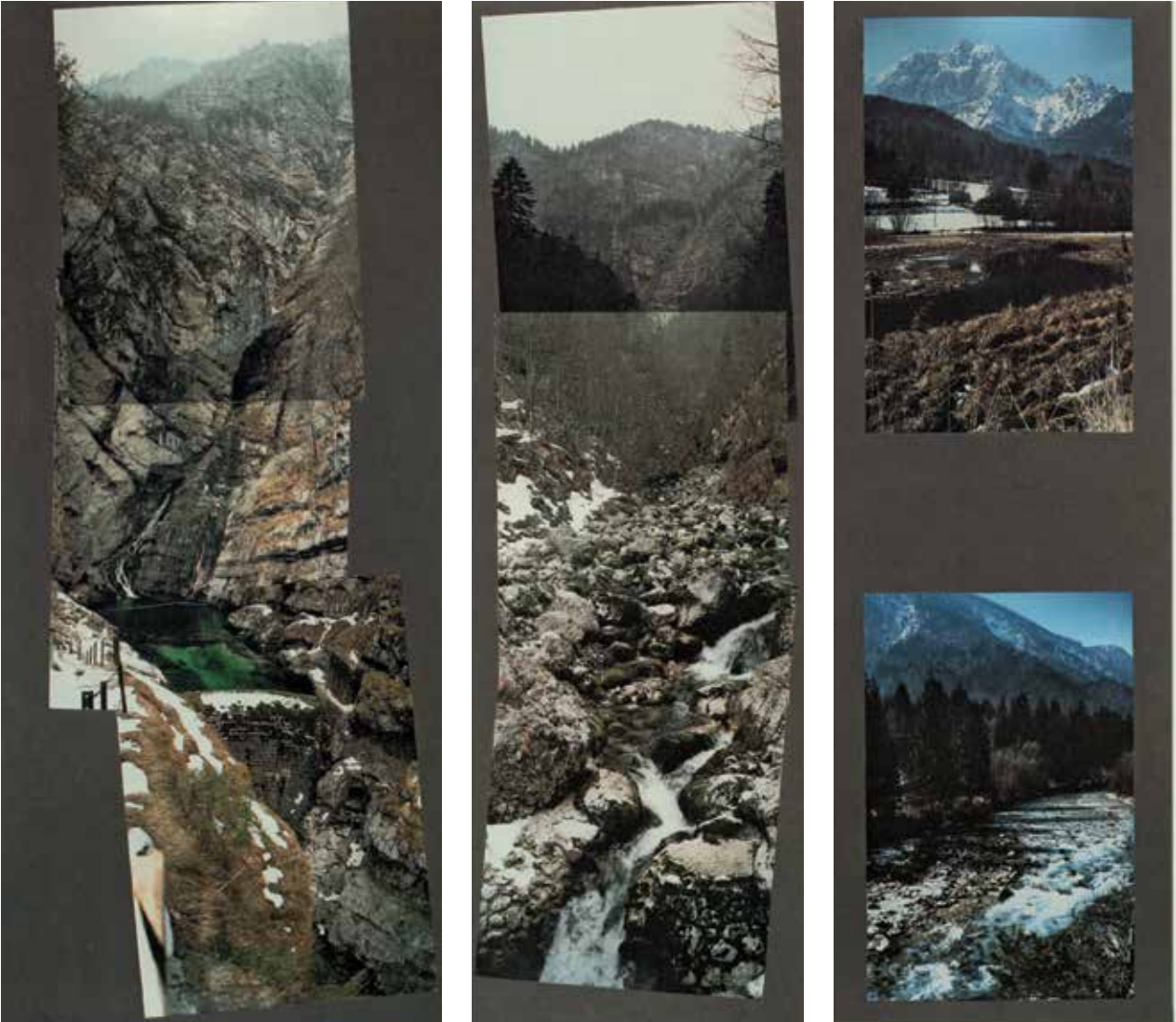
The dykes and the farmlands
Factory farming
The flood plain meadow



You said
Its present state is merely a moment in its history
and is theoretically invisible
I said
Then do you value the direction of its becoming
You said
The river is like nature or for that matter a proton
its existence itself is part of a larger discourse
and its discourse like any discourse
is the sum of its improvisations at any moment
and therefore the direction of its becoming
is theoretically
invisible

I said
Forgetting the question of indeterminacy
do you value the discourse about and around this river
as best you can understand it
You said
I fear for this river's well-being
I said
Then let us find a way to join the conversation

The Sava River has two beginnings in the Austrian Alps, one as a stream outpouring from the mountains, the second as an upwelling in a meadow.



The river is self purifying though it turns black from the coal mine briefly.



Martin as our guide began walking away from us rapidly. He said if the police found us taking pictures of the railroad, we might be considered agents of the CIA and put in jail and forgotten about for a long time.



The river is asked to process new information
when it hits the alluvial floodplain
and the information is mechanical.
A new shape has been constructed for the river
by the construction of levees and dams
so that the river is permitted to rise and fall
but not to spread
and the topology for a giant farming system created thereby.
For the river it is the shape of catastrophe.

The river is asked to process new information
when it hits the alluvial floodplain
and the information is biological.

A change of state has been created for the river
by the disappearance of the life that once pervaded it
which depended upon periodic spread and withdrawal of
waters
and although an act of compensation has been made
through the creation of a nature reserve —
for the river it is the state of catastrophe.

The river is asked to process new information
when it hits the alluvial floodplain
and the information is chemical
and the information is toxic
and

where the information is most toxic
by an unexpected congruence of circumstances
by an unexpected confluence of waters
there is an intersection with the nature reserve.

There is still time for a new history for the Sava which,
while corseted within levees,
is not channeled in concrete.
There is still time for a new history for the Sava
for its alluvial wetlands
while shrunken
are larger than any in Western Europe.
There is still time for a new history for the Sava

for its dams are modest and covered with growth.
There is still time for a new history for the Sava
for its flow is not swallowed or reversed.

There is still time for a new history for the Sava
which, while polluted, is not poisoned.

There is still time for a new history for the Sava
since the shape of catastrophe
is also the shape of opportunity.

Heavy metal from the fertilizer company and calcium pollution form a white spring.
Above a second stream from the city of Kutina is unimproved human waste.



One square kilometer of battery acid. The battery acid streams around the nature reserve that leads to the Sava River.

After the work was finished, we first exhibited it at the Neuer Berliner Kunstverein in Berlin. Thereafter it was moved to the Museum of Modern Art in Ljubljana. The well-advertised show opened; the work was in three languages (German, English, and Serbo-Croatian). Nobody came. There was a good reason; Slovenia was in the process of removing itself from the Yugoslavian Union. The mothers had gotten in trucks, driven down the hill to the border near Zagreb, and pulled their sons out of the army. They were simply not going to have Slavs fighting Slavs. We were very sympathetic to the situation, not realizing Slovenia’s second reason for withdrawal from the Union: They were the wealthiest country and did not want to continue paying heavy taxes to a union they no longer believed in. Standing in the large, empty museum, we looked out the front door to see that a car had pulled up. Five short, stocky men got out. They stomped up the steps. They walked around and read the work. They had a conference. The power figure raised his arm at us, which meant that we should come over. His name was Mr. Braun, he was the director of the Croatian water department. He wanted to know why this work was not in Zagreb, where it belonged. We said we had gone to the museum people in Zagreb, and they had told us that if it was going to open in Ljubljana they would not show it in Zagreb. Mr. Braun waved his hand at us again, which meant that we should go away, which we did. Another conference was held. The hand was waved at us again. We walked over. Mr. Braun said, “This is Radenko Deželic. He will go back to Zagreb tonight. He will talk to the museum people. The day after tomorrow you will go down to Zagreb, and you will choose your museum.” We were thinking, sometimes totalitarianism has its merits; maybe he would send Radenko to New York to talk to the Metropolitan Museum of Art. The *Sava River* work opened in the Museum of the Revolution in Zagreb three months later. The opening was triumphant. The work was much loved. Evidently the pictures we had taken, unknown to us, were of favorite places of many people, most of whom came up to us and told us so. We were invited to talk to the Croatian bureaucracy. Our work had revealed that the Sava River was not in that bad shape, and modest controls of the waste from irrigated farming, a paper factory, and the fertilizer factory would probably be enough to keep the river viable, ecologically. Mr. Braun asked if there was anything that we wanted. “Yes,” we said, “we would like a swamp where we can test out our ideas on how to purify farm waste.” He went over to our maps and said, “Choose your swamp”—in fact, he said, “Choose two swamps” (he was very generous with his swamps).

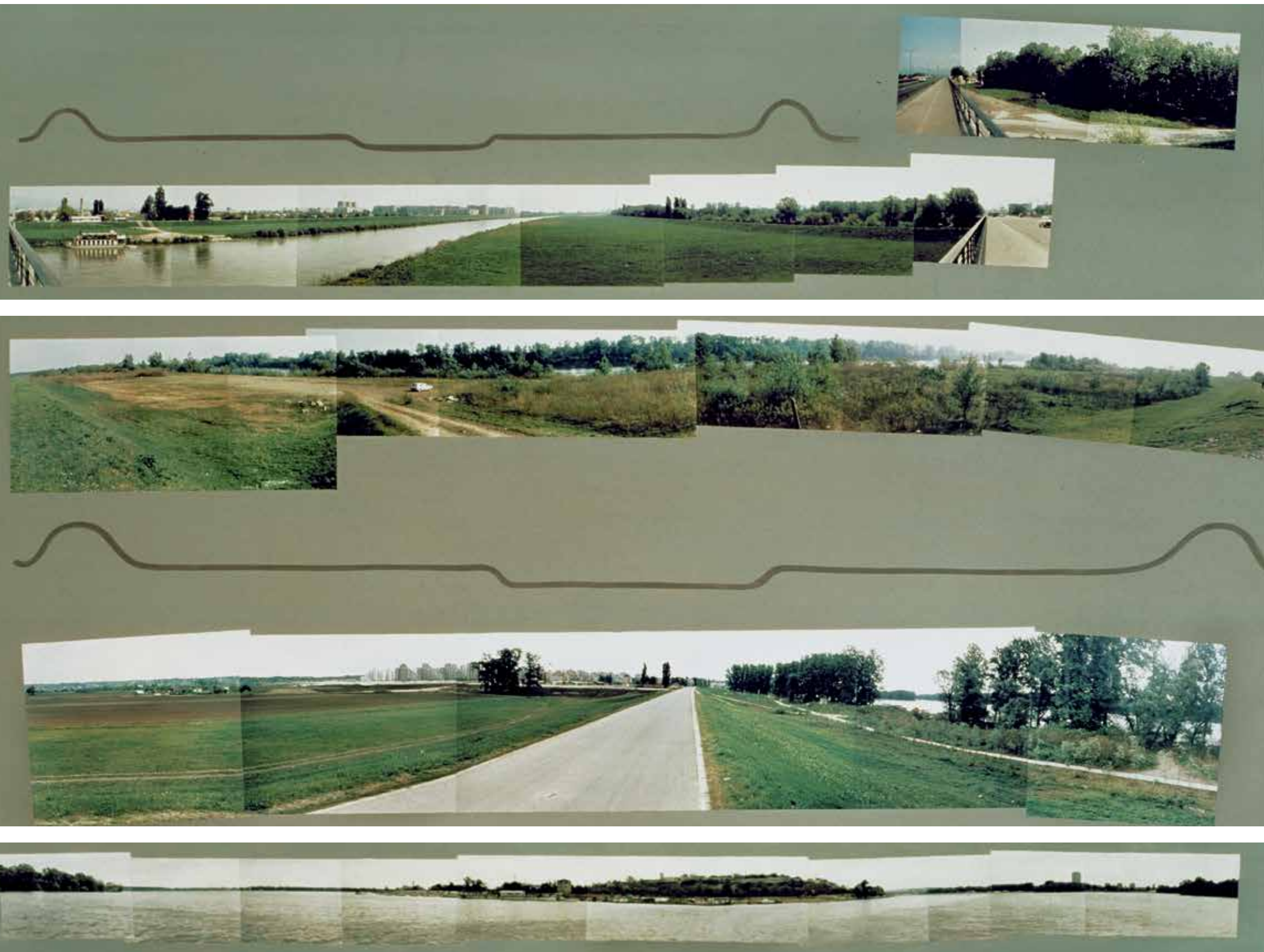
There were many unintended consequences to this, our first bioregional work. It had a busy life; it was shown in many places. Initially translated from English to German to Serbo-Croatian, it made its way into French and finally Japanese thereafter. In 1991, the work was shown in the Nagoya Biennial, entitled *Art and Technology*. The Sava Work had been accepted as an example of biotechnology, a special case amidst all the electronic technology that was so typical at the time. It won second prize, which was awarded to us very formally by the emperor’s cousin, Prince Tomohito.

More importantly, Martin Schneider-Jacoby, our assistant, had gotten his PhD and figured out that watersheds were no more difficult to work with than, say, sea eagle habitats (which were the subject matter of his thesis). So he successfully took on the purification of the Drava River, which is the sister river to the Sava. These rivers collectively gave the lower Danube River about half of its clean waters. The outcome from this was that the very polluted Danube estuary that flowed into the Black Sea was in some measure purified. We called this unintended outcome “Conversational Drift.”

You said
by now it’s an old story
draining the Poljes
wetting the dry
drying the wet
subtracting the floodplains
confining the river
I said
for the Sava, constructing this 5 000-square-kilometer farm
is the shape of a catastrophe
which requires the endless digging
of the endless ditch

There is still time for a new history for the Sava, which,
while corseted within levees,
is not channeled in concrete.
There is still time for a new history for the Sava
for its alluvial wetlands
while shrunken
are larger than any in Western Europe.
There is still time for a new history for the Sava
for its dams are modest and covered with growth.

The river embedded in the floodplain is straightened but still there is room for a floodplain ecosystem to form.



Outfalling into the Danube River

There is still time for a new history for the Sava
for its flow is not swallowed or reversed.

There is still time for a new history for the Sava
which, while polluted, is not poisoned.

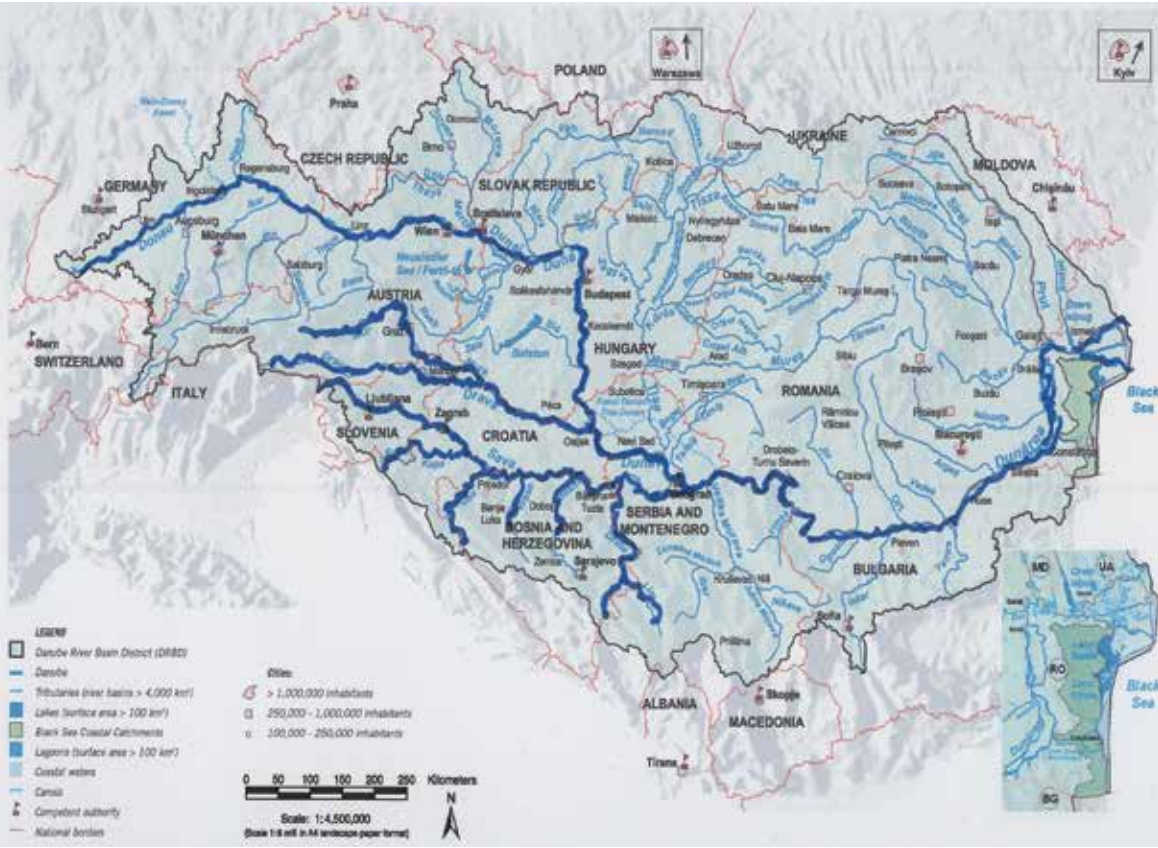
There is still time for a new history for the Sava
since the shape of catastrophe
is also the shape of opportunity.

Standing here at the edge of Novi Beograd
seeing the moment this 500-kilometer-long shape
changed slowly into edges and islands as the Sava
broadened and flowed into the Danube

I said
the shape of confinement is disappearing
You said
then the nature of catastrophe
and the nature of opportunity
have changed

The shape of catastrophe takes on the quality of opportunity
when the great “U” formed by the Sava within its earthen
walls
is understood as a new continuum
a corridor for the wildlife
that in tandem with the corridor for human activity
serpentine through the 500 kilometers of the new
topology
produced by the 5 000-square-kilometer factory farm
The shape of catastrophe takes on the quality of opportunity
when all the drainage ditches are expanded
to end in reed-bed and swamp
purifying the waters and making new habitat
before these waters return to the Sava

Then
the shape of opportunity
emerging from the sum over its histories
becomes the new history for the Sava River floodplain
the second largest alluvial wetland remaining
on the continent of Europe



Two years later, Martin gains agreement from
six different authorities and designs the purifica-
tion for the sister river to the Sava, which is the
Drava. These two rivers give the lower Danube
River about 50 percent of its clean waters. This
has a salutary effect on the polluted estuary of
the Danube River as it flows into the Black Sea.

Tibet Is the High Ground

1993 Ronald Feldman Fine Arts,

New York

1994–1995 Tibet House US,

New York

Tibet Is the High Ground began in 1991. We were working in the water tank studio, and Dr. Robert Livingston showed up. A neuro-scientist who was madly experimenting with slicing human brains into ever thinner sections, he was an old friend from committee meetings and other sociable forms. He looked around the studio, didn’t even say hello, then asked, “What do you think of His Holiness’s idea of a peace park?” Not knowing any Holinesses—and especially not imagining that the Pope, who was the only near Holiness that at that moment we could think of, would have anything to do with a peace park—I asked or you asked, “His Holiness who?” Livingston, astonished, replied, “Why the Dalai Lama, of course!” Information then cascaded out of him: Did we know that the Tibetan population had a special gene, so that when they ran at 3 660 meters or even higher their heart rate didn’t accelerate—that their bodies didn’t respond to altitude the way all others did? (That is, their genetic adaptation to altitude was astonishing.) Did we know that Chinese men were inseminating Tibetan women and in due course the gene would fade out? Did we know that the Chinese were dumping radioactive material on the Plateau? Moreover, he was absolutely incensed about the aggressive actions the Chinese were taking toward Tibetan culture and cultural artifacts.



THE DALAI LAMA

January 31, 1991

Prof. Helen and Newton Harrison
c/o Prof. Bob Livingston
7818 Camino Noguera
San Diego, California 92122-2027
U. S. A.

Dear Prof. Helen and Newton Harrison,

I am excited to learn from my friend, Bob Livingston, about your agreeing to do three big and important projects on Tibet: a five year project to depict Tibet before and after the Chinese occupation, your intention to create a simulated"overflight" panoramic view of the whole of Tibet and to construct an elevated three-dimensional physical model of Tibet. These will be quite unique and, once completed, will not only be of great interest but extremely enlightening. The first project will naturally highlight, much more effectively than anything that we say or write, about the environmental destruction that is going on in Tibet. The other two projects will bring about greater awareness of the size of Tibet, its strategic importance, and most important of all its impact on the ecological balance but not to its neighbouring regions and too far away countries like California in the United States, as Bob explains.

Thank you once again for your efforts directed to help the cause of Tibet and the Tibetan people. I am extremely grateful to you both.

With prayers and good wishes,

Yours sincerely,

Finally, he got back to his original question and said that the Dalai Lama wanted to make a peace park that was ecologically based on the Tibetan Plateau. He implied that the whole Plateau had the possibility of becoming such a park. It was a quintessentially Buddhist notion; one almost felt that the park he had in mind would become an exemplar of the Eightfold Path in its entirety. He explained that he was the Dalai Lama’s science advisor and wanted to send him our work for review, as he thought we would be useful advisors for the formation of such a peace park on the ground. He said, “Write the Dalai Lama a letter expressing your interest, and see what happens.” Having no idea how to address a Holiness who was also a head of state (with whom we shared Buddhist principles, to the degree we were able), we sent him the following poem.

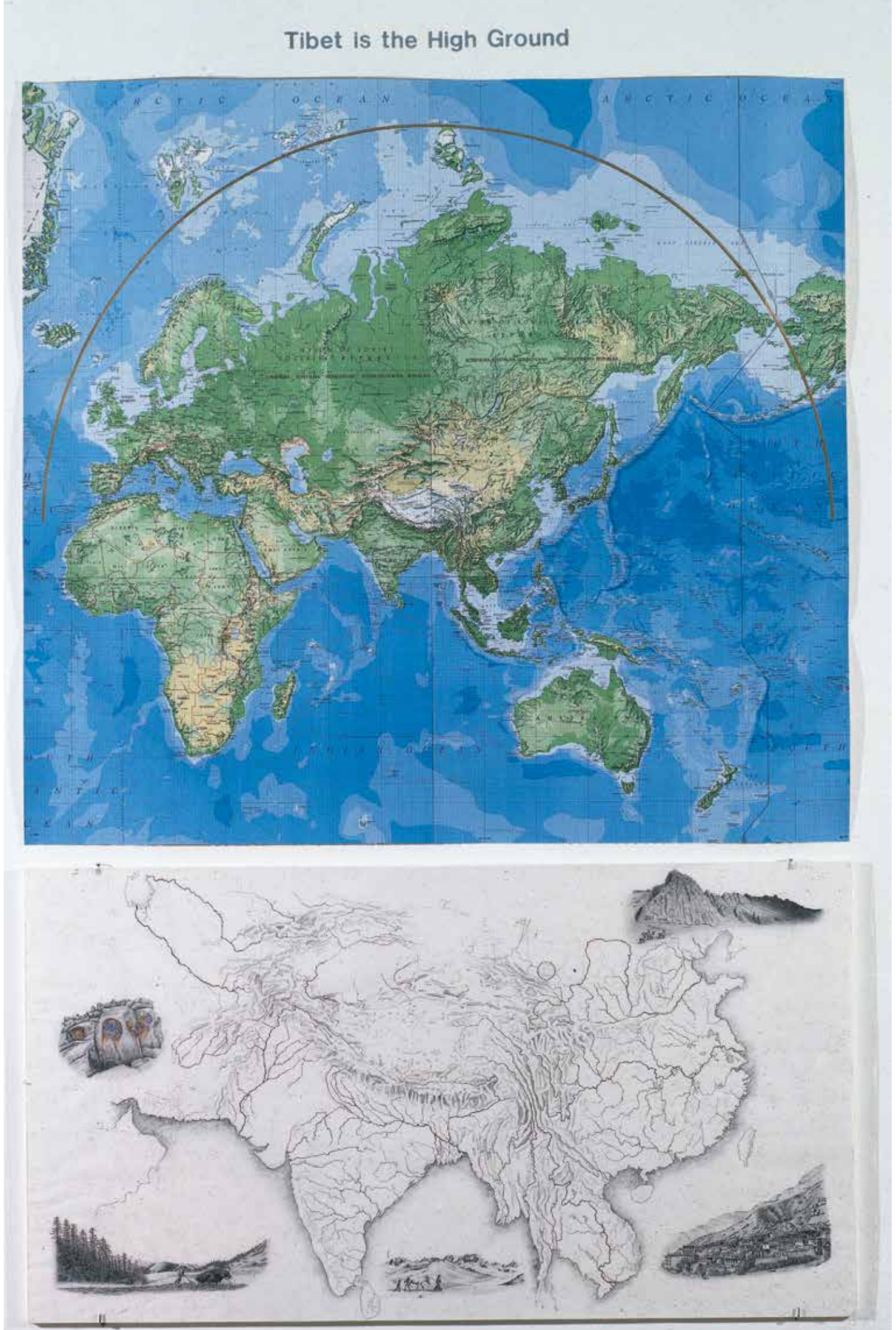
To the Dalai Lama
We hold that the ocean is a great draftsman.
In response to our millenia of manipulation of fire,
The Ocean has answered gracefully
By rising slowly,
And moment by moment
Redrawing the shorelines of the world.
And as the oceans rise gracefully
Changing all boundaries
And means of production
The ways of all living beings will change as well.
To this continuously graceful drawing and redrawing
Can we respond
By withdrawing with equal grace
To the High Ground?
It seems to us that envisioning Tibet as a world peace park,
Certainly High Ground,
Is an act of equal grace.

Within a week, Livingston got a letter from the Dalai Lama asking for our participation; then the Dalai Lama wrote to us directly. It turned out that his middle name or hidden name was “Oceanic Consciousness” (literally Ocean of Wisdom), and we in complete naivete had addressed him with that name! We met with the people from a Tibetan museum that operated out of

a small storefront in a San Diego shopping center, and they put together a couple thousand dollars for us to begin a work. We found that our interest went not so much to the high Plateau but to the seven rivers coming from it that formed the great watersheds serving the continent of Asia. We learned that the Chinese had either cut or influenced the cutting of many of the forests in the Himalayas and traded the wood to the Japanese for some 50 billion dollars. This act of denuding the hillsides created erosion, but above all it reduced the purity of the rivers and their ecological well-being.

And we noted that
Forestry practices, particularly clear-cutting
Were profoundly affecting
The Salween, Mekong, Hwang Ho,
Brahmaputra, Yangtze, Ganges
And the Indus River systems
That traverse inner Mongolia,
China, Tibet Autonomous Region, India,
Burma, Laos, Cambodia, South Vietnam, Bangladesh,
Kashmir and Pakistan.

The work we proposed did not take up the peace park at all. We weren’t all that good at doing what was requested of us; rather, we followed our intuition, our conscience, and our beliefs which led us to attend to the well-being of the mountainsides. We followed the position taken years earlier that the environment was our client. Nonetheless, we named the work *Tibet Is the High Ground*. Unfortunately, we made a mistake in not trying to discuss our refusal to work directly on a peace park with the Dalai Lama; in turn he did not continue any further communication with us. The proposal we came up with argued for funding to create a very large model of the Himalayas with the river systems exaggerated. The model would be in a form that was also a meeting place where people from all the watersheds, hopefully the leadership, could begin to meet with a restoration agenda. This never happened. However, the work hung in Tibet House in New York City for a number of years. We were told that when Al Gore introduced the Dalai Lama in Washington, D C, our map was held up as a background.



Serpentine Lattice

1993 Douglas F. Cooley

Memorial Art Gallery, Reed College,

Portland, OR

Jordan Schnitzer Museum of Art,

University of Oregon,

Eugene, OR

1994 Schweisfurth Stiftung,

Munich, Germany

et al.

Late in 1991, a letter arrived from the Douglas F. Cooley Memorial Art Gallery at Reed College in Portland, Oregon. The director, Susan Fillin-Yeh, asked if we would come up and give a talk, with the idea that maybe we would do a project. The students were bright and inquisitive, and the faculty were curious about some areas of our works and whether they were successful. We began a study of the Pacific Northwest, the North American fog forest that stretched from San Francisco (or, some argued, from Big Sur) northward to Yakutat Bay, Alaska—a little over 3 220 kilometers. Many of the trees were nourished and took their water mostly through pine needles from the fog that came in daily from the Pacific Ocean. Those that were left, that is: over the course of more than a century, beginning in the 1880s, 90 percent of them had been cut down.

To facilitate our work, the college supplied us with a four-seater Cessna 172. It was a scary trip; we flew over hundreds of kilometers of clear-cut mountainside, sometimes dipping down to see destroyed streams. If you were not in an airplane you could be fooled; because the lumber companies often did not cut the roadside trees, it was easy and convenient to believe that you



were driving through the great North American fog forest, rather than a pathetic remnant. Later we heard that the lumber companies, indifferent to public opinion, had even cut down many of the roadside trees to maximize profit. In historic photos, a tree trunk might take up an entire railroad car, with the proud lumber crews sitting on top of it, as hunters do when they kill a large bear or lion or elephant. A great sadness came over us.

Susan Fillin-Yeh was a wonderful host, and a good project manager. She brought us to the University of Oregon in Eugene, where we met with foresters who explained that they were trying to open up old monocultures to encourage biodiversity. But you said or I said, “A tree farm is not a forest.” Wherever we went people told us stories: A forester had been a lumberman for many years, but suddenly felt pain at all the clear-cutting and reeducated himself as an ecologist and an activist. A young ecologist thought, based on the utter urgency of the moment, that the last remaining pristine areas should be preserved and expanded. He wanted to create corridors between these few pristine areas, though he feared that the Pacific coast temperate rain forest might not survive at all. Another forester was creating spaces in older stands of monoculture to reestablish ecological diversity; he was introducing missing species. (We were interested in similar things, although we called this behavior “assisting the migration of species.”) A geographer argued that different features of the landscape should be mapped at different scales, that every place had its own set of rules, and there is no hierarchy of rule sets that governs all topology. (We agreed to meet again, but never did.) Another lumberman, who had also begun to save the forest, said there were no “real” forests left. He said thieves had stolen all of our forests, and what they were cutting then were “just little pecker poles.” (We said, “Woodpecker poles?” He laughed.) A group of students helped us make maps and drove us around but refused to take us to a particular small town, saying that because we were doing an activist work to save or help restore the rain forest, we might get shot at. Feel-

ings were running high. People were afraid of losing jobs, even though most of the trees had been cut, and most of the work was automated, so there weren’t really many jobs to be had.

Finally, someone asked, “What’s the most interesting thing that you’re doing here?” I said or you said, “Wouldn’t it be interesting to buy the 3 220-kilometer ridgeline of the Pacific coast fog forest, from San Francisco to Yakutat Bay. With that kind of command you could know where a restoration would be most useful.” He asked, “How much would it cost?” I said we had calculated the land costs; much of it had been clear-cut and had little value, and much of it was public land. He repeated, “So how much would it cost?” I said or you said, “About three billion dollars, far less than a highway.” We wrote the following story, which turned into a proposal of sorts.

From Southern Alaska
to Northern California
North America’s last great temperate rain forest is dying
everybody knows there’s less than 10 percent
of the old growth left
between
San Francisco and Vancouver Island
perhaps 40 percent in British Columbia
and nobody can agree about Alaska

By now
everybody knows that a tree farm is not a forest
that is, everybody knows
who thinks about such things

There is enough new information about
and enough old wisdom around
for anybody who thinks about these things
to know that the death of a great forest
is a global tragedy

Thinking about this forest
stretching along the coast
from the Western Hemlock of Southern Alaska
downward through Sitka Spruce
Western Red Cedar
and Douglas Fir
to Northern California
where the Coast Redwoods carry on

Knowing that embedded
in this terrain this once great
Pacific coastal fog forest
is the whole North American

Rain Forest
then who can seriously value
its total destruction

We being grateful
for the invitation to join this perilous conversation
began to imagine an act of restitution
you seeing a serpentine
I seeing a lattice
we began to imagine North/South continuities from the
Yakutat Bay
to San Francisco
continuities that would bespeak
the eco-poetics of the whole

Now looking at healthy succession
looking at old growth remaining
wondering about a matrix in which to insert a new vision
suddenly
you said a lattice
and I said serpentine
and you said network the watersheds

and I said a game of go
Imagine the serpentine form
of the crest of the coastal mountains
imagine the serpentine form of the Pacific Coast
imagine some of the rivers
really watershed ensembles
extending from crest to coast
connecting the serpentes
as nearly leaf shaped rungs
or cross members of the lattice

Then
within this lattice could begin
the restoration of the more pristine environments
by leaving them alone
by engaging in a more active restoration
only where clear-cutting has been most severe
by closing off entry roads
when finished

A willful getting out of the way
A felicitous withdrawal

Then within these cross members a minimally mitigated
environment
moving towards the pristine
would exist and could flourish
and expand

Then
a new reversal of ground can come into being
where human activity becomes a figure
within an ecological field
as simultaneously the ecology ceases being an ever-shrinking
figure
within the field of human activity

Trygve Steen, a scientist and professor at the university, had for 20 years flown over this fog forest and photographed the clear-cutting. He was absolutely outraged. He let us go through file cabinet after file cabinet, perhaps 10 000 slides, over the course of a week. We composed panoramas in three slide sets that could be projected very large on a wall. We found the funds to commission him to take yet another flight and make panoramas of a region we thought particularly poignant. Then he looked at our arrays and said, “You know, we’re missing Alaska. I know someone who’s flown Alaska.” So the last five sets came from Alaska, with photos by R. G. Ketchen but composed by us. Ultimately, 55 arrays, composed with an eight-minute reading, became the core of the work.

Susan had a very talented 14-year-old daughter who was interested in our work. We gave her a task: Find out how many kilometers of river and stream there are in the fog forest. Then find out how many kilometers have been damaged by clear-cutting. Several weeks later she returned; her investigation revealed that there were a little less than 161 000 kilometers of river, stream, and small creek in the forest. Of these, 70 percent had been damaged, some seriously. She did not know how to measure the seriousness of the damage, nor was she certain about how many kilometers were river, stream, or creek—but these details didn’t seem to matter. The wreckage of the water system was massive, and its ability to revive itself at that scale was practically nonexistent. With the removal of the trees, the sun warmed the streams, and the stream life—especially the salmon, which relied on cool waters—died back. We were told that there was general agreement that the coastal temperate rain forest occupied about 143 000 square kilometers, and that about 130 000 square kilometers had been cut, mostly clear-cut (though there was no precise count). Reed Noss, the great conservation biologist, was trying to save the hot spots, which made up the other 13 000 square kilometers,

or 10 percent, of the forest. Finally, we asked, “Who’s looking out for this 130 000 square kilometers of mostly clear-cut terrain? If the ecologists are looking out for the hot spots, and the lumber companies find it unprofitable to replant the steep hillsides even now eroding, who’s looking out for this endlessly violated terrain?” Everyone we asked said they didn’t know, so we said that we would take on this task as best we knew how. In the work, which we entitled Serpentine Lattice, we elaborated the proposal.

For instance
if
according to the laws of the conservation of energy
the transfer of energy
from one form to another
generates a net loss
then the clear-cutting of old growth forest
must involve a net loss equal to more
than the energy gained
from transforming it into profit

Who will pay the costs of the loss of plants and herbs
whose medicinal values
are as yet unknown
and the price
when sequestering of carbon
by succession of ecologies diminishes
and who will pay the costs
of apparently unsupervised
aggressive clear-cutting on private lands
after all this long-term energy debt
comes due in the next generation

With the turning of 130 000 square kilometers
of biologically productive lands

into functional deserts
and the elimination
of productive ecosystems
from over 161 000 kilometers
of river-stream habitat
the water-purifying properties
of the wetlands
disappear

Who will pay this eco-debt
and where will we find eco-credits
to put against it
as ecosystems simplify
and become minimally productive

For instance
if the gross national product
is 5.7 trillion dollars
and
producing the gross national product
is the outcome of exploiting
the gross national ecosystem
and the gross national ecosystem
is not infinitely renewable
then it is not difficult to imagine
the gross national product shrinking
in concert with an overexploited
less-productive
gross national ecosystem

However
if as a form of recycling
we take one percent
of our gross national product
and establish an eco-security system

not unlike
our social security system
then
roughly 57 billion dollars
become available yearly
for restoration/reclamation

Finally
ground would be reversed
so that the ecosystem
becomes the field
and human use
the figure within it

Then
the gross national ecosystem
would take its place
privileged appropriately
as the field within which
the political systems
social systems
and business systems that constitute
our eco-cultural entity can exist



The North American temperate rain forest is dying.

From Northern California across the whole Oregon coast.



Through Washington and the Olympics and beyond to Vancouver Island.

And British Columbia up into Alaska.



The map represents the ecosystems bounded by the perimeter of the coastal temperate rain forest watersheds on the east and by the Pacific Ocean on the west, by San Francisco Bay in California in the south and Yakutat Bay in Alaska in the north. These terrestrial ecosystems are connected with the aquatic ecosystems of the Pacific Ocean, the shorelines, the estuaries, and the rivers. Together, these systems represent the fragile, threatened remnants of the largest temperate coastal rain forest in the world. The green on the map represents the area that was covered by the coastal temperate rain forest until the beginning of the 19th Century. The rain forest existing today is much smaller. Much of it is severely damaged, with large areas more than 90 percent logged, although in the northern part of the forest there still exist some areas that retain as much as 90 percent of their original canopy. If today's rain forests were colored, it would exist only as patches of green, rather than as continuous expanse, because so much has been lost to logging, urbanization, agriculture, and mining, et. al.

It was 1993. We offered to debate the representatives from the lumber companies on a local public radio station, but at the last minute they turned us down. President Clinton had just shown up in the region for conferences with ecology groups, and the lumber companies intended to develop a policy. We found an open hall nearby, within steps of their meeting, and presented *Serpentine Lattice*. The politicians and all the others were informed of our exhibition, but the social pressure was so powerful that none came. Later, we learned that the lumber companies had generously funded the Clinton campaign. Much later we learned that the Clinton group had been talked into, at the very least, protecting large bodies of the American forest elsewhere.



Where it can be seen that a tree farm is not a forest

Das Einzugsgebiet

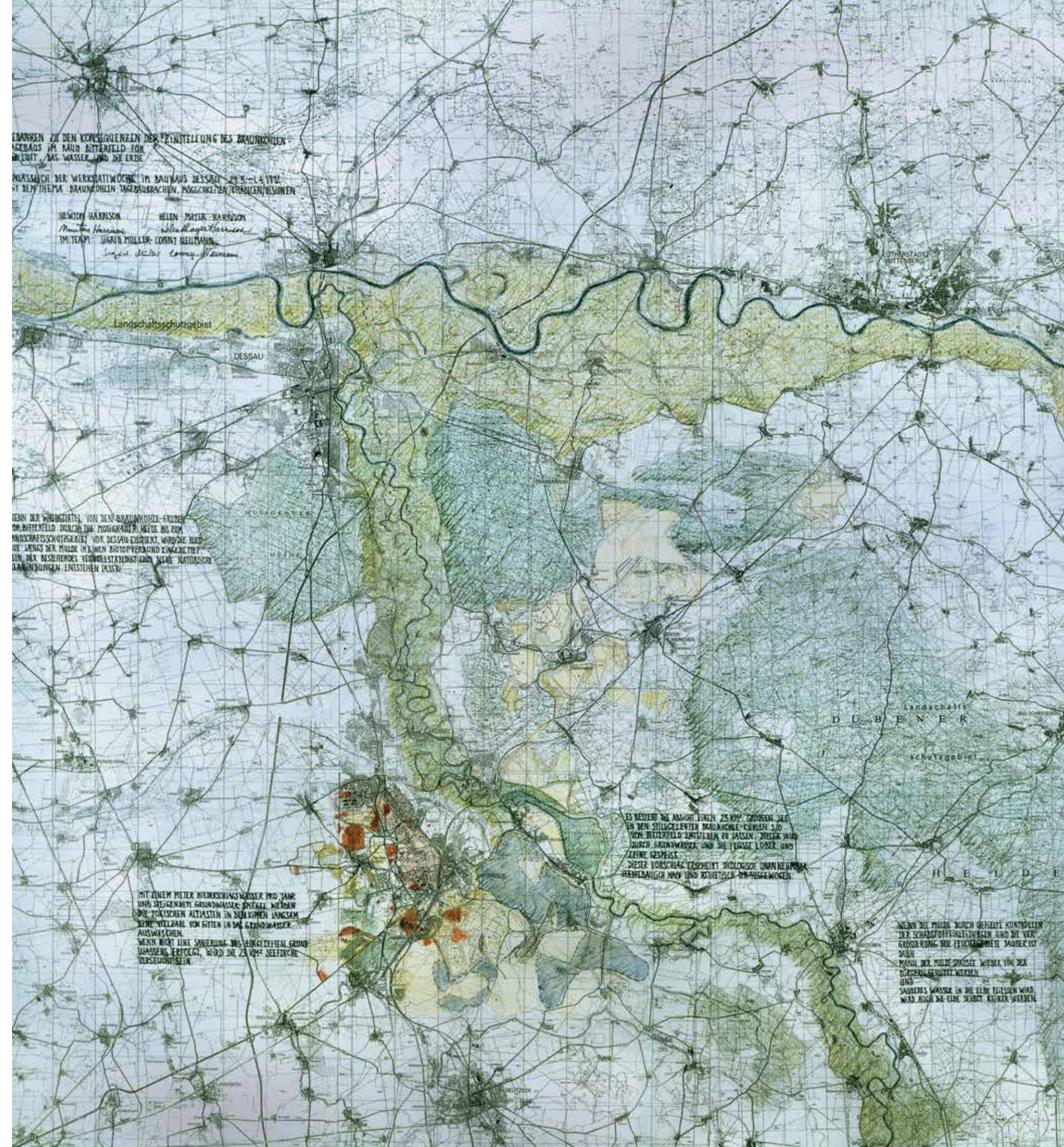
der Mulde

1994 Bauhaus Dessau, Germany

In 1993 we were invited to Bauhaus Dessau, partly as a result of the *Sava River* and *Topography of Terror* works, for what amounted to a three-day architectural charette. The problem was what to do about the 52-square-kilometer pit mine adjacent to the Bauhaus, which was being closed (partly because such mines were so very polluting and partly because most of the site's brown coal had already been recovered).

There were five teams in the charette; our Harrison Studio team included Gabriel Harrison and Vera Westergaard. Then there was the director of the Bauhaus, Rolf Kuhn, and half a dozen students, who were very vocal, very smart, and whose English was good. After a history lesson, an economics lesson, and a brief discourse on reclamation, all five teams began to make designs for this 52-square-kilometer hole in the ground. Our somewhat complex proposal was to make a forest almost the same size as the hole. The work of the forest was to pull the carbon out of the air and to begin to create a carbon sink. Everybody else was making designs for the hole itself—pathways, walkways, and structures. Since there was a pretty good chance that the excavation would in due course fill with water, why the other teams would design for the floor of the excavation was beyond us. Somebody asked, “Why aren’t you working in the excavation like everybody else?” I said or you said, in a kind of one-upmanship, “When everybody looks down, we look up.” This raised our status in the group considerably. Rolf Toyka, from the Chamber of Architect and Town Planners of nearby Hessen, gave us a hand with the drawings.

In the final presentation, after four days of work, ours was the only finished proposal; everyone else was going back to their studios to continue to work. A student from Koblenz (with whom we later worked, becoming good friends) stood up during the discussion, raised his hand, looked directly at us, and said, “Mr. and Mrs. Harrison, you have very good and interesting ideas; however, this is our hole in the ground, not your hole in the ground. We’d like to thank you for your efforts, but you should go home.” We had a contract between us, which ran something like this: “In any project, if we don’t like what people on the ground are doing, or they don’t like what we are doing, we will leave.” So we stood up and walked out of the room, with the idea of packing our bags and heading for the train station. We had gone a few steps outside the building when Kuhn





came running out, saying, “Don’t leave! Don’t leave!” “Why not?” we asked, “We don’t stay where we’re not wanted. Anyway, there’s a lot of other work to be doing.” “You don’t understand,” he said, “the students didn’t really want you to leave, they just wanted to see how you would respond to their dismissal of you.” This turned out to be true: We were invited back to the Bauhaus over the course of two years, staying for a month each time, as Mitarbeiter (members of the staff).

The Berlin Wall had just come down, the East German Marxist hierarchy had broken down, the Stasi were under verbal attack. Helmut Kohl was getting ready to literally buy East Germany. Dessau itself was a dull gray from all the smoke from the pit mines. The Bauhaus, which needed a staff of only about 25, had twice that number; when we asked about it, the response was, “Everyone needs a job.” The differences in everyday life between East and West were profound. In the East, they overemployed, to make jobs for all. Helen needed a refill of her medication, and they were horrified when we asked, “How much will this cost?” Medicine and medical care were free!

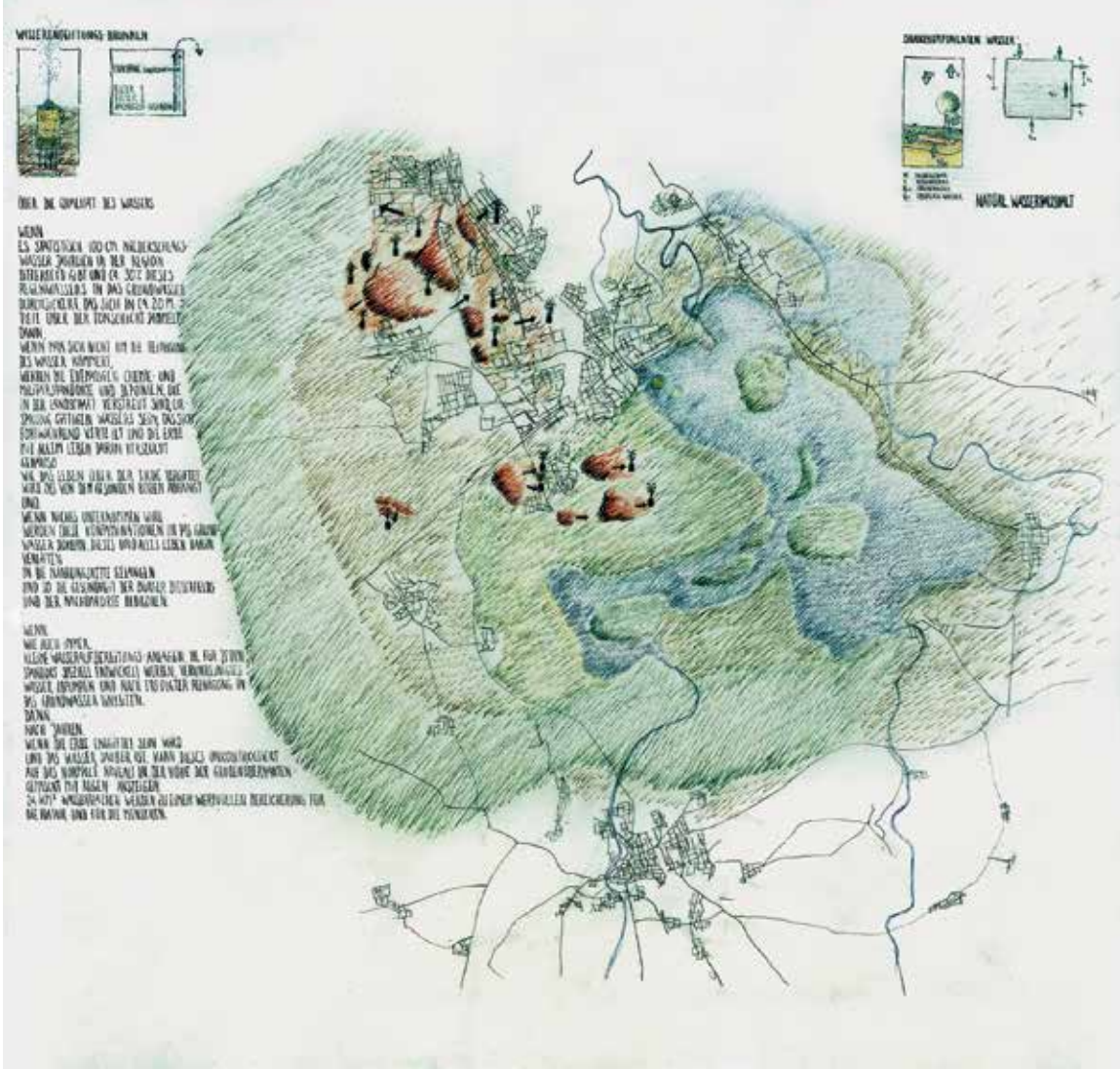
Forested area proposed as a carbon sink

Chemical toxic waste dump sites

It was wonderful working in Walter Gropius’s building at the Bauhaus, though many did not know its history. The astonishing effect on the rest of the world of the work done at the Bauhaus was unrecognized; the sense was only that Hitler had chased out the radicals and what he called “degenerate art”, and the East German sensibility had pretty much wiped out creativity in any larger improvisational sense.

A group formed to work with us, and we were asked what we wanted to do. We said, “Let’s do the Mulde watershed.” The Mulde is the most poisoned river in Germany; when cows eat the grasses near the water’s edge, the milk has to be taken to a toxic waste dump. It was as if the whole countryside was contemptuous of this poor river which contained heavy metals and radioactive material; many towns along the way dumped their sewage into it, unmediated. So it was no small task to take on such a river and the watershed that formed and informed it. In our first meeting with the group, I (Newton) made the argument that we (the Harrison Studio) should take the lead in the design, as we had worked with watersheds for some 20 years. The German students began talking with each other in an excited manner. One stepped forth and said, “Everyone is equal here. We don’t have leaders. In fact, you sound like a fascist. You dominator, you.” There was general agreement among the others that this might even be an understatement. One of the students stepped forth and said, “I took a class on watersheds in high school, I know all about them.”

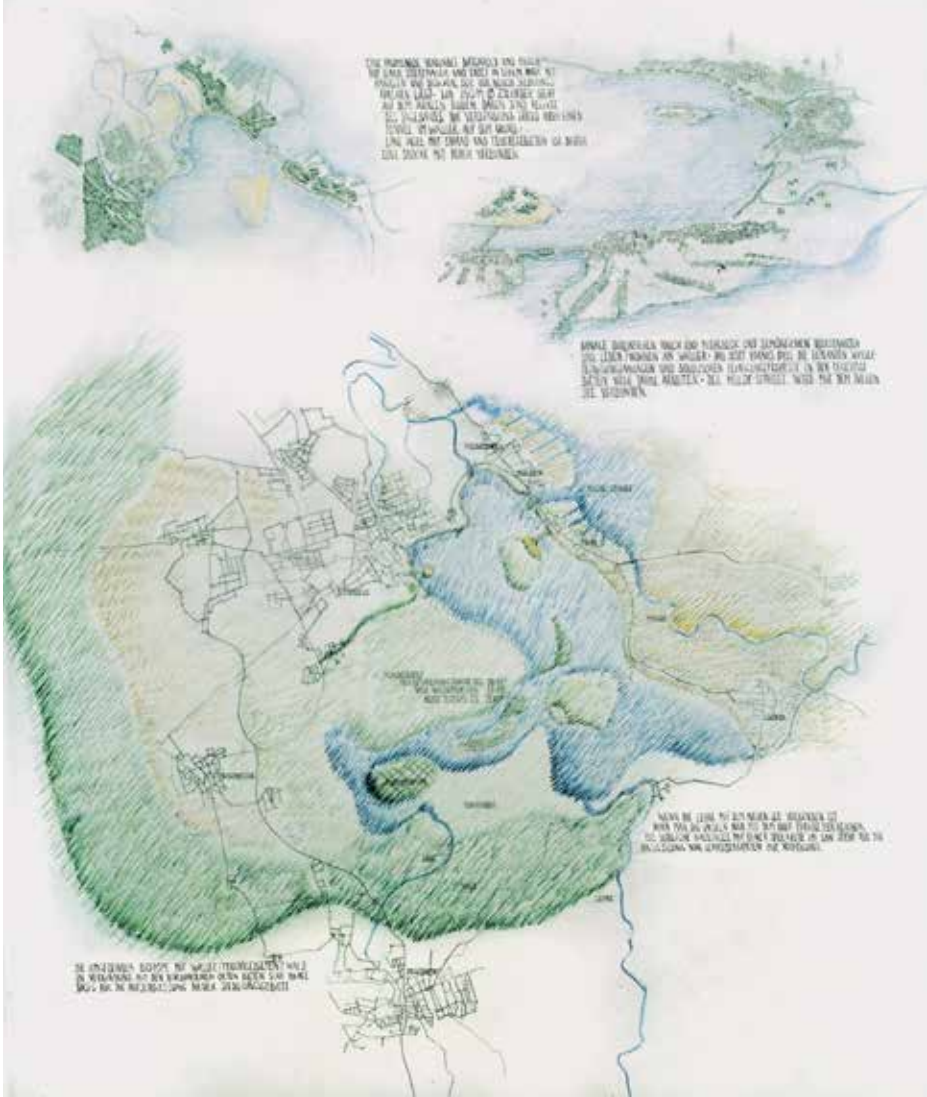
We made a decision. We would form two groups. The student who had taken the watershed class would take the lead in one group, and they would proceed in their investigation and in making imagery; we, in our small team with Gabriel and Vera, would also begin producing work. We would then study each other’s work in a few weeks, and combining creativity would begin to produce a grand proposal. The issue, after all, was to discover how we could help the watershed and particularly the river, which had been so violated. Our small group traveled the watershed, located a drain basin at the top, close to (then) Czechoslovakia, called the Flöha, which fed eventually into the Mulde with extremely clean water. We quickly made the argument that the Flöha, if permitted, would help to flush the Mulde, but point-source pollution, city by city, would have to be



addressed. A forest edge was to be created along the Mulde to catch pollution from the fields and herds, and then the river would begin to purify itself. We roughed these ideas out in a series of maps and texts.

When the two weeks were over, we met with the other group, and it was very awkward. Their leader wondered how we had managed to fill a whole wall with imagery and ideas, whereas they had had a two-week discussion about how to begin, because not everyone agreed and they could not begin in the absence of agreement. We were very sympathetic and asked how they wanted to proceed. Finally, after some discussion, their group leader said in a profoundly aggrieved voice, “We will put aside our differences with you in the interest of the river and because you appear to know more than we about watersheds, but we do this even though we will be working with fascists and dominators like yourselves!”

The work proceeded. Extra funding came when the work was awarded an ecology prize. We called a meeting of the leadership up and down the river. The meeting was tense; each group thought the

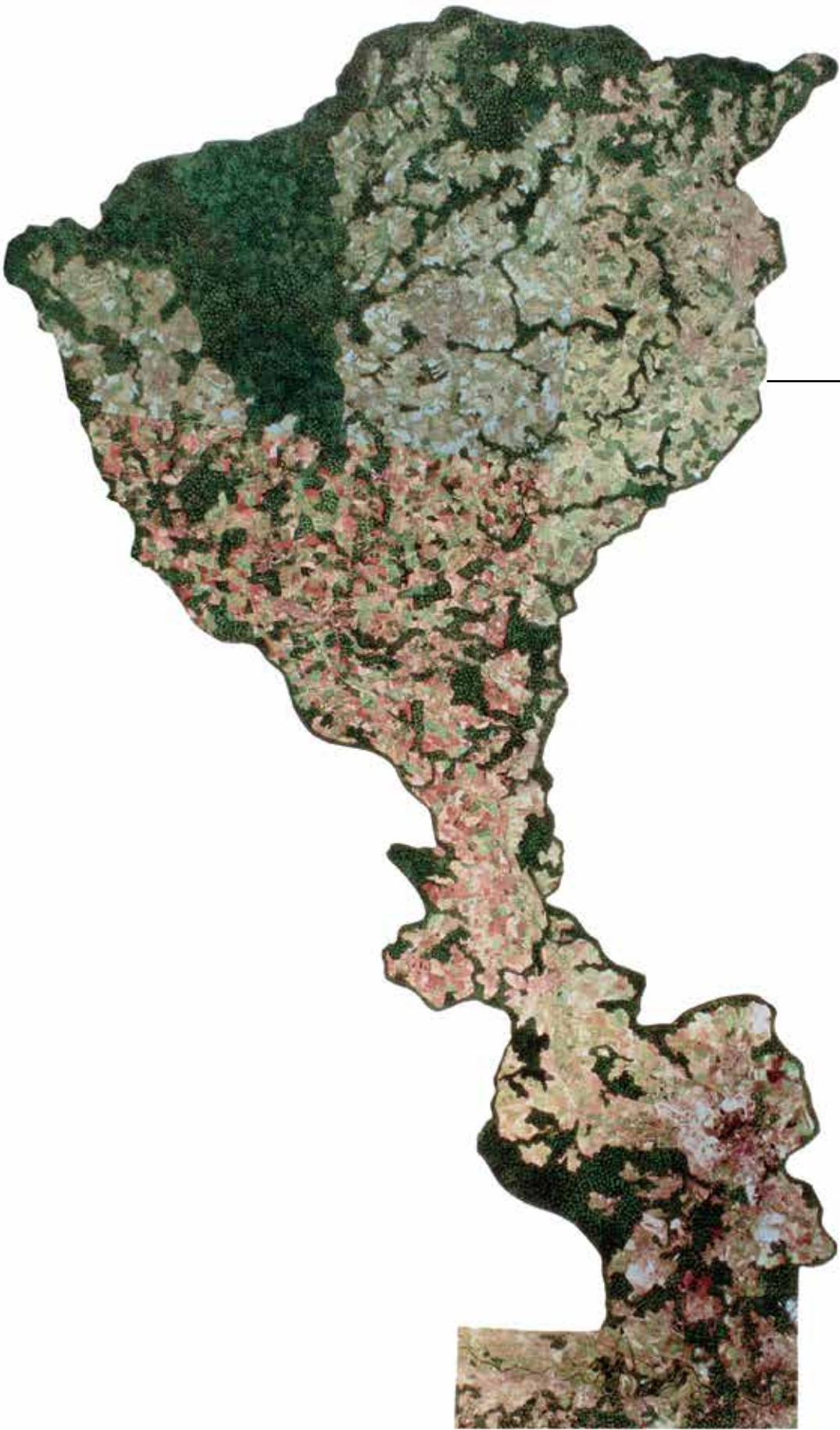


other was most responsible for the pollution of the river. The groups hadn’t talked to one another for perhaps 40 years. Suddenly it became clear that the responsibility for the pollution was shared, as was the responsibility for cleaning it up. People hugged one another, there were tears, agreements were made. The work was exhibited at the Bauhaus and many came. Ultimately, purification of the river was taken on. Part of the river was redirected to fill the 52-square-kilometer pit, making an astonishing lake. Waters slowly cleaned themselves. It was a passionate and transformative moment. The French critic Jacques Leenhardt went there a few years later. He took our forest idea, transforming it into a more cultural landscape wherein the forest and the space itself acknowledged its history, by revealing the landmarks embedded within it. There were many other outcomes, but we lost track.



Accepting a grant from the Environment Ministry of Sachsen-Anhalt.
Working with a team from Bauhaus Dessau
Getting to know the distress in this river
in this place
In this watershed
by meeting with many
by driving the tributaries.
Seeing the effect of the Tagebau at Bitterfeld.
Understanding that the river was burdened
by unprocessed
or minimally processed wastes.
Understanding that the Muldeaue
carried such a density of heavy metals
that the milk of the cows that fed there
had to be taken to the toxic waste dump.
Thinking about one hundred and fifty years of
chemical industry
leaving perhaps a hundred thousand cubic meters
of not well-charted toxic earth in the region
around Bitterfeld.
Looking at the toxicity left by the Russian military.
Wondering about the radioactive waste at Aue.
Calling meetings with water people and
ecology people
from the east in Sachsen and the west in
Sachsen-Anhalt
who also shared this drain basin.
I asked or you asked
»Is there one clean section of the river?«
And the answer was
»Yes.«
There was the little Floha Mulde
a tributary of the Mulde River
a drain basin within a drain basin
perhaps three hundred square kilometers all told.
I said,
»If it rains a meter and a half
and a third of a meter percolates down into the
forest earth.
Then one can imagine clean waters emerging
equivalent to those that might come from a lake
one hundred square kilometers in dimension
one meter deep.«

You said,
»It would be a beginning.«



Peering into the satellite photo
Looking at the odd shapes
formed by the greens
that were designated as forest
mostly tree farm
mostly pines that belonged elsewhere
with high ground forests damaged by acid rain
mostly from the burning of brown coal.
You said
»Imagine if lands were granted or sold to the state
in such a way that most forests could be connected
some that were already state-owned
and some that had been privately owned
but were bought by the state.
And imagine
If
selected forests were let to go into succession
so that a natural forest could return
which
although probably different from the original
would be harvestable selectively
on perhaps a two hundred year cycle.
Then
a new history could come into
for the Mulde river drain basin
in which human activity took place within a forest
field.«
I said
»It would it be the first drain basin in the history
of drain basins that took such an action.«
You said
»At least it would be a beginning.«



A Promenade Ecologique

for Cergy-Pontoise

Exhibited with the regional

architectural proposals

(work lost or destroyed)

From 1994

Visually presented variously

In 1994, on our way to Leipzig, we stopped in Paris to spend some time with Dani Karavan (the Israeli sculptor who, five years earlier, had put us in touch with the mayor of Tel Aviv for the Yarkon River work) and to say hello to Pierre Restany. Pierre was considering writing something on us for *Domus*; instead of talking about that we had long discussions about diabetes (as he, like I, Newton, was a late onset diabetic). I asked him, “How can you drink so much? Doesn’t it raise your blood sugar?” He said 300 was OK; I said no, 80–120 was OK. He said, “You Americans worry too much.”

We spent a few days with Dani and his wife Hava, carefully going over a formidably ambitious project that he had gotten funded and approved. The piece, *Axe Majeur*, created a line of sight, an axis, through the new town of Cergy-Pontoise, created in the sixties in the suburbs of Paris. In one part of the project, you could stand on a large park-like raised platform with an incredible view and steps cascading down to the river. He thought maybe we could do something more ecologically based in the same area, perhaps complementing what he was doing, or at least in transaction with it. We could imagine something as large, but not something as visually powerful and theatrical. Dani had a background in theater that informed and sometimes added drama to what he created, which was often the

connection of one place to another by an axis with mutually complementary destinations.

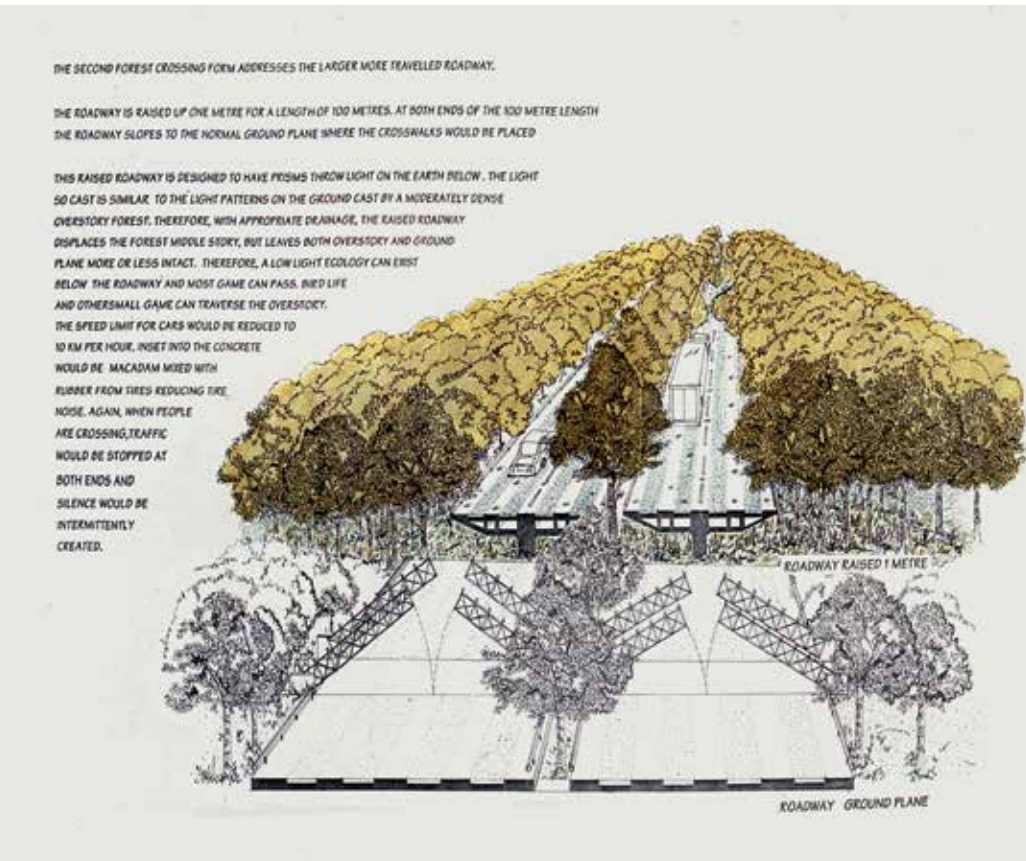
He introduced us to Monique Faux, the counselor for artistic affairs for the ring cities that included Cergy-Pontoise. Monique had helped Dani considerably with funding his axis which had to have cost many million francs. Monique studied our work and asked if we had any idea what we wanted to do. We said we weren’t sure, but the landscape looked too fragmented to us, and there was a disconnect between the towns and the Oise River. She said she was of the same opinion and would fund the work of connection if we could sketch something out for her, which we did. It was a walk that began in the higher ground outside Cergy, near one of the golf courses and the adjoining forest. The walk would then come downhill, cross the Oise River, cross the oxbow, and cross the river again; thereafter, it would move along the farmland a little bit inland away from the railroad track; after crossing the farmland, it would again follow the river, ending in the small town of Pontoise. We invented this walk as both critique and resolution to the problems of extreme development that were happening in the region.

In the beginning of this adventure, we went to the regional planning office and met Richard Bender, the former dean of the College of En-

vironmental Design at University of California, Berkeley, an old friend whom we had met on various projects. It seemed that there was a very complex political formula at work in the planning for the ring cities of Paris. The Minister of Culture, Jacques Toubon, and the French Parliament, and many others wanted the sense of the city of Paris—the aesthetic, the color, the parks—to continue throughout time with only small changes, more or less as it had since the city was transformed by Georges-Eugène Haussmann in the nineteenth century. The issue at hand was that many immigrants were arriving, so it had been legislated that the ring cities would expand and the new housing would be put there, to save the city of Paris itself from the pressure of redevelopment and consequent loss of identity. That was what Richard and a small group of urban planners were doing there.

We took a look at their plans, which amounted to typical landscape rationalization. In the area there were about half a dozen original farming villages which ranged in size from a few hundred to a few thousand people and had the normal character of French farming villages. The planning group’s job, as they defined it or as it was defined for them, was to “infill”—a euphemism for covering all available land between the villages with as many houses as possible. The strategy employed was to make ensembles of houses with modest yards and

many cul-de-sacs, each ensemble shaped as if it were a new village. So we were seeing the bizarre situation of five original villages disappearing in a field of many fake villages. These mini-villages were not necessarily connected to one another, and none of them appeared to have access to the remarkable features in the region which were the Oise River and the wonderful oxbow visible from Dani's central axis at the edge of Cergy.



Therefore, we designed a path as a 50-minute promenade: beginning in a forest near Eancourt; moving along what was to become a biodiversity corridor; crossing a new bridge; crossing the oxbow (where one would pass a proposed university and amusement park); crossing a bridge again; passing through farming; through micro-village after micro-village; ending in the historic town of Pontoise whose identity was still intact. Thus, the multitude of people in the area would have access to one another, as all would be living within 15 minutes of the walk. We drew somewhat on our experience in Baltimore to create the work that became known as *A Promenade Ecologique for Cergy-Pontoise*.

We liked this project a lot, in part because people kept challenging us with questions, like, "What will you do about the freeway?" and "If wildlife was encouraged, what would let it pass freeways?" There were also strange encounters. We took a brief helicopter flight along the Oise River to see the region and pointed out an area where a small museum might well be. The regional planner who was with us asked, "What could such a museum hold?" We answered, "Wouldn't it be nice if it were a museum that dealt with the styles and colors and fabrics worn by the immigrants who came here, which are so colorful, so rich in texture, and so unusual?" We didn't have time to be proud of this idea; it was attacked, first by the pilot and then by the others, as were we, just for having it. This was France! The immigrants were the wrong color, and the wrong culture, and didn't need the kind of approval we were offering.

We had a similar encounter with the architect who was helping us with the drawings for the project. We had drawn the walk from the forest down to the river, and in the design we argued for a 30- or 40-meter band on either side for the first 20 or 30 years, to allow a succession ecosystem to form. For that period, people should not be allowed in the area; thereafter it would be a site for a lovely walk. The architect began to sputter, and said, "I'm not going to draw this up!" I asked or you asked, "Why not?" "I wouldn't draw up a place where you, as foreigners, tell me that a French foot cannot walk." "But, if you were in Africa, in a lion's habitat, don't you think you should keep your foot off it? Aren't there places in the world you should keep your foot from?" He said he no longer wanted to work with us, but would finish the drawing because there was a contract. Ultimately the hostility faded into awkwardness.

We sent the completed drawings off for an exhibition. The work was very well received; there were some nice newspaper articles. We concluded our work in Cergy-Pontoise by making a presentation with other artists at the Fondation Royaumont. The drawings were quick and casual; we asked for them back, but they never came. What remains of the work includes half a dozen photographs of the architectural drawings, which we intended to recreate, but never found the time.

ON PRIVILEGING THE FOREST AND THE WALKER IN THEIR MOVEMENT ACROSS ROADWAYS

EVERY ROAD IS A CATASTROPHE FOR AN ECOSYSTEM AND THE FOREST PROCESSION WILL NEGATE THIS BY THE WAY IT CROSSES ROADS AND BY THE MESSAGES IT SENDS TO THE FOREST, THE WALKER, THE MOTORIST AND THE ROAD BUILDER.

WE ENVISION THREE FORMS OF CROSSING THAT AVOID THE ARTIFICE OF BRIDGE AND TUNNEL, WHILE SETTING UP THE MOST DIRECT POSSIBLE TRANSACTION BETWEEN ROAD AND FOREST.

THE SIMPLEST CROSSING USES THE COUNTRY ROAD WAGON TRACK AS MODEL AND METAPHOR.

THE BLACK TOP IS REMOVED, CRUSHED GRAVEL IS USED FOR THE VEHICULAR PASSAGE, LOW FOREST GROUND COVER IS SELECTED FOR HARDINESS AND OCCUPIES THE SPACE BETWEEN NARROW CRUSHED GRAVEL LANES

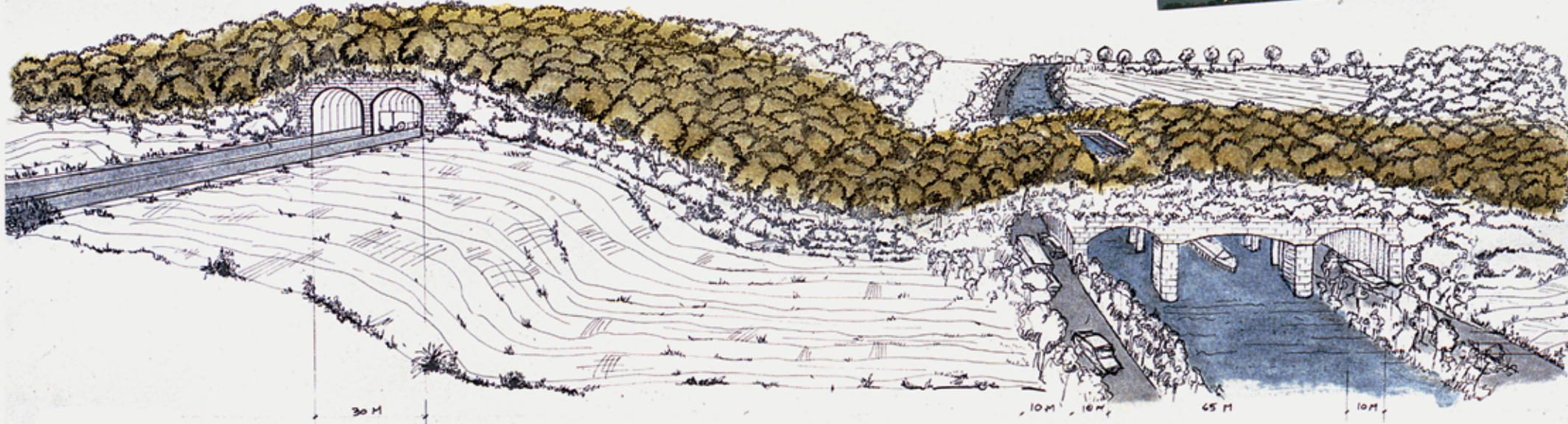
THE LENGTH OF THE PASSAGE IS APPROXIMATELY 100 METRES. THE DESIGN OF THE FOOT CROSSING IS MODELED AFTER THE DEVICES THAT STOP CARS AT

RAILROAD INTERSECTIONS.

AT BOTH ENDS OF THE 100 METRE AREA, THEREFORE, WHEN THE WALKER CROSSES THERE IS ALSO A PERIOD OF SILENCE ACROSS THE WHOLE 100 METRES.

A THIRD WELL KNOWN FORM EXISTS IN WHICH THE ROADWAY IS COVERED, GENERATING MORE URBAN SPACE FOR PARK OR BUILDING SITES.

WE PROPOSE AN EXTREME VERSION OF THIS TYPE OF STRUCTURE. WE CALL IT AN ECO-VIADUCT. THE ECO-VIADUCT WOULD CONVEY THE FOREST AND THE WALKER OVER HIGHWAY, COUNTRY ROAD, RIVER AND COUNTRY ROAD AGAIN IN A SINGLE POWERFUL GESTURE. A FOREST PROCESSION OF THIS MAGNITUDE WOULD BECOME A VIVID ANNOUNCEMENT OF THE FOREST PROCESSION'S EXISTENCE AND INTENTION. THE ECO-VIADUCT GIVES THE FOREST, FOR A MOMENT, THE SAME PRIVILEGE FOR TRAVERSING URBAN SPACE AS ALL FORMS OF MOTORIZED WHEELED VEHICLES.



Green Heart Vision

1994 Jeruzalemkapel Gouda, Netherlands

1997 Kunstmuseum Bonn, Germany

2003 and 2014 Ronald Feldman Fine Arts,

New York

et al.

Installation in Jerusalem Chapel
where the floor
reveals the whole *Green Heart*.
The shape of the
biodiversity ring is embedded
in the imagery,
which is done in Delft tile.

1994 was a busy year; the phone kept ringing. A voice from the Netherlands very politely asked if we couldn't send them information about the work we did; they wanted it to teach to their students. In a second call, they asked if we couldn't send them a list of artists who took on problems similar to ours; they were building a library. A third call came, and they asked if we wouldn't visit the area, as there were perhaps some problems that we could address.

At first, they wanted to know what we would do with a particularly poisoned section of the IJssel River that had been damaged when the Royal Dutch Shell oil company released many barrels of toxic waste into its waters: a truly nauseating thing to do. We suggested that they go after the company and make them pay for a new river, as it appeared to us that the bottom mud would permanently keep the toxic residue in the waters. We made them a sketch; spoke to engineers. There was no outcome.

Some time passed, and there was another call. It turned out that the real problem was not the river (although this was a serious issue): The Green Heart of Holland, an 800-square-kilometer area of farming that also harbored wildlife and 35 villages ac-



tually embodying the whole history of Holland, was the object of desire of many in the planning community there. A 600 000 home community had been proposed, with infrastructure that would have effectively wiped out the properties of the Green Heart. It looked like a 230-billion dollars development was being put forward.

The Green Heart of Holland was originally given that nickname by the head of KLM Royal Dutch Airlines in the early thirties, and it stuck. He flew over the area, found it incredibly beautiful and said, “We must save and protect it as it is our great green area and the green heart of our country.” It was viewed as a great central park by people in the Randstad, the great round of cities that surrounded the whole area, including Amsterdam,



Den Haag, Rotterdam, Utrecht, Dordrecht, Leerdam, and Haarlem, with a combined population of more than five million. All regarded the Green Heart as the history of the Netherlands, in a sense, the history of democracy. That is, many thought that a modernist notion of development was about to subtract a whole history. We thought the same.

We had been thinking about the problematics of extraction for some years: Fish populations were being decimated, topsoil lost, and languages disappearing with their users. Now, in the Netherlands, a major part of their cultural identity was about to disappear. Could we do something about it? This was the conversation we were having with the leadership of the Cultural Council of South Holland. We met with a group of politicians. They agreed to talk with us for five or 10 minutes, but the

talk continued for 45 minutes, until one of the lead parliamentarians asked, “What makes you think you can save the Green Heart of Holland?” “Well, you’ve given us 10 proposal books to read, all attempts to save the Green Heart, all from diverse disciplines, and all have failed. We are willing to sign a contract to save your Green Heart, and nobody else will,” we replied. “Moreover,” we said, “since all else has failed, two things seem clear. First, you need an outsider.” (Here we cited the Einstein position, which was that the kind of thinking that created the problem [especially at this scale] cannot be the thinking that will solve it.) “And second,” we said, “we charge far less than normal planners in any discipline.” Within days we had signed a contract saying that we would save the Green Heart, but that



we needed about six months to work and at least 300 000 dollars worth of support, with a modest percentage of that going to the Harrison Studio as a fee.

The Dutch were lucid and understood clearly what was required. We found ourselves with a very powerful team of Dutchmen—sociologists, a landscape architect/planner, an engineer—and massive support from the Cultural Council. A studio of several hundred square meters was supplied, and the four of us (including Gabriel Harrison and Vera Westergaard) were given shelter in a building that was refugee housing. It was appropriate; in this world we were almost like refugees, albeit with not quite the right skin color for our immediate neighborhood. The Harrison Studio formed in this incarnation with ourselves as the California or outsider contingent, and four Dutchmen plus con-

sultants as the local contingent. We met daily, and every day for a month we were taken to another part of the 800-square-kilometer area, meeting farmers, villagers, ecologists, and mayors from the small towns. The Dutch had invented a Green Heart School to teach us the nature of the place; if they were going to trust and invest in us, they wanted to make absolutely certain that we were educated.

Among the many sites we visited and investigated was the Naardermeer, the oldest nature reserve in Holland which was in fact a very large polder or field that had gone wild. People were proud of the diversity that had appeared over time in this place; storks from Africa had found it on their migration route. It contradicted the argument, made to us by many planners,



that there was no real ecological variety in Holland. During the second month of our education Rimmer de Vries, the landscape architect on the team, decided that his was the role of critic and therefore all actions and all thoughts expressed were subject to his criticism. Eventually I, Newton, decided that this form of criticism had become mean-spirited and counterproductive. In the middle of one day’s meeting, at a particularly ferocious moment of criticism, I stood up and said, “Rimmer, you’re fired! Leave. You’re interfering with the creativity of the group and I won’t permit it.” He jumped up and said, “You can’t fire me. You can’t fire people in Holland!” I said, “I don’t care—get out!” The head of the Cultural Council was called; serious meetings were held. Finally, Rimmer said, “I don’t want to be fired.” I said, “Cease criticizing and start creating and we can work

together.” And that’s what Rimmer did. He proved to be responsible for a number of original touches in the work: some of the original seeing, some of the design. In fact, he turned into someone with whom it was a pleasure to work.

The problem was urgent. The whole history of lowland Holland (the region of the Netherlands reclaimed from the ocean) was at stake. The culture of extraction was about to extract a wonderful history—with an amazing lifestyle, a productive landscape, and a great central park for well over five million people—all to build a new city that would damage the infrastructure and identity of other nearby cities. The land that looked open would now be filled with buildings, simply because it was cheap enough.



We filled the studio with maps and created a large map that emphasized all the open spaces, including places where there might be farms, sometimes greenhouses, but definitely not villages, definitely not urban.

In emphasizing the open spaces, an image emerged. It took on iconic form, much like a sign for the sun. We had an epiphany. We placed it on the wall and the whole group began a collective analysis.

There was a great open center; we drew a line around this center such that the line crossed the fewest freeways possible. The space within was about 800 square kilometers and included 35 villages (two of which were large enough to be towns). A careful examination also revealed that each of the major cities in the Randstad had space around it.

The map of the Netherlands printed backwards with approximately 300 000 houses breaking it into three parts

The map of the Netherlands printed correctly with the proposal embedded in the imagery

Three core concepts then emerged:

1. Ecosystems must be *continuous* and *contiguous*.

To reflect this notion we proposed a biodiversity ring as the Green Heart Boundary.

2. Cultures require *boundary conditions* to maintain their identity.

This was especially true of cultures that have their expression in architectural uniqueness. There had been a big discussion about how the Netherlands which needed space for development could fill in all the spaces between their cities and make a giant round city. While it is true that this would create a kind of new culture, it would also destroy the distinct properties of each city, often creating alienated spaces between them. We proposed that the open spaces between the cities be designated as parklands. Thus the unique properties of Rotterdam, for instance, would not bleed into and submerge the unique properties of Delft or Den Haag.

3. Any plan at scale had to look at the impact on the Green Heart as a *whole*.

The Green Heart and the Randstad could be looked at as a yin and yang relationship; planning for each part needed to respect its impact on the whole. From our perspective, 600 000 houses plus infrastructure, placed in the middle of the Green Heart, disrespected the whole history of the Netherlands and the well-being of the Randstad itself.

From these insights we designed the work. First we produced a 2.4-meter-square map of the Green Heart and the Randstad and printed it backwards. We added a couple 100 000 houses, about a third of what the development would be. Immediately, it became clear that the developed Green Heart would be fragmented and its original identity lost. We wrote a text to go with this map, entitled “On the Urgency of the Moment,” which was a guiding metaphor for the work as a whole.

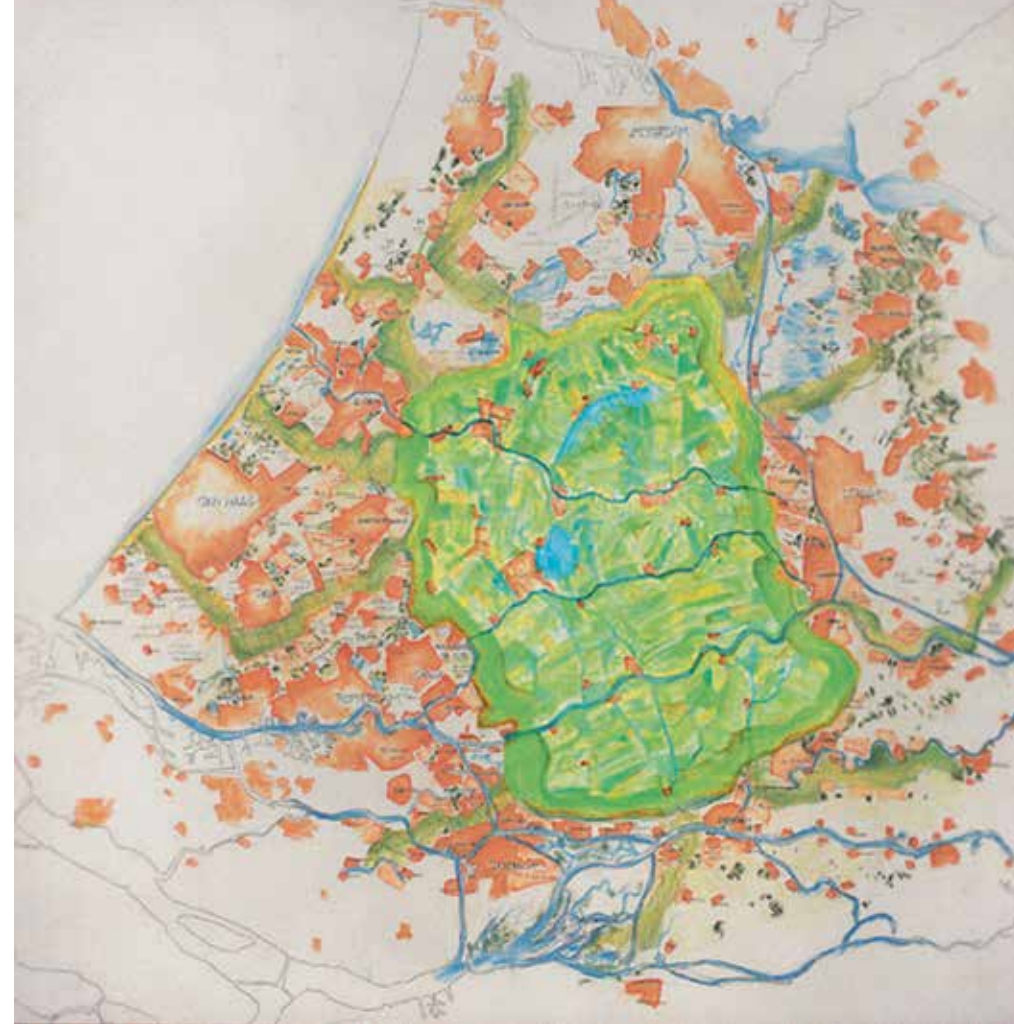


Looking at the map of Holland.
Seeing it as the expression of one moment
in 1200 years of contested history
about who will command the land
and why and how.
Seeing it as a metaphor
for yet another contest
as to who will shape the future
of this physical terrain
understood to be the Randstad
and the Green Heart.

Where in a ten-year moment
less than one percent of the time
of its whole history as a civilization

the people on this ground
must construct a response
in physical terms
to intense population pressure
coupled to an expansion-committed
economic engine in such a way
that these two self-reproducing forces
mutually energizing and interrelated
will consume
much of these lands available
in the Green Heart
which do not have specific ecological
or historical or other civic designation
and unless or until
a new direction is set in place

an alternative consensus agreed upon
by governmental and economic
and civic institutions
on limiting growth.
For
in the absence of
such an alternate consensus
clearly expressed on the ground
the outcome for the Green Heart
the Randstad
and the lowlands of Holland
appears to be
unfortunate in the extreme
mostly unnecessary
but mostly inevitable.



The Dutch had insisted on evolving what we called the Open Studio. Once a week, one or another group of planners, architects, academics, museum people, and then planners again would spend an hour with us in the studio, looking at the work we were designing and offering insight and sometimes criticism. (The most hostile critique came from a director of a very small museum who walked around, looked at the mappings, listened to stories, then rather aggressively said, “This work is not good enough to go in museums!” and left.) In response to our big map of the developed Green Heart, many asked, “Why did you print our map backward?” Our response was, “Because we think you’re designing your country backward.” To that, all responded in one way or another, “If this is backward, what’s forward?”

Our second design was also a 2.4-meter-square map. It featured the biodiversity ring (beautifully hand painted by a miniaturist) which acted as the boundary condition for the Green Heart. The life web within the biodiversity ring was modeled variously on the life webs of the Naardermeer and the Nieuwkoopse Plassen (a natural area of reclaimed peat-digging lakes), as well as succes-

sion ensembles that appeared along the De Meije River. Extending from the biodiversity ring were what came to be known as the “wiggles”: Each long wiggling form followed a pattern of open land that formed a frame for each city in the Randstad. These long, linear parks were designed to reach out to an ecologically rich area so that species could travel between the Green Heart and the biodiversity ring. It made a beautiful and surprising image. The biodiversity ring was composed of polders—fields surrounded by dykes or ditches which filled with waters that were pumped away. (All polders are below sea level.) So it was basically a polder ring, designed to go wild like the Naardermeer, but also designed to purify about 60 million cubic meters of water per year which we thought would be a large enough economic generator to both pay for and support the polder ring. (The mayor of a small town showed up at one point; he looked at our mappings, at the biodiversity ring, and at the park wiggles. He became very disturbed and said, “You have left my village out of your plan. We’ll lose our meadows, we’ll be developed.” He went over to the work table, took a paintbrush, mixed himself some green and yellow paint, ran over to our image, and painted his village in.)

The Green Heart mapping that makes clear the relationship of 35 villages and two towns to 800 square kilometers of farm land, pastures, and nature reserve

Where it is discovered that 600 000 houses and more easily fit into the perimeter of the cities that surround and separate the Green Heart

Our critics, looking at this odd invention (which read a bit like a giant sun symbol imposed upon their landscape), got the intentionality of it alright, but then, with typical Dutch bluntness, asked, “Where would you put 600 000 houses?” We decided to take a risk. Annette Kempenaar was a very ambitious and extremely smart landscape architecture graduate student working in the studio. We gave her an unlimited budget, and told her to go away for a couple of weeks and decide where to put 600 000 houses. The stakes were high. We were looking at a 220-billion dollars economic engine in the area; naturally, it was the object of much desire. Annette came back with a drawing we had hoped for but had not expected: between the giant wiggles, in the spaces around and within all the great cities, there was abundant space to put 600 000 and more houses, while still maintaining the great central park, the Green Heart, and keeping the city cultures separate. Moreover, the new residents who would occupy those houses, often economically disadvantaged, would have about 140 linear kilometers of parkland to build against. Everyone would be within minutes of the Green Heart or of a Green Heart extension.

We had a concept, which we called the eco-urban edge and which had embedded in it a question: What is the best way for an urban continuum to end and ecological continuum to begin? Is there a way for this mutual beginning and ending to give advantage to both?

Meanwhile, the two artists on the team suggested that we follow one of our practices in many previous works by constructing an aerial photo of the whole Green Heart, transferring it onto Delft tile, and making a floor piece; that way, everyone who came to the exhibition could see the location of their own house, their school, or their business, in relation to the “sun” icon. It was wonderful to see grandmas bring their grandchildren to look at the mappings and crawl around on the floor.

The project manager for the Cultural Council, Adriaan de Regt, did a number of rather intelligent things. He set up television debates between us and developers, arranged for newspaper articles and much publicity, and helped us negotiate with the group of 45 mayors (who had come to support the work, understanding that a 600 000-house development would bury their villages and their cultures). He also located the work in the very small Jerusalem Chapel in Gouda with the idea that if we were unsuccessful, he could hide us away, but if we were successful, people would make pilgrimages to the chapel and we would be complimented for our modesty.

The outcomes were wonderful. The subject matter, text, and imagery of the work were leaked to the Minister of the Environment a little before the exhibition opened; the minister approved it. We met with the head of the Green Party, who adopted *Green Heart Vision* as part of their platform. An article appeared in the *Amsterdam Financial Daily* complimenting the work and supporting it. They understood that if the original plan was adopted and 600 000 houses put into the Green Heart, much of that money would go to foreign developers, whereas our work and design spun both the housing and the 220 billion dollars economic engine back into the countryside, city by city, village by village, allowing for local development and local timing while enhancing the local tax base. It was one of those marvelous moments: Elections were about to be held; several politicians included our work in their platforms. Then the marvelous two weeks ended. Elections were held, the right wing took over, and *Green Heart Vision* was shelved. Some of the people who had vigorously supported us suggested that we leave, which we did. The work was exhibited widely despite the project’s cancellation.

But there is an afterstory of success which takes place five years later, and then five years after that.



Four images where the self organizing principle that informs much of the biodiversity that informs fragments of land into the Green Heart

Thus it appears
that the planning system in Holland
is presently enacting
historic beliefs and processes
that are so simple and so long standing
that they are practically invisible
and certainly unquestioned
and
the results are always the same
taking the form of patches
or blocks or small land masses
or water masses or parks
with occasional ecological reserves
each patch a fragment
each fragment reflecting a desire
each fragment reflecting the belief
that all fragments will finally meet
in a much to be desired future
that will take care of itself

Finally
these plans evolve and are enacted
in ignorance of the paradigms
and the paradox
that biodiversity requires connectivity
and continuity
to exist and flourish
while
cultural diversity needs framing
and separation
to exist and flourish

Finally
in this increasingly unbalanced image
as the unbuilt living environment
is fragmented and

development driven urban sprawl
is growing to meet
development driven urban sprawl
the loss of cultural diversity
mirrors the loss of biodiversity
and as cultural monoculture
the outcome
is mostly unfortunate
yet certainly not inevitable

Good Government
Where Limitation is Survival

It happens
although rarely
that complicated but powerful
environmental planning systems
like those in the Randstad
and those in the Green Heart
facing an imminent conflict
between growth and habitability
can construct a new consensus
on the nature value and meaning
of their own goals

When this happens
a fortunate reversal can occur
whereby a planning system
envisions a future terrain
the design of which can go far beyond
production on the ground
of variations of and improvisations on
its own successful past work

Looking at the map in silence
refusing to imagine the Randstad

and the Green Heart
together in an ensemble
as a site for growth and development
as space for 600 000 houses
as space for about 1 500 000 people
with all that infrastructure
but instead imagining
all of the urban places fading back
then
all of the open lands
mostly polder
melding into one land.

And from this envisioning
a new image emerges
where the Green Heart
appears
to undulate through
the whole urban landscape
in long arrays
of polder and farm and wetland
co-joined
which act simultaneously
as separation and boundary
and
as outreach arms from Green Heart
which serve as green space
as breathing space
as park space and public lands
between Dordrecht and Rotterdam
Rotterdam and Den Haag
Den Haag and Leiden
between Leiden and Haarlem
Haarlem and Amsterdam
Amsterdam and Hilversum
Hilversum and Utrecht

in fact
between all the large cities
in and about the Randstad

In this future
the cities secure their cultural identities
by gaining parkland borders
improving the quality of the space
they will need to construct housing
connecting themselves to the Green Heart
and to each other
through parklands at large scale
and gaining the benefits of clean air
and grander vistas
that large open spaces
can offer the urban state.

Simultaneously in this future
the Green Heart appears as an island
bounded partly by water filled polders
partly by drier ones by peat polders
and clay polders and mixtures thereof
modeled mostly
after the Naardemeer bosoms
all left to develop
or helped to develop
succession ecologies
becoming in fact
a Bio-Diversity Ring
conceived to express
the full range of ecological possibility
in lowland Holland.

And by so doing
the Green Heart gains clear definition
both on the ground

and on the map
surrounded
by
this Bio-Diversity Ring
one to two kilometers wide
about 140 kilometers
in circumference
a never before conceived
eco-cultural amenity
that acts also as an air purifying system
and as a water purifying system
and as a water retaining system.
A Bio-Diversity Ring
that acts as transition
between the increasingly urban Randstad
and a clearly defined Green Heart.

A Bio-Diversity Ring
that acts as a vast bio-indicator
for the environmental health
of both the Green Heart
and the Randstad.

Simultaneously
in this new understanding
the Green Heart clarifies itself
as a village-dike-sloot lifestyle
pleasing to many
endangered by growth.
The Green Heart clarifies itself
as a many thousand hectare farm
reflecting the history of Holland
a farm
endangered by population pressures
and by economic pressures
in need of valuing and protecting.

The Green Heart clarifies itself
as an open space centering the Randstad
and defining it
as the Randstad defines the Green Heart.

The image completes itself
as alternating figure and field
a unique eco-cultural feature
landmarking the Randstad
and the Green Heart
as a global city
with a singular topology.

Finally
in this new vision
a single form is proposed
that
engages directly the land form of Holland
protecting and enhancing
cultural diversity
while permitting
an increase in biodiversity.
Defining and protecting the Green Heart
acting in part
as an air purification systems
as it protects and defines
the cities which surround it.
Taking housing pressure from
the Green Heart
by locating at its exterior boundary
space
for hopefully less than
the 1 500 000 people
presently planned for
and thereafter
defining limits to population growth
Respecting the Green Heart
as both a many thousand hectare farm
and
as open space

with small towns and villages
and isolated housing
along dikes and canals
that center the Randstad.
Accounting for
and folding into itself
bio-diversity
in a self-sustaining shape
which both defines the Green Heart
and acts
as an eco-cultural transition zone
between an increasingly urbanized
cultural landscape
and a historic still living
agricultural landscape
that
in the long-term will pay for itself
and that oddly enough
appears like a great sun sign
emerging from the terrain of Holland.

It can happen
that a fortunate reversal will occur
where
a system can come to a consensus
that limitation is survival
and
with its future
now seen as different from its past
can construct new visions
which
will reframe the present crisis
for the advantage of many
and the disadvantage of few

On Fragmentation and Unity
Where it can be seen
that many strategic projects
were designed
to give advantage to the ecosystem

and or advantage
to the movement and play of people.

Where it can be seen
that these projects
operate independently of each other
having connection only
by the inevitable crossings
that canals or bikepaths
have
with stationary elements
like parks and nature reserves.

Many of these new projects would co-join
if
the proposals for a national eco-structure
are enacted
since
wetland-park-forest-meadow-connections
between the IJsselmeer and the dunes
through the Green Heart
to the Brabant and beyond
are planned.

Where it can be seen
that
if
the *Green Heart Vision* is accepted
then all projects
nature reserve
public forest
park
waterpark
bicycle and boat route
proposed or enacted
could
come into contact
with each other
then
a new unity of parks

could come into being
within this GreenHeart/Randstad
community
and this new unity
would be complimentary to
and
enriching and enriched by
the National eco-structure plan
to the advantage of most
and the disadvantage of few.

Conclusion
Reflecting back
on the processes involved
the ideas in this work appeared
all of a sudden
over a weekend in late November.
That is to say
the Bio-Diversity Ring
and the Outreach Arms
came together as one image
after a month on the site
traveling and talking to people

Thereafter
planners came and offered opinions
as did mayors of smaller cities
as did a few art people
though not many
as did business people
as did farmers as did students
as did ecologists architects
landscape architects video people
and journalists.

Some wanted to know
where the money would come from
many others
how to stop development
others

how to stop
too many trees from being planted
others
how to stop
greenhouses
from overrunning their villages.
Others
asked why we were there at all
and how would we solve this
or that
problem
as there were many.
It was as if the hope
engendered by this image
evoked a concomitant flow of doubt
then
doubt reversing
many
over time
offered intelligent suggestions
and support.

Above all,

the Dutch team
and leadership for this work
added a rich layer of creativity.
The addition of the tile floor
was one example
and the insight that
the Naardemeer Polder
could be a good model
for the Bio-Diversity Ring
was another.

The work first opened
in a small chapel in Gouda
where many groups came
and talked of this or that concern.
Many voted

most with favorable comment.
Thereafter
the work moved to exhibition spaces
in Delft and Zoetemeer
and other places.
There were many press articles
videos television presentations.
There were many public presentations
by ourselves and by others on the team.

Finally
we were told
that the Minister of the Environment
was calling for a national discourse
on the Green Heart
in November
and that the *Green Heart Vision* presented
here
would be part
of the government presentation
where in the Dutch manner
the many desires
to build to conserve
to give market place control
to do nothing
to give each city its desire
would be publicly stated.

Of course
we could not know where
in this conversational mass
our *Green Heart Vision* would drift
in time and space
and then land.

The miraculous had happened. Almost six years had passed since we had done the Greenheart work. A communication came to us from Sim Visser, the Kasteel Groeneveld director who had become a friend. He was quite excited, he said the conservative government had been ousted and the much more liberal government that had supported our work were re-instated. As a consequence, there was a sense in the air that our work was the best plan for Holland, with only a few small changes but in principle the best.

In 2000, we were invited back, the work was re-exhibited, and seminars were held. The most important was made of four teams, three teams of architects and ourselves with Gabe and Vera. The subject matter was to actually invent the eco-urban edge we had talked about earlier, having had long wondered if an edge like an ecotone could be created between the urban state and abutting ecosystems. Work began, feverish activity took place, it was quite like an architectural charrette. The outcome was surprising, we invented the idea of a stone row, maybe 0.6 to 0.9 meters high with many different kinds and sizes of stones that would attract mosses, lichens, very small game, perhaps insects, and a bird or two. The other teams focused on designing houses to discover what the Dutch were always trying to discover, how many houses, how many people could comfortably be put in the spaces available. No one else had an interest in such an obscure idea as an eco-urban edge.

A luncheon was held with many important people there. It turned out to be an award luncheon and in it we were awarded the Groeneveld prize for doing work that was most beneficial for Holland that year. We were presented with a small catalogue of our work in Dutch. It was a special moment and like no other we had experienced. It was explained to us that our concepts which were maintaining the integrity of cities by framing them with parks, regenerating the ecosystems by making them continuous while evaluating the effect of all major plans for the Greenheart in terms of their effect on the whole. We had seen the Greenheart and the Ransstad as a yin yang situation. Most important, they had put a line on their map around the Greenheart that pretty well followed our biodiversity ring limiting development. They argued that biodiversity would be better served by expanding rivers and letting biodiversity form naturally at the borders. We thought them correct.



The most interesting part of the luncheon was a conversation we had with people who were the directors of the Dutch version of our *National Geographic*. The conversation was broad-ranging but finally settled down on immigration, they argued that the Netherlands are a small country and that recent research suggested that for this country to maintain its identity, its history, its sense of self and place, they could not integrate and bring into the culture a body of immigrants who were much larger than 10 percent of their population. The sense we got was not that people were interested in controlling immigration but were looking for intelligent ways to maintain the integrity of their culture. Personally, we liked the culture, it was a wonderful place to work. Then the unanswerable question came, what was one to do if there were just too great an immigrant population. No one was yet discussing birth control and the education of women.

Another five years pass, we receive a pamphlet entitled *Sustainable Open Space in North West Europe*. The pamphlet argued that the Greenheart of Holland was one of the critical spaces necessary to be maintained in North West Europe. The drawing of the Greenheart in this little booklet was almost an exact replica of the drawing Rimmer de Vries had made in 1994 while working in our Greenheart studio.



Installation at the Ronald Feldman Gallery, New York

From the 200 square kilometer
pit mine region in South Leipzig

A Brown Coal Park
for South Leipzig, Germany

1996 Sächsische Landesvertretung

beim Bund, Bonn, Germany

1997 Grassimuseum, Leipzig, Germany

Kunstmuseum Cottbus, Germany

et al.

In 1995, we were contacted by critic and curator Perdita von Kraft and asked to join a group that was putting together a team of artists to deal with the cultural landscape of Eastern Europe, mainly Germany and Poland. The group would be supported by the Siemens Kulturprogramm and the Kulturstiftung des Freistaates Sachsen. There would be a catalogue and a big exhibition, perhaps a traveling one. She said that the artists would be interesting, among them photographers Josef Koudelka and Lewis Baltz and sculptors Maria Nordman from the USA and Auke de Vries from the Netherlands. The work would deal with social problems that emerged from the landscape. She expected it to be roughly a year’s work, intermittently. Were we interested?

Traveling by bus, sometimes in caravan, we visited many places. The most interesting to us was a profoundly distressed landscape in the brown coal mining area of South Leipzig. In our work in Dessau we learned quite a bit about open-pit surface mining. At the Bauhaus we had met repeatedly with officials from a company called MIBRAG (Mitteldeutsche Braunkohlengesellschaft). They had billions of deutsche mark allocated to the mission of closing the mines. After a while they had stopped looking forward to our meetings because we kept disagreeing with their methods of reclamation. Our disagreement was straightforward: We took the position that you could not use the giant machinery originally used for coal mining to restore the mines ecologically. We argued that it was necessary to invest in smaller, much more versatile machinery (like front-end loaders, and tractors with two or three meter shovels), which would permit the exercise of much more creativity in reshaping of the walls of the pit mines.



The neighborhood and the comparison between the MIBRAG and the Harrison Studio work

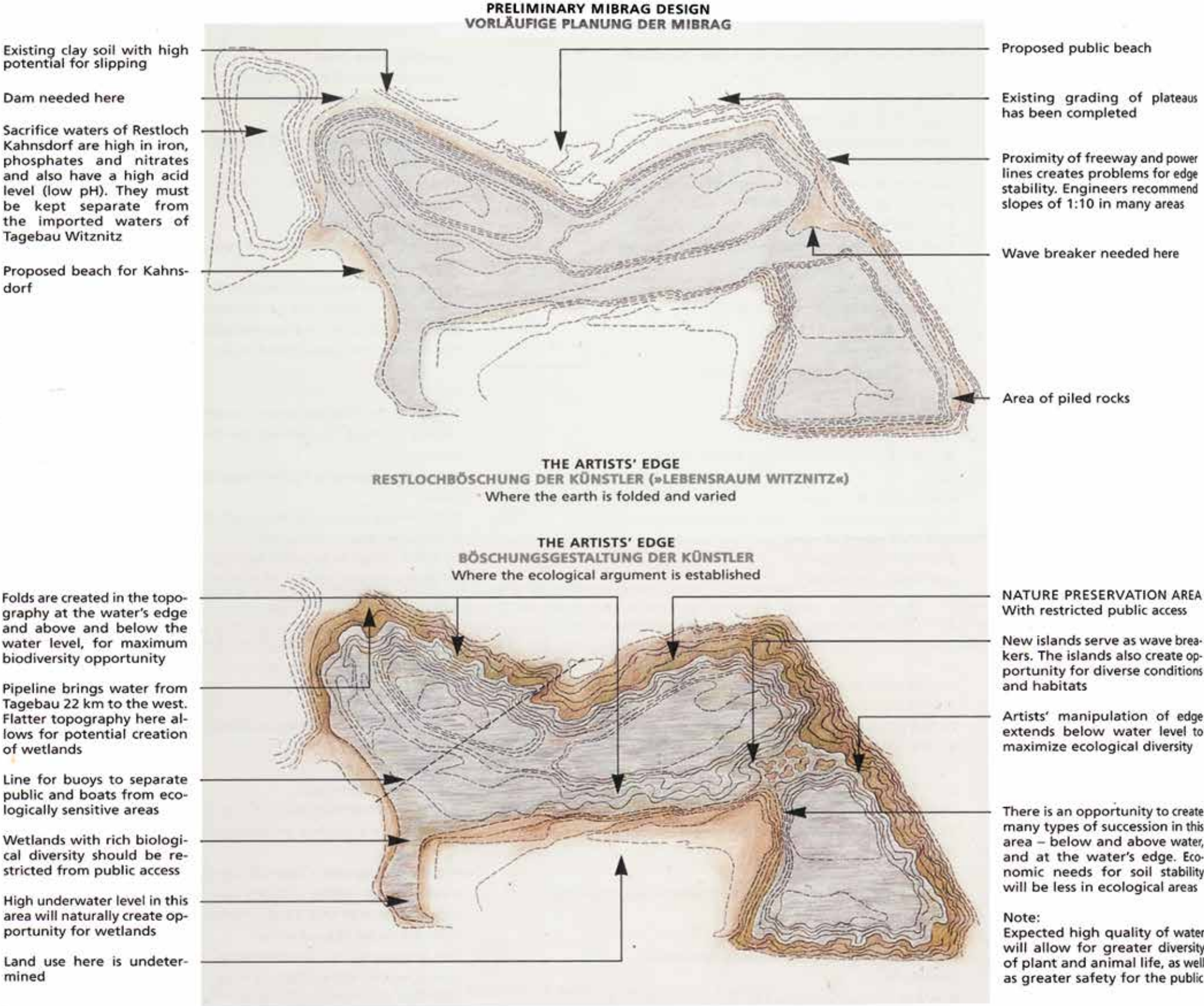


The MIBRAG company design and the Harrison Studio Borna counterdesign from the perspective of shaping earth

MIBRAG had a central office in South Leipzig. It was our region of choice, having several hundred kilometers of holes in the ground, turned earth, destroyed villages, and upset infrastructure. That region had generated electric power for the east of Germany for almost 50 years, during which the environmental impact (such as lakes dying from acid rain in northern Europe) was just part of the cost of doing business. Now the massive mining operation was being closed out, and MIBRAG was given the problem of restoration. Discovering that those same Bauhaus artists from the USA were part of the art team and intended to take up the design of the mining area, the MIBRAG director met with us. He said, “Let’s find out exactly what you’ve been complaining about for the last few years. We’ll give you a Tagebau (open-pit surface mine) and some engineering assistance, and you’ll show us exactly what you mean.” And so we were more or less informally awarded Tagebau Witznitz. The excavation took up some 20-odd kilometers and was 27.5 meters deep or more in places; the walls were shaped like large steps from top to bottom. Since the water table was very high, it was expected that Witznitz would soon fill with water. MIBRAG gave us their design to work with.

The MIBRAG people had designed the walls as long linear steps roughly three meters wide, which resembled contour lines on a topographical map. In so doing, they had disadvantaged nature by not giving it the opportunity to regenerate biodiverse boundary relationships at the water’s edge. Our response was straightforward. We had been working with the notion that the only available response, when nature had been put at such a disadvantage, was to invent another unnatural form, a counterdesign that would give maximum advantage to edge relationships. So we designed the edges to be curvilinear, such that there were both dark and light side edges, and both flat and curved planes. This would multiply the available surfaces, and multiply the conditions on such surfaces for the greatest possible diversity of species to find a comfortable home space. We made a presentation that contrasted the MIBRAG drawing for the Witznitz mine sides with our own.

Thereafter, we took the same attitude toward the whole 300 square kilometers of turned earth and excavation, which was a completely new topology, a moonscape-like condition created over more than 50 years. The only reminders of what had previously been there were fragments: a piece of farm here, a bit of grassland there, a remnant of a village somewhere else. We drew a shape on a large map of the region, indicating where the earth had been turned. On this shape we proposed to make a *Brown Coal Park*.



The turned earth was somewhat like glacial earth, its topsoil removed, and the succession ecology that would form (with a little assistance from our biologist colleagues) would be a new aesthetic, as it began the long and arduous task of regenerating topsoil. Meanwhile, as the water table rose, many lakes would form (it seemed obvious to us that a new Lake District wanted to happen). On the final map we

drew a boundary that took the shape of a line of turned earth. It could also be seen in the mind’s eye as an icon, a potential attractor, so that one could imagine walking the 140 linear kilometers on the perimeter of turned earth. Looking inward every eight to 12 kilometers, one would see a remnant of the coal mining that once existed there — a linear museum of sorts. Ultimately we began to think of



The 360 square kilometer shape of turned earth with Tagebau Witznitz as a detail

the place as a complex system. Wanting a physical presence and looking for a guiding metaphor we wrote a poem (see page 274). Meetings were held, discussions were had with many of the senior planners in the Leipzig city center and with small groups of mayors and city leaders and everyday folk about the ideas we were developing. Many people were suspicious; they'd had their fill of large-scale planning as



The area mapped as it stands with nice coloration obscuring the event structure on the ground

manifested by the heavy hand of the East German bureaucracy which echoed the even heavier hand of Moscow. A decision was made, based on a rumor that the Siemens Corporation, somehow standing in for Moscow, was planning a regional takeover — and that we, the Harrison Studio, were the leading edge of this plot. The inference was that we should leave, and so we did.



164-kilometer perimeter of the icon *Turned Earth* from which historic mining elements, a sort of perimeter museum, become visible

A planning decision was taken that every populated microregion should decide what they wanted to do with their own open-pit surface mine soon to be a lake. Almost all saw recreation as a profit center. 18 years later, we looked at the site, using advanced satellite imagery, and the transformation was startling. The restoration was such that the region looked like anywhere else, except that it had a few more lakes. Great



The Harrison Studio Borna re-design forming a lake district with turned earth as the ground from which a new ecosystem springs

effort had been spent to make the violence done to this place disappear into the continuum of everything else that was in its surround. The evidence of a vast, disturbed former coal-mining region had then disappeared. Everywhere one went, the new Germany appeared to be remaking itself, small town by small town, into what the old Germany looked like before the war.

That Which Was Intended

A complexity of this sort is a fragile event
not having the stability of entropy
nor the greater constancy of simplicity
nor the apparent randomness of a
chaotic state.
Thinking about this
We began imagining a 300-square-kilometer park
that would take its shape
and meaning from the “turned earth.”

This park would function both as a memorial
and an example of reclamation;
It would be a way of recreating a cultural landscape
so it could be seen as one place
that had once been another place
before the earth had been turned.
And we named it
A Brown Coal Park
for Südraum Leipzig.

We understood
that there would be serious economic
issues to be resolved.
and there could be formidable political issues.
and issues of human need and greed
that arise with a change of ecotones.

As we knew that
the life web is most diverse
at the boundaries between ecotones.

And
as the water level rises
all excavations will become lakes
therefore a lake region is probable.

And we have seen that ecosystems
will respond to disturbances
of turned earth
by moving rapidly across those surfaces
as at Mount Saint Helens or Tagebau Bockwitz.

The shape of turned earth becomes an icon
in the cultural landscape
when boundary conditions
are made clear and available.

It was not then difficult to see how
the catastrophic event that
transformed these lands
could flip into its reverse
when the randomness of a chaotic state
becomes reorganized and transformed.

Then an image emerged of a transformation
that is literally a reversal of ground
where the cultural activities
of existing farming and towns
industries and infrastructure
collectively become the figures
in a biodiverse lace-like field
An eco-cultural landscape
uniquely self organizing.

That Which Happened



And the environment is restated as if a vast pit mining operation had never existed.

A Forest for Karl-Marx-Allee

From 1994

Not exhibited, presented at

various conferences

Rolf Toyka, the architect who had helped us at Bauhaus Dessau, was putting together a team to make proposals for the Karl-Marx-Allee, a boulevard in Berlin. They were choosing five groups to work on this area; would we be one of them? We liked Rolf, liked working with him in Dessau, and thought the architectural theorist and critic Manuel Cuadra, a partner in the project, was interesting as well. So we said yes.

After we walked the area, read maps, and looked at the history, certain qualities of the life lived there became apparent. Much of the land along the Allee had been bombed during World War II. It was remarkable how much public space was made available in the housing that the East Germans built after the war (which reflected Russian thinking and design). The housing itself, however, took the form of very inexpensive red brick structures, mostly walk-ups three to five stories tall. The apartments tended to be small, but most had views out into the large, open green spaces. The green spaces themselves, though park-like, were poorly managed, with little consideration for the plantings; shrubs, flowers, and trees were set far apart. To Western eyes, these many blocks of public housing implied a state of near poverty.

Nearby, in the same neighborhood, were a number of blocks of pre-war housing, with large interior spaces, complex facades, and almost no park or open space. The two architectures, side by side, were in diametric opposition. One valued private space above all; the other valued public space with equal ferocity. The architectural theories that drove the designs and the social theories of the communities living in those designs were correspondingly disparate.

The Harrison Studio Berlin (with Gabriel Harrison and Vera Westergaard) did an analysis of the open and closed spaces, the number of public services, and the population density, and came up with a narrative that suggested small changes in the housing and vast changes in the landscape. At the same time, this small body of work took issue with the Western approach to space, which valued private property and profit over the public space and public services that the Marxist system had put into place, albeit poorly, particularly from an eco-urban perspective.

The analysis of the other teams focused on architectural design rather than on the social critique that drove our analysis. One of the original designers of the boulevard, Hermann Henselmann (then nearly 90 years old), was brought to our final meeting in 1994 to look at what we all had done. He had been an architect and urban planner of great note in East Germany for many decades. He somewhat preferred our work but liked other works as well, particularly those that added housing. He thought housing trumped other situations; that is, people needed to be served. We met, we sat around the table together, but he was uncomfortable. Finally he said to me, “Newton, I find it almost impossible to look at you.” “Why?” I asked. He said, “You look too much like Karl Marx.”

The work was published and then disappeared. Karl-Marx-Allee, 15 years later, had undergone dramatic redevelopment more or less indifferent to public space, profoundly privileging private space.



Where it is made clear that the new buildings constructed in this area are disposed in a very different pattern than those in the areas not bombed
We came to value them



Where it is made clear that the social service system has been designed into the new community in a different manner and number than those in the areas not bombed
We came to value the difference



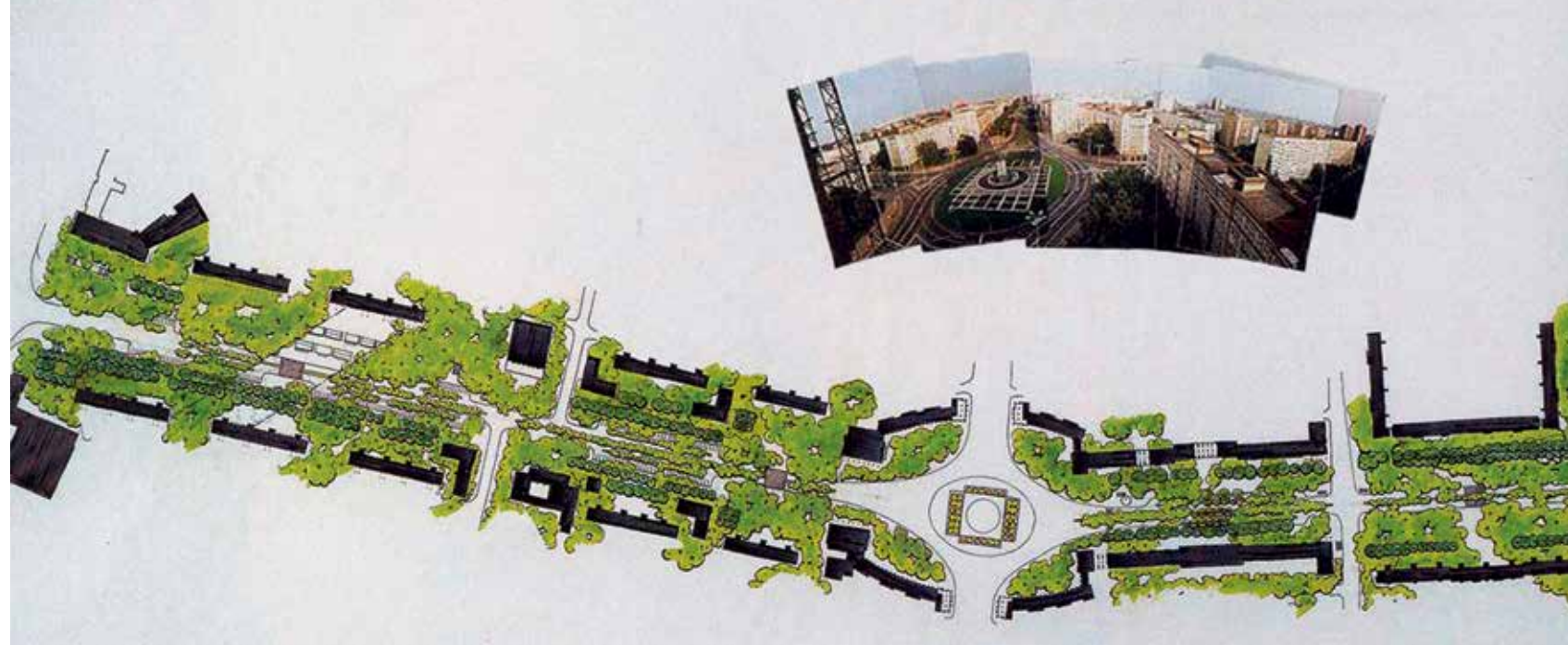
Where it is made clear that the plantings in the open spaces designed for this new community that is so different from the areas not bombed are dispersed and fragmentary in nature
We came to believe these new open spaces had been under-valued



Where it is made clear that the open spaces can be re-valued by networking the green spaces creating new unities
We began to imagine a new urban forest



Where it is made clear that the open spaces within this new community can be re-created to contain a complex new urban forest with overstorey understorey meadow grassland – a life web
We began to see a reversal of ground where the buildings found a new existence within an urban forest as will the people who inhabitat them



On Revaluing Long Held Beliefs

Our group holds that certain of the basic principles expressed on this terrain have guided the design of public housing and public spaces in diverse cultures and countries even back to the mammoth bone community huts of Siberian steppes and pueblos of the American Southwest. Therefore, we have decided to let the design principles of the “first architects” and those who resettled this area after World War II guide our collective effort.

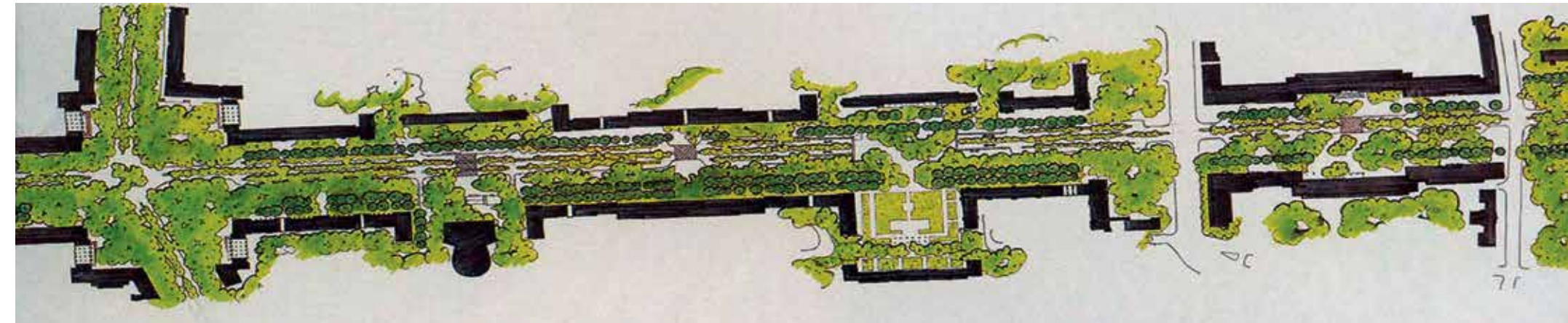
We have applied these principles expressed in our drawing—one might say that we have recycled them from the “discard pile” where socialist thought and practice was placed after reunification. To do so, we first defined as a neighborhood the area that includes the Karl-Marx-Allee from the Alexanderplatz to the Frankfurter Tor. This neighborhood includes the land and structures on either side of the Allee. We include in this neighborhood only the lands, buildings, parking elements, and social amenities that were designed and built over years under the basic socialist design guidelines. Our group has proposed new guidelines for these elements, always referring to early designs, always asking ourselves “What is in the interest of the whole neighborhood?”

On the Neighborhood Housing and Amenities

Given the change from a socialist to a market economy, it would be difficult, if not impossible, to continue to enact socialist principles of housing. However, it is possible to offer all who continue to reside in this area and those who move in over time conditions that would improve, rather than lower, the quality of life, reflecting the metaphor that public space is public wealth. And it would still be possible to recycle certain original intentions of the builders (for example, affordable housing and amenities of space and use) as well as their buildings.

On Rejoining the Neighborhood Lands and Open Spaces to Develop an Urban Forest

The neighborhood ground plane was designed in such a manner that most apartment buildings behind Karl-Marx-Allee have front, side, and rear garden space. They are joined by small, intimate, alley-type parking spaces, often bordered by trees or grass. The streets are not broad—except for the Karl-Marx-Allee itself. There are occasional “leftover” spaces between buildings. The overall ground space far exceeds the space covered by rooftops in the normal high-density urban context. Therefore, we propose that new urban green space be created, structured in a manner that would be singular and unique, in a manner different from the normal landscape design, based upon ecological rather than horticultural principles. This creati-



on would behave as an analogue forest in which the plant and tree groupings for the entire neighborhood would function as a unity, with canopy, bushy understory, meadow, and grasslands.

The Karl-Marx-Allee as Centering a Unique Neighborhood within the first Urban Forest

It does not happen so often that a “tabula rasa”, a clean slate for the re-development of urban habitat occurs, but in the aftermath of the violence of World War II, the rebuilding of large parts of many, if not most of the cities of Germany, had become a necessity. And for the eastern section of Berlin, the liberation from one set of ideologies was followed by the imposition of a drastically different ideology which called for a different design for living and therefore a different handling of space. The new designs were basically simple, sometimes poorly constructed, but none the less embodied a new set of values. We were told that the new plan, enacted in the first decades after World War II by the first idealistic generation of the new socialist regime, put in place an egalitarian ethos which rejected the hierarchical values of the Western capitalist traditions and was expressed in certain fundamental, strongly held concepts:

- 1 While the concept of private wealth as a basis for the quality of life was rejected, the concept of intellectual and social wealth as the basis for the quality of life was encouraged by the allocation of massive public space for recreation, inexpensive entertainments, various readily available intellectual and cultural activities, hospitals, schools, child care, and other amenities.
- 2 And concomitant to the above, it was believed that all housing for all people should have space and structural elements in common so that no person or family could be seen as more privileged than any other. Thus, in terms of urban design, “equality in housing standards represents equality of privilege.” Public wealth as seen in the abundance of land, living space, and social amenities represented equally held wealth.

These statements laid the foundation for the design principles for our redevelopment from Alexanderplatz along the Karl-Marx-Allee to Frankfurter Tor, including the housing and gardens for several blocks on either side. This development took place from the early fifties until the nineties when these original egalitarian beliefs, although often practiced more in the breach than in the observance, were called into question after the fall of the Berlin Wall by the late twentieth century market-directed power structure.

In conclusion, our work investigates the possibilities for transformation available along the Karl-Marx-Allee to re-contextualize what we perceive as the most socially valuable, historically interesting, and accidentally ecologically provident intentions of its planners.

A Perimeter Walk

for Frankfurt

A Prophetic Walk

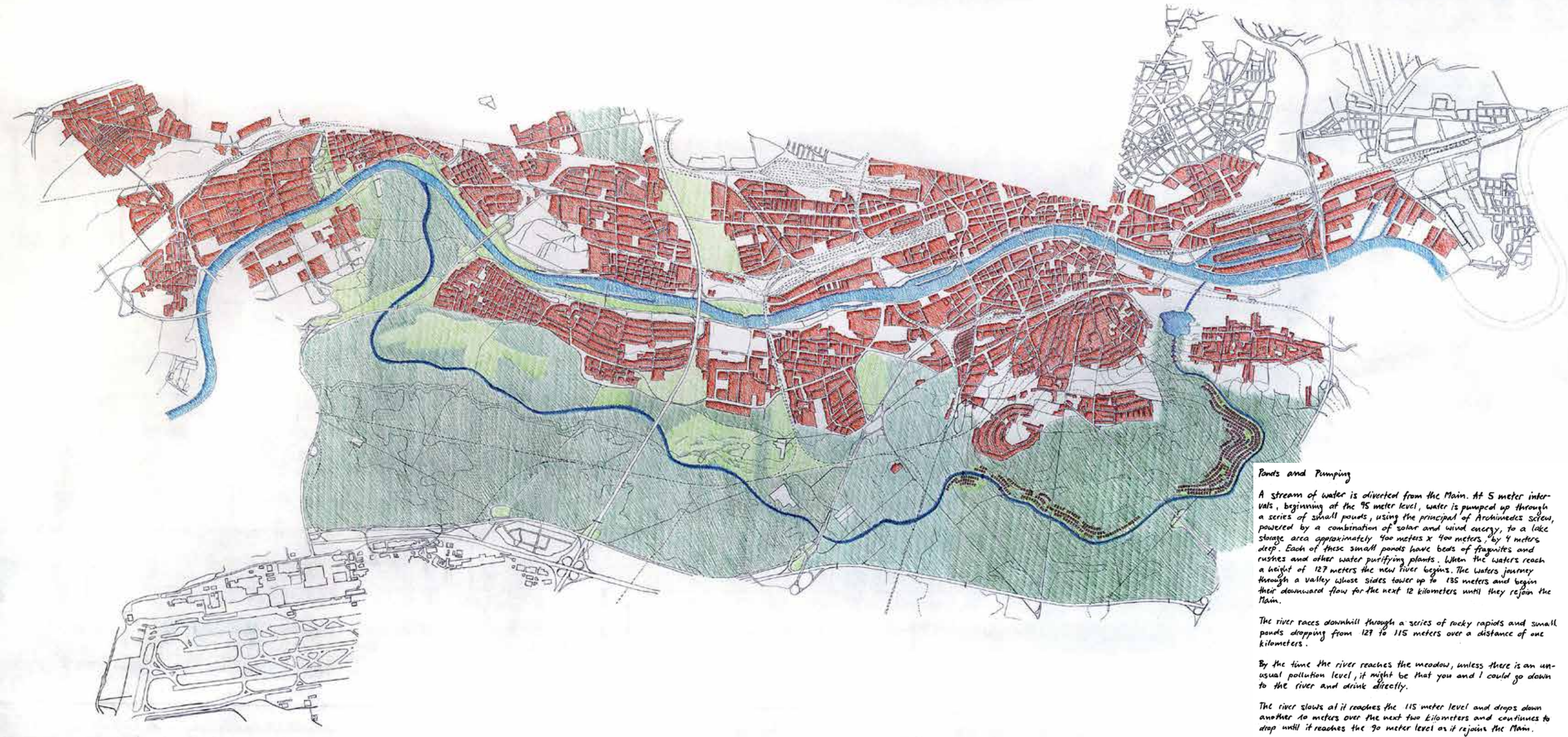
for Frankfurt

1997 Deutsches Architekturmuseum,

Frankfurt-on-Main, Germany

(Submitted by the city of Frankfurt

as part of their bid for the Olympics)



Ponds and Pumping

A stream of water is diverted from the Main. At 5 meter intervals, beginning at the 95 meter level, water is pumped up through a series of small ponds, using the principle of Archimedes screw, powered by a combination of solar and wind energy, to a lake storage area approximately 400 meters x 400 meters, by 4 meters deep. Each of these small ponds have beds of fragmites and rushes and other water purifying plants. When the waters reach a height of 127 meters the new river begins. The waters journey through a valley whose sides tower up to 135 meters and begin their downward flow for the next 12 kilometers until they rejoin the Main.

The river races downhill through a series of rocky rapids and small ponds dropping from 127 to 115 meters over a distance of one kilometers.

By the time the river reaches the meadow, unless there is an unusual pollution level, it might be that you and I could go down to the river and drink directly.

The river slows as it reaches the 115 meter level and drops down another 10 meters over the next two kilometers and continues to drop until it reaches the 90 meter level as it rejoins the Main.

In 1996, Rolf Toyka and Manuel Cuadra (with whom we'd worked at the Bauhaus and the Karl-Marx-Allee) called to ask if we would act as artist-designers and join four or five teams of architects to address some profound problems in the city of Frankfurt-on-Main. Our interests and priorities were shifting toward bioregional issues, but eco-urban projects kept coming at us. We had the typical artist's fear that whatever project we were working on would be our last, so we had one rule: Say yes to all requests and hope for the best.

Work began in a large classroom in Frankfurt in what appeared to be a former school for the deaf. There, the usual process of education took place: Urban planners, politicians, and developers came; even a banker appeared. It seemed that Frankfurt was full of banks, but the city had a terrible economic problem, as all the wealthy people were moving out of town to the nearby hills. (Making, we supposed, German versions of McMansions.) Then there was the "immigration problem." An uncomfortable number of Turks and Pakistanis had settled

in this place; there were racist overtones in the air. Frankfurt was an old historic town with a river running through it and probably the biggest airport in Germany at that time. With the change in the cultural content of the population, it was losing its identity as a vibrant German city. Everybody urged us to do something. During dinners we sat around and urged each other to do something. There was a week within which to come up with a work, so we took a car and began to traverse the city.

Frankfurt had remarkable properties within its city limits that appeared to be profoundly undervalued. One was that they had a wonderful river running through a forest; another was that there were hundreds of hectares of farms (some were flower fields, and some truck farms). We observed a disconnect between the urban, multi-cultural, condensed population, the airport, and the great wealth in the banks on the one hand and the farming on the other. At least it seemed to us outsiders that they operated independently of one another. We kept being drawn back to the farms and the open spaces; we mapped them. In our work in cities we sought to offer an unexpected and hopefully profound public benefit that was eco-urban in nature—eco-urban meaning the weaving together of human activities and natural systems to each other's benefit. We decided to frame Frankfurt by making a perimeter walk around the city, the majority of which was through farming areas close to the center.

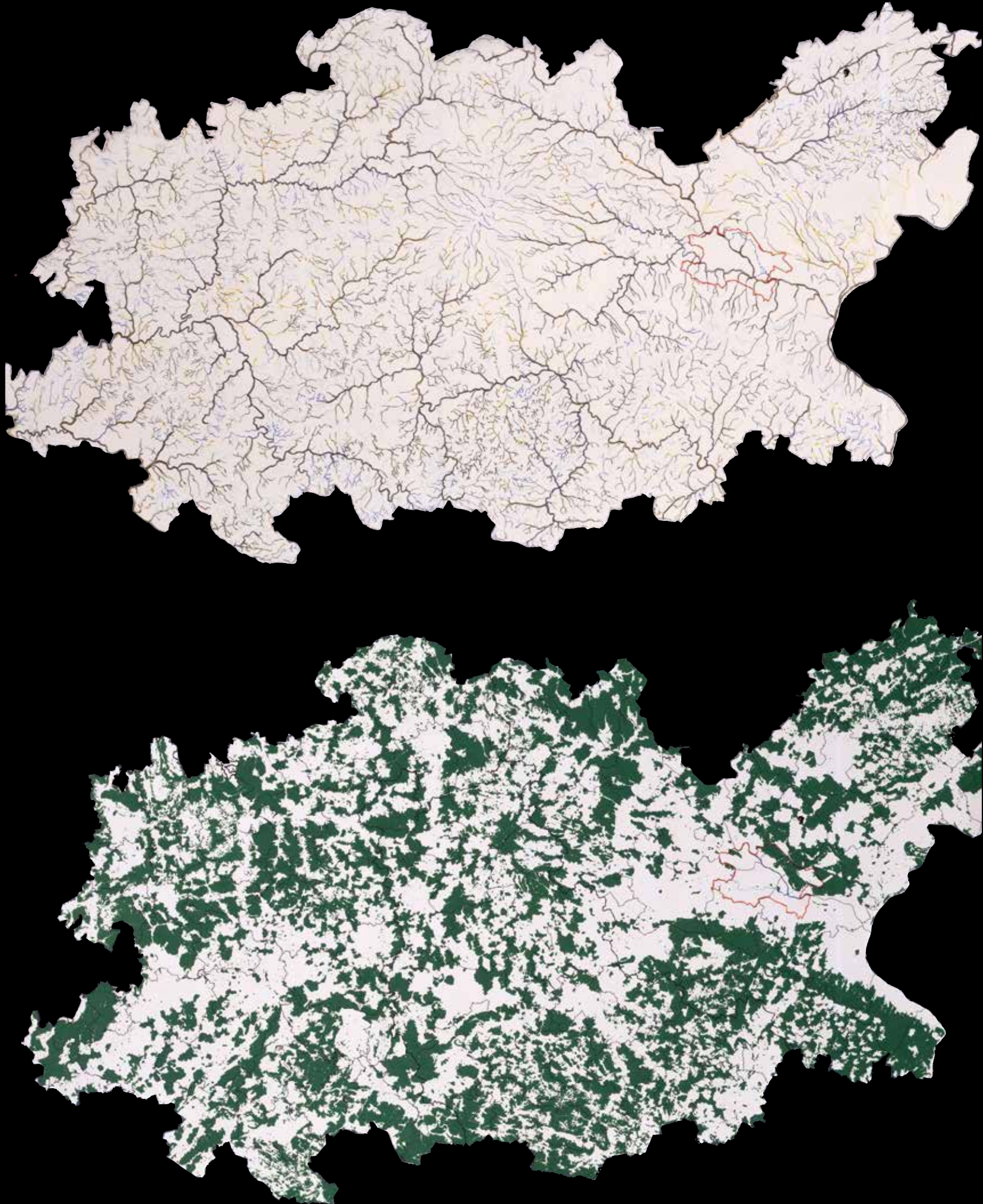
There was an argument going on in Frankfurt about growth. As wealth left the city and taxes were insufficient for infrastructure, a debate formed about how to grow and whether to annex small perimeter towns. We had come to believe that the city of Frankfurt should continue to preserve and improve the quality of its neighborhoods, infrastructure, and farms, as well as biodiversity patches within the existing city limits, as opposed to growing physically. When we first arrived, rather than looking at Frankfurt, we had looked at Hessen, particularly at the forests. In the 1980s, acid rain had harmed the forests of Hessen, but since then the acidity had been dramatically reduced and the forests were returning—an example that helped us decide to attend to the well-being of the city.

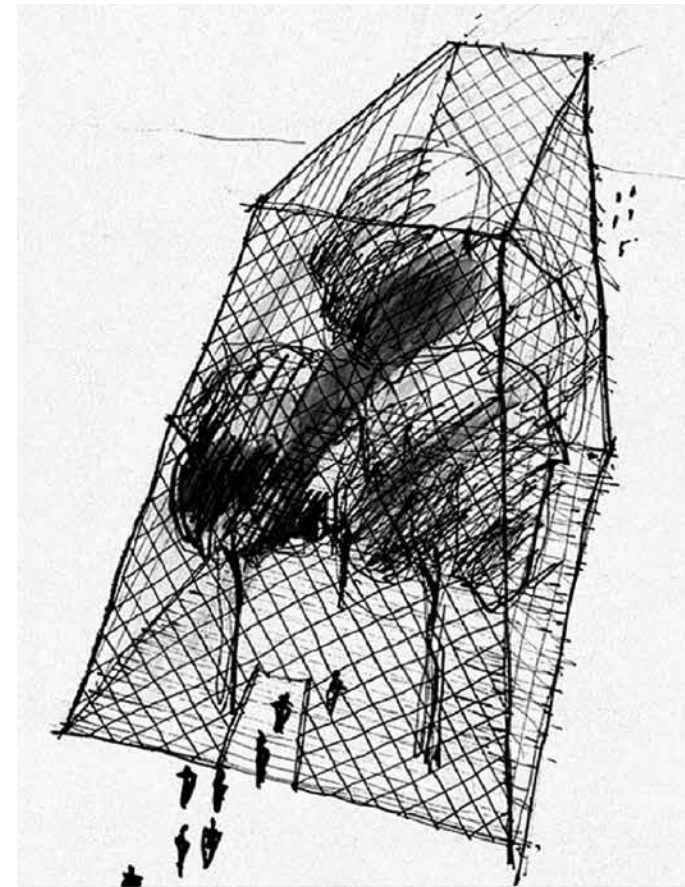
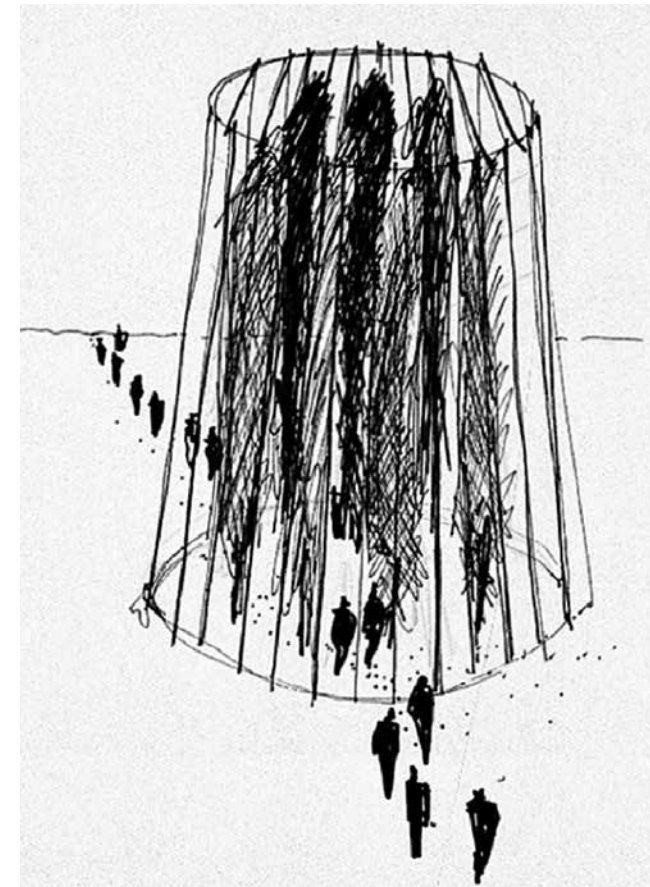
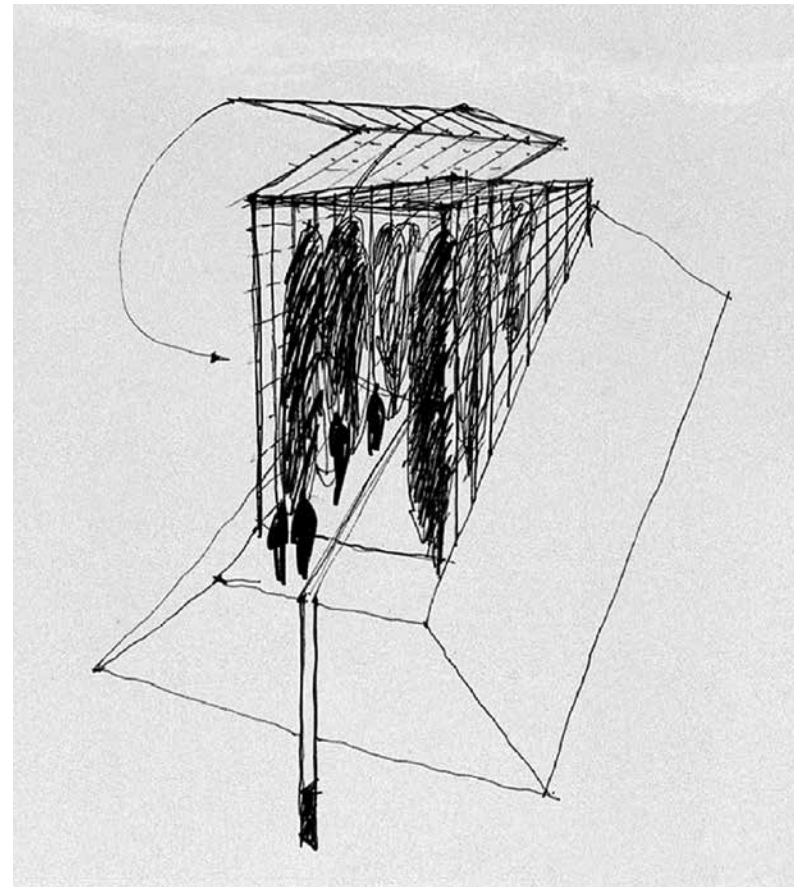
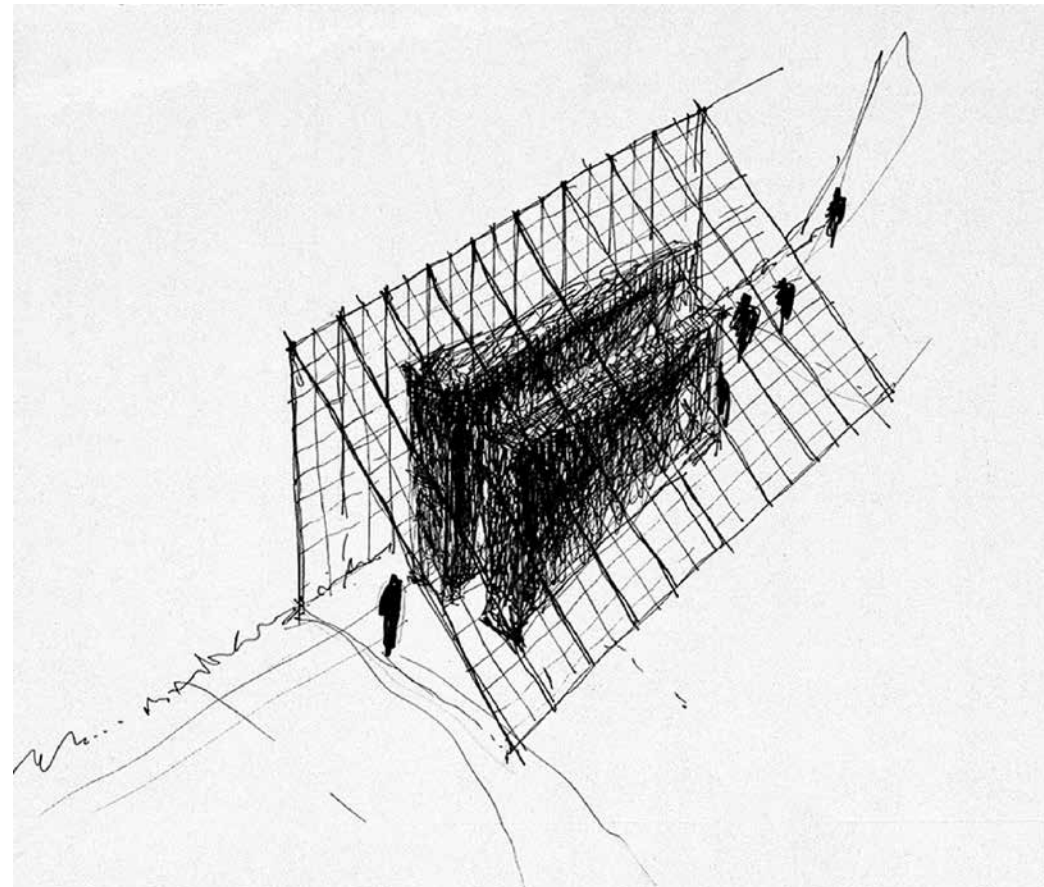
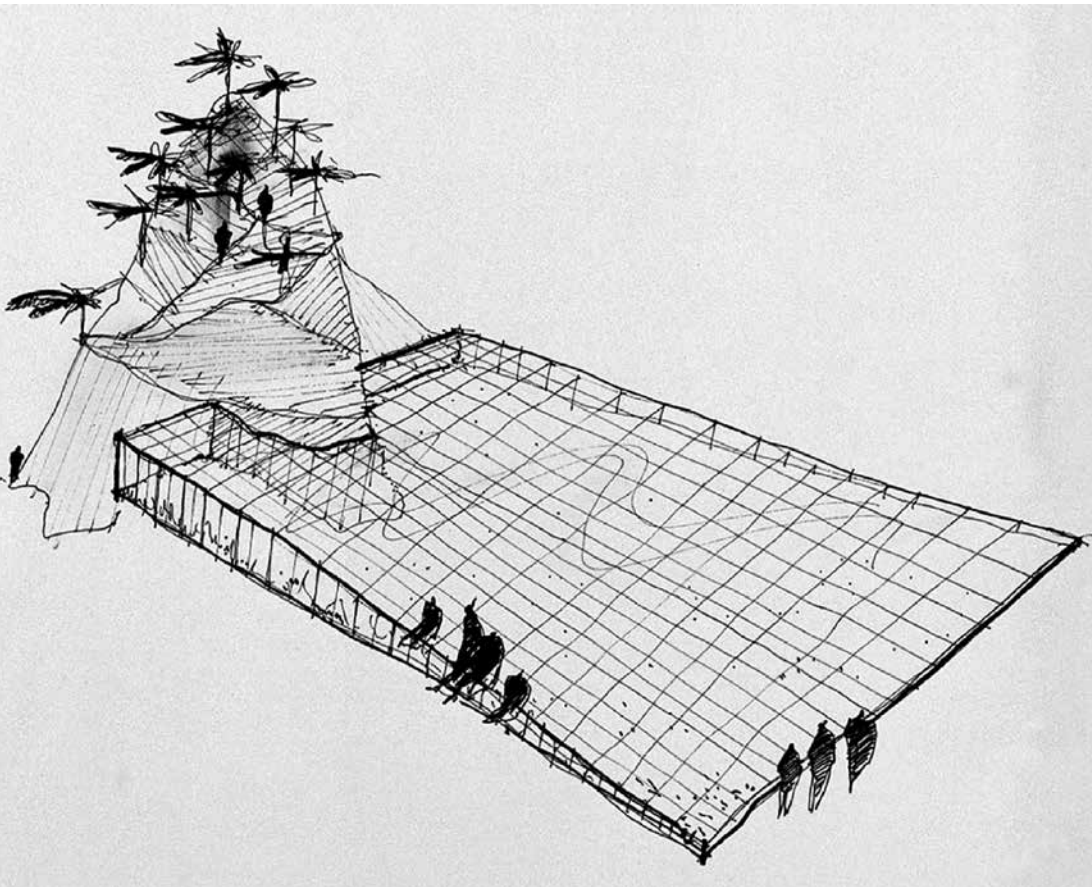
In thinking about Frankfurt
seeing the many small farms
on the North Edge
seeing them as an amenity for the city
thinking about them collectively as almost a park
We began talking to many of the farmers
some organic
some partially organic
some using industrial farming methodologies
we put on the table an argument
for all the farming
to be seen as one farm
a great green farm for Frankfurt

We began a calculation. There were perhaps half a million people in Frankfurt, and half a million people produced enough organic waste (which could be turned into humus using digester technologies) to eliminate the need for fertilizer in the city's farms. Since it took 1000 years to make 2.5 centimeter of topsoil, we argued that this 1000 years could be reduced by orders of magnitude. If the waste of Frankfurt were transformed into humus and then applied to the topsoil, the air would improve, the taste and quality of food from the farms would improve. The need for landfills would be reduced.

Our global warming studies suggested that a three-degree-Celsius temperature rise was highly probable within the next 100 years, maybe sooner. So we proposed an amenity for Frankfurt, a perimeter walk that bordered much of the farmlands on which large greenhouse structures would be built (approximately every kilometer). Each greenhouse would be an experiment looking at what would live best under new temperature conditions: some would be directed toward arboreal triads, others toward what might grow in the meadowlands; also represented would be species that might become more appropriate than those being farmed at the time. It would be a walk through a probable botanical future. It would educate and have its own aesthetic character while simultaneously being a serious (albeit speculative) scientific array of experiments. We thought such a unique configuration would benefit the city and science, not to mention the children. As a tourist attraction, it would also bring new revenues into the city.

Finally we studied the river and watershed system in which the city of Frankfurt was embedded. The relationship of forest to farm turned out to be well-thought out and healthy. As were, in the main, the rivers, the streams, and the forests. And so we were comfortable with putting aside the bioregional impulse which gave us space of mind to take on the city, its peoples, its terrain.

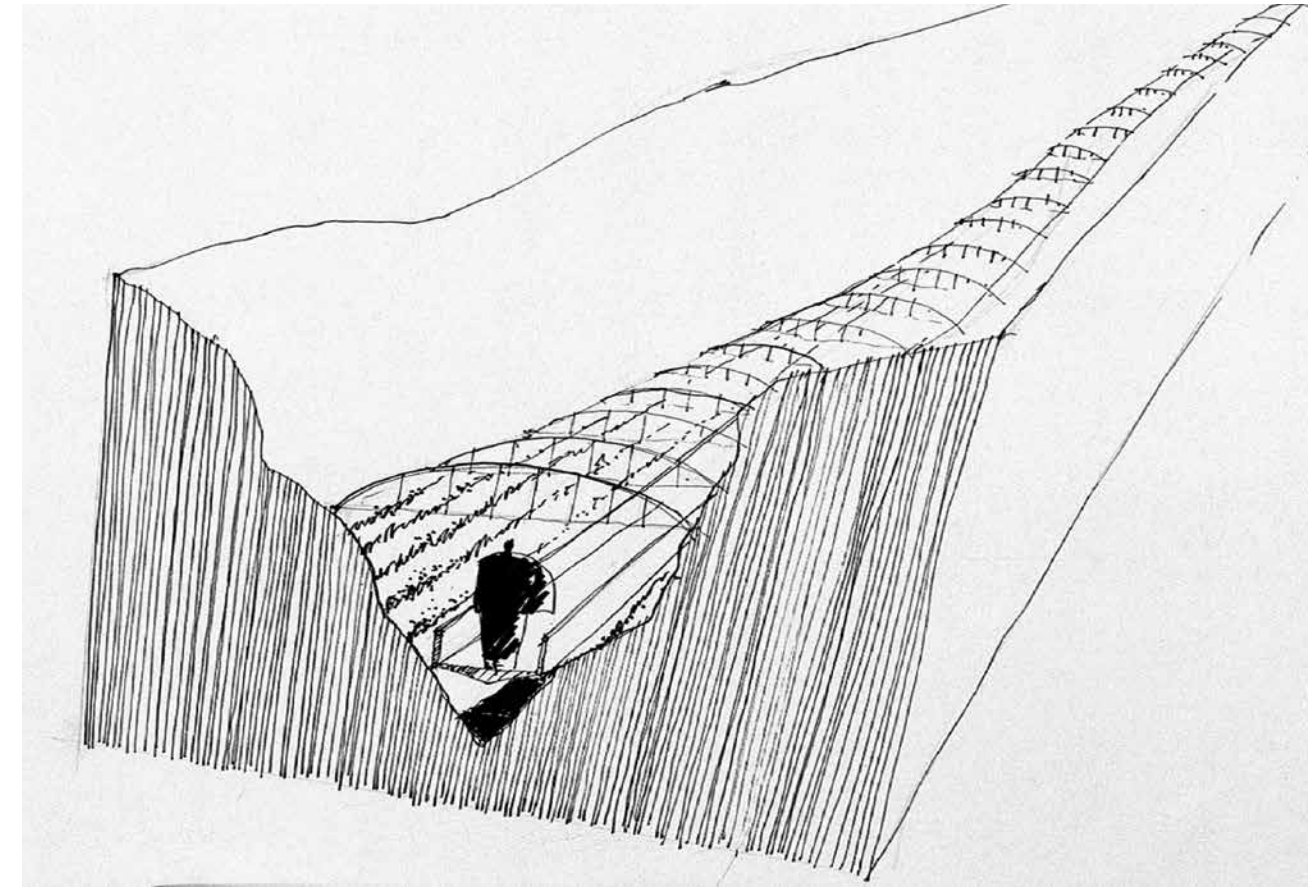
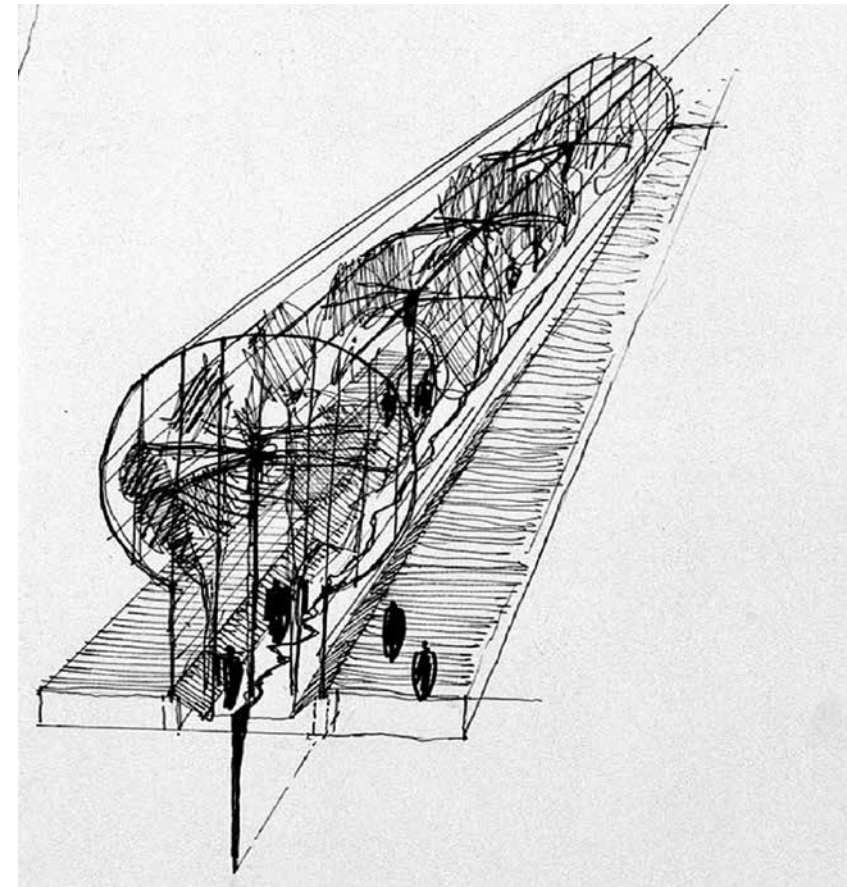
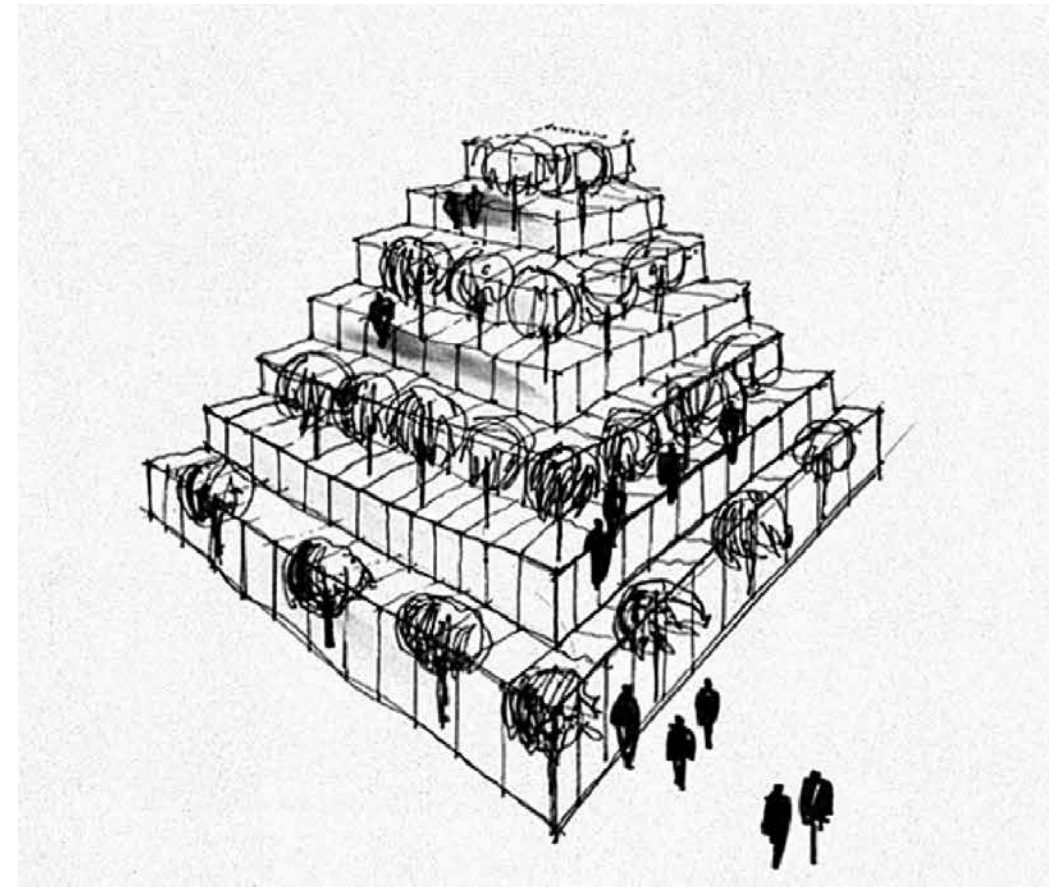
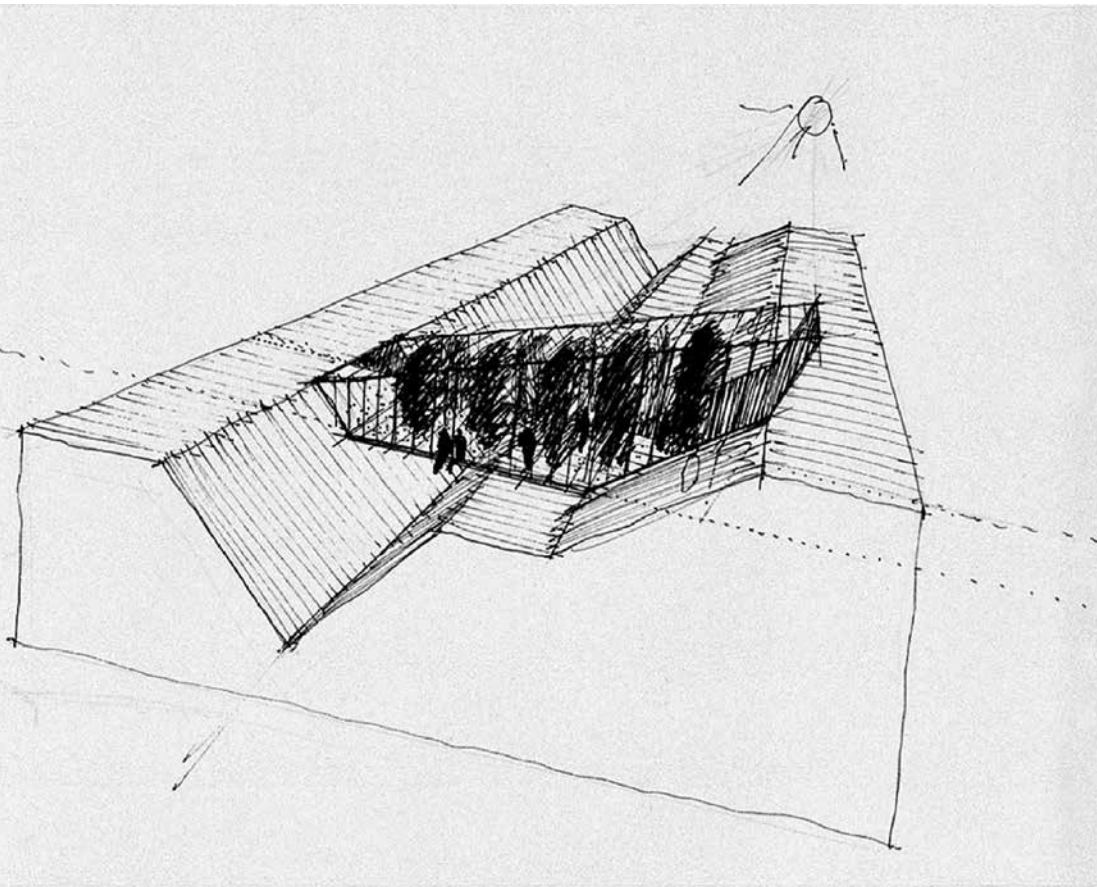




So following the concept with a few quick sketches of our own as background, Rolf Toyka drew eight possible greenhouse configurations.

It was a kind of speculative design attempting to create spaces for a future ecosystem that would simultaneously act as a perimeter walk through





the farmlands of Frankfurt and a botanical adventure with scientific implications. The science sought was interesting in the extreme as

we proposed paleoecological research of what grew in the area when temperatures were three degrees Celsius higher.



Endangered Meadows
of Europe

1996 Rooftop of Kunst- und

Ausstellungshalle der

Bundesrepublik Deutschland,

Bonn, Germany

1997 Second site, permanent

installation, Rheinaue,

Bonn, Germany, under the title:

A Mother Meadow for Bonn

Roof garden prior to meadow installation



In late 1994, we visited our friend Manfred Langlotz in Bonn. Manfred had been our project manager at documenta; now, three years later, he had landed on his feet as a sort of overarching project manager for the Kunst- und Ausstellungshalle der Bundesrepublik Deutschland, which was then being completed. It was Helmut Kohl who supported its founding, and it was the biggest as well as one of the very few national museums in Germany designed by Gustav Peichl. The newly appointed director, Wenzel Jacob, had been an assistant to Manfred Schneckenburger, who was instrumental in getting Wenzel appointed. We had a kind of old-friends meeting. Wenzel took us aside and said, “Look at our rooftop. It’s a roof garden that will be hard to use. It has three giant towers that are basically skylights, and they are tiled bright blue. The problem is that no one can do anything up there to be alive in the space.” (No one, we said, except for Niki de Saint Phalle, who made big enough and bright enough things to compete with Peichl’s towers.) So Wenzel said, “What could you do for my rooftop?” It was basically 0.8 hectares—no small rooftop! He gave us enough money to put the Harrison Studio to work for about two months while we designed; in this case the Harrison Studio again included Ga-

The mature meadow
composed of four different meadows
in four discrete soil types
with collectively 164 species





Growth experiments



Wet Meadow



Rock Meadow



Scything, a performance



Hay stacked, seeds gathered



Fence structure with image and text

briel Harrison and Vera Westergaard, Martin Schneider-Jacoby, and ourselves, among others.

We came up with a stunning design: a greenhouse, 3.7 to 4.3 meters tall, that covered the perimeter walk (which was six meters wide, all the way around the roof). In this greenhouse we constructed a narrative.

About 25 percent of the greenhouse space was to be taken up with a work called *Greenhouse Bonn* in which we used paleobotanical research to find out what would live in the region, botanically speaking, if the temperature rose approximately three degrees Celsius. This work later became the *Garden of Hot Winds and Warm Rains*; we developed a future ecosystem on one side of the greenhouse based upon a warm dry landscape, and one on the other side based on a warm wet landscape. We had three collaborators: Wilhelm Barthlott (director of the Botanical Institute and Botanical Gardens at the University of Bonn) and two of his graduate students who helped work out the ecological design. Gabriel and Vera produced very elaborate drawings. When we presented them to Wenzel he became frantic, saying, “This will cost several million deutsche mark. Forget it! Bring me something else.” It was a bad moment for the Harrison Studio.

We were working with a separate idea for the 0.6 hectares monoculture of grass that took up the rest of the rooftop (within the perimeter walk). The idea had come from Martin Schneider-Jacoby who had worked with us so fruitfully on the *Sava River*

and had agreed to become a consultant for this work. We had begun by talking about the forests in Europe and how to think about them, but Martin said that it was the meadow system that was most endangered. It turned out that across Europe in the fourteenth and fifteenth centuries, livestock would eat grasses and sometimes young trees as well as the lower branches or leaves from mature trees. Over time, as woods were harvested for heat and housing, the forest became grassland, and different grassland types developed—from Sicily in the south, to Greece, across the Pyrenees, to the Carpathians, and beyond. Different soils attracted different species groupings, so that there were rock meadows, chalk meadows, sand meadows, dry meadows, and wet meadows. The diversity was profound.

The cattle herders had learned over the years to harvest the grasses and the flowers only after the seeds were dropped, perhaps twice a year. Over time, the rich forest floor soils became somewhat poorer, and the poorer soils attracted the greatest diversity of grasses and flowers and seedlings. The harvest preserved the system because the farmers all understood that the harvesters (in the form of cattle) were also the fertilizers, and that hooves often forced seed into the ground. There was a felicitous outcome. Deer liked the meadows, foxes liked the meadows, small birds and storks liked the meadows, frogs and small amphibians liked the meadows, many types of insects liked the meadows—and sometimes a top predator like the brown bear or the lynx would come out of the mountains

and feed. A marvelous, if only partially conscious collaboration encouraged the production of protein for people, but people were not the only beneficiaries. A whole ecosystem flourished: it was botanical, it was avian, it was amphibian, it had reptiles and a rich insect life. Martin said that this whole system was in danger because modern industry had chosen to maximize profit by maximizing the productivity of protein. To do this, meadowlands were fertilized and cut as many as six times per year for silage, which meant that only a very few types of grass could grow. The whole complex life web was extracted and replaced by a monoculture of grass in support of a monoculture of livestock. So Martin said, “You people are artists, maybe you can do something about it. After all, look at what you did with the Sava River.”

We went and talked to Wilhelm Barthlott who had become our friend as well as an advisor to the work. When he heard that we were considering constructing a meadow on the roof of the Kunst- und Ausstellungshalle he was ecstatic. He gave us a wonderful lecture on meadowlands; in that region there were typically 32 or more species per hectare, but he knew of places in Mexico where there were as many as a 100. He said, “You’ve got to meet Schumacher, Professor Doktor Schumacher,” Dr. Wolfgang Schumacher was a meadow master and a professor of geobotany and nature conservation at the University of Bonn, well known for broad expertise. We should also meet Gotthard Wolf, an expert on local meadows and part of the government program to protect them.

Later that week, a very curious Wolfgang Schumacher agreed to meet us because his colleague Wilhelm Barthlott said that we might have some common work to do. We spent a while with Schumacher, explaining that we wanted to create a meadow work for the top of the Kunst- und Ausstellungshalle. We had in mind a piece to be called *The Endangered Meadows of Europe*. He immediately became our collaborator; he thought that we as artists could make people aware of the catastrophe that meadow life was facing in a way that he as a scientist could not.

He said that he and his students had been working for many years, observing and experimenting with a meadow several hundred kilometers away in the Eifel region, and now developers were coming and they were going to dig a road through his meadow and develop it. It was very personal for him, and even more so for his students; he would lose the 400-year-old meadow that he had spent so many years learning from, and nobody would listen to him, at least where development was concerned.

Our studio called a meeting with Wenzel and Manfred, and we said we’d like to rent equipment—some trucks and several of those machines that roll up sod for golf courses—because we wanted to roll up a 400-year-old endangered meadow in the Eifel that was facing development, put it in the trucks, and drive it to the Kunst- und Ausstellungshalle. From there we would take it upstairs in the elevator (which was big and could lift large sculpture) and then unroll this meadow on the roof, on top of the existing monoculture, which we intended to starve. “What do you mean, starve?” Wenzel asked. We said, “Right now you



have a grass monoculture on your roof. If you don't water it, it will die. After it dies it will become food for the meadow that we will unroll on top of it." Wenzel called Barthlott, and he called others; he had his doubts about whether the meadow would live on the roof. We said that we would experiment with sections of the roof; if it lived there, we would cover the whole roof, and if it didn't, we would go away.

Meanwhile, we were engaged in many passionate conversations with meadow folk. Wolf, for instance, had a new meadow, very species-complex but with too much nitrogen in the soil. (You could tell there was too much nitrogen, because it was too green, but in a few years the plants would use up the nitrogen and the meadow would normalize.) Barthlott asked us, "Do you understand what a wet meadow is? If you are doing meadows, why not do a wet meadow as well?" Martin proposed a stone meadow—and a dry meadow if we could find one.

Our growth experiment on the roof was shockingly successful. The section of the Eifel that we unrolled virtually leaped out of its sod. It was so successful that Wenzel sent us out among the grasses to be photographed. A photo op—maybe we could pick some seeds, so that we look busy? (Workers in the field, as it were.) We explained that, given the season, nobody in their right mind would pick seeds; you had to wait for them to ripen. Wenzel said, "If you don't pick seeds, we'll send somebody else to pick them—we need the photo!" So we did as we were told,

doing as little damage as possible in the process. Over the course of a year, we installed the Eifel meadow, Dr. Wolf's meadow, a wet meadow, and a stone meadow. Collectively they contained 164 species, where normally there would be 30 to 35. So we had unwittingly put together what appeared to be the most complex meadow biotope in Europe. It was beautiful to behold. We designed a perimeter walk of normal grass, about two meters wide, with 14 fence structures for sitting. Each one included a wooden book-like form; by turning the plywood page you could read the English or the German version of a text. Each one featured a different meadow story and an image of a particular meadow—one from Sicily, another from Spain, another from Sweden, and so on. A person who walked the perimeter and did the reading became meadow-wise. The very last text was not a story at all; it was a proposal that the meadow was a great teacher, and that we should learn from it how to produce food so that the harvest preserved the system.

A quarter of a million people came to see the meadow. It was widely publicized and became, for the few years of its existence, a famous place. People came up to us and told us stories. (One woman said that the first time she made love was in a meadow; the grasses were high and no one could see her. She whispered, because her husband was nearby, and she thought he didn't have to know everything about her life.) We made many friends. Schumacher's graduate students continued their studies, and the scientific aspect of the work bore fruit after three years,

The meadow moved to the park of Bonn.

when new species counts were made. The 160 species had dropped to about 144—this was a normal species loss, given the transplanting—but something else had shown up. Each species grouping was comfortable dropping seed in its own earth, but none had moved. The 100-year-old meadow species did not move to the new meadow (or to the stone or wet meadow). The same was true of all; given the fact that all received equal sun and water, this suggested that earth type was a dominant feature for species settlement.

Wenzel called and said that the head of the parks for Bonn was going to be in our meadow, and we should walk with him and explain it. The city's great Rheinaue Leisure Park was very large, 160 hectares, much loved and much used (it also acted sometimes as a floodplain). The head of the parks was a very determined person—and amusing and ecologically literate as well. He said, "We've been trying to grow a meadow like this for the last 30 years and we couldn't do it. How did you do this?" "Well," we replied, "we went up to the Eifel, found an endangered meadow, and under the direction of Professor Schumacher we rolled it up, trucked it here, and unrolled it on the roof." We said, "If you want a meadow, why don't you do that? We'll show you how." He looked at our meadow, looked at the fence structures, read a story or two, and then said, "I don't want a meadow from the Eifel, I want your meadow." Suddenly it became clear he wanted a meadow that was a work of art. So we began to design what we called *A Mother Meadow for Bonn*: we would take the seed from the rooftop, prepare the land along a rather long hillside in the Rheinaue Park, and do the planting. With the help of Wolf, this meadow came into being. Then, when it was time to take down our rooftop meadow (against the wishes of many), the structures were moved to the Mother Meadow, another opening and celebration were had, and the *Mother Meadow for Bonn* was officially born.

The rooftop meadow had been opened by a speech written for it by Angela Merkel, who was then Helmut Kohl's Federal Minister for the Environment. Our original intention, doing the en-

Dr. Wolf, one of many who saw the Mother Meadow as classroom

dangered meadows, was to influence the German parliament, which at that time met only two blocks away (parliamentarians often came to the meadow). We had hoped to put in place the idea of restoring the meadow mosaic of Europe in such a way that biodiversity would again be the signatory for meadow life. (We thought that just 10 to 15 percent of the total land area committed to meadowlands would be sufficient for the original biodiversity to return and only a small subsidy would be needed.) This did not happen, although, perhaps twice a year, for three or four years, we received news that the Mother Meadow had had another daughter; as seed was harvested, meadows were installed in other parks in Bonn. There were many outcomes. Normal grass needed to be fertilized, but meadowlands needed to not be fertilized; normal grasses needed to be cut, perhaps every two or three weeks, but meadowlands needed to be harvested or cut only once or twice a year. We liked the idea that our work had encouraged the city of Bonn to reinstall, within its borders, the meadowlands that had historically been there, enhancing a new aesthetic thereby. We were also told that the grasslands along many of the free-ways that had once been cut every several weeks were only being cut only once or twice a year, enhancing biodiversity. Finally, we learned that the mayor of Bonn, who had attended our opening at the Rheinaue Park, had asked that the seed from our meadow be sent to other cities up and down the Rhine.

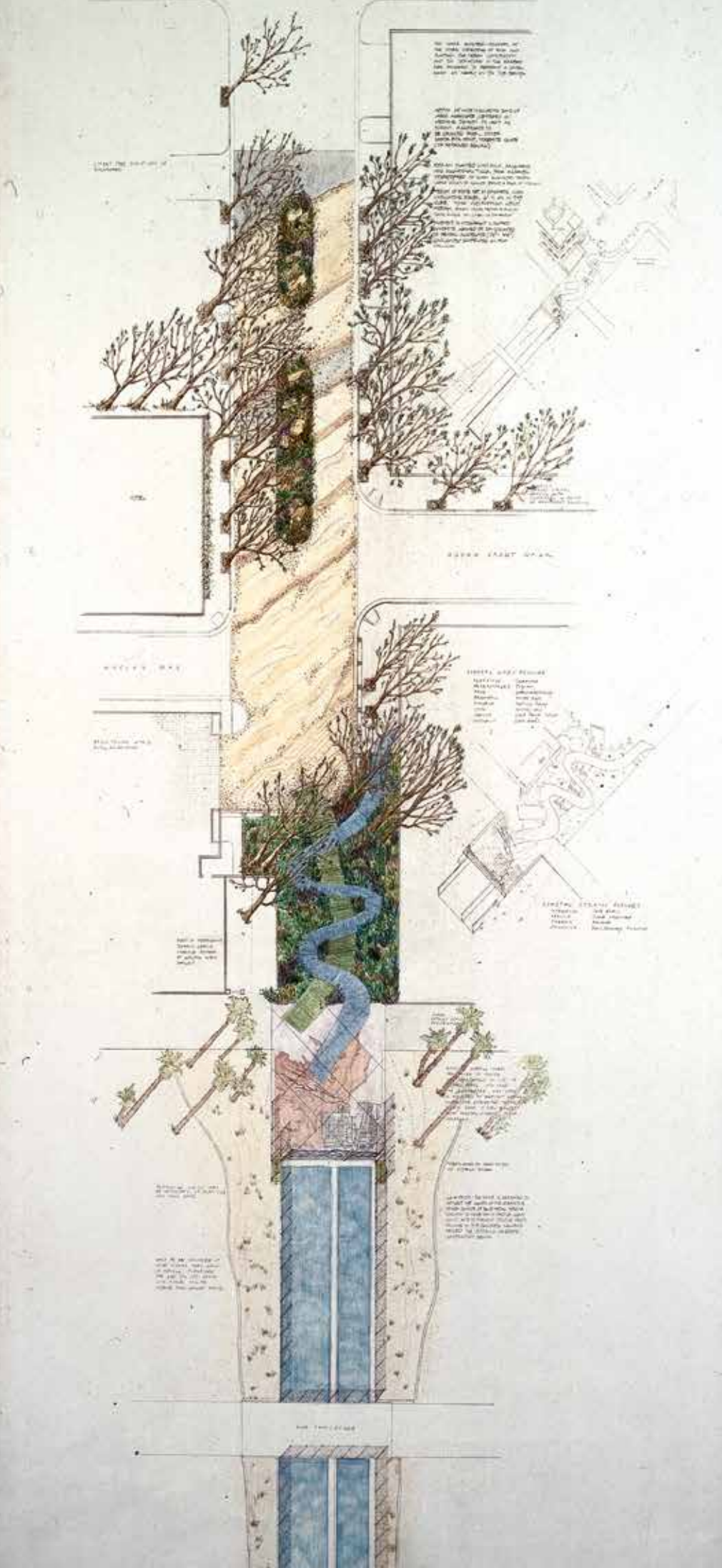


The California Wash

1988–1997

Terminus of Pico Boulevard at the

Santa Monica Promenade, CA



In 1988, Henry Korn, the head of the Public Arts Program for the City of Santa Monica, contacted us and said there was a big project in the city that he urgently wanted us to compete for. I said or you said, “We don’t compete! Why should we do another’s agenda when our own always makes more sense to us?” Korn was undeterred. He said, “You really need to compete for this, and we’ll give you 7 500 dollars just for making your presentation.” We mumbled something about not being able to be bought, but he insisted and insisted. So we went to Santa Monica to take a look.

The competition was to reconstruct the area at the end of Pico Boulevard as a work of art. It was the longest street in the city of Los Angeles; the terminus was the Santa Monica Promenade along the beach. Thus, Pico was facing the ocean. On the left was an old health spa, the Pritikin Center, and on the right, a new hotel that was under construction. This new hotel had contributed three quarters of a million dollars to make a work of art at the end of Pico, to benefit both itself and the city. Furthermore, the city saw the site as its public connection to the promenade, the beach, and the ocean beyond. Hence, the competition drew a very odd group of well-known artists: George Herms, Red Grooms, James Turrell, and then us.

A few days later, after we were told that we had won the competition, we were taken into the city offices where the officials had examined our plans and found that they were indeed workable. However, they were going to require us to obtain at least two million dollars worth of insurance (preferably five million). A very tough person said in a very tough voice that we were committed by contract to hold the city harmless where any lawsuits were concerned. Stunned, we made a choice on the spot. I said or you said, “No, we will not get insurance, we will not lose our house. We will not take the risks.” We told them to give the project to Turrell, the runner-up. He would do a good work. “He can lose his house—he has airplanes, he can lose them, too!” We turned and began to walk out, when a shocked voice said, “OK, the city will hold you harmless.”

The site was disturbing to see. If you looked down from the end of Pico toward the promenade, you saw a bridge covering the outfall that carried the overflow of sewer water and street run-

off to the ocean. We were told that occasionally a dead body would turn up there! Not a very promising siting for a work of art. It appeared that the architect/designers, who came from Boston, were not attuned to this place and had imagined a generic walkway through a generic garden that ended, basically, in a sewer: definitely distressing, but also very funny. Nonetheless, we joined up with some very interesting landscape architects from a San Diego firm called Spurlock Poirier. They insisted that a clause be put in our contract that said we could not ask them to do anything over again more than three times. Evidently, our reputation for aesthetic discontent had preceded us. They did the working drawings for the piece, which rather neatly passed inspection. It was Andy Spurlock who said, “You can’t do this work without a map, you always make maps.”

We proposed that first a pedestrian intersection be made by covering the outfall. The intersection would be public space, thus taking the space away from the hotel. (Originally, the object of the hotel’s contribution to the city for the work of art was to enhance itself.) Then we asked what happened to the streams that flowed down from the top of the Pico central drain basin. The old maps showed that the streams had been canalized, put underground in the city, catching all the dirt and garbage off the surface—and their original outfall was at the end of Pico, where this ugly, foul-smelling water flowed out to the Bay. As streams flow down to the ocean in California, they typically bring seed down from higher ground. A very special “wash ecosystem” forms as a result. With the plant ecologist Bob Perry we added native California foliage to the plan and named the work *California Wash*, creating the end of a wash ecosystem from the top of the intersection down to the promenade. Then we designed a serpentine walk to run through this garden down to the outfall. The serpentine walkway was organized so that it accommodated everyone—but instead of making a work, as many did, that marginalized the handicapped, we designed it as if there was no practical difference between the handicapped and everyone else. It was lovely. All those from the city who looked at the design said it would fail because the skateboarders would knock the handicapped over. So we went and interviewed skateboarders and described our work. They said that nothing we could do would keep them off the pathway; anything we tried would only be a challenge



The outfall
at the bottom of
Pico Boulevard

The outfall
exchanging waters
with the bay

to them that they would overcome. So, we did nothing. But we noticed, when it was finished and in use, that when a person in a wheelchair or with a cane (or other visible handicap) appeared, all skateboarding stopped. There were no accidents; no skateboarder knocked over or intended to knock over any handicapped person. In fact, it was easy to avoid them, and it was ignorant of us to ask such a question in the first place. We simply had not recognized the potential for the civility of social capital to operate.

It seemed to us that the objections to the walkway, and later to our design for covering the outfall channel, were taking attention away from the larger image we had in mind, which was to make an ecological narrative with the wash garden in the center and other elements of equal importance moving backward up Pico. We had photographed striations in various places in the hills up and down the coast, revealed by wind and ero-



sion (as along the mountains below Tijuana) or water. There were sufficient funds for us to design a series of striations in the pavement that went down Pico from about 15 meters below Ocean Avenue all the way to the wash garden and then beyond the wash garden across the outfall cover to a piece that we entitled *Wave Fence*. *Wave Fence* marked the end of the work (and, incidentally, kept people from falling into the outfall). The large outfall cover gave us a pavement “canvas” in which to incise a topo map of all of Santa Monica, with striations running through it. Thus the terminus of Pico Boulevard was transformed to read as if it had been carved out of rock by flowing waters. (Later, cars running up and down the street often turned the pavements on the street gray; the hotel had refused to power-spray the streets to keep the color fresh.) We had constructed *Wave Fence* such that if you stood on the path late in the afternoon or early in the morning, especially with fog coming in, the fence would visually join with the

ocean. In our minds the striations, in various browns and ochres and grays, represented (in part) a dry streambed. We were attempting to symbolically establish a riparian motif and so had sycamore planted on either side as street trees. Sycamore (along with poison oak) is typically present in riparian habitats.

In the center of the street were two large islands that separated the traffic going in opposite directions. In lieu of conventional landscaping we invented a chaparral ensemble in dialogue with the wash garden some 45 meters below. We had the naive notion that the wash garden might reseed itself, thus creating a seedbed that might be used in other wash gardens. Because chaparral was disappearing from the area, we thought that it could serve as a reminder of what had been lost through the traditional wall-to-wall development, with its ecologically irrational green spaces here and there. We had in mind a complex ecological narrative that, when decoded, spoke of disappearing

The scale model



The walkway done with gardens just planted



Construction



Two years pass and the *California Wash* garden matures.

ecosystems and unhealthy land transformations. The piece was perhaps 137 meters long. It turned out in the long term that everyone liked its parts, but very few put it together as a story—almost a fable—as we had hoped.

This sounds like the end of the story, but while we were working on the piece, the hotel went bankrupt. The new owners did not like our wash garden and thought ecology was for fools! They wanted a colorful garden with petunias to match their window boxes. So the hotel had a fight with us. But they also had a fight with the city about management, funds, and who would be responsible for the garden, each believing the responsibility belonged to the other. Meanwhile, we and the city were having an intense disagreement with California Flood Management. They didn't like our 762-meter outfall cover, demanding that it be made strong enough for heavy trucks (it later proved to be so). Work slowed down. But the wash garden of native California plants was put in, designed by Bob Perry and elaborated somewhat by Leslie Ryan. The beautiful serpentine walk was constructed. The outfall cover was redesigned to city specs, costing them over a million dollars.

Six years passed. Due to the various conflicts, *California Wash* remained unfinished. The monies, which had been deposited in the bank, had increased to over a million dollars. We learned that if the city did not appropriately maintain a work of art, the artist could demand the city return it.





The outfall cover with view to the Santa Monica pier

Wave fence in relation to the map of Santa Monica

The buried stream system made evident

Armed with this piece of information, we let it be known that we might want our work back: several hundred tons of concrete; a 232-square-meter wash garden; a 15-meter, several-ton metal fence; a 232-square-meter outfall cover, and two island gardens, designed with chaparral habitat. Would they kindly deliver this work, in its entirety, to the artists' studio in San Diego? There was consternation; did we really mean this? We expected the city to call our bluff. But in two weeks, flood management and the city reached their agreement. The hotel stopped asking us to turn the beautiful wash garden into a petunia field. Gabriel Harrison and Vera Westergaard of the Harrison Studio managed the construction and installation. The work opened to fanfare and good reviews and won an award for Excellence in Concrete Construction from the American Concrete Institute. Given our history, this award was definitely bizarre to receive! Finally, it was nice to discover that we could design a serious ecological work for a street corner. It was curious to experience an odd form of social capital as skateboarders automatically became still in the presence of a handicapped person. (More amusing, the hotel suddenly got to like our garden because its clients complimented them on it.) An early criticism of the work was that, while it made the area visually attractive, it was using art to hide an eyesore—namely a particularly obnoxious water outfall that was bad for the bay. We had argued that the very presence of our work would create social pressure for the city to put in a purification system, which they soon did.

Over the years of contention the wash garden had matured; as a subtle assertion of power the hotel introduced an almost invisible row of exotic flowers at the top of the garden. One day, in a rather large and luxurious meeting room, the owners explained that they had bought the health resort next door and were going to turn it into another high-end hotel. They had a little parking problem, and it would be convenient for them were we to permit a driveway and automobile access into the hotel next door to move through the upper part of our work. They said they would make it worth our while, very much worth our while. I said or you said, "No."

Wave Fence



Casting a Green Net

Can It Be We Are Seeing a Dragon?

1998 The Bluecoat Gallery,

Liverpool, Great Britain

1999 Ludwig Forum für

Internationale Kunst,

Aachen, Germany

2003 Ronald Feldman Fine Arts,

New York

In late 1996, we received a call from Ian Hunter and Celia Larner in Manchester, Great Britain. Ian and Celia were the people behind the Littoral trust, a social and environmental change non-profit organization, and they invited us to spend time with them to engage the Pennine landscape of northern England. So we flew over from Germany, where we were working on the endangered meadows, and spent a week together, driving the Pennines. With them we developed our first Pennine work which addressed the Mersey Basin (the catchment area of the Mersey River and its tributaries). They took us to the top of the Mersey drain basin. We spent time in the moorlands tracing the modest little stream that later becomes a rushing river. We made a very large map of Manchester to look at the city. It turned out that the design of Manchester caused it to read like a star in the landscape: valleys that moved into the city were undeveloped and read as green against the higher grounds on which Manchester expanded. At that time we had begun the process of scanning for icons of great scale in the landscape, much as we had discovered in the Pacific Northwest, in Leipzig, and in the Netherlands.

Ian and Celia had developed a seminar in Suffolk, where we presented the *Sava River* work, among other pieces. At the back of the audience was Robert Hopper, the director of the Henry Moore Foundation. He and Lewis Biggs, the director of the Tate Liverpool, were putting together a large exhibition to be called *Artranspennine98* in which artists would work in the Pennines and particularly in the cities of Liverpool, Manchester, even Leeds, as well as the countryside. He asked Ian and Celia to arrange a meeting with us. Within the week, we met with Hopper and Biggs at the Henry Moore Foundation, and they asked us to participate in their exhibition. They had an agenda for us: Since we did big works and we sometimes connected things that were far away from one another, could we invent a sculpture walk from Liverpool to Leeds, some 64 kilometers away? The challenge was how to respond politely, as this was a terrible idea. We explained, regretfully, that sculpture walks of that dimension didn't really work

in our experience; there were too many freeways to cross, and we wondered who would want to do such a walk. Moreover, there probably weren't enough sculptors of merit to populate a walk that long. We had already decided to do an ecological work that networked Liverpool on Merseyside across the Pennines to Hull on Humberside. We didn't tell them exactly what we expected to do, but they did agree about the former matter and accepted in principle the latter.

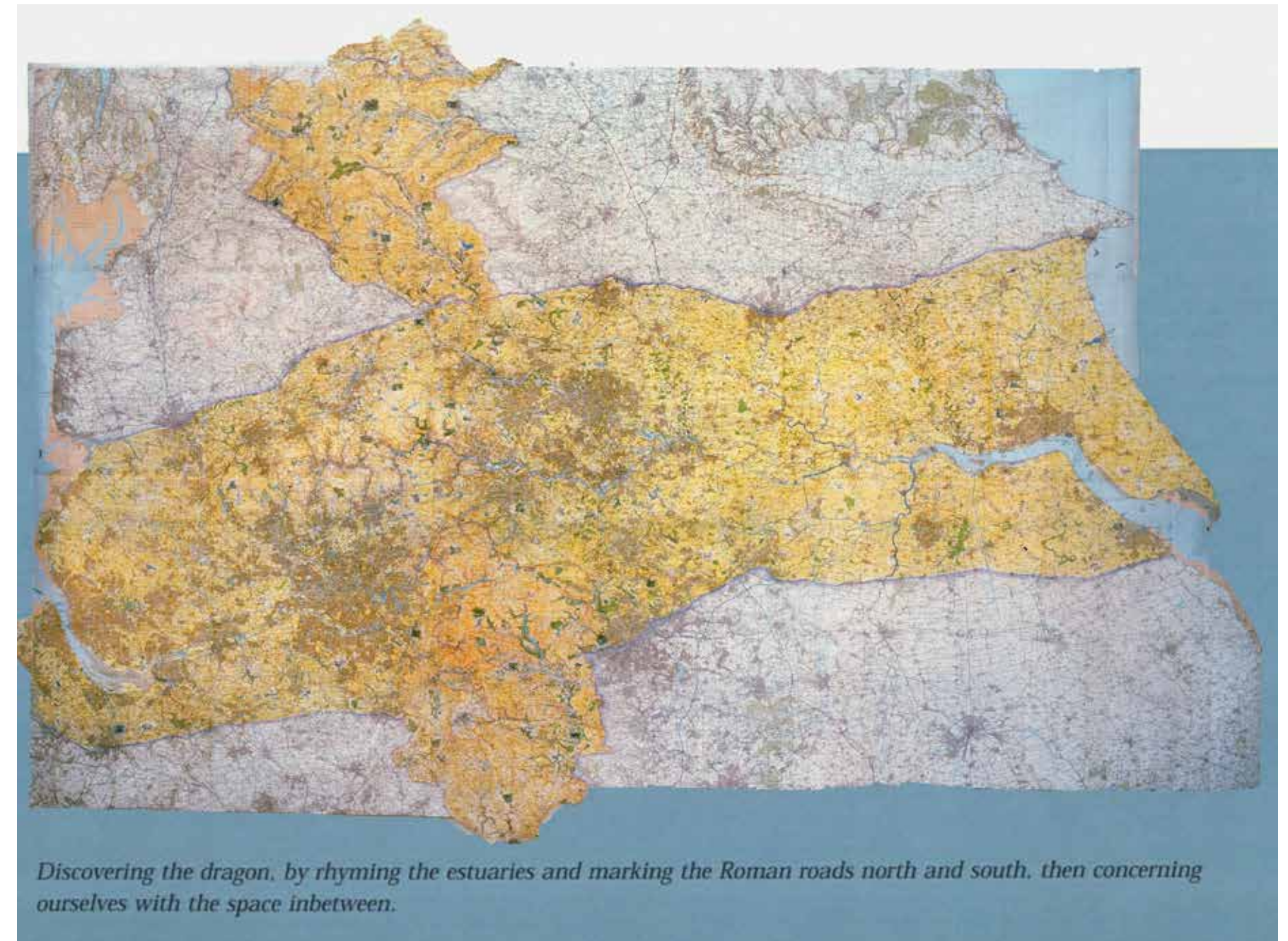
It happened that Elsa Leviser, a landscape architect with whom we had been in touch in the USA, was then teaching environmental design at Manchester Metropolitan University. She contacted us and invited us to teach a course, as she liked our work and our ways of thinking. Almost all of our work happens out of what one might call a best moment, or as Fritz Perls (with whom we had worked some 20 years earlier), used to say, a "mini satori." Many people have some variation of this kind of experience; we called it "instant knowing." Thinking about the project, Helen suddenly said, "I imagine myself standing at the outfall of the Mersey River, very tall—perhaps hundreds of meters tall—with an expandable net, and having the strength in my arms to cast this net from Liverpool across the Pennines to Hull." She continued, "This net has magical properties, as it will only land where green wants to be, like the hedgerows that once existed or the meadow boundaries that once existed and the many green fragments that presently exist." We said that we would develop our course around a project. Elsa was delighted to agree. She arranged the course and got us a big room to work in, with David Haley acting both as graduate assistant and project manager at Manchester Metropolitan University. With our students we put together a topo map that expressed the terrain from Liverpool to Hull. At a scale typical for our mapping exercises of 1:500 000, it was almost 2.4 meters tall and four meters long; it began with the outfall of the Mersey River on the Liverpool/Irish Sea side and ended at Hull with the outfall of the Humber River into the North Sea.





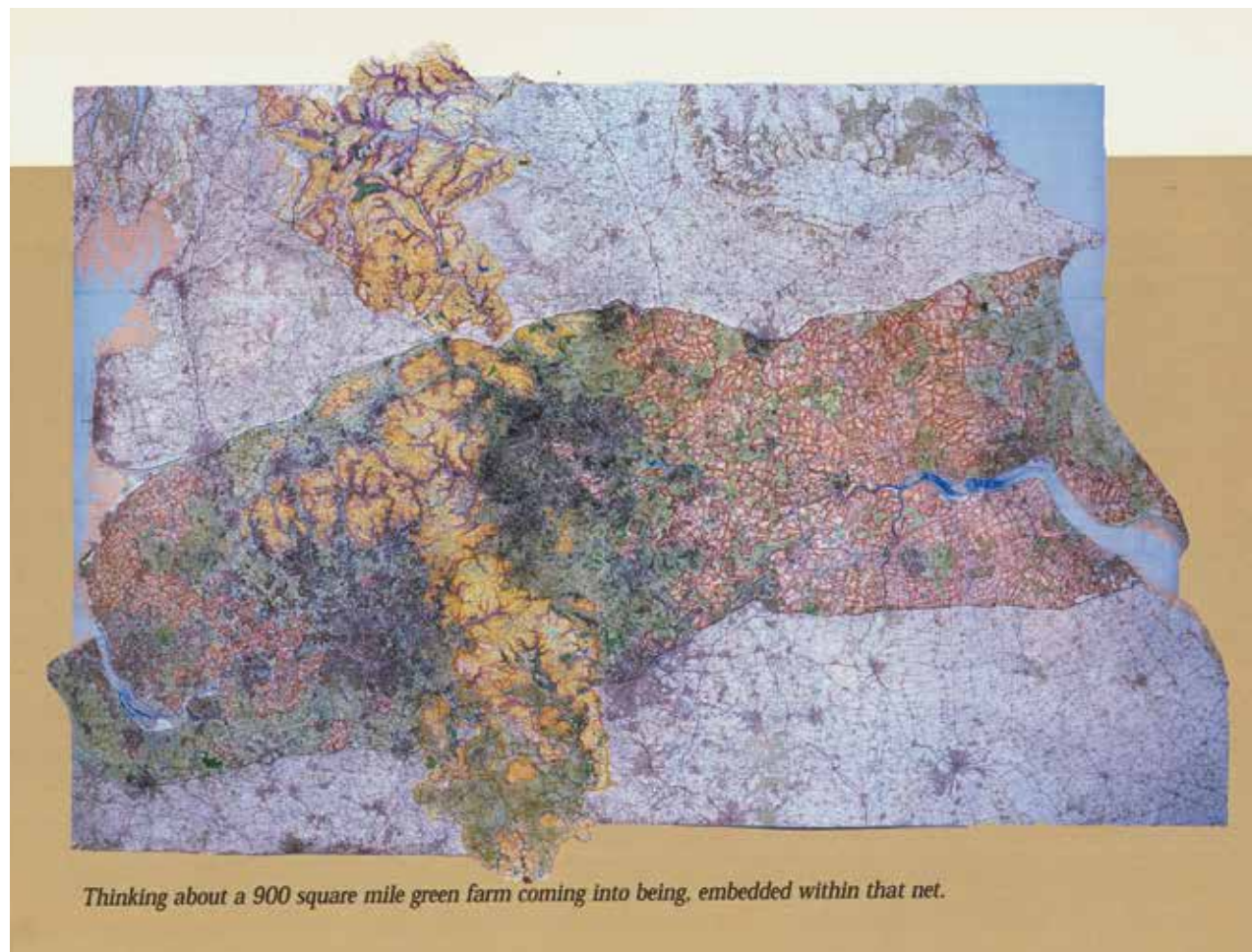
Eight images from the body of the Dragon

Sunlight on the Dragon



In a van with a group of students, while driving one of the ancient roads constructed by the Romans, David pointed out that there were two Roman roads, one to the north of us and one to the south which were about 48 kilometers apart. That day we went back to the studio and drew the Roman roads on the large map as boundaries where Helen's net would land. We then looked at the great national parks farther north and south—the Yorkshire Dales

and Peak District, respectively. We outlined them as where the more extreme parts of Helen's net would land. Standing back, one of us said, "Can it be we are seeing a dragon in flight, with a lake as an eye?" All agreed: We were seeing a dragon. So the work, in a single day, gained its guiding metaphor, its shape as icon, and its purpose. We filled in the shape with a saffron yellow and it became the first version of the icon: Sunlight on the Dragon.



If market forces take over, then development will take place on the cheapest land for the greatest profit. And development appears to be such that a multitude of village life and small farms will disappear if development is not tuned to the Dragon. The outcome will be a loss of a large quantum of village life and the history of place.

Installation at Ronald Feldman Fine Arts, New York



David Haley, a masterful networker, began introducing people to our working process. (In fact, we were running an open studio, not so different from the open studio in Holland.) John Handley, a land planner and professor at Manchester University, brought his friends in one by one and then his classes; they began to study our method of using maps (he had never seen mapping used at this scale and with this effect). Then David brought a landscape architect who was in touch with ley lines and his companion who was straight out of theosophy. They were very cold and awkward. After we shook hands in the English manner, they asked what we wanted from them; their response to our work and perhaps some help, we replied. The companion—obviously suspicious and clearly in testing mode—said, “Please point out on the map where you think we might be of help.” I, Newton, went into another state of mind that I sometimes achieve and began walking back and forth in

front of the Dragon. (By this time the Dragon was a very real entity to me.) I reached out, touched a part of the map, and said, “Perhaps we should begin here.” She became very still, then said, “That’s where I was born.” I continued walking the map, my hand reached out, I touched another point. They both said, “That’s where we live and work.” I walked, I reached out, I touched a third place. They said, “That is where we are doing an experiment” (but they were careful to not say what it was). They then became very animated, looking at the Dragon. They said that the bottom edge had many ley line points running through it, as if they were lifting the Dragon itself. After some study they suggested that the Dragon might be creating its own ley line and shared their research with us. Later, a group of very colorful African women visited and wanted to know why we didn’t do work in Africa. We said that no one had invited us, and without a serious invitation there

Installation at the Ludwig Forum für Internationale Kunst, Aachen, Germany



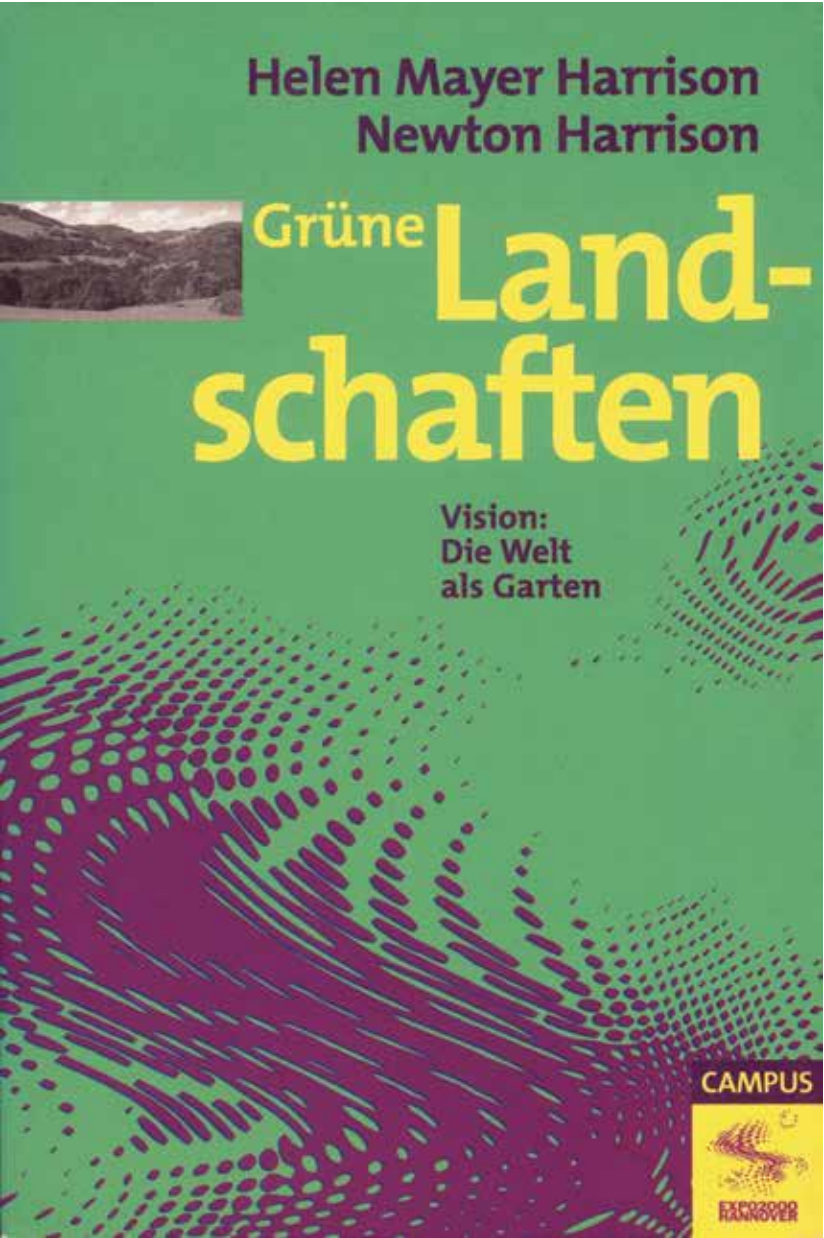
wasn’t much we could do. The most useful visitor was Les Firbank, a biologist and land-use researcher at the Centre for Ecology and Hydrology. Firbank was studying land-use change and its consequences for biodiversity, and he was astonished that we were proposing a future landscape with serious transformations having little to do with preexisting ideals. Over time many came, and a warm community formed around the emergence of the Dragon. There were exceptions. David had encouraged a historian of note to come and look at our Dragon piece. The African women had just left the studio. The art historian announced himself, walked quickly around the studio, looked at the floor, looked at the ceiling, glanced at the work, and left without speaking. Jamie Saunders, a permaculturist and futurist who worked as a sustainability coordinator in city government, took a look at the maps and asked whether we knew that the Dragon was part

of a trade route (E20) being planned by Great Britain and the European Union that began on the west coast of Ireland and crossed the Baltics to end in St. Petersburg! He began to imagine the flight of the Dragon. We withdrew into ourselves and began writing the story of the route, tuning the writing to the Dragon. Thereafter, with the student group, we made four more maps of the same size and scale as the first, locating the Dragon on each map. The Dragon told us stories, and the stories told us what the Dragon wanted to happen within its boundaries. The work, which ultimately consisted of words, images, and narratives, proposed a transformation that would permit biodiversity and cultural/economic diversity to co-evolve across the Pennines. It was first exhibited at the Bluecoat Gallery in Liverpool, then at the Ludwig Forum für internationale Kunst in Aachen, Germany, and finally at Ronald Feldman Gallery in New York in 2003.

The World as a Garden

1998–1999

Presented variously at conferences



In late 1998, we received an e-mail from Franz-Theo Gottwald, the Director of the Schweisfurth Foundation in Munich. Gottwald was part of a group of people who had helped to put together the forthcoming Expo 2000 World’s Fair in Hanover. He made clear that their original intention was for this World’s Fair to be about how all kinds of human enterprises were working with environmental problems. Then a director from a Belgian bank was hired without consultation with his group. McDonald’s was given the Green Food franchise! This new version of the fair was about paying an outrageous amount of money per square meter of exhibition space. His group was both marginalized and outraged; taking a contrarian position, they were funding 10 or 11 books about the future of Europe. A distin-

guished person or group would write each book, which would take up an issue of consequence. The subject matter would vary from refugees, to food, to economics, to the social order, and—where we fit in—to the environment. “After all,” he said, “we have studied your *Serpentine Lattice*, and your watershed works on the Mulde River, and the *Endangered Meadows of Europe*, and your work in Holland on the Green Heart. We have concluded that we need at least one artist in our group of writers, and we know of no other whose grasp of the landscape, both ecologically and politically, has the diversity, scale, and insight that you have—and you can write.”

A little bit awed, we walked away from this conversation and returned to our studio in San Diego and put together a large map of Europe, from the British Channel across the Carpathians, the Russian plain, to the Urals. We used an everyday topo map with all the roads emphasized and the rivers present but barely visible. After a few days spent penciling out the roads and enhancing the rivers, something formerly invisible became very clear. The Dniester River began in the Carpathian Mountains and flowed into the Black Sea, dividing Moldova from the Russian plain. The Vistula flowed off the Carpathians to the Baltic, more or less dividing Poland from the Russian plain. Backing off from the map, the visual difference between the newly visible Peninsula of Europe and the Russian plain was startling, the geophysical differences profound. When you looked at the Peninsula of Europe, you saw that it was surrounded by water on three sides. The Vistula and the Dniester began in the Carpathians, only 48 kilometers apart, which meant to us that the Peninsula of Europe was connected to the Russian plain only by a strip of land about 30 kilometers wide; the fourth side also had wetlands adjacent to the two rivers. When we stood back and looked again, we saw that the salient feature in the newly visible Peninsula was the high ground, the mountains. It looked to us like we had a field of play. We called Franz-Theo, sent him a small drawing, and told him that we would write the book—as we had arrived at what, from our perspective, was a reasonable definition of Europe.

It was clear that the Peninsula of Europe (as we were defining it) and the European Union (as it was enlarging itself) were becoming quite close to the same thing (with the exception of Turkey, which nonetheless looked promising for the future). We

had been amusing ourselves by reading *The Web of Life* by Fritjof Capra, in which he discusses the “Santiago theory of cognition” as laid out by Humberto Maturana and Francisco Varela. Basically, the Santiago theory argues that life—that is, livingness, or intelligence operating embedded in livingness—can be defined as anything that knew what was good for itself and did it, and knew what was bad for itself and avoided doing it. In its simplest form, you were talking about bacteria, and in its most complex form, human beings. Therefore, they argued that intelligence was not the same as consciousness; intelligence could and did operate in the absence of a central nervous system. Moreover, drawing from Ilya Prigogine’s notion of “dissipative structures,” they argued that all living things, to be living things, were a priori dissipative structures, taking in that which was good for themselves, dissipating that which they were finished processing or which was no longer good for themselves.

In a mad moment, we asked the question: Would it be possible for a subcontinent, with everything on it that was alive, to make an ensemble decision—mostly unconscious —to do what was good for itself and to avoid what was bad for itself? That is to say, could an ecological vision be applied to a subcontinent? This question, the metaphor implicit in it, and the entailments that flowed from it, became the subject matter for this book: *Grüne Landschaften. Vision: die Welt als Garten (The Green Landscape: The World as a Garden)*. In the process of writing this book, it became clear to us that the subcontinent was about to undergo great stress from overpopulation and concomitant stress from the lack of fresh waters. After intensive scrutiny of the river systems, we made a choice to define the high grounds as the area in which the rivers began (replacing the alpine tree line as a geophysical boundary), which revealed a shape of roughly 1.3 million square kilometers. The book ended with a proposal for the regeneration of the high grounds of Europe to secure ecosystems and water supply. Except the book didn’t end there to our surprise and then, to our dismay, the editor added a page or two of his own about what we ought to do and what we should do and signed our names to it.



The exhibition in Potsdam, Germany, in 2001, where the *Peninsula of Europe* becomes, through the process of azimuthal equidistant projection mapping, the center of a world

Peninsula Europe

Part I:

The High Ground

Bringing Forth

a New State of Mind

2002 Ludwig Forum

für Internationale Kunst,

Aachen, Germany

Les Abattoirs, Toulouse, France

Kasteel Groeneveld, Baarn, Netherlands

et al.

Early in the year 2000, we were in the Netherlands. It was a propitious year. (The news had been all about how computers globally were going to break down due to Y2K, the switch from the twentieth to the twenty-first century. It was a hyped anxiety and the catastrophe never happened.) The Green Heart of Holland work had just been reinstated when we received a call from Franz-Theo Gottwald, the director of the Schweisfurth Foundation. He said that ours was the only one of the commissioned books that actually had a proposal in it; did we want to do anything with that proposal? Our response straightaway was that we’d like to make an exhibition—after all, that’s what we did best—that would carry the proposal. However, the proposal we were making posed a remarkable question: Would it be possible to regenerate the 1.3 million square kilometers of the high grounds of Europe? The idea was to enhance and guarantee the flow of fresh waters that were now endangered by overuse, hints of drought, and the as yet unproved suspicion that global warming was going to have very dramatic negative effects. We requested he call a meeting with a senior member from the European Union, several powerful ecologists (with particular ex-

pertise from the Carpathians across the Massif Central to the Pyrenees and beyond), someone with a feeling for the way European taxes worked, and at least one economist. Franz-Theo wanted to know why we would want such a meeting and what we hoped would come from it. Our reasoning was simple enough: if everyone agreed that our concept for the high grounds had merit, we would move forward with the exhibition and elaborate the proposal. If, however, they really disagreed, we would not proceed. We needed a bunch of tough-minded people to take a look at what we were doing and comment on it—very academic, very much not what art was normally about, and very risky from an academic perspective. The meeting was held. The ecologists, Dr. Georg Grabherr and Dr. Martin Schneider-Jacoby, after looking at maps, hearing us present, and questioning us rather closely, agreed that the effort was a worthy one. They thought it speculative, therefore something that scientists would never take on, but were we to make discoveries of consequence (which appeared likely), both science and society in general might benefit. The economist was more or less silent; the numbers were too big for him, and he was not ecologically literate. Resistance came from a representative of the European Environment Agency, who said such a proposal would cost hundreds of millions of euros. We said, “Think billions.” “Where would the money come from?” he asked. “I would never approve such an adventure unless I knew where the money was coming from.” I, Newton, went to the blackboard and made the following list of calculations.

One cubic meter of water coming from the mountains tends to be reused five or six times before ending up at the sea. One cubic meter of water typically is worth one euro, less under some circumstances, more under others, but generally one euro. Let us imagine that glaciers retreat, snow becomes rain, and an important river, perhaps the Oder River, experiences flood and drought with dramatically reduced flow during drought periods. Let us imagine we are looking at a loss of several billion cubic meters of water. Let us imagine we have spent nine billion euros, ecologically redesigning the high grounds of the Oder River watershed, dropping the loss of waters dramatically by 75 percent

“Now,” we said to our European Union representative, “if we have saved three billion cubic meters of water with an expense of nine billion euro, why then, the cost of ecological redesign would be paid for within three to four years. Thereafter, it’s mainly profit outside of normal maintenance.” We suggested that he do a similar calculation for each of the major rivers in Europe that would be threatened in this manner. He said, “I don’t have to do that calculation,” and said that we should simply go for a European Union grant. Getting a European Union (EU) grant required repeated trips to Brussels and a presentation to the body of parliamentarians who were responsible for cultural grants. We briefly showed them our redrawing of Europe, of the peninsula. People understood the framing and the mountains becoming a figure in a geophysical field; they also understood that we were trying to express a relationship between the evolution of culture and the evolution of diversity in ecosystems, watershed by watershed. However, an exasperated parliamentarian from Italy said he knew the Apennines well and didn’t think there were anything like the number of rivers we had drawn there. We agreed that he was right, in the sense that we had delineated all watercourses, whether they were year-round streams and rivers or dry streambeds that filled only during the rainy season. But we countered that whereas the mapmakers had privileged all the roads, we had chosen to decommission the roadways and privilege the waters. He didn’t like the answer too much. Other meetings were held. One particularly exasperated, very senior administrator explained to us in detail why he had concluded that democracy, at least in the EU, was failing. It was about so many different opinions being given equal weight that had the collective effect of neutralizing decision-making.

Our grant application to the European Union culture program asked for only 150 000 euros. They demanded deliverables: How many catalogues, in how many languages, would be published? Were there museums of consequence in three different countries that would commit matching funds? Were there posters? How many television appearances did we expect to make? How many people would come to the exhibitions? It took us a



Seeing the geophysical heartland of Europe
As a peninsula
Extending from the continent of Eurasia
With Ocean boundaries
Co-joined by the Dniester and Vistula Rivers
separating it from the Russian plain
making it almost an island
I said
“It’s an array of drain basins cradled by the mountains
formed by the pouring forth of the rivers
that begin in the high grounds.”
You said,
“Most of Europe’s water begins there.”

A public school map is chosen as a study in order to find the simplest forms for *Peninsiula Europe* and the simplest way to differentiate the *Peninsula of Europe* from the Russian Plain and the Urals behind it.

year, but we fulfilled all their demands. The European Union grant came, as did 250 000 euros from the German Federal Environmental Foundation, the Deutsche Bundesstiftung Umwelt. (Franz-Theo had taken us to their offices in Osnabrück; they had a dossier on us, having funded a conference on the *Endangered Meadows* work. They also had material on other projects and thought our funding request was reasonable, even modest.) As per requirement, three museums in three countries committed to the work, agreed to dates, agreed to matching funds (both soft and hard money), and agreed to the “deliverables”—a term that we didn’t like at all, since it didn’t allow for accident or chance or improvisation after the fact. The three institutions were the Ludwig Forum für Internationale Kunst in Aachen; the Musée d’art moderne et contemporain de Toulouse et FRAC Midi-Pyrénées (also known as Les Abattoirs); and the Kasteel Groeneveld national center for forest, culture, and landscape in Baarn. We formed the Harrison Studio in Berlin and proceeded to work. Having defined the field of play, which was the peninsula itself, we laid out the guiding metaphors that would drive the work. They took the form of a prophecy that followed the direction of thought in the book *The World as a Garden*. The guiding metaphors began as an elaborate question, framed as an array of statements; in short: Can entityhood become a domain of stability?

Is *Peninsula Europe* at a bifurcation point?
At a point of change and self-transformation?
After all, from the Romans through the Middle Ages
through the Renaissance
the Enlightenment

from Modernity to the Now,
that territory we call Europe
has many times rebuilt its landscape
economically, politically, culturally.
It has rebuilt its belief systems
and rebuilt its ecosystems.
Now we imagine a new set of emergent properties
suggesting this is indeed a bifurcation point in a state of becoming
a point of reorganization of its own complexities
into a new form of entityhood.
If so
Peninsula Europe becomes the center of a world.

Peninsula Europe moves towards entityhood
when its boundary conditions become
more permeable
to what it understands
as contributing to its well-being
and
less permeable
to what does not.

Peninsula Europe moves towards entityhood
when its discourse
can focus on the carrying capacity of its terrains
for industry, farming, fishing
information production
and cultural divergence.
Peninsula Europe moves towards entityhood

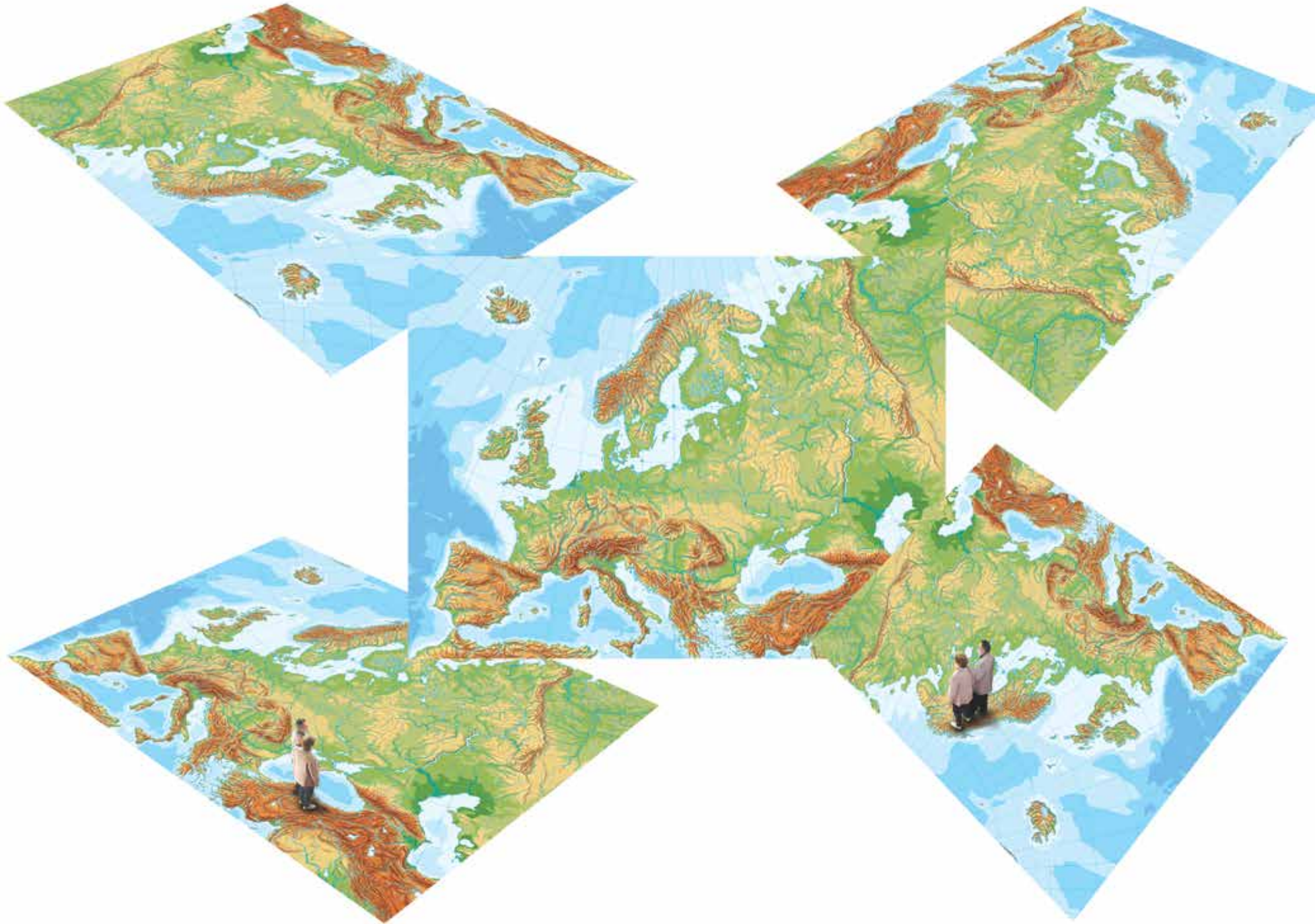
as it transforms its wastes
into that which is useful and valuable
while successively reducing the wastes
that are damaging to itself
and when
its organic waste disposal
becomes a vast topsoil regenerating system
insuring green farming
remodeling its food production systems
on natural systems.

Peninsula Europe moves towards entityhood
when its river systems, estuaries, ocean edges,
forests, wetlands, meadowlands, and eco-corridors
are valued sufficiently
and enabled to co-join
into a complex biodiverse life web
self-sustaining in nature
an eco-net of the whole
and its high ground, grassland, forest communities
contribute ecological redundancy, continuity, and mass
at a continental scale.
Peninsula Europe moves towards entityhood
when its diversity of cultures is protected
and they are valued for themselves
and are encouraged to be seen as self-creating entities
adding improvisation and creativity
diversity and uniqueness to the cultural web.

Entityhood happens when each part feeds value to the whole
and the whole complicates itself
following the natural laws of self-organization
and creating a complex entity.

The first thing we designed with our team was a body of watershed works: a ring of many floodplains for the Oder River ending in Germany and another for the Garonne River near Toulouse. Then the Rhine, then the Mulde, and finally, the water system for Vienna, which was the best, producing about

400 000 cubic meters of water per day for the city. Vienna drew its water almost entirely from the karst mountains of the Alps; their system had been implemented more than 150 years before, and they had carefully protected the watershed and the high grounds that supplied the city's water. In attempting to do a map of the European watersheds, we found that nothing matched anything else, as each country had its own mapping form. So we invented a watershed map for all of Europe, posing the question for which there was no answer: Who is attending to the connectivity of the whole?
We did research and located the rainfall data for the whole of Europe, coming up with a few figures writ large upon the land. The population of the Peninsula as a whole was about 450 million people, but the population of the high grounds, well over a third of the terrain, was only about 40 million. Of the Peninsula's 3.31 million square kilometers of land, about 1.46 million square kilometers were in the high grounds, but more than half of the total forest was in the high grounds. Most revealing, however, was that in the whole domain there appeared to be about 25 000 square kilometers of urban land, but only 2 100 square kilometers of urban land in the high ground. There was relative openness of terrain in the high ground and a relatively low population; with the low population the stress of the needed transformation would be not nearly so great as if the lowlands of Europe faced the same difficulty. By "needed transformation" we mean that the systems shock causing glacial melt requires a co-equal effort on the part of civilization to assist the upward movement of species in such a manner as to counter the negative impact of glacial melt and the absence of snow melt.
Big figures were an empowering aid to thought, invention, improvisation, and play. For instance, using the new definition we had arrived at for the high grounds, which was where the waters began (or at about 366 meters and up), it was easy to draw the boundary line on the map. When drawn on an overlay and lifted off the map, it became what we called the "icon", defining the area and the scale at which work would need to be done. We assumed that global warming would dramatically affect the high grounds; much of the ecosystem would die out. Almost half a million square kilometers of forest (which actu-



From a bird's eye view
no matter which way you look
the forms of the Russian plain
are distinct and separate from
those of the European peninsula.

Focusing on the Peninsula alone
the high grounds emerge as figure
the lowlands as field
the waters as frame.

Continuing to look
the heartland of Europe is surrounded by waters
with its eastern boundary
divided from the Russian plain
by the Dnestr River
flowing south from the Carpathians down to the Black Sea
and with the Vistula flowing northward to the Baltic.
These rivers form a boundary
leaving a physical land connection to the Russian plain
of perhaps only thirty kilometers.



Mapping the results of research: 650 000 square kilometers of forest, mostly in the mountains, mostly tree farms, and mostly susceptible to climate change. Same with the pasture

ally constituted a factory farm with inappropriate tree species) would be subject to disease, insect infestation, and fire. Thus, to secure water downstream a whole new ecosystem would have to be invented. How would we know the shape of the terrain if we did not first know where the rivers began? How would we have realized the shape of this terrain if we had not had the help of the skilled mapmakers of Act’Image in Toulouse who simply lifted it off the map for us?

The work was first exhibited in a partially unfinished state in the Potsdam city hall as a test. There was a conference, and many people came. Georg Grabherr gave a wonderful talk. Some thought the rough presentation strong, others wished it were more finished.

Several months later *Peninsula Europe: The High Ground* was due to be exhibited in Aachen, at the Ludwig Forum für Internationale Kunst. The director of the museum, whose position was tenuous, had agreed to match the funds as required by the European Union and to do the exhibition. When it came time to proceed, a new person had more or less taken over and didn’t like *Peninsula Europe* that much; they were canceling. Franz-Theo, outraged, said, “We have a letter promising this exhibition.” He found out that the Aachen operation was in part funded by the city; he called up the Lord Mayor and told him that the Schweisfurth Foundation was going to sue the city and possibly the museum. The Lord Mayor called up the head of the museum and said it was now decided that we could have the show. (This required building about 30 meters of wall to enclose space, which they did.) The show was successful. People in Aachen were surprised at the content of our work and asked how we had gotten to where we were. So we produced an addendum to the Peninsula Europe catalogue, entitled *From There to Here*, which began with urban farming and included images from the *Endangered Meadows*, *Sava River*, *Green Heart Vision*, and *Dragon* works. Conferences were held; classes came from the schools in the region. On the most interesting occasion, poet Jerome Rothen-

berg, ecologist Martin Schneider-Jacoby, a remarkable film critic from Romania, and a representative from a Hamburg ecology group took the stage together. Did a peninsula of this character actually exist? If so, was the vision of consequence?

A few months later, *Peninsula Europe* opened in Toulouse, and the catalogue was translated into French. The senior curator, Pascal Pique, told us that since we were exhibiting our large floor piece and icon in a hall that had a Pablo Picasso tapestry, we had to make our work larger in order to hold the space as well as Picasso. (If they were going to take the Picasso down, they wanted something at least as large to replace it.) So we called our mapmakers in Toulouse. They produced the work at larger scale, and all agreed that we had successfully competed with the master. (We rather thought not.) Many classes came from local schools, and we noticed that the floor map was so big that one group of students could stand on the Carpathians with another on the Pyrenees and holler local recipes back and forth. We had convinced the museum director that the lower gallery (where we had replaced the Picasso tapestry) would benefit from a new version of *Making Earth*. We felt that this was important because the earth in the high ground was itself to some degree endangered—by acid rain (which changed the soil chemistry), by the overuse of fertilizers, and by erosion (which we thought would become more evident as warming took place). We made a box about 76 centimeters wide by 61 centimeters deep and maybe six meters long. In it we put clay, river loam, and all kinds of manure and to change the aroma in the room to something less pleasant we added sewage sludge. Day three was a shock to the museological sensibility; the mix evidently contained an abundance of horsefly larvae. The warmth of the museum, the turning of earth, and the application of water set off a horsefly explosion that rapidly spread throughout the whole museum. It was an undesirable, unintended consequence. We explained to a group of agitated curators that it was a normal part of doing this kind of work (which it was not) and that patience was required as these insects were short-lived. In three days, the museum was clear again. We were not entirely forgiven.

A Few Figures Writ Large upon the Land

- 420 000 000 population
- 3 315 000 square kilometers of land
- 2 300 000 square kilometers of farmland
- 340 000 square kilometers of grassland
- 650 000 square kilometers of forest
- 25 000 square kilometers of urban land
- 2 693 000 000 cubic kilometers of rainfall per year
- 500 kilo average organic waste per person
- 210 000 000 metric tons of organic waste per year

A Few Figures Writ Large upon the Icon

- 40–45 000 000 population
- 1 463 550 square kilometers of land
- 1 030 000 square kilometers of farmland
- 147 000 square kilometers of grassland
- 565 000 square kilometers of forest
- 3 000 square kilometers of glacier
- 2 100 square kilometers of urban land
- 1 430 cubic kilometers of rainfall above 300 meters per year
- 1 430 000 000 cubic meters of rainfall above 300 meters per year
- 1 185 cubic kilometers of rainfall above 600 meters per year
- 1 185 000 000 cubic meters of rainfall above 600 meters per year

The situation at Kasteel Groeneveld in Baarn was exactly the opposite of that in Toulouse. The space was compressed; what works could we leave out? The politics of the Dutch seemed quite peculiar to us (although rational). Sim Visser, the director, explained that if we wanted to show *Peninsula Europe* we should also make a new work that suggested how the concepts we were working with in *Peninsula Europe* would affect Holland, which we did.

The exhibitions ranged in size from 186 square meters in the Netherlands to almost 464 square meters in Toulouse; the version at Ronald Feldman Gallery in New York, a few years later, was about 325 square meters. No matter what its configuration, *Peninsula Europe* appeared to carry too much information in too many categories to be easily comprehensible. Two examples should give a sense of this predicament.

As an outcome from the watershed pieces, we had tried to make clear an idea about fragmentation and unity. It was about bio-regional watershed nurture that transcended national boundaries. Thinking that big numbers were scary, we began the writing:

Reflecting on Big Numbers
Refusing to Be Intimidated
Looking for a Middle Way
Reflecting
on fragmentation and the conditions for unity
on the health and well-being of the high grounds
and its life web
reflecting on the will of civilization to fragment
when its survival
and that of the ecology upon which it depends
require certain unities

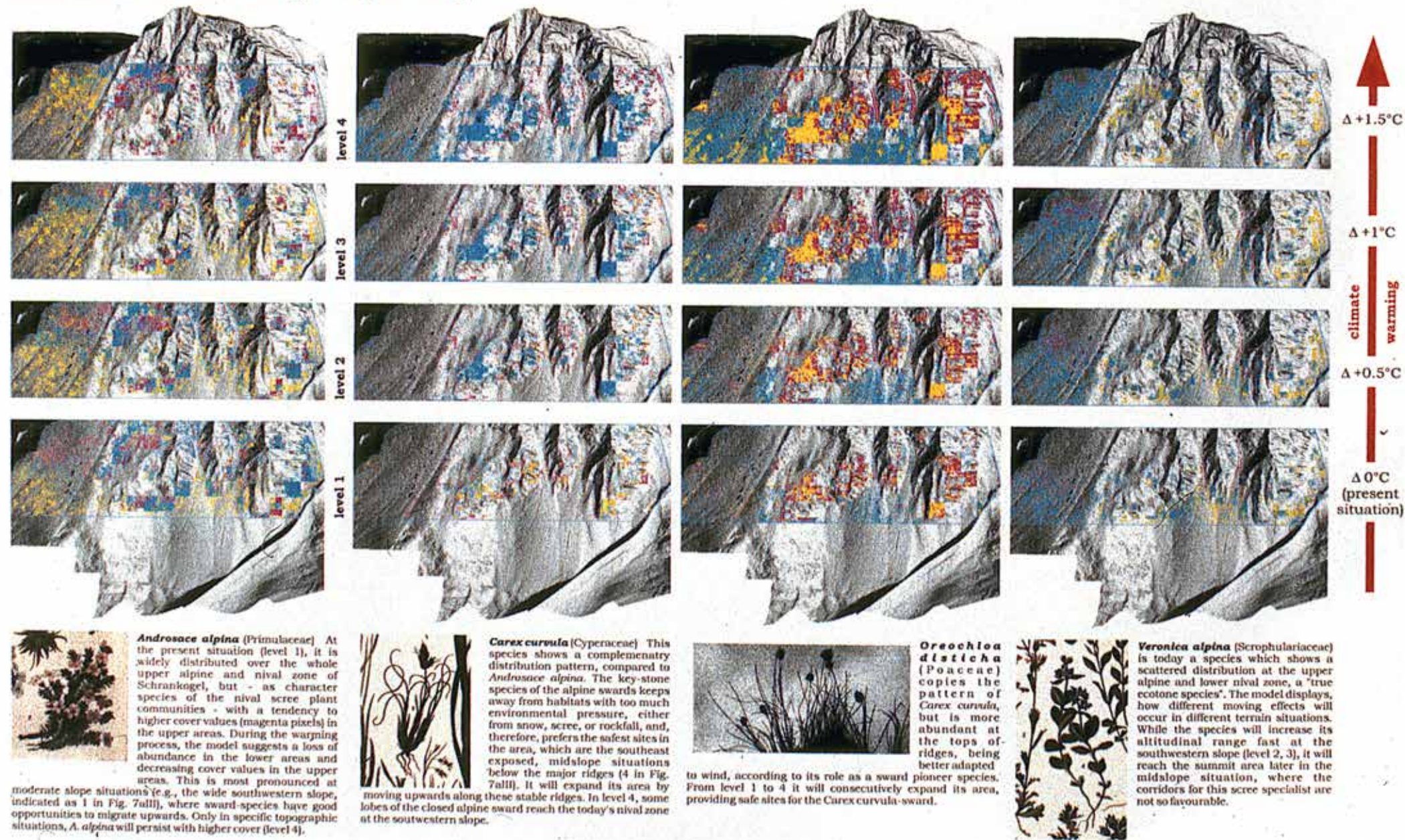
reflecting on reframing the conversation
by which culture recreates itself
movement by movement

for instance
how can the process of fragmentation be mediated
and the process of ecological reunification begun?
for
if
the process of fragmentation reflects
the ways in which human authority divides itself as well
into townships and cities
authorities and businesses and industries
public lands and private lands
with each division looking to the interest of its part
then
who is there to look at the high grounds as a whole?

Therefore
we risk a proposal for the whole
we propose an extra-national drain basin authority
to look after the well-being of the high grounds
a proposal based on a future necessity
for an authority
who will look to the health of the waters
the rivers the forest the meadows the croplands the parks
drain basin by drain basin

4 Assuming a temperature gradient of -0.6 K by 100 altitudinal meters, a migration scenario, triggered by global warming, was run with the following result: **Vegetation belts will not move as whole entities. Species specific responses are more likely, due to different abilities of the species to deal with topographical migration barriers. Moreover, the response of each particular species will be different in different topographical situations. The alpine-nival ecotone will not move as it is, but will disaggregate due to invaders from alpine swards. Its high biodiversity will decrease. Some high-altitude vegetation types may be "trapped" at the summits, or get extinct. Biodiversity hot spots will disappear or may survive only in very specific topographic situations.**

Fig. 12 Scenario of future distribution patterns of 4 typical alpine and nival species and the species richness. The static, predictive model assumes an altitudinal temperature gradient of -0.6°C per 100m altitudinal increase. Colors indicate cover values (in Fig. 12 right: species richness): cyan: low, yellow: middle, magenta: high.



Working with Georg Grabherr, an erudite and extremely thoughtful scientist who knew well how to work with artists, we did something we rarely do. Georg and his students had been complaining that they couldn't get people to understand their work, which was elegant and simple. (They had, over many years, studied four keystone species on the Austrian Schrankogel Mountain, and noted their upward movement as the temperature rose in tenth-of-a-degree increments, some moving as much as six meters.) They were seeking incontrovertible

Detail from the experimental design for Schrankogel Mountain, Austria, on the upward movement of species. These experiments were done by Dr. Georg Grabherr with his graduate students in Vienna. This book began in the 1980's, was funded by the European Union, and is ongoing.

Detail from the video *The Mountain in the Greenhouse* which was derived from the Grabherr experiments on the Schrankogel Mountain with the testing of global warming in relationship to the upward movement of species as temperatures rise



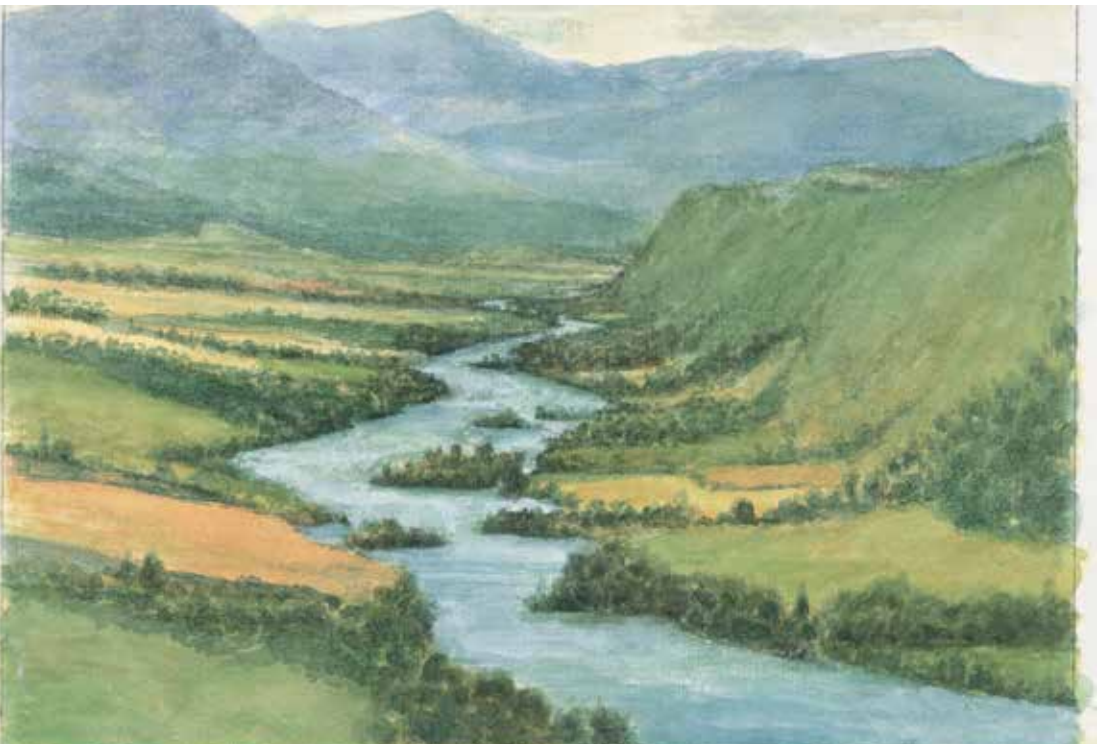
This is a little drama entitled *The Mountain in the Greenhouse*. The theme is the disruption living systems will undergo as the perturbations of global warming reverberate through the European high grounds. It is a drama being enacted in fast time if you happen to be a glacier but slow time if you happen to be a person.

evidence of global warming on the ground—and had found it—but nobody was listening. We were interested in the notion that we (as artists) could say what he (as a scientist) could not, which was that it appeared that the global warming phenomenon was going to grow at an exponential rate, not at the very slow rate that was then being predicted. So we created a large-screen video work entitled *The Mountain in the Greenhouse*. The idea was that Georg could show the video; when it got to the exponential argument, he could dismiss it as the yet-to-be-proven fantasy of artists—yet it would prove effective as a discussion point. It was in this sense that we took the role of stalking horse. It was urgent that his message get off the page, and the dramatic images, 2.4 meters by three meters, accomplished that. As the accompanying text says, “It’s high drama in fast time if you’re a glacier and high drama in slow time if you’re a bipedal creature with an analytic brain.” In the *Peninsula Europe* exhibitions the video was viewed as a curiosity. Assuming a temperature gradient of -0.6° Celsius by 100 altitudinal meters, a migration scenario, triggered by global warming, was run with the following result. Vegetation belts will not move as whole entities. Species-specific responses are more likely, due to different abilities of the species to deal with topographical migration barriers. Moreover, the response of each particular species will be different in different topographical situations. The alpine-nival ecotone will not move as it is but will disaggregate due to invaders from alpine swards. Its high biodiversity will decrease. Some high altitude vegetation types may be “trapped” at the summits or get extinct. Biodiversity hot spots will disappear or may survive only in very specific topographical situations. I said, “Do you mean that something like 27 square kilometers yields 400 000 cubic meters of water a day on average, and that is sufficient for almost all of Vienna’s water needs?” He said, “Yes. But only in the karst mountains and only if there has been sufficient snow pack.” Then he said, “The water system of Vienna is a 200-year-old system, and the land it is on is protected, much of it owned by the city. It is a cultural landscape but now grazing has been reduced. Indigenous species are returning. Touristic use is limited, and there are small associated water purification operations.”

Mini floodplain sketch from the Oder River work



The High Rhine made into a canal.
The High Rhine is re-envisioned.

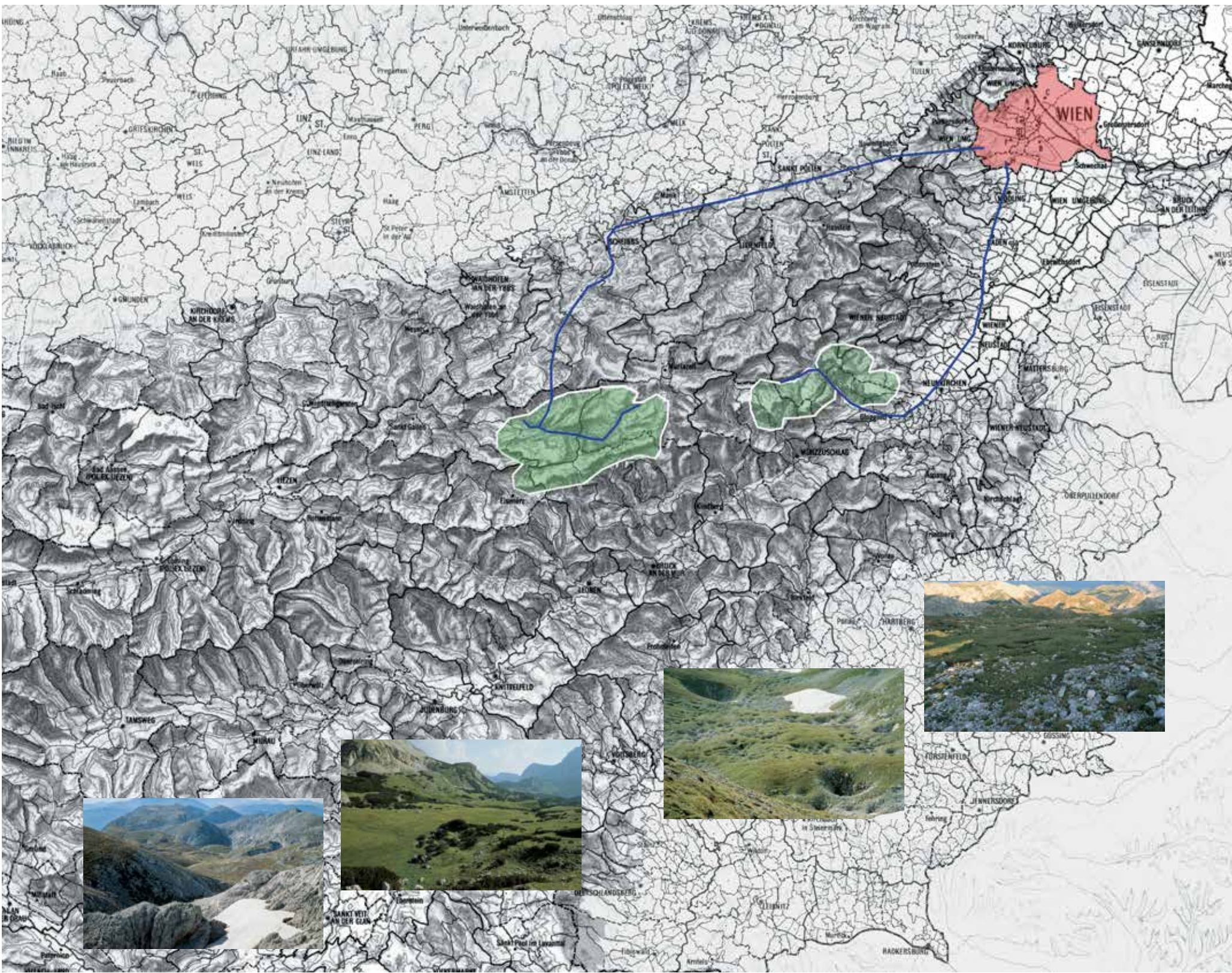


But to us, the most remarkable thing was the Karst Mountains. He said that Karst meant that the mountains were made of limestone, and the rock was porous and full of holes. Perhaps six meters of water a year rained on these mountains, many of which were really plateaus. Water gathered on the top and flowed straight down the core of the mountain underground, then welled up and was collected in two pipes and moved directly to the city of Vienna, several hundred kilometers away. He said that the system was simplicity itself, needing only to be modernized from time to time. I said that it looked like it could be a model for many places, and we were looking for such models of long term functioning water systems for our high ground project. He began to show us pictures. I said we had just calculated the amount of water that fell upon the high grounds. It was about a thousand billion cubic meters.

**If Not Here, Then Elsewhere: A Ring of Mini Floodplains,
– The First Attempt – Toulouse**

The telephone rang or was it e-mail? At any rate, it was an invitation to go to Toulouse to do a new work at Les Abattoirs, the new Museum for Modern and Contemporary Art, for the opening show. We went there. The Garonne River flowed past the museum and we saw the length of it, the power of it, and the place where it flooded between Toulouse and Agen. Every few years these floods did considerable damage, sometimes causing deaths. Now there was a 50 kilometer parklike stretch where the river flowed with minimum containment and maximum freedom. Its potential to become a nature park was obvious. So we educated ourselves, working with a team of students and informed by members of the Institute of the CNRS and the Syndicat mixte d'études et d'aménagement de la Garonne. The ecologists there were concerned with saving the hot spots along the river, and those scientists concerned with the river had little to do with the river shores. The lines were rigidly drawn.

Where 27 square kilometers yield on average 400 000 cubic meters of good water per day.
Karst Mountain watershed, Vienna, Austria. Installation Kasteel Groeneveld, Baarn, the Netherlands.





Talking to a high school class at Ludwig Forum, Aachen, Germany

I asked or you asked about the flooding and about the common belief that floods were inevitable. The floodplain was, except for the stretch below Toulouse, occupied, or the river was walled in with stones or earthen levees. So we proposed a concept—a ring of mini-floodplains. The idea was simple, lands would be bought along the tributaries leading to the river. Wetlands to serve as new small floodplains could be made there, creating a displacement that would simultaneously generate a new form of flood control, an array of nature reserves that would simultaneously generate a new form of flood control, an array of nature reserves that were simultaneously water storage systems, purification systems, and parks. We asked questions about the speed and amount of water flow, the size and cost of the hundred-year flood, the cost of land, the condition of the waters. The idea was that building a ring of mini floodplains would, over time, cost less than the flood damage and could save lives and property. When we asked the people at the agency that controlled the water they told us that unfortunately it was not their domain. The museum people were too busy to pursue. Our project manager had more interesting things to do. Our student team was too inexperienced. Our ecologists too concerned with hot spots. We called many times. Nobody called us back. Finally, you said, “if not here then elsewhere.”



Museum of modern and contemporary art in Toulouse: Dancing

A Ring of Many Floodplains for the Oder River

Thinking about the Oder River and a work we agreed to do there. Studying a complex conceptual design put together by the Worldwide Fund for the whole length of the river. It appeared to propose wetland reclamation projects where possible and to widen the riverbed here and there if possible. But the river, almost completely canalized, left no large areas within which the floodwaters could spread without damage. To our surprise, this plan did not appear to deal with the problems of flooding in any significant way.

We met a very knowledgeable man—politically and ecologically. He knew many people up and down the river. He told us many amusing stories. Perhaps the most amusing was one about the dikes that run along the river. It appeared that the Poles, particularly up river, never had the money to take care of their dikes as well as the Germans did. The river therefore is far more prone to flooding on the Polish side. He said that if the Poles improved their dikes, then the probability of flooding downstream in German territory would become considerably greater. And he said that Poland had just received extensive funding for such repairs! So we told him our idea of a ring of many floodplains; a concept based on substitution.



Dutch elementary class viewing the *High Ground Watershed* videos at Kasteel Groeneveld, Baarn, the Netherlands

The basic notion would be to buy available land in spaces as close as possible to the place where the tributaries flow into the river, creating areas that can serve as small floodplains. These could collectively behave as a single large one. This then would save the money required for massive dikes along the Oder River, ending the danger and costs of massive flooding while creating an array of wetland parks, purifying waters and adding ecological and social value to place. I said, “From an economic perspective, it probably costs less to do than not to do.” You said, “Three questions would answer this. They are simple calculations: 1. How many square kilometers does the hundred-year flood need to express itself without great damage? 2. What is the cost of land per hectare? 3. What is the cost of a major flood?” He answered, “Call my friends at the ministry, and they will help you.”

His friend from the ministry wrote back that the information he was sharing with us was proprietary, which we found surprising as we thought such information would be a matter of public record. He said to contact people in Poland. He explained that the main part of the Oder River, 89 percent of the watershed, was in Poland and only 5 percent was in Germany, with the rest in the Czech Republic.



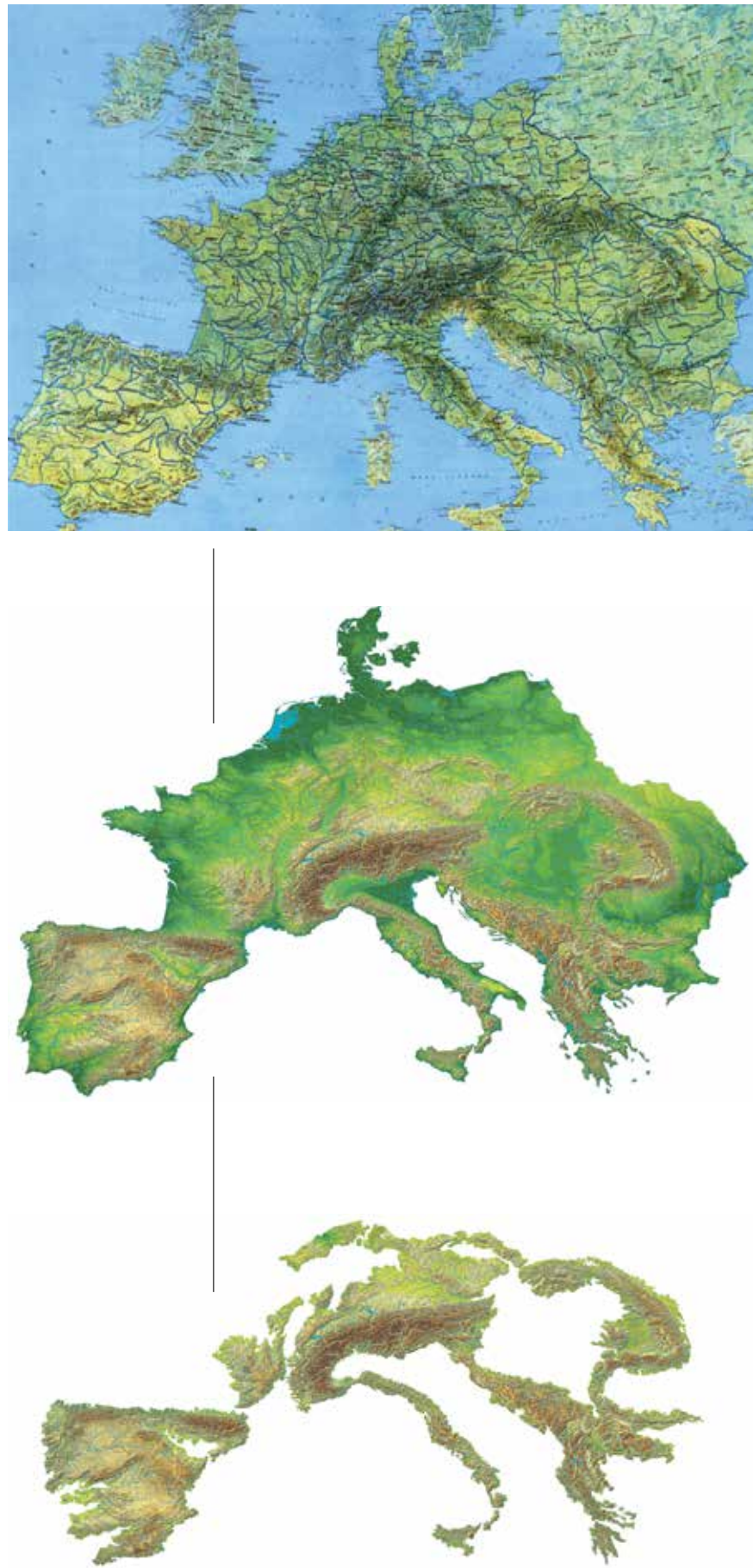
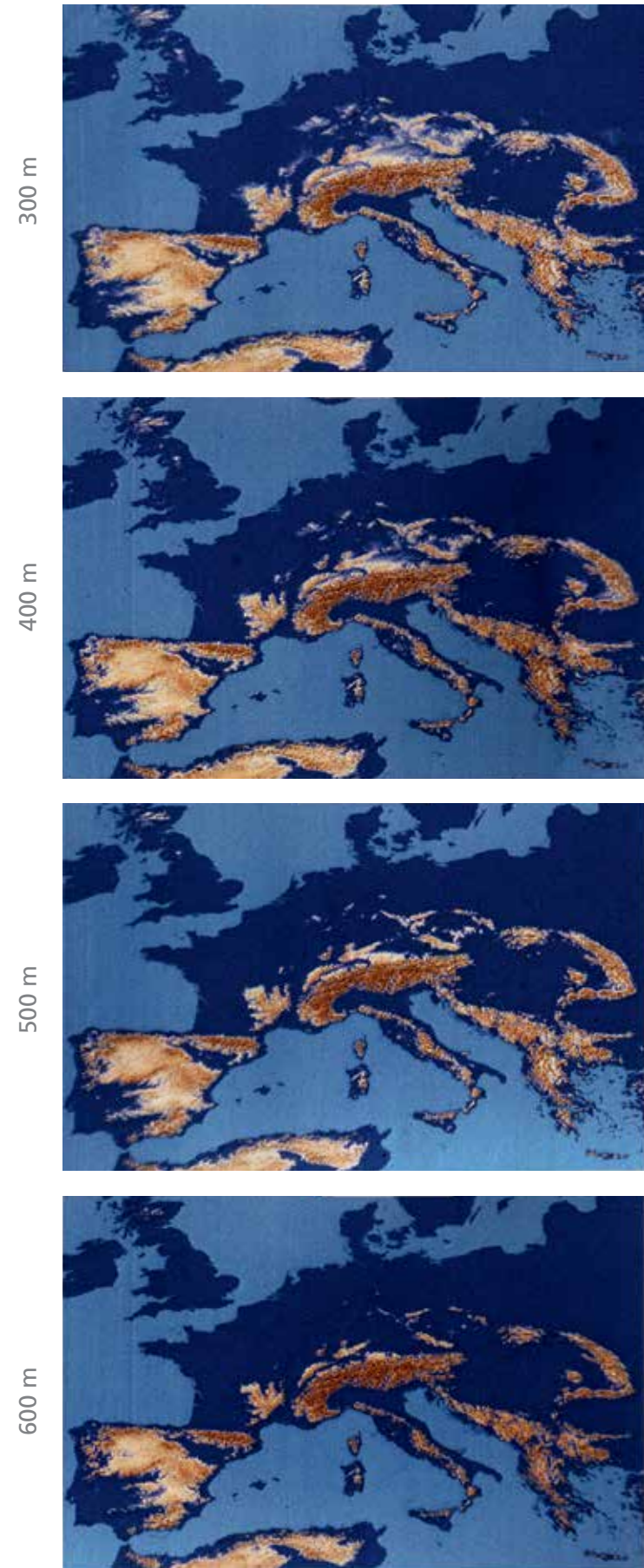
Children on the floor map installation at the museum of modern and contemporary art in Toulouse

I asked another ecologist, “How many square kilometers would one need for such a floodplain?” He said, “About five hundred kilometers more or less.” Now farmlands cost about 5 000 German marks per hectare at their most expensive. And approximating the amount of floodplain needed to handle the hundred year flood at about 500 square kilometers, the cost of land alone would appear to be about 250 000 000 German marks. But it would probably cost much less in Poland and the Czech Republic which share the Oder floodplain with Germany.

I said, “Looking at the cost of flooding in the three countries as an ensemble, it appears that the cost of acquiring new floodplain lands and doing the appropriate design and the earth shaping technical and ecological operations altogether would cost about 30 to 35 times less than the last big flood.”

“Yes,” you said, “It looks like the cost of the hundred year flood could be 30 to 35 times more than the cost of the land needed to prevent it. Even so, a friend of ours asked, “Where will the money come from right now to build this ring of mini floodplains?” I asked in return, “Where did the money come from to repair the damages from the last flood?”

The discovery of the icon begins with the research that locates where the rivers begin at about 350 meters.



On Icons, Networks, Feedback Loops and Stability Domains

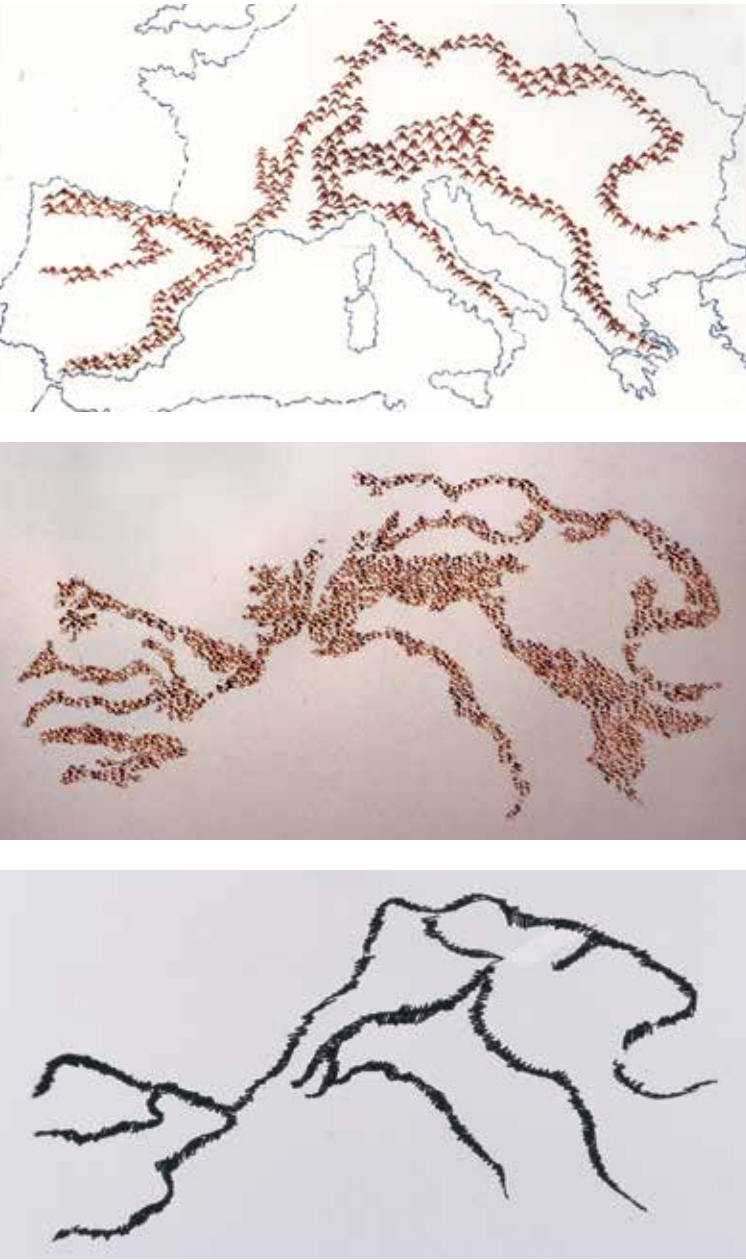
We had also been involved in thinking about icons. Our understanding—perhaps overly simplified—was that early icons, from prehistoric fertility figures to the religious images of the Renaissance, were information-saturated but also depended for understanding on a text or narrative that preexisted in people’s minds. The icon was read variously by the differences in narrative (and layers of narrative) that viewers brought to it; nonetheless, story and image were always associated. We can never know all that the Venus of Willendorf meant to the particular group by whom she was created; surely the obvious answer, fertility, is only the beginning of the story. Yet the Buddha icon, though the Buddha lived more than 2000 years ago, still carries a text that is fully (if variously) apprehended in our time by believers in the many millions. Each of these icons invokes a many-layered set of ethical beliefs, a world view, and a vision of how one ought to conduct one’s life. The golden arches of McDonald’s make for a negative example, one that nevertheless has much to do with how millions of people conduct their lives.

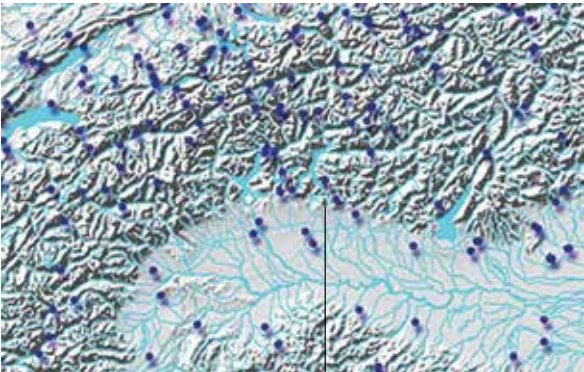
As artists, we had been working for some years on the relationship between texts and icons. We appeared to be designing proto-icons which did not have preexisting narratives or texts in the culture. Therefore, we attempted to supply text and stories in poetic form, so that they might join with the proto-icons we had invented. We intended for the relationship of the images to the spoken or written text to begin in a linear way; then, after the narrative properties were discovered and ultimately internalized, the understanding should flip into a nonlinear state.

We tried this with the shape of the Pacific Northwest watersheds and the central image of *Green Heart Vision*. The potential for the Brown Coal Park to become an iconic shape in the landscape near Leipzig seemed real to us. So it was not difficult to come to the idea that the high-ground shape that we had lifted off the *Peninsula Europe* map had the properties it needed to become an icon. The shape of the high grounds, redrawn as mountains, was a powerful form, and it scaled in an unusual way. It was readable as a billboard, 10.7 meters long, and also as a button, five or 7.6 centimeters in diameter. Once you had seen the shape, you could recognize it on many maps (it was particularly obvious on the maps used in the early years of schooling). It seemed to us that it had all the visual properties typical in an icon. What it needed was the text in the culture—which did not exist—having to do with the well-being of the *Peninsula of Europe* being dependent upon the regeneration of high-ground ecosystems. This story needed to become part of the public discourse for our image to achieve iconic status. The experiment did not work. We tried this idea out on many, but the interest was not there —though people really did like the nine-meter shape on the wall.

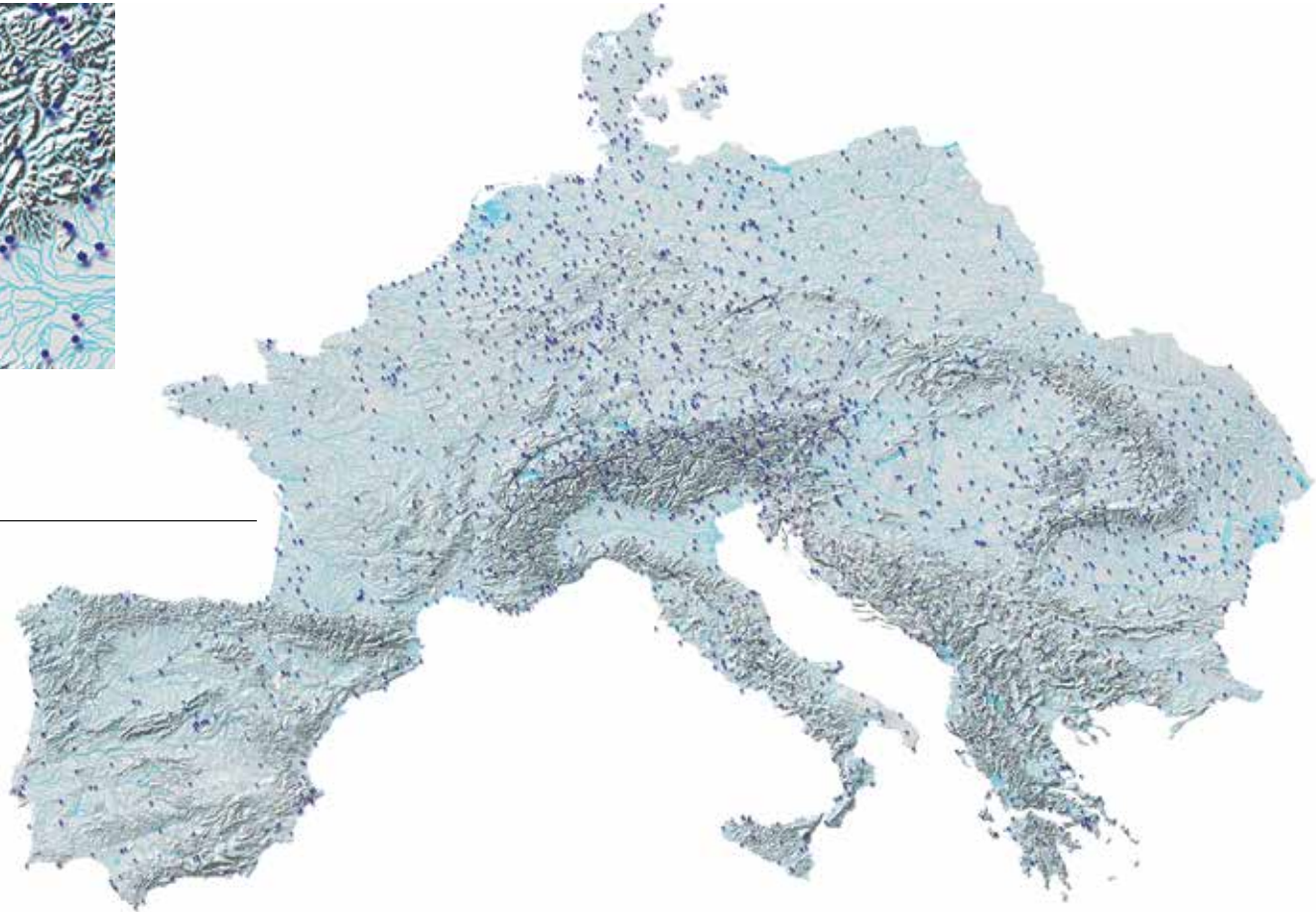
The vision of *Peninsula Europe: The High Ground—Bringing Forth a New State of Mind* is intended to suggest that a new synthesis is available, a rebalancing of the parts such that, if different relationships form, a new pattern of organization will emerge: a pattern wherein each part, self-nourishing, acts in support of a whole, which will complicate itself in ways valuable to its own well-being, but as yet unknowable in the now of its beginnings.

The evolution of an icon

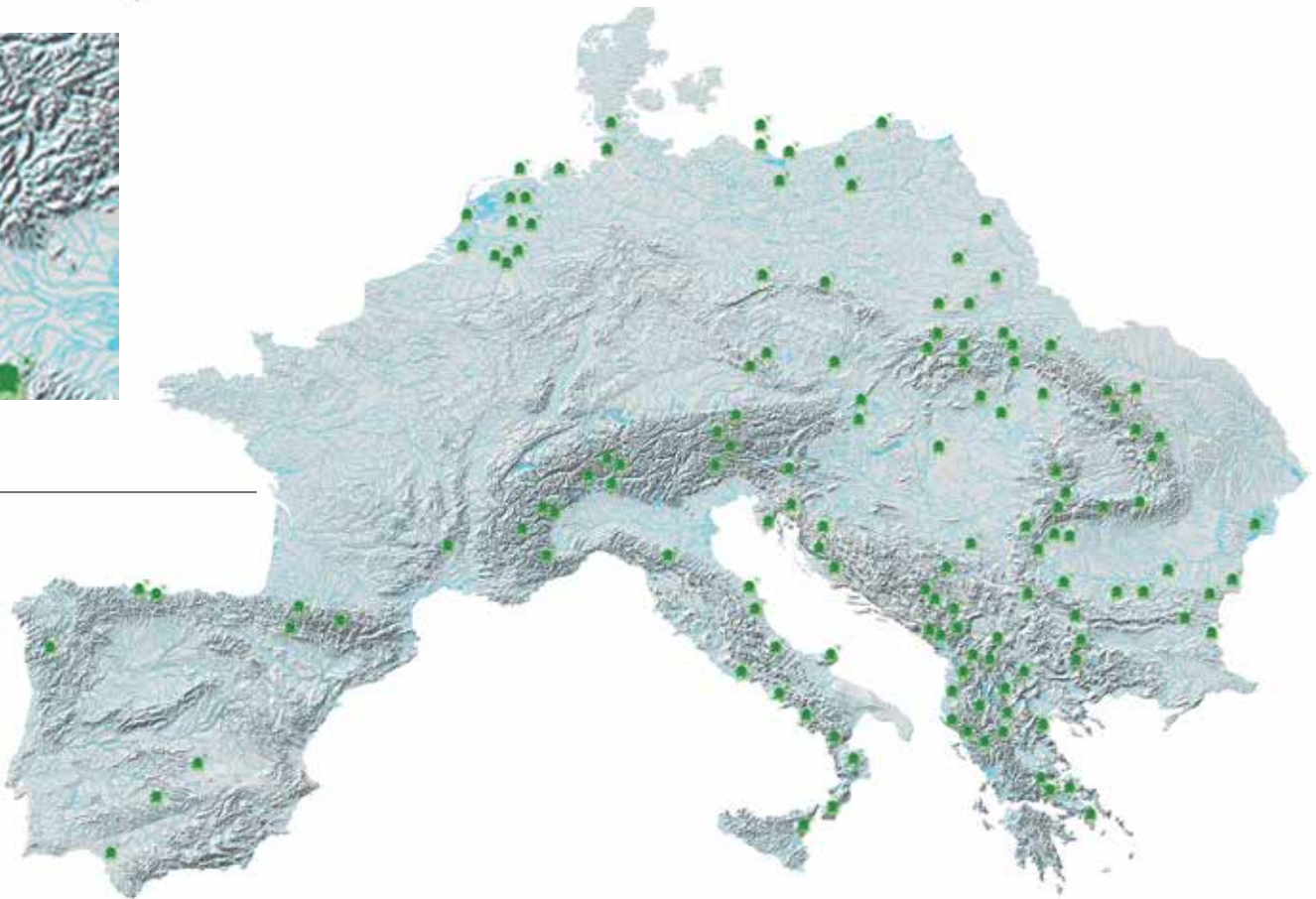




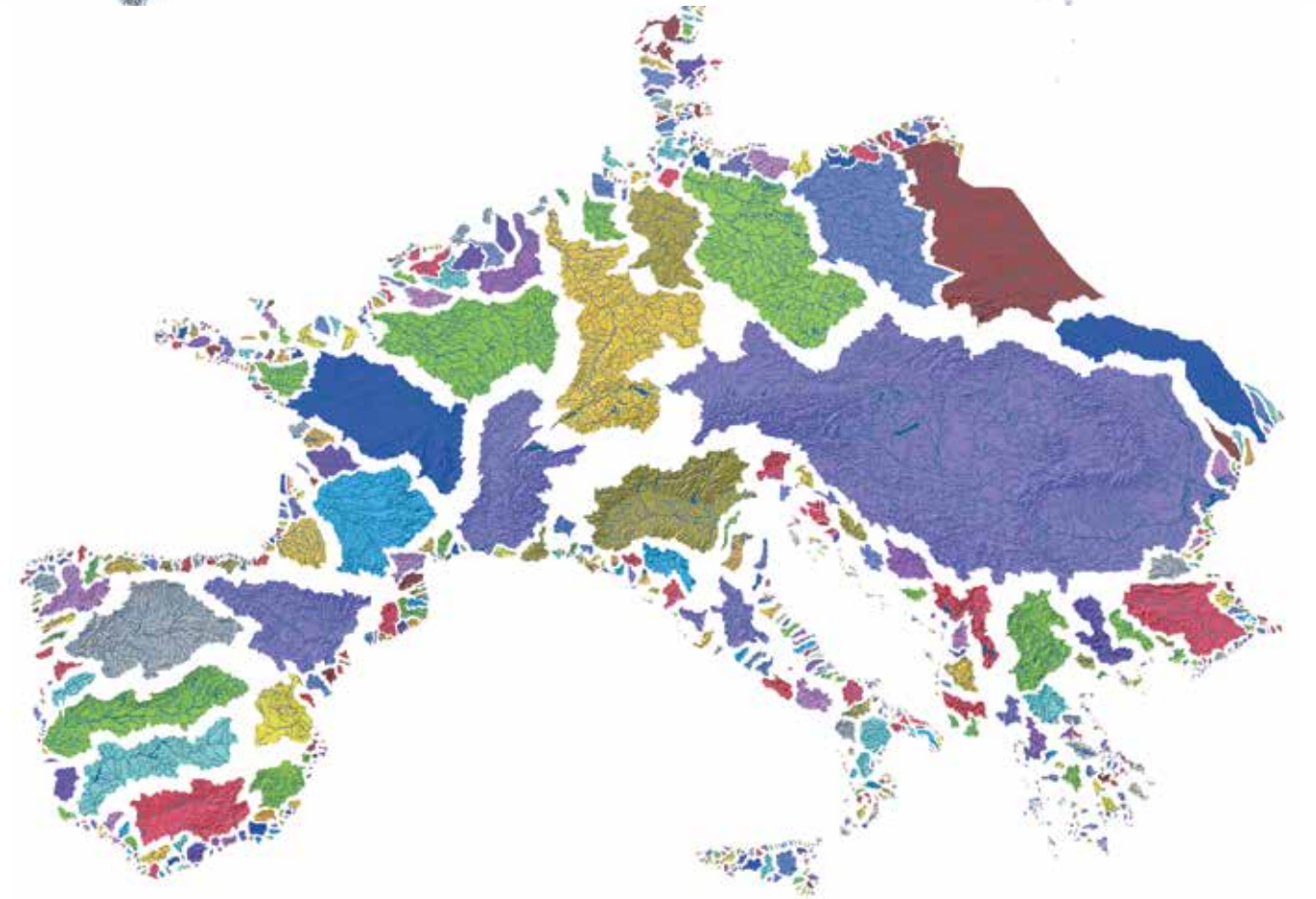
Rainwater testing sites



National park sites



We, looking at the watersheds as a whole, did not find anyone else who was looking or mapping the peninsula in this way. After all this looking, thinking, and seeing, the notion came to us that the geophysical diversity from the Carpathians to the Pyrenees and beyond had led to great biodiversity, watershed to watershed. Given the great variations in culture, language, self-awareness, architecture, religion, land division, and economies, we concluded that geophysical diversity led to biodiversity which in turn led to cultural diversity. The evidence was not clear, but we came to believe this anyways.



The Krimpenerwaard

2002 Kasteel Groeneveld,

Baarn, Netherlands

2011 Ronald Feldman Fine Arts,

New York

A distinguished group of people sat around the table in the conference room at the castle, discussing possible directions a new project for the Netherlands could take. Sim Visser, the director of Kasteel Groeneveld in Baarn, guided our conversation with Frans Vera, Willem Overmars, and Harm Janssen. Frans was a famous forester (and the author of *Grazing Ecology and Forest History*, one of the great books on the subject); Willem, who became a close friend and collaborator, was one of the original landscape architects who redesigned rivers in the Netherlands (letting them seek their own pathways, becoming more ecologically provident thereby); Harm was a water engineer.

The meeting was friendly but spirited. At the end, Harm, a rather shy and very quiet man, pulled us aside. He said that the regional water department leadership group, of which he was a member, had a little problem. Actually, it wasn't the group that had the problem, but rather the Krimpenerwaard, a body of land that spanned several hundred square kilometers in the Green Heart.

The Krimpenerwaard as a region was sinking more than a meter every hundred years. It was sinking because the farmers in the region had pressed the water department, Harm's group, to keep the water table low by pumping more or less clean waters from the Krimpenerwaard into the canals nearby. The farmers, some three hundred cattlemen and -women, required the lower water table to permit the very rich peatlands to grow very rich pasture, which in turn induced their herds to produce more milk per cow than any others in the region. The problem with lowering the water table to produce that much grass was that the peat evaporated. In less than a hundred years, a meter of peat had disappeared.

Finally, he came to the point: He wanted a work of art that would effect a policy change of some magnitude. We appeared to think so easily outside of the box, so could we do a work of art that would convince the 12 people in his group to press the farmers to go elsewhere? Then the water department could let the water table rise and begin to set up the conditions in which the peat would stop shrinking and sinking. Moreover, could we do this work so that it wasn't political? If it looked political, it would be thrown out. He said he had a small budget for it,

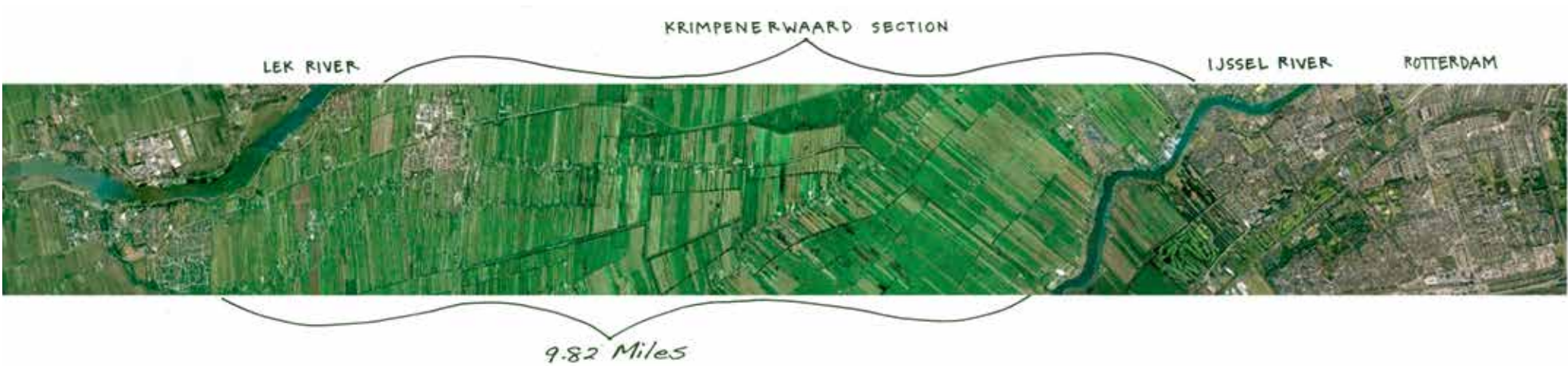
about 15 000 euros. We had never done a work of art specifically addressed to an audience of 12 (of whom we knew only one)—much less a work that set out to change a vast landscape and interfere with the livelihood of hundreds of people while setting up the conditions for a rather radical policy change. It was a marvelous opportunity. We immediately said yes.

Our proposal was as follows: Cease pumping immediately and let the water table rise. Then a lake would appear, perhaps 30 or 40 square kilometers in area. Most of the rest of the land in the Krimpenerwaard would no longer support the cattle as it would become somewhat marshy with the water table only about a foot below the surface. However, the water a foot below the surface would keep the peat moist and it would not shrink through evaporation; thereafter, the Krimpenerwaard as a whole would stop sinking. The proposal pointed out that there were several roads traversing the Krimpenerwaard with people living along them. The majority of these roadways were already raised, with only one exception. Therefore, while the landscape would change, nobody would have to move or leave their house. There was an obvious question in need of an answer: What economic processes or systems would make up for the loss of three hundred small farms? (Each farm was typically 20 to 30 hectares in area, with a herd of perhaps 80 cattle.)

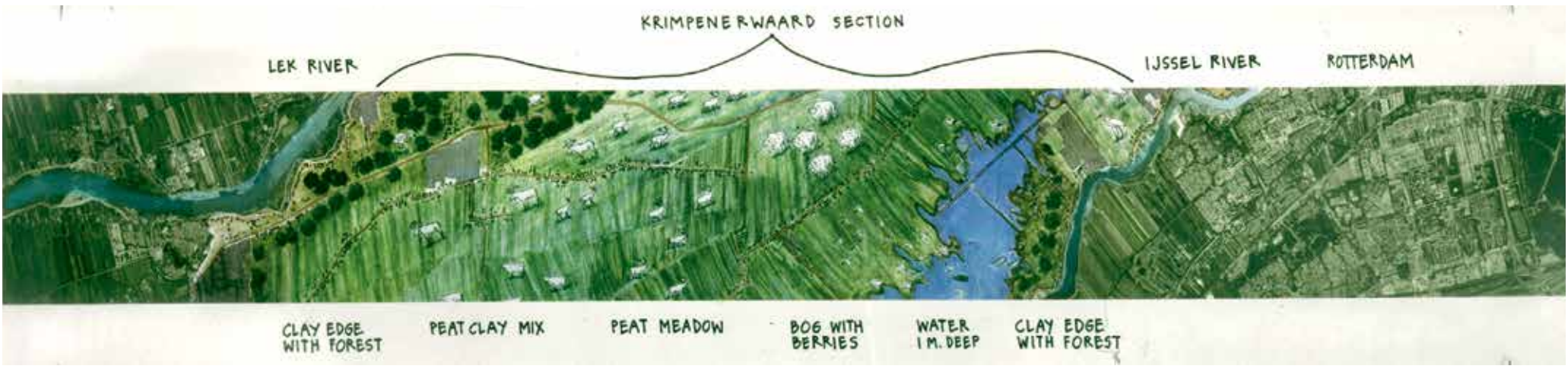
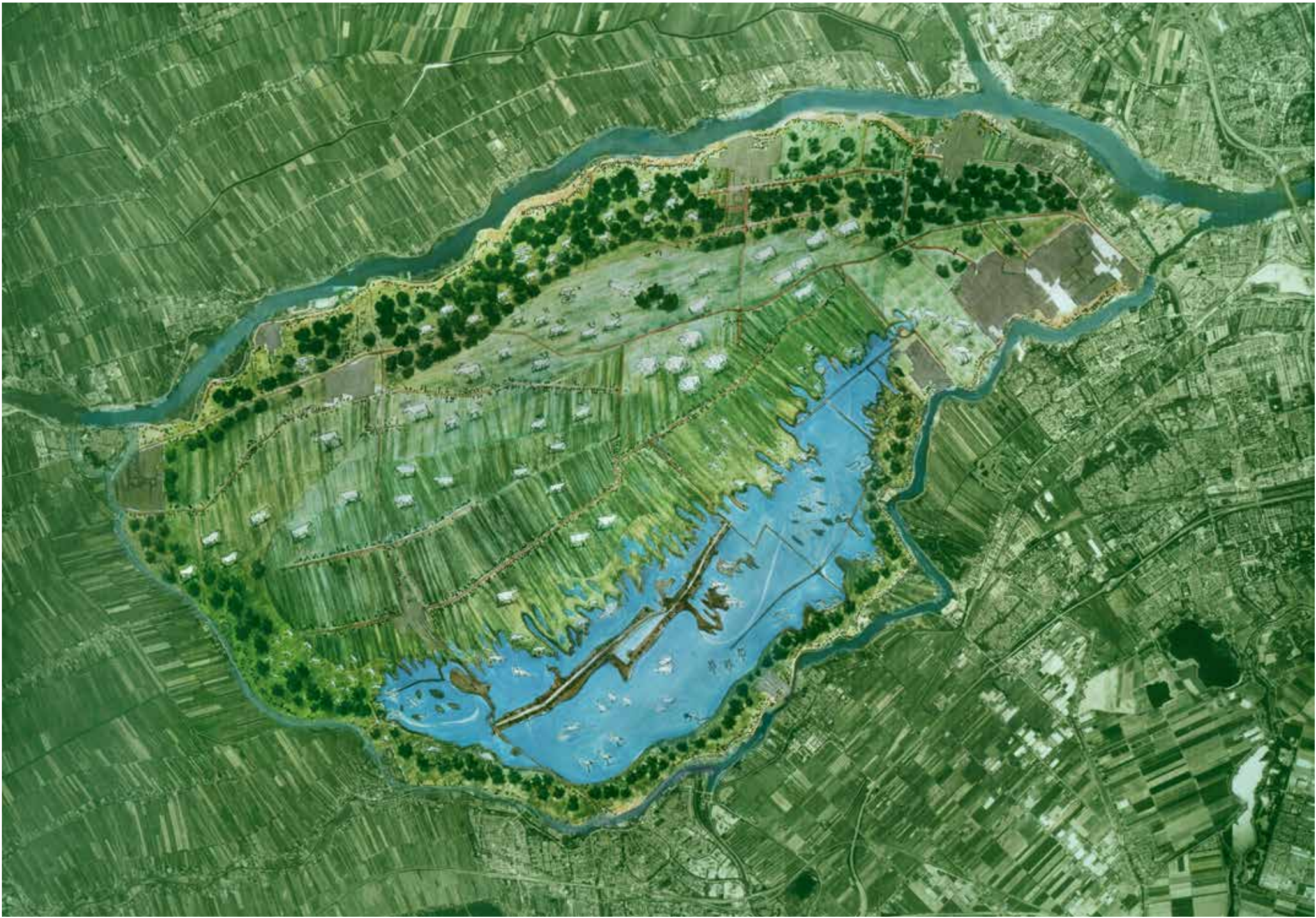
Our proposal argued that a new landscape would emerge as the water table rose. We suggested that it would be at least as productive as the old landscape while maintaining the visually open quality of the historic landscapes of the Netherlands. For instance, as the water table rose, a 30-square-kilometer lake would emerge. This lake would make an extremely productive low-intensity fish farm. The edges of that lake, having marsh-like properties, would make a wonderful site for very productive cranberry bogs. The large open spaces would make excellent pasturelands for species like the European bison and other wide-footed herd animals. The perimeter of the Krimpenerwaard, composed of heavier soils, would be a natural area for orchards. Then, since it was a new landscape having a new aesthetic, we argued there would be tourism opportunities to

explore. Overall, it appeared that more people would be employed than in the current family farms. However, a new aesthetic would need to be accepted. At the same time, funding would be required to slowly acquire the lands that were currently used for intensive milk production. (This would not be very difficult, as the land would lose value if the water table were permitted to normalize; in addition, we heard rumors about farmers becoming wealthy by selling small holdings and then buying larger holdings in nearby countries that had high grounds.)

Some years later a letter came to us from Harm. He suggested that our work had been successful. Dairy farming was moving out of the region; parts of the region were turning into nature reserves; others had found different uses.



The Krimpenerwaard as indistinguishable from the rest of the Green Heart, the Netherlands



The Krimpenerwaard transformed as a new landscape form in the mosaic of the Netherlands.

Santa Fe Watershed

Lessons from the Genius of Place

2005 Santa Fe Art Institute,

Santa Fe, NM

Work is owned by the

local Historical Society

and exhibited variously

In 2003, Diane Karp, the director of the Santa Fe Art Institute, called—or did she e-mail? We had known Diane since the early nineties when she had succeeded founder Lucio Pozzi as the publisher of *New Observations*, a journal that dealt with art and politics. (She had published the *Sava River* work there; granted, it was in black and white, but it was no mean feat.) Diane wanted us to come out for four or five days, give one of our lecture/performance speakings to the community, and then teach a seminar about water and our work. The Santa Fe Art Institute was reforming itself under Diane at the time and was in a very interesting state intellectually. The buildings had been designed by the Mexican architect Ricardo Legorreta and had a very comfortable and easy feel; there was something about the place that said, “Community happens here.” We gave our performance which as usual consisted of images, impromptu commentary, readings, and later jousting with the audience. For that particular event we showed *Sava River*, *Endangered Meadows of Europe*, and *Peninsula Europe*—work at a range of scales, addressing a range of issues.

People in the audience were curious to learn if we had anything in mind for their community and for Santa Fe in general. Would we address the overdevelopment and overconsumption of water? Above all, could we do something about the Santa Fe River which had run dry? It was the most concerned community we had ever encountered. In the mid-sixties, while teaching at the University of New Mexico in Albuquerque, we often went to Santa Fe to visit friends and saw a working river. All these years later, to see what looked like a dead river was disconcerting and very sad.

The next day we met with what we thought would be our group of students. There were no students. Five people joined us, all permaculturists; they said that we sounded like permaculturists ourselves, but working at a much larger scale. We said that we weren’t exactly sure what permaculturists did, but offhand it sounded like a good thing to be doing. We educated one another about our work and found that the ecological and ethical grounds were common, but the scale, approach, and processes were dramatically different. They especially wanted to know

how we worked so easily at large scales. After about an hour, we were again asked what we wanted to do. We posed the question, by then familiar to anyone who had worked with us: How big is here?

The group was very interesting. Ben Haggard was working with microgardens; Joel Glanzberg was working with keystone species and natural systems; and Jan-Willem Jansens was a landscape architect working with the Earth Works Institute on soil and wetlands restoration. What had happened to the hundreds of square kilometers of grasslands in and around the Santa Fe drain basin was a sad story. In the 1890s, grasses were waist-high and diverse. Vast herds of sheep were brought in; the land was grazed so completely that it became desertified. Biodiversity decreased and erosion increased. A resource had been extracted, profit maximized, and the long-term cost to the community and to the ecosystem was dumped back on the community. Any damn fool could see that the cost of that extraction had still not been amortized a hundred years later.

Getting back to how big here was, we suggested that the Santa Fe watershed—out of which the Santa Fe River sprang—was a pretty lucid here. All agreed. Two of us went to a small map-producing firm in town, and an hour later we had a 2.4-meter-tall map of the watershed. Jan-Willem, who knew the terrain intimately, drew the watershed outline. Ben and the others drew the arroyos. There turned out to be 87 major arroyos—dry stream beds—that ended in the Santa Fe River, which was dry, with little growing at its edges. We drew the river and its outfall into the Rio Grande some 19 kilometers below. It was a startling image. The topo map was gorgeously detailed. There was much more talk about water and flood and drought. A decision was taken to do this work. Diane—explaining that there was no money at all, and that we would have to arrange money along the way—asked how much it would cost. We said somewhere between 50 000–100 000 dollars to meet and work with everyone in the community groups that was on her list and then produce an exhibition. Yes, we would if she would, and yes, she would if we would. So began a three-year process.



The piñon, dying in great numbers
The new earth created below
The raking together of new earth
The grasslands beginning to form
There were millions of dead piñons
We imagined large patches of topsoil
Created with the dying of the piñon
and a new beginning for grasslands
and a new form of topsoil reclamation
We call it *The Piñon and the Patch*

After acquiring funds, Diane hired Richard Jennings on a part-time basis as a project manager. Richard, like each of the others, was an ingenious original; his ability to harvest water under diverse circumstances was quite amazing. From 2002 to 2005 we flew out to Santa Fe for four or five days every month or two. We met with Hispanic and Native American groups, one of which included an inspired botanist. We met with city hall, the watershed association, and anthropologists who gave us a hand in thinking about the history of the place—as well as with many others who knew it and loved it, but did not always love one another.

Over time, a pattern became clear: virtually everyone talked about water. Historically, there had been enough water in the Santa Fe River for the small community that lived there, but the city had been developed far beyond the carrying capacity of the place. There was even talk about a 100 million dollars pipeline to bring new waters from the higher grounds of the Rio Grande. A new and different pattern emerged for us; while everyone talked about water, we kept making discoveries about earth. The five proposals that eventually emerged all included a requirement for the enrichment of earth (for example, adding earth in large amounts to restore the riverbed). This took us back to the world of the sponge, which had first appeared in *Peninsula Europe*, and then back 35 years to *Making Earth*.

The Piñon and the Patch:

A Topsoil Grassland Regenerating Opportunity

With Richard Jennings, at the back of his property, we were discussing storm pulse systems, the sponge phenomenon, and drainage patterns. He explained that massive overgrazing of then rich grasslands had led early on to massive topsoil loss during heavy rains. The piñon and the juniper had settled this bleak landscape, and the piñon, now weakened by drought and under assault by the bark beetle, were dying in the millions. We saw that each tree had created a pool of topsoil beneath it, simply by living and continuing. (Were we looking at a reservoir of topsoil?) Under the remains of the dead piñon, a series of

islands of rich soil and duff was present. In between the islands of developing topsoil were ephemeral drainage swales with grasses barely hanging on, the ground around and under them often washed away by heavy rains. Looking at the dark earth that had formed under the trees, thinking about it spreading patch by patch, we began to imagine new grasslands coming into being.

The piñon yields energy twice in the process of dying, once from the tree itself—wood that can be burned or transformed—and then by the actual creation of topsoil. We tried to calculate how much a new reservoir of topsoil might be worth and then imagined all those harvested trees yielding energy. So we made a proposal for the northern quadrant of the city: If 40.4 hectares of new grassland, composed of interconnected patches, were generated as a result of the death of the piñon, the area would, over time, turn into a sponge. It would absorb approximately 14 802 cubic meters of water, as well as make healthy grasslands with the help of the rainy season. Our thinking came to naught. “But,” you said or I said, “this idea might need repetition, again and again, until it seeps into the discourse that forms the cultural landscape.”

On Seeps and Springs:

The Movement of Water and Sewage through a Community

Richard Jennings, being a water harvester, had the notion of capturing the sewage water of the community and inventing small purification systems, perhaps every 10 or 15 blocks in the city. He had in his hands a purification system that was called the “Pirana”: a cocktail of microorganisms that, when dropped into a septic system, would transform almost anything organic, even sanitary napkins. Thus, it was adaptable to small communities since it took raw sewage and transformed it into water, and its results were better than those from standard secondary treatment. Thereafter, the earth through which the water flowed finished the process. Seeping into the riverbed after initial treatment, the water would behave like the perennial springs that once existed here.



The idea was to democratize the sewer system

The idea was that the people owned the water having already paid for it

The idea was that these waters be returned to the river early on creating new river flow setting the conditions for waters percolating into the aquifer Thinking about this process as creating seeps and springs and recapturing storm waters with the understanding that all the waters that fall here and the sewage that is produced here and some fair percentage of the storm waters can collectively restore in part normal flow in the rivers Of course the people who control the sewage downstream and re-sell this water to irrigated farming did not like the concept of democratizing the sewer system even a little bit

Sewer system detail

One day, Patrick Lannan came to a meeting. His Lannan Foundation supported many causes and many artists. We were explaining the idea we had developed with Joel Glanzberg to create guilds or small gardens at the top of every arroyo so that when the rains came they would grow. The plant groupings were chosen for the way in which the roots would sequester water; thereafter, seeds could go downhill, and those gardens that survived would, over time, regenerate biodiversity, arroyo by arroyo. I, Newton, asked, “How much would one guild cost?” Joel answered, “About 200 dollars.” “How much would it cost to do 87 arroyos?” “That comes out to 17 400 dollars.” After a little urging Patrick put up the money. It certainly was a modest amount to set out for the regeneration of the ecosystem in a several-hundred-square-kilometer watershed. This was how the guild system was funded.

One day we were in the high ground with a group of kids from the Youth Conservation Corps, constructing check dams in an ensemble of arroyos. We came to a fence; through the fence we could see an ideal site. Everyone thought for a minute. Since I, Newton, had bad knees I was taken to hide among the piñon while everyone else scrambled over the fence. 10 minutes later everyone scrambled back, pleased with themselves, and a new check dam had magically appeared on what seemed to be private property. The kids said how relieved they were to be doing something of real consequence, when mostly their work was trivial, like picking up trash.

The Arroyo and the Guild:

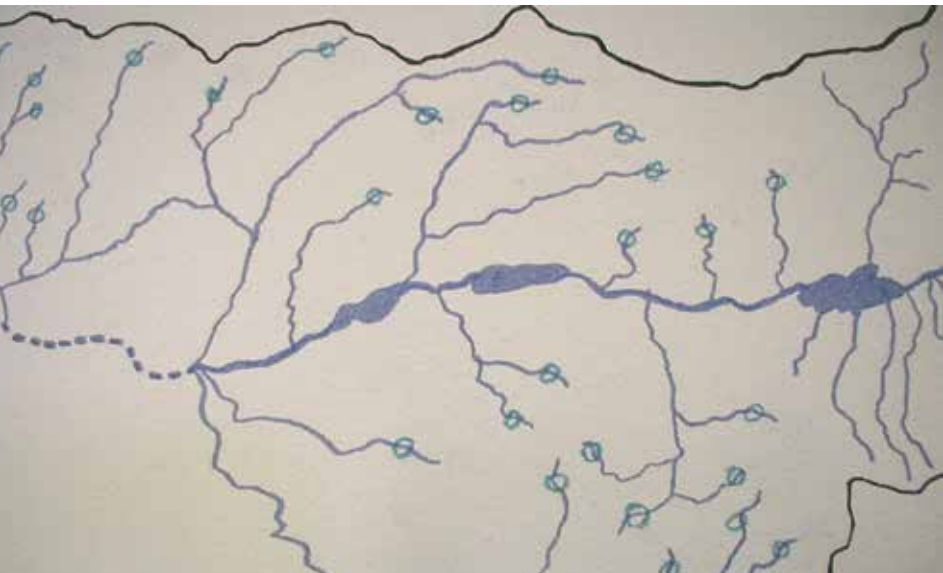
A Genetic Diffusion System for the Santa Fe Basin

The question was posed, “How can we invent a genetic diffusion system to encourage biodiversity in the arroyos?” (They looked strangely empty of vegetation.) Joel Glanzberg became the guide and cocreator. Knowledgeable about such things, he said that there was a long history of putting large and small check dams in the arroyos to catch earth, to catch water, and to encourage growth. The model for this was the ancient farming system which most thought went back to the Anasazi, in which corn and other crops were planted behind these small dams at the bottom of the hill. “Around here,” he said, “we call these check-dam plant ensembles with differing root lengths guilds.” So I said or you said, “Put aside individual arroyos and think genetic diffusion system for the whole.” And he said, “Look at where the arroyos begin.”



Arroyo detail as if they were experiencing a flash flood

Arroyo detail planting sites for the check dams



A River Narrative

We had begun attempting to teach a small group of students from the Santa Fe Indian School—or if not teach, at least explain what we were about (after all, it was their watershed and we were visitors). We worked with Rina Swentzell, an author and anthropologist much revered in the region as a wise woman profoundly in touch with Tewa history. Over time, we came to the notion of finding a way to give voice to the Tewa story of their beginning. The idea was to create a piece of public sculpture in the river, maybe 0.8 kilometers long, using Tewa symbols as large shapes that would help collect earth and raise the riverbed so under stress from gravel extraction.

A river narrative was created
emerging from the Tewa symbols that bespoke
the Tewa story of the beginning
Mountains
Where clouds form
From which comes lightning
To energize the water serpent
That lives within the earth bowl
Wherein flowing waters
Rivers and streams nurture life
Studying the Tewa symbols
Made in earlier times by people who lived here
feeling their vitality
We imagined the narrative that wanted to happen
We asked our engineer
If for instance a 12-meter zig-zag form
Or bowl forms



Or mountain forms
Or serpent forms
Could also be used in the riverbed
As forms that would catch earth
that could create sinuosity in the river
Once the riverbed has been raised.
He said, Yes. Why not.
But it will be more expensive than a normal weir
You said, Art always costs a little more
I said, Sometimes even much more
The real question was
Did it want to happen
And people who were wise and knowing
All who saw this image liked the idea
That an ancient river story
Might contribute to the restoration and well-being
Of the river itself

I said, or you said, “Why?”
He said “Think gravity.”
Imagine a guild
planted at the top or near the top of every arroyo
assuming growth
and the generation of seed guild by guild
The rains and the winds
will carry the seeds of these plants downhill
some seeds then catch
in the rough crevices of the arroyo
create new green on the dry streamsides
Over time creating friable soil
and their own microclimate
the genetic material is diffused
and the arroyos will begin
their return to ecological health
as will the Santa Fe River.

**An Occasional Cascade for the Santa Fe River:
Returning Earth to the River Bottom**

The head of a granting agency wanted to know what the financial payback to the community would be if he put funding behind our research and exhibition. We said, “Imagine a restoration of 13 running kilometers of river, from above Frenchy’s Field to the sewage plant. Imagine 22 running kilometers of restored river edge, then calculate the increased financial value of the adjacent lands. Then calculate the increased value socially, ecologically, and culturally.” The monies for the exhibition were procured for the river itself, and we were told that a new city administration and mayor had accepted the proposal.

Almost 40 years ago
Standing at the edge of the Santa Fe River
We saw a running river with riparian habitat
And cottonwood bosques
Where people were fishing
The Santa Fe River was now dry
In answer to the question
What are the best things that could happen here?
Our project engineer said
The concept is simple
Raise the riverbed
Which in turn would raise the water table
Setting the stage
for restoring the sinuosity of the river
Restoring the riverine habitat and some of the acequias
By inventing a weir system
To catch the flow of earth and debris
Add new weirs each year as needed
Until the bed of the river is normalized
I asked how much would a 13-kilometer stretch
From Frenchy’s Field to the sewage plant cost
Prepared he answered
4 000 000 to 5 000 000 dollars
for four hundred weirs with present technology
Less with simpler technology
Then you asked or I asked how long will this take
About two years
Where the cuts are shallow
And perhaps 10 years or more
Where the erosion is severe
Around the gravel extraction site
Then you said or I said it’s not so much
About 400 000 dollars a year
about the cost of a house in the suburbs



An Urban Ecosystem for Santa Fe

It was midsummer in our second year of visiting Santa Fe, and we were walking with Ben Haggard on mostly treeless streets downtown. The sun created a relentless field of heat, and we began a discussion about how valuable an arboreal overstory would be. It would reduce temperatures at street level, increase bird life, and—if the trees were deciduous—allow the sun to warm in winter. With a small group we began to explore what a new urban ecosystem for Santa Fe might look like and what an urban plant vocabulary might be composed of. It was clear that if trees were overstory, we might begin to think of people and buildings as middle story, with perhaps backyards enhanced by urban farming. We chose a site, bordered on the north by Frenchy’s Field and the river, on the south by Cerrillos Road, on the west by Maez Road, and on the east by the end of the Casa Alegre neighborhood. The site was mapped from four perspectives: hardscape,

softscape, overstory, and the activity of water. We imagined that the neighborhood would include a local sewage system and thus become an exemplar of the idea of seeps and springs. Aside from a few compliments, no one was interested. The exhibition at the Santa Fe Art Institute was enormously successful. People came from all over. A half-hour video about the project was shown. All the cocreators spoke. Edward Archuleta, whose family had settled there in the sixteenth century, spoke about the carrying capacity of the land; he spoke against further development. *Santa Fe Watershed: Lessons from the Genius of Place* became part of the history of Santa Fe as an artwork donated to the Santa Fe Historical Society (which, we are told, exhibits one part or another from time to time). Although our proposal for raising the riverbed was in the city plan, it was not clear whether the city would or even could act on it in the near future. Together, for a moment, everyone understood that regenerating the topsoil was crucial for the Santa Fe watershed’s well-being and for the Santa Fe River itself.

Greenhouse Britain

2008 City Hall, London, Great Britain

Centre for Contemporary Art and

the Natural World, Devon, Great Britain

Traveled to four other venues

in Great Britain

2009 Kala Art Gallery, Berkeley, CA

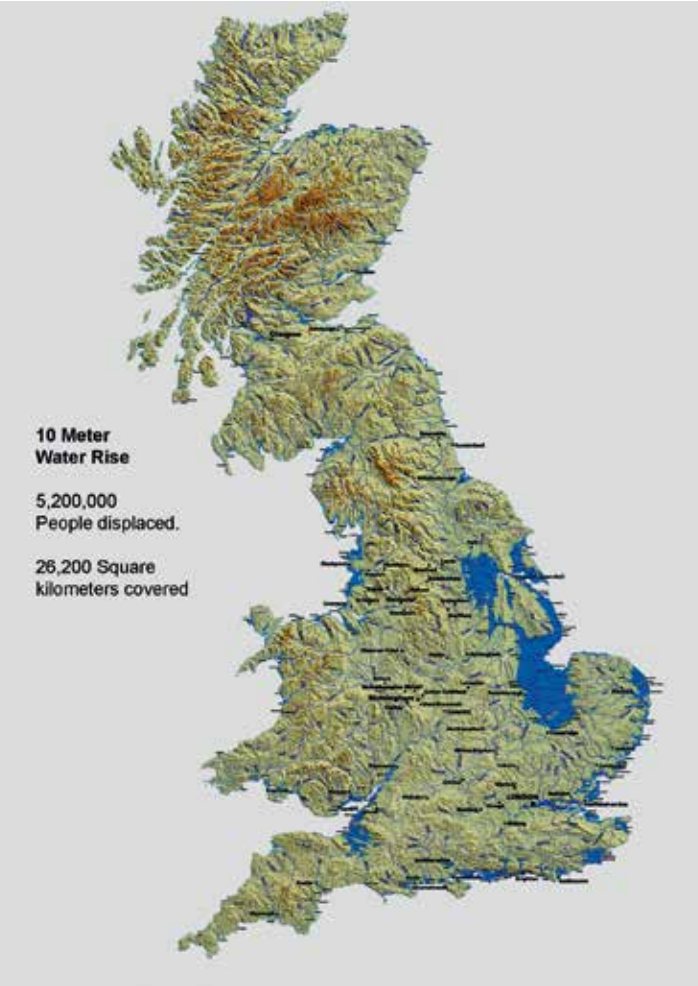
In 2005, we heard from David Haley, the British artist who had been both our friend and the project manager for *Casting a Green Net: Can It Be We Are Seeing a Dragon?* He asked if we would be interested in giving the keynote speech for “Evolving the Future”, the first Darwin Summer Symposium in Shrewsbury (Darwin’s birthplace), which he was organizing. Who could refuse Darwin? The site was distinguished, the audience interesting, and the aura of the room was lovely. We talked about *Peninsula Europe* and *Green Heart Vision, The Endangered Meadows of Europe*, and a bit about the *Dragon*, never quite tying things to evolution. Finally, it was time for questions. After the usual expressions of curiosity about our collaboration and about how much of the work actually got done on the ground, someone asked, “Well now, what will you do for Britain?”

Both of us became very quiet. It was an epiphany moment, and one of us said, in that bubble of silence, “Let us do the island, and let us do Britain.” The discussion that followed was spirited. We pointed out that preliterate people, when the waters rose, packed up that which could be carried or dragged and moved upward. David said, “Why don’t we propose a series of lectures to half a dozen institutions around the country to see if these ideas can be elaborated and if there would be support to pursue them?” So we presented in five venues: Manchester City Hall, University of Wolverhampton, Knowle West Media Centre, Manchester Metropolitan University, Holden Gallery, and Clive Adams’s museum in the woods in Devon near Plymouth, the Centre for Contemporary Art and the Natural World. The responses varied from “How can we help?” to “Good luck.”

One of the people that David Haley brought into our group, Christopher Fremantle, heard that there were still two days left to apply for a grant of several hundred thousand pounds being offered by DEFRA (Department of the Environment, Food and Rural Affairs). The grant was part of almost 100 million pounds that DEFRA had been charged to disburse to projects that educated the British public about global warming. Christopher and David, bringing a number of our catalogues with them, made a personal presentation to DEFRA. They proposed that Helen and I, or the team we were forming, were going to make a model of Great Britain that demonstrated the ris-

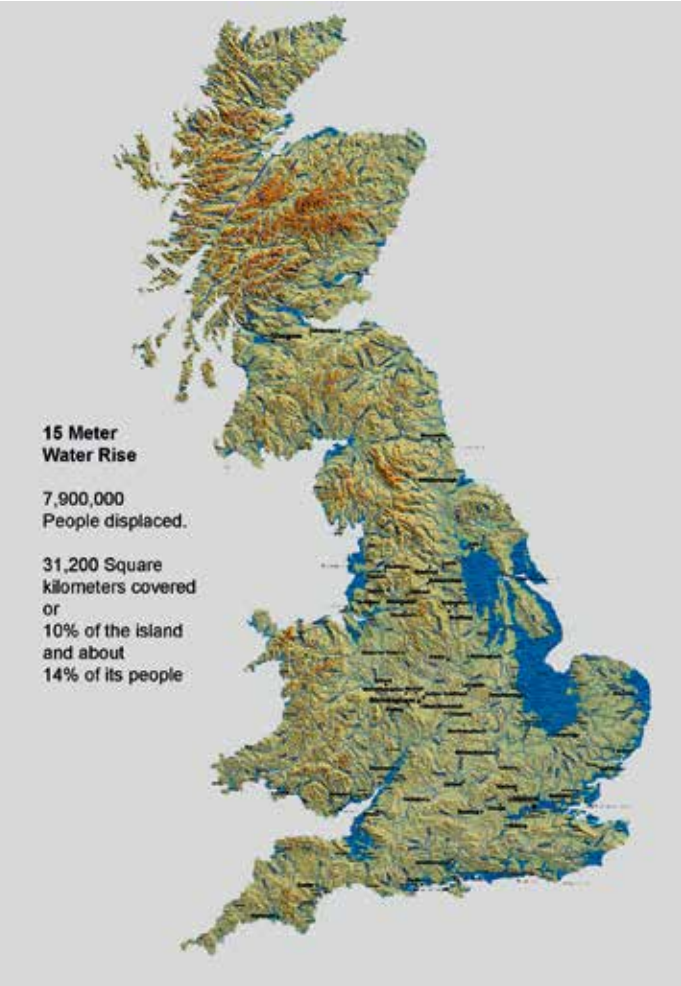


ing waters, and we would need about 200 000 pounds to do it. “How big would this model be?” asked a small group of very interested bureaucrats. “Oh,” said Christopher, “about the size of a football field.” The grant was written up quickly, submitted, approved. To do this work we put together the Harrison Studio with David as associate artist, Christopher as producer, and Gabriel Harrison as exhibition designer. Later, reality entered. We delivered an elaborate apology, with a new presentation, explaining that the model would actually be approximately 2.4 meters by five meters, museum size, with six projectors above it. Suddenly we were under great stress; we had to spend the money and mount five promised exhibitions within a year. We ended up making two models—two whole exhibitions, in fact—in order to exhibit in two venues simultaneously.



The work developed a life of its own. Charged with bringing consciousness of global warming to a large body of people in a number of different circumstances, we developed four global warming works, which dealt with various questions:

- The waters will rise gracefully; how might one withdraw with equal grace?
- What would the upward movement of people into the wilds look like—for instance, into a new village in the Pennines?
- How would one defend a city—say Bristol—from flooding if the sea rose four to five meters?
- How would London face a two-to-five-meter water rise, in which a quarter of the city might be under water?
- What would the whole island look like with such a rise of the sea?





For the first part, we designed a four-meter model of the island of Britain, with six projectors that projected a series of two-meter water rises, up to 16 meters (and also made clear what storm surges would look like). The idea was to democratize the information about what the water rises would do to the shore-line, so that each person could see what a two- or four-meter rising of the sea would do to the area where they lived. The implication was that every person facing this emerging event could become their own planner, or join groups to do so. The exhibition was designed so that the viewer encountered this piece as the beginning of a journey. To get at the sense of urgency, we devised a text that was read in a ten-minute cycle, following the upward movement of waters.

“The news is not good and is getting worse:”
(voice text above the model)

And for this island
which is a much-loved place
The news is not good and is getting worse

Helen
For instance
the Greenland Ice Shelf is breaking up
much more rapidly than anyone thought
and this alone could cause an ocean rise
of up to seven meters

Installation, Ronald Feldman Gallery, New York

British voice
Looking at the first two-meter rise
looking at the storm surge thinking about protection
thinking about where monies might come from
to protect land and people

Newton
The news is not good and it’s getting worse
animals are on the run plants are migrating
if the temperatures on the average
rise over two degrees Celsius one scenario predicts
Europe, Asia, America, and the Amazon
will lose 30 percent of their forests with concomitant extinctions

British voice
Looking at the four-meter rise
Looking at the shape of the storm surge
we examined what a five-meter ocean rise might mean
and we were looking at
about a 10 000 square kilometer loss of land
with about 2.2 million people displaced

Newton
Will it be enough to slow this temperature rise

Helen
If the CO₂ from all the coal burning plants
presently existing
and the hundreds of new ones that China will build
were to be captured and sequestered
Other models suggest there is only a 20-year window to do this

Newton
The news is not good and it’s getting worse
Nobody thinks the oil companies
and coal producers will yield

Helen
Botanists studying the Western Siberian permafrost
have seen once frozen peat bogs in Siberia

bigger than France and Germany combined
begin to boil furiously
as methane bubbles to the surface
they thought this to be 100 000 tons a day
which means a warming
greater than that caused by
America’s production of CO₂
Some models say
we have a 30 to 50 year window to do something
Others say less much less

British voice
Looking at the six-meter rise
looking at the shape of the storm surge
it does not seem that so much can be protected
and the economic urgency appears outrageous

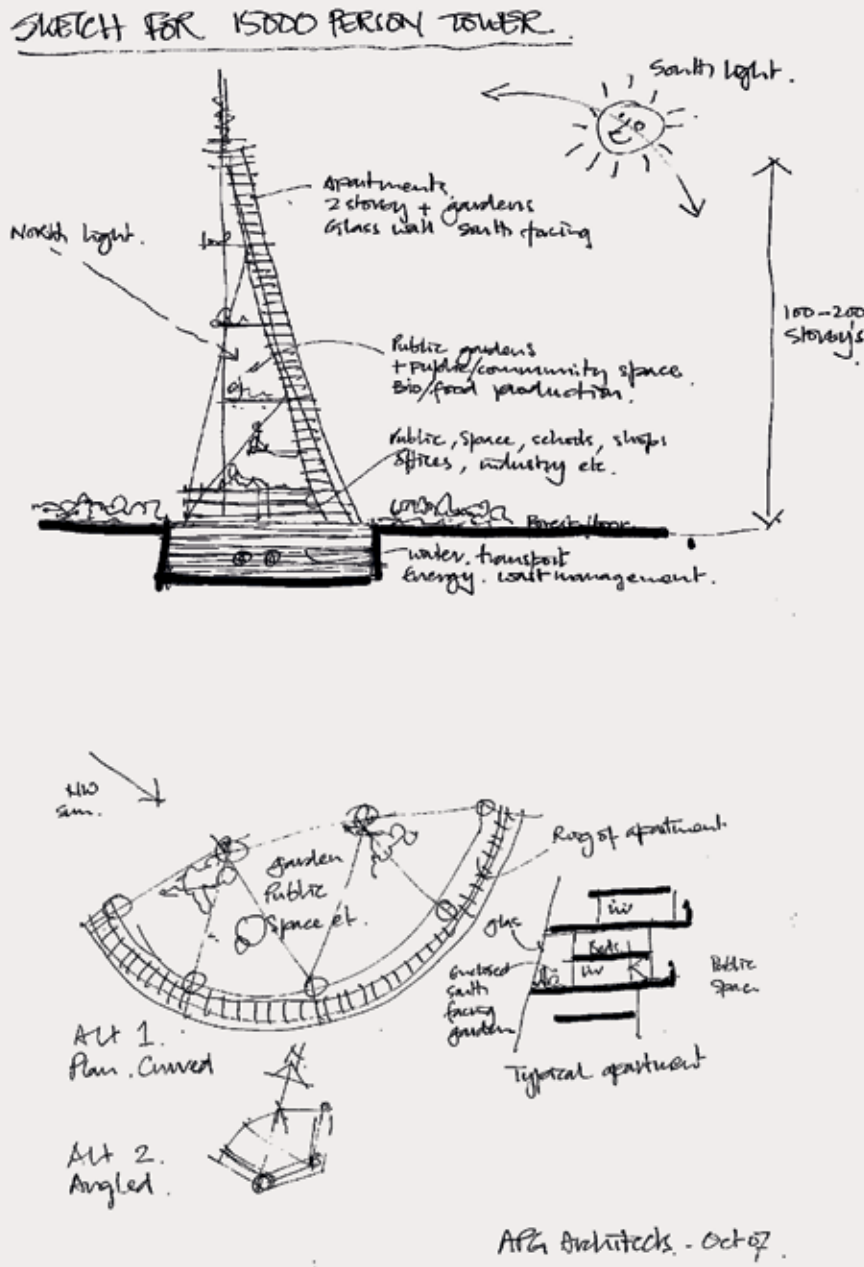
Newton
For instance
The news could be much worse
if the yearly gross domestic product of the United Kingdom
is 2.3 trillion dollars (CIA estimates)
and 1 percent of this domestic production
would be 23 billion dollars
then after 20 years,
about 460 billion dollars would be sequestered
Which would be sufficient to support
the first upward movement of people
and the upward movement of infrastructure

Helen
Finally understanding
that the news is neither good nor bad
it is simply that great differences are upon us
that great changes are upon us as a culture
and great changes are upon all planetary life systems
and the news is about how we meet these changes
and are transformed by them or in turn transform them

High Rise Settlement in a Forest Surround



To live in a forest surround
with a bio-diverse edge
where every high-rise form
becomes a figure
in a biodiverse forest field
enacting a new paradigm
where contemporary resettlement
displacing much of
the gateway development planning
restates much of the benefit
inherent in
historic village forms



First design effort sketched out by John Bignell and APG Designs

Commisioned by the Harrison Studio
for the work entitled *Greenhouse Britain*

Then we made a large map of the 2 600-square-kilometer Lea watershed and proposed 71 skyscrapers that collectively would hold about 750 000 people (10 000 to 12 000 per structure). The 71 structures that we proposed would behave as a giant serpentine, moving through the lower Lea Valley (not far from the edge of London), designed to receive the upward movement of people as waters rose. The intention of *The Lea Valley: On the Upward Movement of Planning* was to release the area below the five-meter mark from the proposed development; it was a criticism, and it was not loved.

For instance
looking at the Lea Valley watershed
it was not difficult to go in the mind's eye
downriver on the Thames a bit
and see the Gateway planning for a multitude of housing
understanding that what might be built from those plans
would be underwater as the oceans rise
we began imagining the upward movement of planning

For instance
Imagine a new form of dispersal of people
money and resources where
development becomes associated with
the generation of biodiverse habitat
so that the one does not subsume the other
as is now so often the case
We began imagining that this development
new and ecologically provident is spread across
the open areas in the Lea Valley
to the east and north of the Lea River above the five-meter mark

We proposed a bold experiment asking the question
can intense population diversity and complex biodiversity
coexist within a blended community
imagine that ecologically provident
culturally appropriate high-rise dwellings

We designed a companion piece that was adjacent to the model entitled *In Defense of the City of Bristol* in which we attempted to simultaneously manifest the possibility of defense and the ineffectual properties of long-term defense. (No one outside our group caught the irony.) For this work which looked at the effect of the ocean rise on a particular place, we worked with the architect John Bignell of the Bristol firm APG. Part of his team made a five-minute film following our design, with text moving slowly through the images:

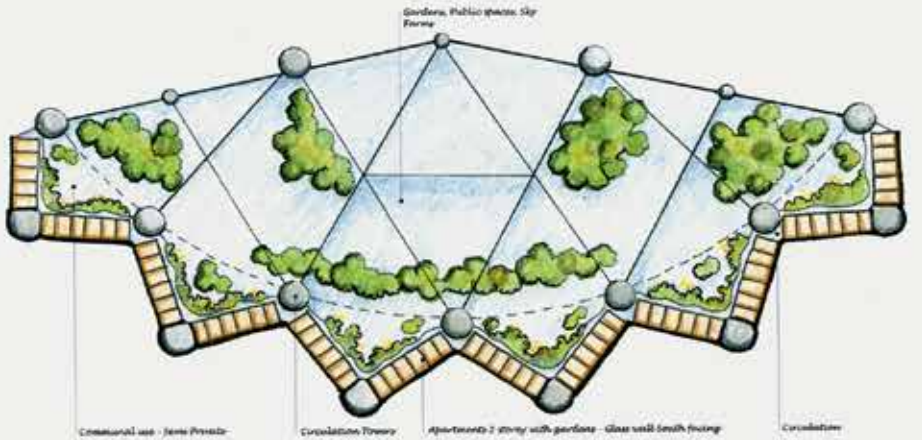
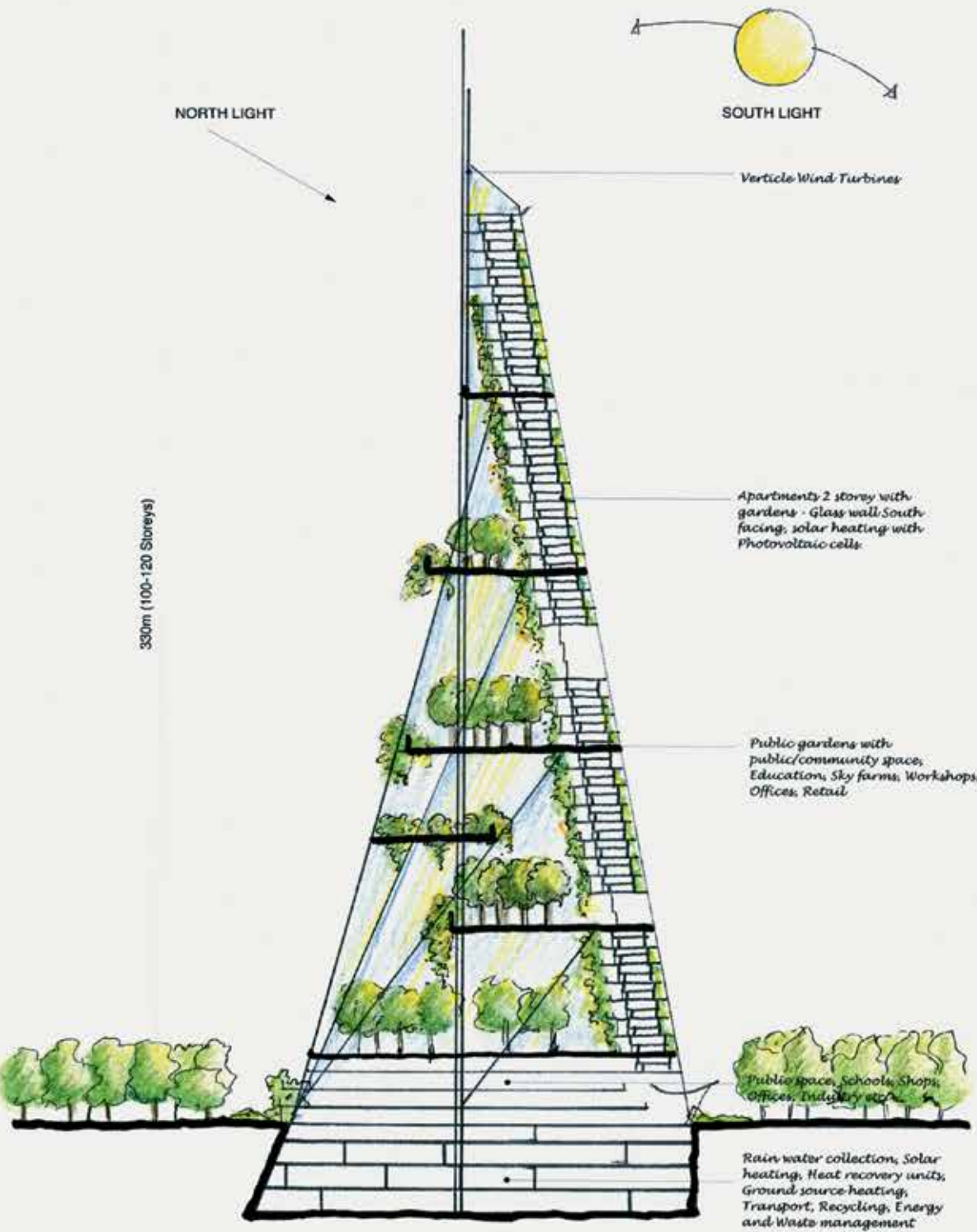
The ocean waters rise five meters.
The five-meter rise moves up the Avon Gorge.
Unimpeded, the waters reach and flood Bristol city center.
A dam is constructed in the Avon Gorge,
holding back the five-meter ocean rise.

The dam resists the storm surge.
With the dam in place, Bristol city center is protected.

The Avon River fills the gorge behind the new dam.
The tide drops 10 meters twice a day.
The water from the Avon River collects behind the dam
at high tide.
At lower tides, the Avon's water pours through the dam,
dropping the river quickly to normal twice daily.
In this process the falling water creates electricity.
And the community is served twice
by the protection from flood and by the production of electricity.
Then
The ocean rises above six or seven meters.
The dam is further raised to hold back the ocean waters.
The Avon Gorge is no longer sufficient to contain the outfall of
the Avon River,
which above a six-meter ocean rise would backfill, flooding the city.
In this new eventuality the Avon River is diverted above the city.
A new riverbed is cut through the open countryside.
A new Avon River estuary then flows into the Severn River

Sky Gardens

We propose a bold experiment
answering the question
can intense population density
and complex biodiversity
coexist within a unified field
Imagine that ecologically provident
culturally appropriate
high-rise dwellings
some of which are already
being designed for people
in large numbers
behaving as a high-rise village
each having its own garden
each garden hanging in the sky



behaving as a high-rise village
each having its own garden
but most important
embedded in the high-rise village is the matter of civility
which leads to the formation of community
this property is in the main absent from large box buildings
designed by architects from Corbusier to the present
Later we began the design of a vertical main street
with the architectural team ATOPIA which has all the properties
and community values of a small town main street
perhaps a 10 000 person community
wherein the promenade behaves
as a homeostatic mechanism
which assists the community in making a judgment
on its own well-being every day
done through the process of seeing
and tuning to the movement of everyday people
and where all services
of trade and work
are in sight of each other
and participatory in nature
and agricultural systems
become participants
in the urban metabolism
which itself is in an ongoing state of creativity
Thereafter thinking about carbon and water
We envisioned the 95 175 hectares
of farm and meadow lands
within the Lea Valley drain basin reforested
and in this new history the work of the forest
is to sequester carbon in large amounts
the work of the forest is to reestablish the earth as sponge
generating waters in large amounts
in fact creating a water security system
for the city of London as a whole

On Eco-Civility

From Corbu to any vast apartment building
to the 61 meter tall structure in Dubai
Big Box Buildings are places
where each person enters at the bottom
and first by rapid elevation
then by traversing
a non-windowed hallway
reaches a mostly modest
sometimes opulent
living space
These behaviors
repeated millions of times
normalize the social alienation
of big box buildings
where the nature of the structure itself
determines that community and a civil society
cannot form in the populations within them
The loss of social capital is profound

Here we design a new structure
and a new use of volume
based on an as yet untested premise
a complex synthesis of
normal elements in everyday life
placed in an unexpected relationship
basically a vertically designed small town
following the definition of complex systems
but behaving as any small town might
with the help of two interlocking systems
that comprise this urban ecosystem

The first is a vertical promenade
perhaps four blocks long
with side streets

The work of this promenade
is to host an activity and to be a place
a stage on which people in a community meet and mix



It is a leisurely meeting and mixing
having different purposiveness and tempo
than daily activities in a workplace.
And like any promenade
it is marked by people
physically tuning their walking
to common movement and rhythm
as is typical in all urban ecologies
This is a basic homeostatic or self-regulating mechanism
by which the community as a whole
maintains awareness of the well-being
of the individuals who comprise it
and by which the sense of community
is reaffirmed collectively.
It is an arena
on which the communal drama is publicly enacted
Even the funicular
which acts as transport
shares the leisurely pace
contributing to
the experience of constancy and change
defining self and group in the context of society and time.
in fact the urban metabolism at work

As in any small town
the ways to traverse it are many
On foot and in this case
on a rapid elevator
or funicular and occasionally on an escalator
Streets vary between 4.6 and six meters wide
and everybody is within 5 to 10 minutes
in physical time
of anyone, anywhere and anyplace
Traversing it becoming an adventure
in diversity of experiences

Internal flexibility permits evolution
and over time new patterns will emerge
which may generate new permissions
to improvise new relationships
between people and people
people and place, place and place

On Structure

The second system, equally complex, interactive and diverse
as the vertical promenade
is determined by a space volume
of hundreds of cubic meters
created within a space frame
It becomes a self supporting external structure
as is already made for some skyscrapers

The work of the external structure is complex
it encloses a space volume
behaving metaphorically
like the skin on a living entity
or exoskeleton
taking energy into itself

Note:

The work, with the title *On Eco-Civility and Structure* is the second design effort with this subject matter. The role of the Harrison Studio was generating the core concepts first expressed in the installation *Green House Britain*. The role of ATOPIA was to create a physical structure of considerable complexity and scale that further developed and embodied the original Harrison Studio concept on eco-civility.

Looking at the potential for rapid ocean rise over the next century, the idea of saving cities seemed far less important to us than allowing for the upward movement of people. Having designed an urban approach with the Lea Valley proposal, we came upon a rather novel question. Instead of designing forward as developers did, with existing know-how and well-developed systems of building, could we actually design backward from carbon, letting that be the form determinant for everything that occurred? We began imagining a Pennine Village, posing the question: How many hectares would it take—two-thirds grassland and one-third forest—to sequester the local carbon footprint of seven or 8 000 people? We searched for a school of landscape architecture and design that might be interested in investigating this idea, locating a site, and helping to create an expression for the exhibition. Gabriel, our exhibition designer, came up with Paul Selman, the director of landscape design for the University of Sheffield. We called him, and he liked the idea. We put together a reasonable sum for two weeks, work by 10 students, a two-week charrette was composed, and we went to Sheffield. Gabriel directed the actual production of imagery. For the first three days of work, people thought we had asked an unanswerable question. In the second three days, it was agreed that the question was answerable. The second week was spent investigating sites and looking into animal husbandry. Studying forest and animal behavior in the high Pennines, we found a site, and spoke the following text.

We are standing at the Liverpool dock
imagining the waters rising first five, then ten,
then 15 meters
thinking about the upward movement of people
and talking about how that might happen gracefully.
Deciding to replace the term “development”
with the term “settlement.”
For us it is a metaphorical flip an aide to thinking
and thereafter to designing
The differences between settlement and development are profound.
We agree that the term “settlement”
has embedded in it the idea of habitat for ourselves
and of niches for other living creatures
Then you said or I said the metaphorical shift
between development design
and settlement design
becomes visible at its simplest level
in selecting an appropriate site
and then tuning settlement
to the carrying capacity of the terrain

So we
with a small group of people began
looking for a site well above Liverpool in the high Pennines
where human habitation might be designed
as an interactive figure within a biodiverse field.
Our small group discovered
a place in the Pennines
with 16 watersheds running from
the Dark Peak moorlands in the east
through a topographically diverse
and ecologically diverse landscape
with sloping hills.
These moved gently towards the lower Mersey basin
Beginning at perhaps 350 meters and
ending at perhaps 250 meters.
Then somebody said “I know this place
It’s really many places

It has peatlands.
It has upland moorland and pastureland
with semi-natural woodland and plantations
including wet and dry meadows
and some urban and rural gardens.
Walking in the terrain finding aquatic ecosystems
and upland streams riparian habitat
little dew ponds and lakeside
and streamside ecosystems.”
We measured this terrain and shaped it
finding that its boundary included about 109 square kilometers
and about 4 500
people living in Hayfield or dispersed nearby
This place appeared to us
a quintessentially Pennine place
And thus we began a process
of thinking exploring and designing
what we came to think of
as a new Pennine configuration
a new form in the British landscape mosaic

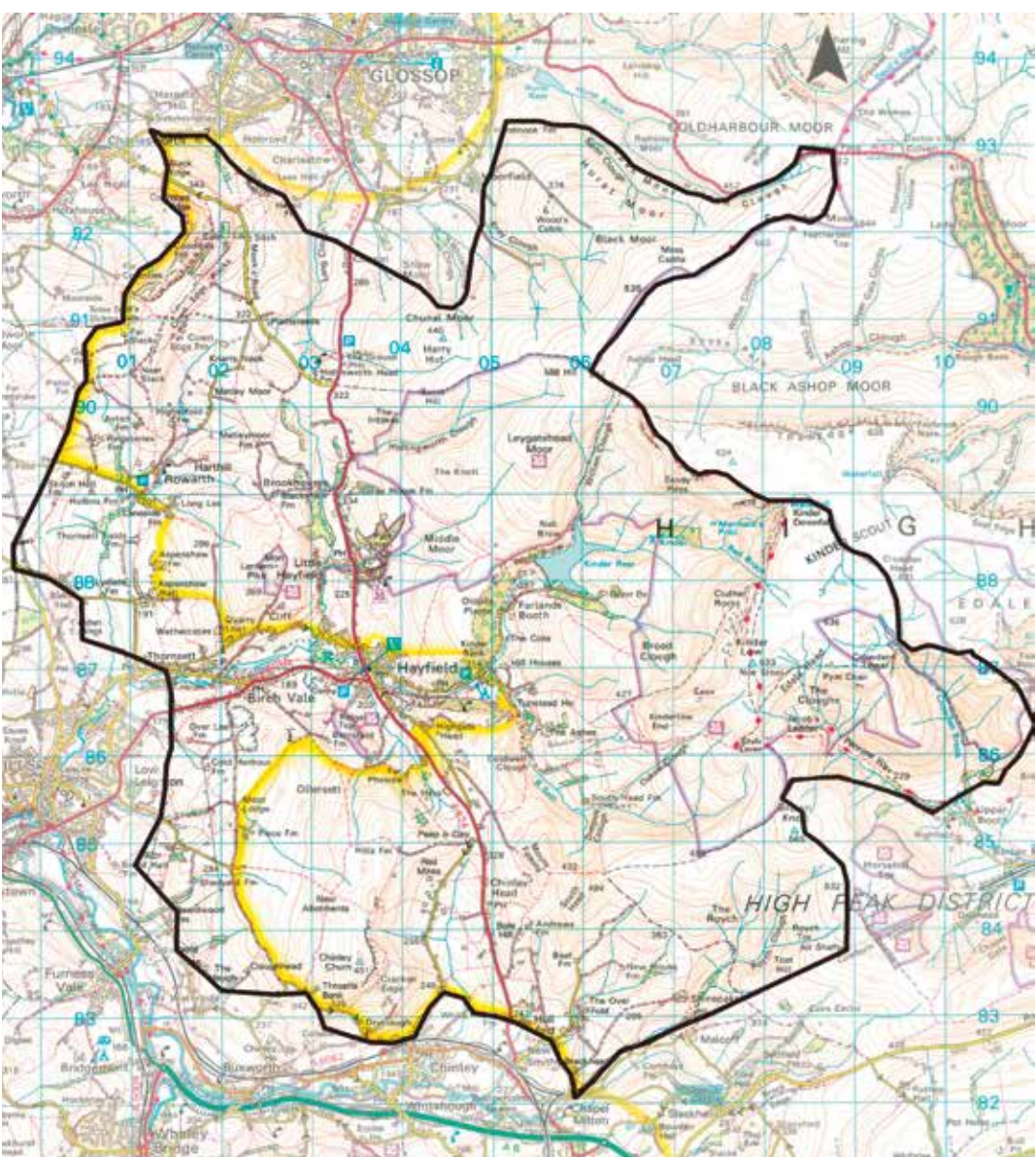
Beginning this process
We became for a while four groups.
One thinking about carbon sequestration
and a second group which took on the task
of imagining
an open canopy forest and meadowland
Then a third group
imagined what a village might look like
a fourth group
began the process of envisioning this place
as a whole system
that was replicable around the Pennines.
And together
we began a consideration of what one
might harvest from the land
and how such a harvest could preserve the system.
And in the process we began to imagine
a self-nourishing self-preserving system

Understanding this Pennine place to be 109 square kilometers
the power of the passive sequestration of carbon
here became obvious.
The choice was made
to conceive an open-canopy forest
that was 30 percent forested, 3 642 hectares
and 70 percent meadowland, 7 284 hectares
Since meadows sequester one ton of carbon per year
and forests sequester two tons per year
This new landscape would pull
about 36 000 tons of carbon from the air every year.
With about 4 000 people living here now
and imagining a village
of another 4 000 people coming
understanding that the domestic carbon footprint
of each person is four to five tons per year
then an open-canopy forest grassland
of the kind we imagine
would passively sequester most of the local carbon
of each of the 8000 people’s carbon footprint.
and we began looking
for other ways to design backwards from carbon.

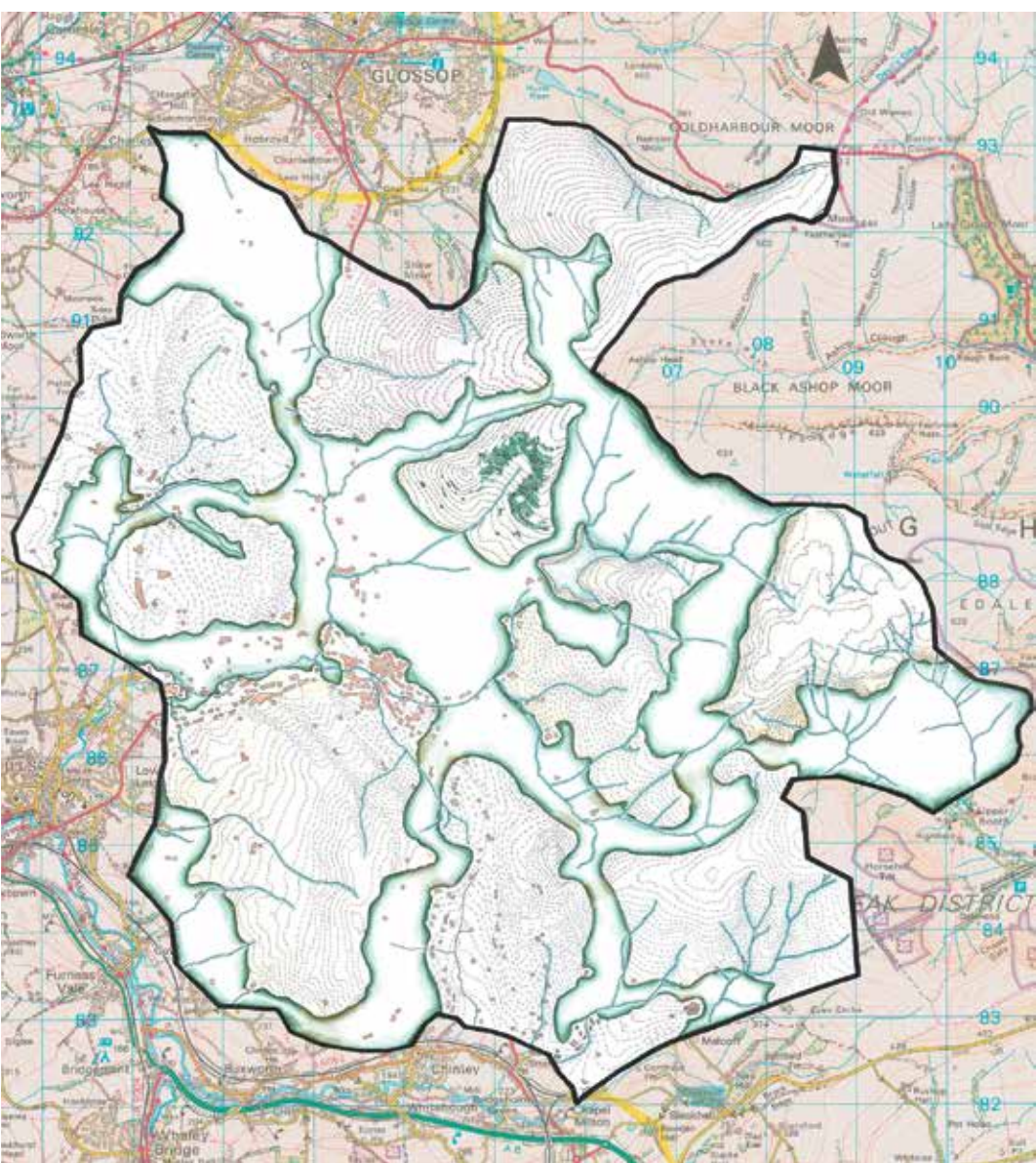
Proposed Pennine Village terrain from the satellite,
a typical fragmented landscape



The 109-square-kilometer Pennine Village terrain
with Hayfield at the center



The Pennine site where watersheds
determine meadowlands



Pennine site where meadows and watersheds
determine forest terrain



On the upward movement of people
into a hilly landscape which is
mostly open, mostly trees, grasslands
on the hillsides and moorlands
on the hilltops.

Beginning a Pennine Village design by respecting the ecosystem design in the earth

All waste water generated and all surface water collected
is filtered, biodegraded, and absorbed on site

All foundation elements projected into the soil are designed
to have minimum impact on the flow of waters
and the migration of biota through the living soil layers



On the Pennine Ring

Finally
thinking about big numbers
finding that the Pennine Ring
had what looked to be
the lowest population
and the greatest open space
on the island
We began to think about the Pennines
as a whole place
with a length of 215 km
With the area
of the High Pennines
over 300 metres
equalling under 3,000 square miles
And the area
of a 5 km downward perimeter
equalling about 3,600 square miles
Then we did the obvious
and imagined repeating our model
around this ring
80 times
with theme and variations
adding 4,000 people
to each new 42 square mile shape
Thus we discovered
that 320,000 new people
might live
and to some extent work
in a harmonious
part-like
savannah-like
bio-diverse
food-producing
open-canopy forest
which by its very nature
dramatically reduced
the carbon footprint of all
and everybody living there

The thinking
about still bigger numbers
as the oceans rise 5 metres
about 2.2 million people
will be displaced
and 6,000 square miles of land
covered
and in this circumstance
this Pennine Ring
becomes an invitation to
15% of these people displaced
to move into
a new world
a world that is marvelous

The Pennines

Tower District

Greenhouse Britain
Losing Ground, Gaining Wisdom

The last of the five exhibitions was to be in London City Hall, in the lower rotunda. An election was going on, and Ken Livingstone, the left-wing but moderate mayor of London, lost to Boris Johnson. Three days before our installation we received a call from the event director of the building. The new mayor did not too much believe in global warming, and had no interest in the upward movements of people whatsoever; therefore, the exhibition was to say the least endangered. David Haley threatened to go to the press, to begin a discourse in the *Guardian* about the repression of artistic freedom as the first act of the new mayor—clearly not good publicity for an opening move. A day passed; condolences came, wishes for courage and good luck. The new mayor conceded. *Greenhouse Britain* was installed, but the mayor got his revenge by cutting out publicity and making sure there was no opening party. Some years later, we received an Art, Water, and Environment Award from the Centre for Contemporary Art and the Natural World and CIWEM (Chartered Institution of Water and Environmental Management) for having done the most to inform the British public about global warming.

After the prize ceremony, David said that he was hoping to write a book or a monograph on transdisciplinarity. It would focus on Basarab Nicolescu's writings as he sought to define what had the look of a new discipline. My response was that we were working with a concept that he well knew, which was what we called the "ennobling problem." The idea being that if you took up a problem associated with profound need and at great scale, the problem itself would tell you both what disciplines were needed for a solution and how deeply you needed to go into them with your investigations. So what is the difference between this and transdisciplinarity? One of us said, "This transdisciplinarity sounds like a replacement for what everybody for years has been calling 'post-modernism.'" I then said, "You know David, in one of our morning conversatons sometime in the early 80's, we were discussing post-modernism as it had a lot of heat at the time, and we decided to skip it."

Fecal Matters

2005 Miller Gallery

at Carnegie Mellon University,

Pittsburgh, PA

We were invited as an artist team to address the township of Braddock, Pennsylvania, by the Studio for Creative Inquiry at Carnegie Mellon University in Pittsburgh.

Tim Collins and Reiko Goto, artists and Center Fellows (and another husband-and-wife collaborative team) had invented a body of work called the *Nine Mile Run Greenway Project* that dealt with rethinking streams and rivers, their ecological and physical roles in the city of Pittsburgh, which was still emerging from being a coal and steel town. They then organized a three-part project that brought artists in the Pittsburgh area to initiate change. We were among 24 international artists (and artist teams) to present at the Monongahela Conference in October 2003, then one of 12 to participate in the Monongahela Residencies in June 2004. This all culminated in the exhibition *Groundworks: Environmental Collaboration in Contemporary Art* at Carnegie Mellon in 2005. We had originally asked to deal with the high grounds at the top of all the watersheds, where we thought original work could be done. But Tim was adamant in wanting us to take on the small town of Braddock. It was almost uninhabited, with a great Carnegie Library still a community presence there. Sometimes, sitting on the library steps, you would hear a strange grumbling and crackling sound that would last maybe 10 seconds; the kids there explained that another abandoned, poorly built coal miner's house had collapsed.

Braddock fronts on the Monongahela River for approximately 1.5 kilometers. Most of the frontage land is owned by large businesses that appear to be simply holding the land, waiting for it to increase in value. After spending several weeks on site, we understood that Braddock's drastic drop in population—from 25 000 to 2 500—could be seen as a catastrophe when viewed from the perspective of job loss and the ending of the hegemony of the steel industry in the region. However, our experience suggested that, seen differently, Braddock was in a process of resettlement: People were slowly returning, due to the low cost of housing. The multitude of empty lots were going into succession as nature resettled where it could. What we chose to propose took advantage of this emerging situation.

The only public entry into the Monongahela River in Braddock was a 12-meter-wide concrete ramp where boats could enter the river and where people sometimes fished. An old sign there read, "Beware of Fecal Matter." We could see that it was floating all around the sign, so we decided to do a work entitled *Fecal Matters*. Both the surface-water drainage system and the sewage system used the same pipes, which normally led to a centralized sewage treatment system but on overload emptied directly into the river. Apparently, it took only 0.25 centimeters of rain to cause this system to overflow—hence, the warning.

There was an extended conversation in the city of Pittsburgh about its sewage problem. The cost of rebuilding the large centralized sewer treatment plants and the inflow pipes was estimated at 3 to 8 billion dollars (depending on who was doing the estimating). The plan favored by many was to build large holding tanks to capture the diluted effluent that the down-river sewage plant could not process during the heavy rains, then to slowly release it during dry periods. Plans of these kinds, proposals for action and the like, take a long time to develop in the city of Pittsburgh where funds are so limited. We perceived Braddock, North Braddock, and the hills above, an area of approximately 405 hectares, as an ideal site to test a concept.

If surface waters could be channeled from streets and rooftops into nearby empty lots whenever rainfall exceeded 0.25 centimeters, then effluent would not overfill the pipes and the sewage system would not be stressed. Then, fecal matter would not pollute the river as it flows past Braddock. The vast cost of separating groundwater from effluent by creating new underground water-transport systems would be replaced by a far less expensive, more ecologically provident system.

Channeling runoff onto the many empty lots, appropriately treated and planted, would make those lands amenable to percolation. Then, from the perspective of the land, Braddock would become a place with wetland gardens that in turn, over time, let clean waters percolate down into the ground and slowly seep into the Monongahela River. Braddock would become a unique place with a special beauty, land values would rise, neighborhoods become more interesting, and the new early settlers would benefit economically, socially, and culturally.

To communicate with the sewer management community, who were an important part of our audience, we began thinking in big numbers. For instance, if Braddock, North Braddock, and the hills above were seen as one place (perhaps 405 hectares, all told), and approximately 2.5 centimeters of rain were to fall in a day, then we would be looking at about 102 380 cubic meters of water spreading over these lands. (In the previous year, 2.5 centimeters of rain or more had fallen on 12 days, 0.5 centimeters or more on 35 days, and almost 15 centimeters on the worst day.)

In addition, if we assumed that the sewer system itself would take about 9 868 cubic meters (10 percent) of the water, and the open lands, without any diversion, would take another 10 percent, then the remaining diversion of waters would require land sufficient to percolate about 77 700 cubic meters of water for 2.5 centimeters of rainfall (or about 39 470 cubic meters for 0.5 centimeter, which was more typical). Thus, to handle 77 700 cubic meters would require about six percent of the land in a 405-hectare site to percolate 0.3 meters of water. (In the event of 0.5 centimeter of rain, that same six percent of land would need to percolate only 0.15 meters.)

Even in those interesting geophysical circumstances, in which excess waters could be percolated into the ground, there was still the probability of overload. For instance, if test studies showed that more than 0.5 or 1.9 centimeters of rain would constitute overflow, then a tank or reservoir to capture the overflow waters with diluted effluent would need to be constructed (as was even then being proposed for elsewhere in the city). It appeared to us that there was a remarkable opportunity to test the concept of sewage system decentralization wherein waters were purified in situ rather than gathered and sent long distances to a central facility. Toward that end, we proposed a system, called the Pirana, that could purify large amounts of water containing diluted effluent. The Pirana uses an aerobic bacteria generator (ABG) process; its inventor, Dan Wickham, describes it this way:

The essence of the ABG technology is to condense as many of the critical components of microbial treatment into the smallest possible configuration, so that a given amount of treatment ca-

capacity can be mobilized in an instantaneous fashion wherever and whenever it is needed.

The unit is thus a transportable, fixed-film treatment unit, applicable to almost any strength effluent. Treatment is based on passage through the unit over the bacterial matrix. With concentrated effluent, more passes over the aerated bio-film are necessary.

Thus, for a given mass of organic waste, the concentration will depend on the volume of water it is in. Low water volumes will exhibit higher concentrations. A Pirana will cycle some measurable volume depending on the size of the unit. For instance, a P-40 circulates 114 000–190 000 liters per day through it. For 3 800 liters of concentrated waste we get 30 to 50 treatment passes per day. That same mass of waste in 38 000 liters will experience only three to five passages through, however, since its concentration is only 10 percent of the more concentrated effluent, fewer treatment passes are necessary.

In effect, the treatment capacity is independent of concentration, being similar at high or low dilution because of the self-correcting iterative nature of the process.

Further, the portability of the units allows use in almost any feasible containment. Again, treatment is a function of the internal characteristics of the unit and not the configuration of the containment surrounding it.

In our proposal, we summarized the situation as we perceived it: It is for these reasons that we find this situation in the Braddock area extremely interesting socially, ecologically, and economically. Moreover, it is for these reasons that we are seeking monies to first bring together a group competent to more precisely conceive how this project would work and thereafter to locate a test site and then to seek further funds to test the idea directly on the ground.

However, from driving through the city, looking at maps, and taking a boat trip, it appears to us that the parts of Pittsburgh that have had both population loss and building loss are open to the separation of groundwater and effluent that we propose here. If the system we propose lives up to its potential, we believe the savings will be considerable.



We were invited as an artist team to address the township of Braddock by the Studio for Creative Inquiry at Carnegie Mellon. This proposal is the outcome of our investigation.

For approximately one mile, Braddock fronts on the Monongahela River. Most of the frontage land is owned by large businesses that appear to be simply holding the land, waiting for it to appreciate in value. We feel, after spending several weeks on site, that Braddock's reduction of population from 25,000 to 2,500 can be seen as a catastrophe when looked at from the perspective of job loss and the ending of the hegemony of the steel industry in the region. However, our experience suggests that seen anew, Braddock is in a process of resettlement. People are slowly returning due to inexpensive housing, and the multitude of empty lots are going into succession as nature resettles where it can. Basically what we will propose takes advantage of this emerging situation.

Our investigation led us to the only public entry into the Monongahela River that Braddock fronts on. This is a concrete ramp approximately 40 feet wide, where boats can enter the river and where people sometimes fish. There is an old sign there that says, "Beware of Fecal Matter." We looked at the water, and we became intensely aware of fecal matter, as it was floating all around the sign. In a moment of epiphany, we decided to do a work entitled Fecal Matters.



It seems that both the surface-water drainage system and the sewage system use the same pipes that normally go to a centralized sewage treatment system but an overload empty directly into the river. Apparently, it takes only 1/10" of rain to cause this system to overflow. Hence, the fecal matter warning.

This proposal makes an argument for channeling surface waters on to the many empty lots in Braddock in order to reduce the flow of surface waters into the existing sewer system. The idea is that after appropriate planting and attention to the over-compaction of earth, waters would then be able to percolate into the ground where they would be purified and slowly find their way into the Monongahela River. To the extent that surface waters would be reduced, sewage overflow would be correspondingly reduced. (We understand the arguments against percolation, but we do not believe they hold in all cases.) This proposal continues with the idea of creating catchment basins or holding areas that could catch the dilute sewage effluent overflow during heavy rainfall that could not be accommodated by the percolation system described above. Further, this proposal argues for a particular treatment system that can rapidly purify rainwater-diluted sewage effluent to better than secondary treatment level that could then be released directly into the river system. We argue that the present sewage system of Pittsburgh is obviously under great stress due to the older engineering systems that tend



to over centralize, and might greatly benefit from taking the risk of decentralization. This proposal argues that Braddock, North Braddock, and the hills above would be an ideal test site for the ideas expressed therein.

For instance, if surface waters could be channeled from streets and rooftops into the nearby empty lots when rainwater exceeds 1/10" per day, then effluent would not overflow the pipes and the sewage system would not be stressed. Then, fecal matter would not pollute the river as the river flows past Braddock. The vast cost of separating groundwater from effluent by creating new underground water-transport systems would be replaced by a far less expensive, more ecologically provident system.

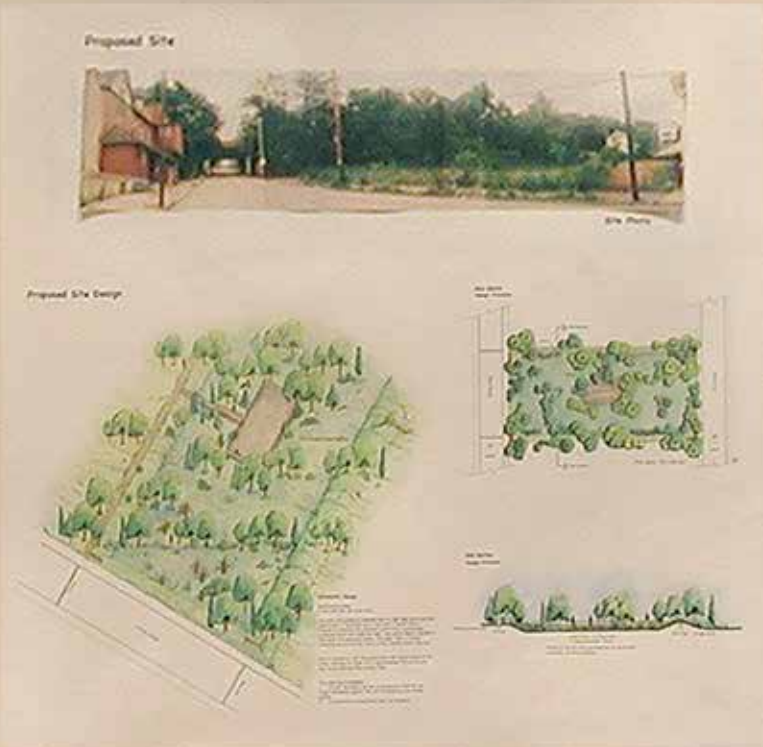
The idea here is that channeling rainwaters from the street and various rooftops of Braddock onto the many empty lots appropriately treated and planted will make these lands amenable to percolation. Then, from the perspective of the land Braddock becomes a place with wetland gardens that in turn, over time, let clean waters percolate down into the ground and slowly seep into the Monongahela River. Then Braddock becomes a unique place with a beauty special to itself. Then land values rise and neighborhoods become more interesting and the new early settlers benefit economically, socially, and culturally.



For instance the aerial views of Braddock North Braddock and the hills above reveal more than enough open terrain to create percolation parks in sufficient number to release this area of the sewer system of Pittsburgh from the overflow of raw sewage except under the heaviest of rainfall.

For instance assuming the area from the hills to the river is 1,000 acres and assuming the average rainfall does not exceed one inch in a day then approximately 84 acre feet of rain or about 26,800,000 gallons of water a day can fall upon these thousand acres.

For instance if about 10% of the rain can be absorbed by the sewer system before it overflows then it will be necessary to percolate into the ground about 76 acre feet of water and if we assume that percolation ponds can be designed to accept one and a half acre feet of water then we are looking at about 40 to 50 acres of land to be sequestered for percolation park or about 5% of these acres or even less. Hence this design as a working model.



However, where the population is dense and open space rare, the idea of the creation of large catchment areas, perhaps in the form of large concrete holding tanks, may well be the least expensive solution to these very intractable problems, and intractable they are. Fundamentally, we are arguing that the Braddock experiment offers the possibility of generating a model for decentralization

to replace, or at the very least enhance, an over-centralized, apparently increasingly inefficient sewer system that exists in Pittsburgh.

A critic, in one of the essays in the exhibition catalogue, objected to our use of technical language. We in turn reflected on how valuable it would be for our critic friend to become both ecologically literate and fluent in sewer talk.

Seven years later, we were talking with our friend Betsy Damon, with whom we hoped to work in China. Betsy told us that she was doing a big Pittsburgh work, in part on their sewer system. We wished her good luck, and said that we had given it a try in Braddock. We thought that maybe enough time had passed, and she was a good enough community organizer to get it done.



Letino seen from the fields below



Gallo across the lake from Letino

Between Letino & Gallo

The Domain of the Path

2006 exhibited in an abandoned church

in the city of Letino, Italy

It was 2004; we were slowly working toward a conclusion for the Santa Fe watershed work when we were contacted by an architectural group asking if we would be willing to do something with small towns above Naples in the Apennines poverty-stricken, youth leaving places, some with abandoned houses that were for sale for less than 20 000 dollars. What was there to say? So we said, “Yes” but tried to leave a maybe as part of the “Yes.” They said they would get back to us as we were very important to their project and they were waiting for UN and European money to bring together groups of artists in an interdisciplinary ensemble. And they would definitely get back to us.

Several years passed, and we had the last *Peninsula Europe* exhibition in Munich. The Santa Fe watershed is completed and exhibited and *Greenhouse Britain* begun. The usual number of talks has taken place, as have references and articles, when the team from Naples calls us again. They are very happy, it has taken them only the last two years to get the money from the UN, the European Union, and the Italian government, with a little aid from their university to do this heroic project. We liked the Italians and were able to speak the language reason-

ably well having lived in Italy earlier for three years. Everything they were going to do was heroic and exciting. How could one not like heroic and exciting? There looked to be about 10 artist teams taking up various civic enterprises, the best of which was a young and ambitious group from Austria who in one of the regional towns had discovered in a castle a group of interrelated semi-cellarers with views outside. With volunteer labor they were converting it into a tourist hotel that would bring money into the community. It is not clear that this work was ever finished. It is not clear that any tourists came.

Meanwhile, we were assigned or rather asked if we could not find a way to overcome 1 000 years of conflict that had existed between two towns that were in sight of each other. One, with a building at the head of a high-ground watershed with a foundation that dated back to earliest history, was entitled Letino. The other, at the base of an adjacent low-ground watershed and Bulgarian in origin, was called Gallo Matese. It was explained to us that the people in Letino, where we would live and work, had a background that predated the Etruscans and had been in the area for some thousands of years, whereas the people from Gallo Matese had emigrated from the Bulgarian

countryside a little over 1 000 years ago. It was not clear to us how active distaste and hostility, often unspoken in the main, could exist for that amount of time without petering out. We asked if there were intermarriages. We were taken to the high ground between the two towns, which was a combined castle, church, and cemetery. From there one could see both towns. There was a lake between the towns that within the last 50 years had been transformed with a dam to generate electricity, but there was great conflict about it as the waters covered some of the best farmland.

All this was discussed at dinner in Naples and during a bouncy two-hour-ride from Naples to Letino. We pulled into the first little Letino town square and stopped at the Che Guevara Café for coffee. Two large German shepherd dogs greeted us or rather inspected us. One was named “Sadam”, and the other we don’t remember. We had never been to a socialist town before. It was explained to us that Gallo, the companion town, was a capitalist town and that the mayor was a fanatic supporter of the despised Silvio Berlusconi. We were introduced to the mayors of both towns, the city councils, and the priest at the castle/church. With landscape architect and our co-worker Les-

The Castle and the Church above Letino



The remains of the old path



lie Ryan, and two student assistants from Germany, one an artist, the other a landscape architect, and a wonderful interpreter named Sylvia, we began an investigation of the landscape. In addition, there was an inspired group of young architects who ran from group to group assisting, enabling, and educating, Claudio Calabritto being assigned to us.

From the first moment of work, it was clear that we needed to create a pathway connecting these two towns with enough interest along the way so that people would see the advantage of taking this path. The concept of this path was to become a domain, a place that was more than just a path. Since our base of operations was in Letino we decided that the first section would be from the plaza in Letino to the church. From the first day the church beckoned. We found it was a six- or seven-minute walk up from the plaza to the church and castle and much less down. We found that looking at Letino from below did not tell us about the walk within the town. To us, as strangers walking upward, breathing a little hard, the space, although narrow, felt sculptural with direct stairways and pathways serpentineing upward or downward. People gathered and talked across this space, doorway to doorway. It was a welcoming, friendly experience walking from the plaza to the castle and church. Reaching the space of the castle, taking an uncomfortable short road upward to the church, we found a small plaza of cracked stone in front of the church. Close to the small plaza were three small walled open spaces with sparse grass, without

a place to sit, unless on the single bench. Although the views were powerful, the experience was the opposite of the plaza below and the walkway up. The experience was unwelcoming and unexpected. The cemetery, however, entered through the plaza, evoked a feeling of quiet awe and age and was special and we found ourselves not wanting to leave. Thereafter, we gathered and began to imagine making the castle environs a more welcoming and contemplative space. Working closely with Leslie Ryan, we designed a work with meditative gardens, some seating places, and a maze worked into the paving, and work was contracted for and begun. Actually, every project had a budget for constructing something that would remain in the environment over time, and the maze garden was our contribution. Later we were told that the priest didn't like the work anymore as couples came at night to do sexual things that were presumably ungodly. Standing at the castle, looking at the mountain side that was tree covered and looked a little impenetrable, then across the valley to Gallo, you said or I said, "Over the past 1000 or so years, people here must have found a way from the castle, or the castle site, to the valley below," but we could see no visible path. We thought, a forgetting had taken place. And then Sylvia, our interpreter, found a short section of a path. Our whole group of pathfinders scattered over this special mountainside, looking for other parts of the path. After several mornings' work and many wrong turns we found what we all agreed was the remains of an old zig-zag path.

This path, although needing repair, was exhilarating to experience, with moments to look out over lake and mountains and to experience the intense gusts of wind or calm and quiet. This zig-zag of a path has a voice of its own, having been worn into the earth by many over many years or built with stone supports at the edges and worn and also used by many over many years.

At the bottom of the path was a shepherd with sheep and goats. He was a three-dog shepherd. One of us asked him how many kilometers he walked each day. He said he did not think that way. He said he began walking at first light and finished at dark. He said walking slowly behind and with his sheep and goats was the best way. That way you could see many things and he pointed downward a hundred meters to a wild boar wandering the countryside. All felt that the experience of traversing hillside and valley floor added a rich experience to the emerging domain of the path. Later in the exhibition, the old men of both villages gathered, remembering as children traversing this path. But as children, the remembered trees were very small as the mountain side had been recently harvested. We had been reflecting on what would make such a path interesting at all. The mountainside was surely one. We had been thinking about amphitheatres in the countryside as one of the sculptural elements along the way of the path that would also be a performance space and serve as a gathering place. One evening early in our visit, we were talking with the policeman

from Gallo as best we could at a performance in the Letino town square. He said he was interested in working with us in some way, although he was busy everyday in the late afternoon working with students from both Gallo and Letino on a dramatic production of a Shakespearian play. It was the first time in the history of both places that something like that had been done. We asked about how he found his work space. He said, "So-So." In a moment of clarity, I asked if he would like an amphitheater for his productions, His face lit up with a "Yes." "Where would you put it?" he asked. "Why, on the line that divides Gallo and Letino," we answered. In this moment, the amphitheater, as an "Event Along the Way" in the *Domain of the Path*, was born.

We were in the office of the "commune" of Gallo Matese doing amphitheater-type talk. Someone asked how big the amphitheater would be. I said, "Big enough for 200 people." "No, big enough for 400 people," said the policeman. "Then at least 400," said the mayor. "Ok, 400," you said. "All right, 400," I said. We met at the site. The two mayors, ourselves, and supporting groups from both towns and a number of film makers. It was an historic moment. Tough questions were asked about parking, siting, approvals, money, and the like. Finally it became obvious to all that exact topography lines were required for precise planning. A surveyor was called for so that working drawings could be ordered. It was agreed that an amphitheater precisely on the line between Gallo and Letino would come into being. The two mayors gave speeches, although they actually refused



Amphitheater circle drawing midway between Letino and Gallo

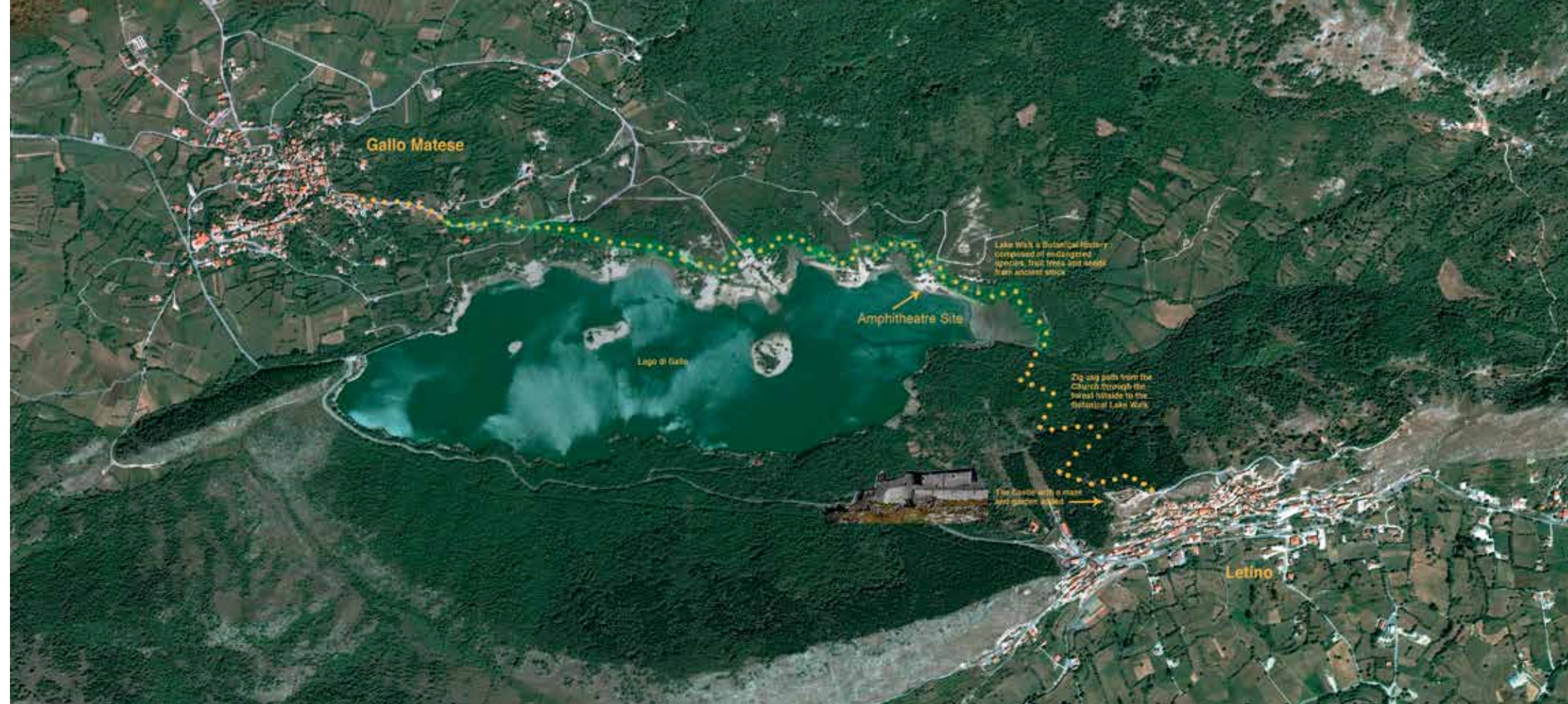
to look at each other. Some of the people from each supporting group urged the two mayors to shake hands. They inched toward each other. They shook hands quickly. They hated it.

We had been pondering what to do with the lake and with the lake edge. A restaurant was being planned for the middle of the lake edge. It was not clear to us how or why people would go there. We began an investigation of endangered species in the area and what might happen along the lake and whether one might make a one-hundred-meter-wide band along the lake, a botanical adventure dealing with the endangered species and not so endangered species, perhaps an outdoor botanical garden that folded into itself both the restaurant and the amphitheater and other elements yet to be dreamed of, yet to be designed, yet to be conceived somewhat in the manner we had designed the *Perimeter Walk* for Frankfurt. It would connect the dam and the city of Gallo Matese to the zig-zag path that led to the church and the path that was the outer edge of the city of Letino.

Finally, this work of art, the *Domain of the Path*, was designed to take the walker through a complex variety of experiences, from a remarkable valley countryside with unexpected shifts in perception, space, and timing. For instance, walking through the willows on a boardwalk to climbing a mountainside, following ancient shepherd paths to a castle highpoint where a whole countryside can be seen at a glance.

Moreover the *Domain of the Path* was designed to offer a walking experience with many diverse views into the mountain-scapes beyond and into biodiverse riparian habitats lakeside. Stopping places along the way offer diverse events such as a series of small gardens of the senses on the path now bordered with fruit trees, nuts, and berry patches to an amphitheater situated on the line between Gallo and Letino.

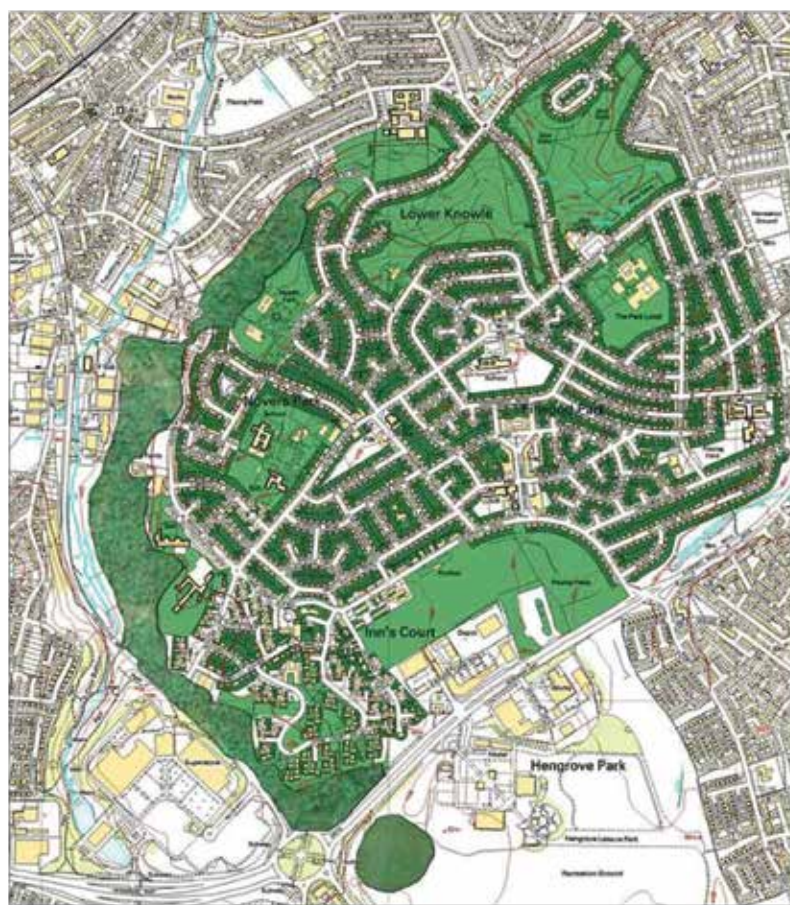
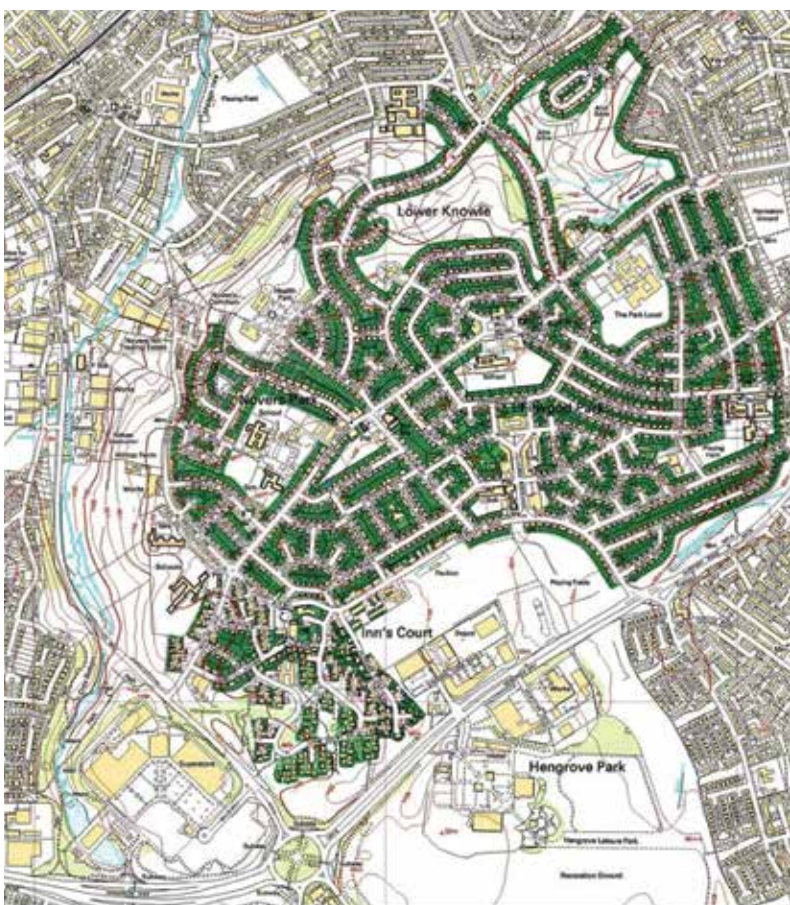
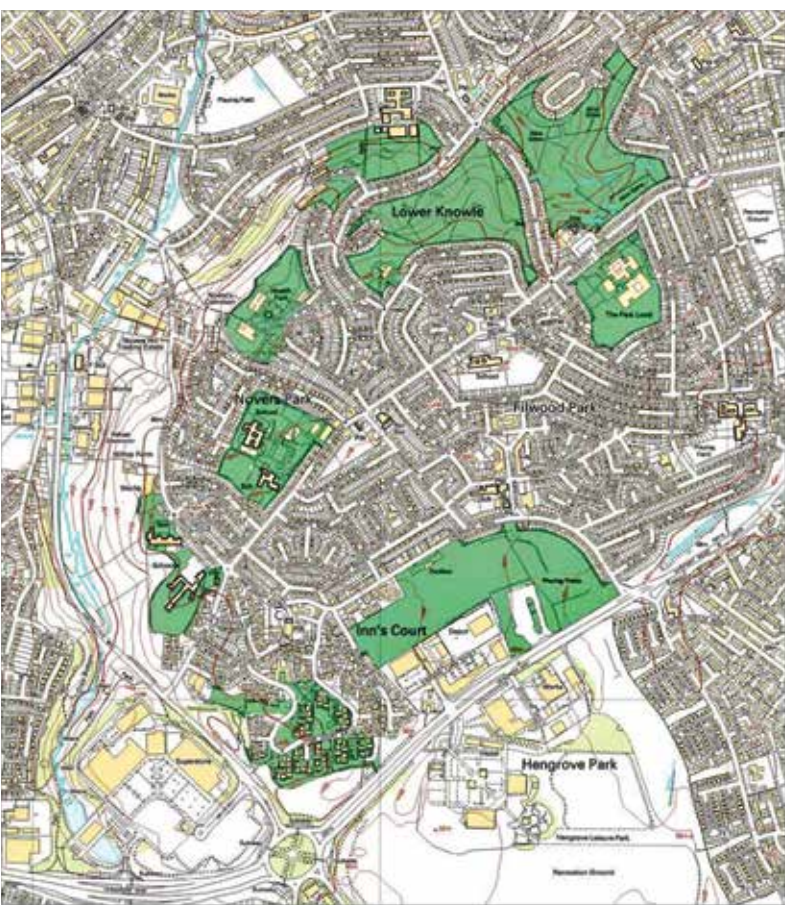
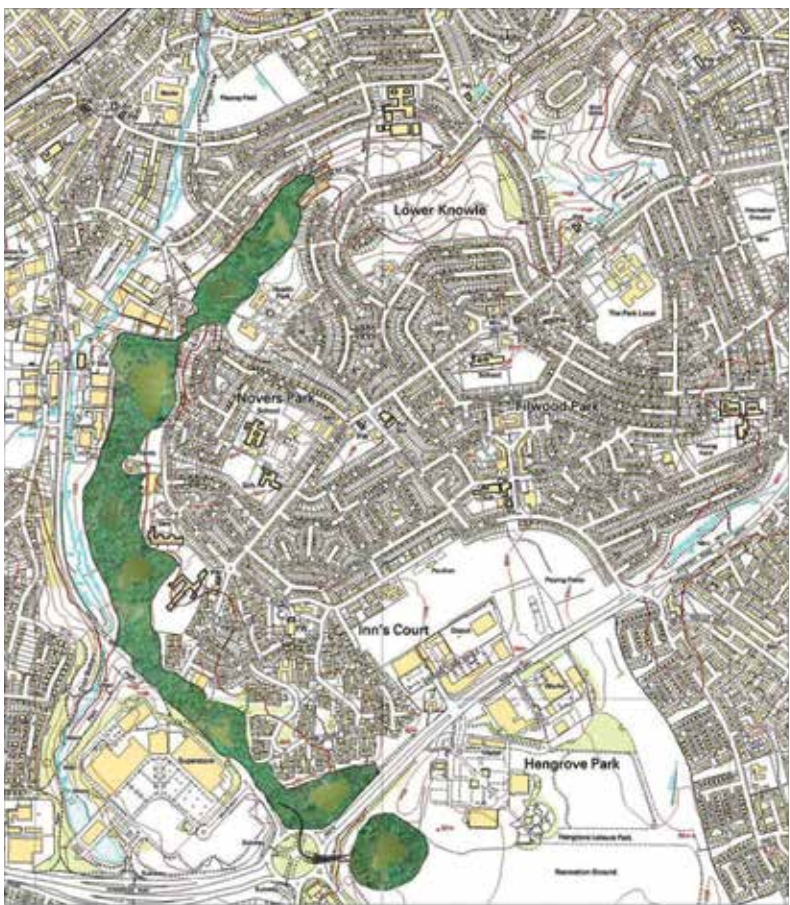
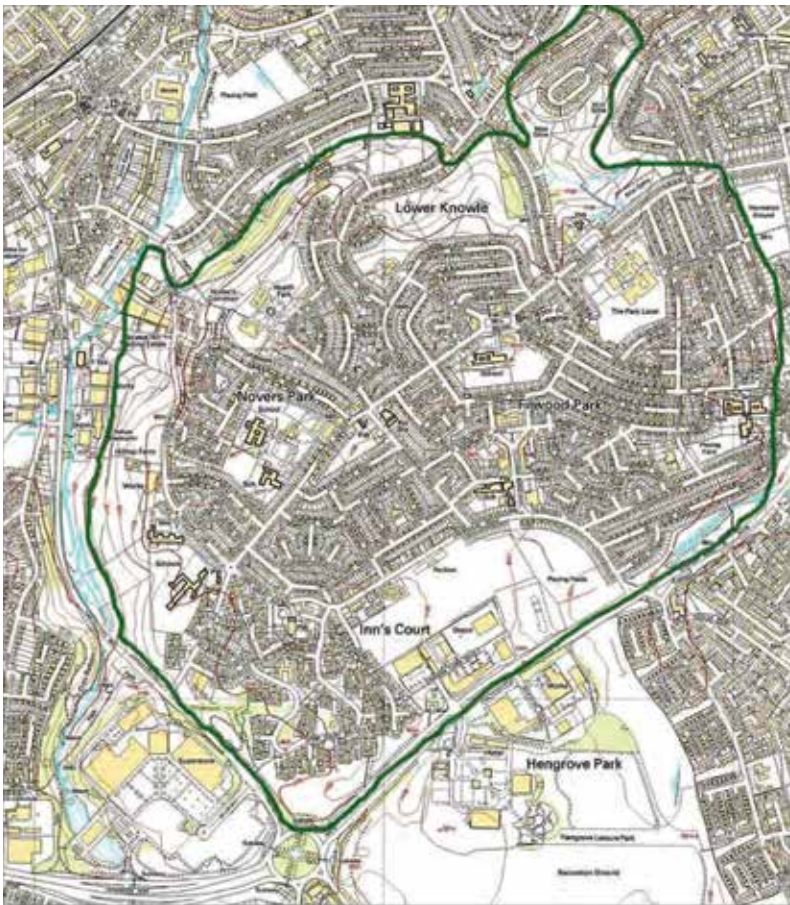
Ultimately, this work, the *Domain of the Path*, sets out to organize diverse experiences into a one-and-a-half to two-hour walk, almost film time. Depending on the choice of the walkers, we as the artists see them as participants, observers, and or performers within the newly designed, continually evolving,



eco-cultural space that was intended to become a shared experience for the people of two towns, Letino and Gallo Matese. The concept of *Domain of the Path* was intended to carry with it a sense of place as well as a sense of the path used in the act of traversing from one place to another. Both towns, in our judgment, needed the energy of people, new creativity, and a new form to attract both. After all, Gallo had so depopulated that rather nice houses were selling for as little as 15 000 to 20 000 dollars. We chose to ignore the typical conflict-resolution methodology; town meetings, long discussions, lots of analysis, common dances, and common mixing during holidays at the church. We expected most of this had already been done during more than 1 000 or so years that these two communities within sight of each other had been enacting. Perhaps even valorizing their distaste for each other. Thus the zig-zag path down from the church to the lake is an experience through a forested mountain side of trees with intermittent views of distant landscapes. It is perhaps a 10 to 12 minute walk down and a 20 minute walk up, having the properties of being both path and place.

The botanical section which follows the lakeside above the high water mark has an entirely different intention. Much more like a 30-to-40-minute walk, the intention is to make a historic and useful botanical adventure with old orchard stock, endangered species, occasional greenhouses, a restaurant in the middle, and other elements along the way which are yet to be invented. It too, was designed to be a place, having promenade and amphitheater properties. Funds were promised but were not forthcoming which would have permitted a clarified design path leading from the Castle to Letino town center and from the edge of Lago di Gallo to the Gallo town center.

Finally, we had come to believe that the common labor and common experience of dealing with the *Domain of the Path* on a daily basis, collectively using the amphitheater, collectively maintaining the botanical experimentation and play at the water's edge would bring both communities closer together by the creation of shared work and play.



The Greening of Knowle West

2007 Knowle West Media Centre,
Bristol, Great Britain

In 2006, David Haley and Chris Fremantle put together meetings with Tom Trevor, the director of the Arnolfini contemporary art center in Bristol to see if the Arnolfini would show *Greenhouse Britain*. We particularly wanted to have this exhibition at the same time that the London art and activism organization Platform was to occupy the rest of the museum; we were fans of each other's work, having ethics in common as well as an appreciation of scale. (Plus we liked them personally.) Tom, who learned that there had been disagreement between us and Peter Fend about the *Sava River* work, wanted Peter and us to have a public debate—clearly he was hoping that sparks would fly. We refused the idea as counterproductive. He in turn made clear that he was going to show Peter Fend with Platform, instead of us, and then brought us into contact with Knowle West (to get rid of us, we suspected). Ultimately, we found Knowle West a far more interesting community to work with than the more narrow museum world that the Arnolfini represented, so Tom's instinct was fortunate for us, whatever his motives might have been. A hill on the perimeter of the city of Bristol, Knowle West, had originally been home to a tobacco factory that employed most of its folk. The factory had left, then the shopping district; most

of the citizens had gone on welfare, and there was an inevitable drug problem. The town was so depressed that the one pub in town—pubs being the ultimate source of social cohesion—had closed its doors. A remarkable thing was happening however—a new media center was being built. It was a truly green hay-bale building. The director, Carolyn Hassan, was a formidable community organizer. She agreed to two things within the first few days of our visit: to show *Greenhouse Britain* at the opening of their media center, and that we would do a work for Knowle West based upon its very unusual geography. It appeared that the community was held together by a remarkable and powerful small group of people (mostly women) to whom we were introduced one by one. The first was Mil Lusk, an environmental activist who was working to clear brush but took time out for tea with us. The core idea that came from this meeting was about backyard farming. Mil said that everyone should grow fruit trees and produce in their back garden; our own backyard farming works came to mind. We said that all grasslands might become biodiverse meadow land; she replied, "Of course!" We met with Carol Casey, an activist on site, who understood immediately that the greening of Knowle West

Knowle West 2007 invisible on the map

The forested Hillsides

The meadows and open space

The backyards

Where it becomes obvious
that a complex green commons is
the heart of Knowle West



would add quality of life and a new aesthetic to the community and act as an attractor for enterprise. Then we met with Misty Tunks, the carbon makeover project leader. She thought that Knowle West as a whole—with grasslands, parklands, back gardens, and an open-canopy forest we proposed for the northward hillsides—could gain carbon credits and therefore funding. After seeing our *Endangered Meadows* work she came up with the idea that her whole group should be given meadow seeds to scatter. Then Carol Hassan put us together with Sam Burkey, who had experience in managing forest and grasslands—she wished to move as quickly as possible to begin community tree-planting programs. We met many others: local council members, people from the Master Planning group of Bristol, fiscal supporters, local residents (some as young as 14 or 15, still others in their seventies). All agreed to move forward in some measure. It was inspiring. People told us stories. A taxi driver explained that during World War II his father had shot deer and hare on the hillside to put meat on the table. Others shared similar memories of a time

when Knowle West was a vital place. Could it be vital again? We spent time on the land, looked at maps, and calculated such things as acreage, carbon sequestration ratios, and how much forest might grow on the hillside. Then we made our proposal.

For several years after the exhibition and presentation we were called back to Knowle West by Carol Hassan. It seemed that the British government had called for new housing and development city by city, throughout the country. The city planners of Bristol had their eye on Knowle West, as it had over 32.4 hectares of parkland, not counting hillsides that could be built on, and ideas were presented to make a new Main Street and develop, develop, develop. The presentations emphasized that the citizens of Knowle West (and the region) would benefit economically; little note was made that Knowle West would lose its original identity. We saw it as an act of cultural extraction at a micro level: As Knowle West's history disappeared, its network of human relationships would fade, and the aesthetic that made it unique, with parkland and hillside free of development, would vanish.



So, whenever one of these meetings was being held, Carolyn would invite us to be the voice of Knowle West. Our work had given us experience in the planning world, and the folk in Knowle West, having neither language nor experience, could not defend themselves. In the final meeting that we attended, an architectural planning group, supported by the city (and even by the director of Public Arts) made their presentation. It was elaborate, there were drawings and visualizations, there appeared to be only benefit for all, with no downside. Then, invited to speak on behalf of the people of Knowle West, we took the proposal apart piece by piece. We could see dismay on the faces of the planning group and relief on the faces of some of the Knowle West folk. Suddenly, surprisingly, we were aggressively defending the status quo—and we liked it! As far as we know, Knowle West has maintained its identity, and the greening of Knowle West is taking place, if slowly.

Knowle West 2013

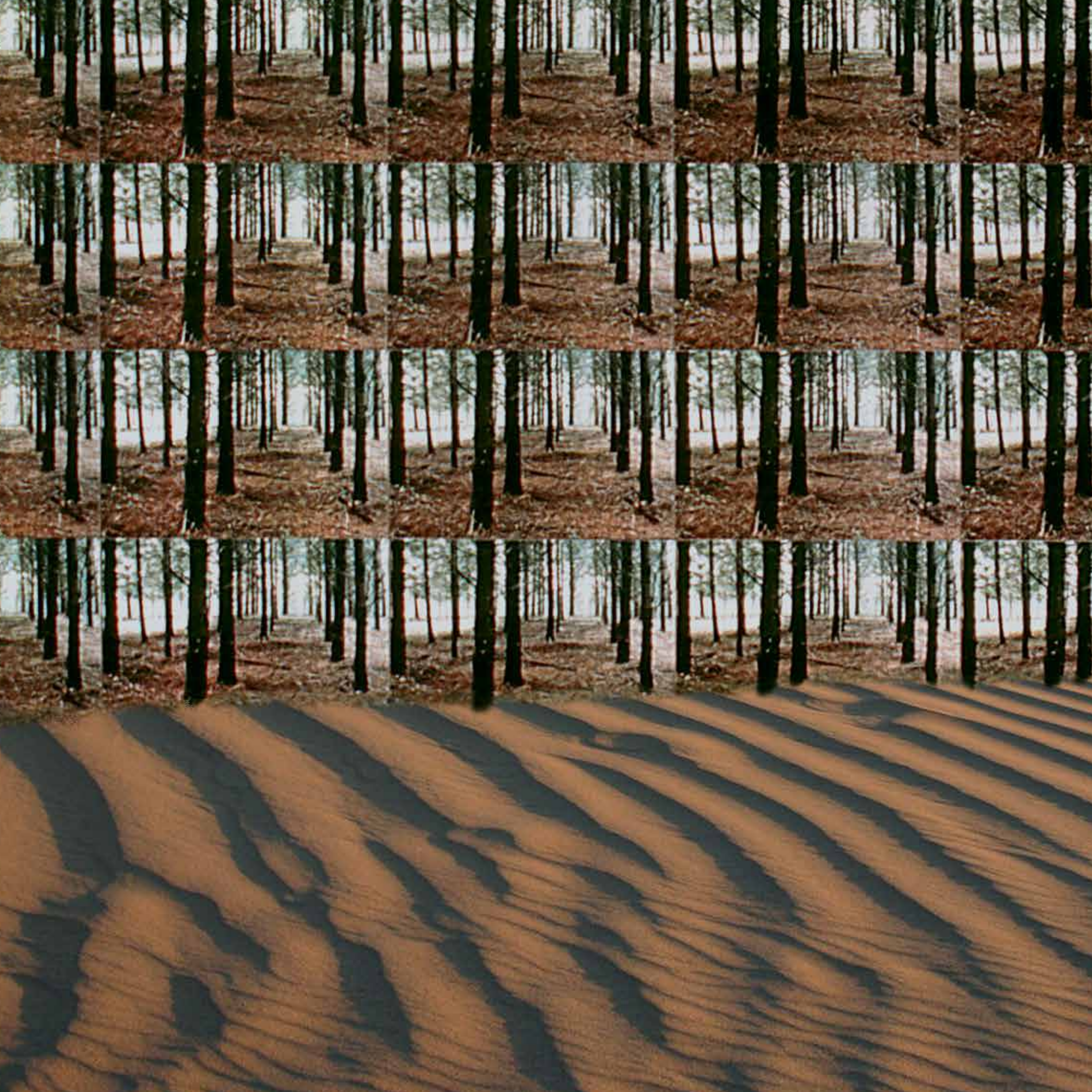
Knowle West seen as
a singular and powerful shape
in the urban field

**Reflecting on the Laws of the Conservation of Energy
and Exploitation in Ecosystems**

Matter/energy can be transformed from one form to another.
Matter/energy can be neither created nor destroyed.
When matter/energy is transformed from one form to another,
there is a net loss of available energy to perform work.
This loss is called entropy.
A system that has been so transformed and has lost energy
moves towards higher local entropy.
A system that maintains its ability to take useful energy into itself
and dissipate unuseful energy
tends to be a healthy, low-entropy system.
If a forest in a watershed is clear-cut
all the useful energies in the forest
are transformed and dispersed.
The energies within topsoil
supporting a multiplicity of lives
as a consequence of erosion, in part are dispersed.
The entropy of the watershed has been increased
by the dispersal of these energies.
The energies so dispersed cannot be retrieved.
What then, watershed, what then.

We as artists have come to understand that entropy is a special case
for how energy is defined. When we say entropy is raised in a sys-
tem, we mean the system has lost the energy to maintain itself in
its former state, in other words, it has become more uniform, with
less usable energy. When we say the energy has been dispersed, the
cut wood from the watershed for instance becomes the work of the
lumberyard and is no longer available to do the work of the for-
est. The dictionary defines entropy “the degradation of the matter
and energy ... to an ultimate state of inert uniformity.” In nature,
mostly, the dispersal of energy from one system is put to use by an-
other nearby. Hence, with the free energy sources being the sun and
the available waste of others, nature can and does grow. The differ-
ence between how nature works and human industry works is that
nature uses the waste it creates and industry in the main does not.
Above all, nature does not charge a profit. These thoughts inform
much of what we later write.

The Force Majeure



The Force Majeure

Introduction

Sometime in late 2007 or early 2008, I (Newton) was reminded of walking with Richard Feynman in the eucalyptus grove at the University of California, San Diego, nearly 45 years before. He was the science advisor for my *Artificial Aurora Borealis*, just being completed at the Jet Propulsion Laboratories for the American Pavilion at Expo '70 in Osaka. Actually, he had no interest in this work—after all, it was only about simple plasma physics!—so he began talking about his equations. He said, “For a long time I had written these equations, and always something was missing.” Finally, he had an epiphany; he said, “That which was missing was something. Therefore, inferentially, nothing had been missing in the first place.” Exactly what that “something” was eluded me, but I found the persistence of his search, his process of discovery, and his “sum over histories” insight electrifying. As a result, I in this now intuited that something was in fact missing from our work—obviously a very different something than what Feynman was referring to.

After reviewing all the works we had produced over 45 years, we came to understand, in a less-than-20-minute moment, that the great forces we had been talking about had in fact been

set into motion and were seriously at work. In practice, entropy had been accelerated in most surfaces of local planetary ecosystems that we could understand. If there were indeed an arrow of entropy (ecosystemically speaking), it was possible to imagine that we had—collectively, and with great effort, ingenuity, and creativity—gotten it pointed in the wrong direction! We had done this through our processes of becoming “civilized,” which included a population explosion, an energy-consumption explosion, and runaway economic development, with all that those processes entailed. What previously had been invisible to us was a great force that humanity, as creators, had brought into being; we named it the Force Majeure.

All of our thinking and working around this issue ultimately led to the formation in 2009 of a new research center. We were teaching a graduate projects course at the University of California, Santa Cruz (UCSC), that focused on art making with a global reach, underpinned by various forms of eco-literacy. David Yager, the dean of the Arts Division, announced rather boldly that anyone in the division who wanted to create a Center could do so and would be supported if they could justify such a proposition. With a lawyer friend we designed the Center for the Study of the Force Majeure, with the idea that he would be the director until we found a more effective person for the job (which finally turned out to be us). The dean approved it, and an advisory group was formed.

In the Center’s Statement of Purpose, we define the Force Majeure as the pressure of global warming on all planetary systems, acting in collaboration with the industrial processes whose negative effects on the environment have more than co-equally accelerated over the past century. The Center is founded on our belief that we as a species must adapt ourselves to a very different world, and that is the basis for the research that informs our artmaking. We define the type of problem that the Center deals with as an ennobling problem, in the sense that the feedback from addressing issues at this scale confers benefits on the individuals involved, as well as on human culture and the planetary environment as a whole.

In its present state, the Center proceeds on our assertion that ecologically based, large-scale systems of adaptation to the

extreme changes in the ever-warming environment are necessary for collective survival and so must be invented. Seen metaphorically, two frontiers are emergent and evolving exponentially: One is a wave front of water, advancing on the edges of all continents that touch the oceans; the other is a heat wave that is increasing (apparently slowly, but in fact exponentially) and covering, touching, and affecting the whole planet and the lives on it. These are different from all other frontiers that have been part of human experience, frontiers that we have advanced toward, most often by conquering or exploiting to our own advantage. These new frontiers move toward us, and our habitual responses of exploiting resources for production, consumption, and profit are no longer meaningful behaviors. Rather, we must adapt ourselves to meet these two frontiers at the scale on which they operate. The body of work that follows this process of seeing, thinking, and doing seeks to address the workings of the Force Majeure and to discover how we might cope with the probability of extreme stress that the Force Majeure indicates is upon us, with mass extinction as a real possibility. The question that we had earlier raised—What would be enough?—translates into a new question: Would it be enough for life to continue, by reducing local entropy system by system?

When we say “for life to continue” we mean whole systems continuing. Lowering entropy within living systems turns out to require the elimination or transformation of all economic systems based on exploitation, and their regeneration into systems of exchange. With that understanding, the work that we have done so far, even if successful, would be open to exploitation as long as “business as usual” remained unchanged—in this context our whole body of work would not “be enough.”

While all this thinking was going on, and our days were consumed by a review of physical laws (particularly the conservation of energy), the people who had awarded us the CIWEM Prize for *Greenhouse Britain* invited us to contribute to a book of artists’ manifestos. We noted that our manifesto occupied the last two pages in the book; when we asked why, we were told with some amusement that nobody wanted to follow us.

A MANIFESTO FOR THE TWENTY-FIRST CENTURY

We of the Force Majeure Center believe
As do others, although differently
That a series of events have come into being
Beginning in the time of Gilgamesh and before
Beginning with agriculture and the first genetic manipulation
Beginning with culturing of animals and ongoing genetic manipulation
Beginning with globalization 6 000 years ago, with the Salt Route
A little later, the Silk Route
Especially with science informed by Descartes’ clock
And with modernity recreating the cultural landscape
While deconstructing nature in the process
From the Industrial Revolution to the present
Until all at once a new force has become apparent
We reframe a legal meaning ecologically
And name it the Force Majeure

We at the Center assert
That the Force Majeure, framed ecologically
Enacts, in physical terms, outcomes on the ground
All that we have created in the global landscape
Bringing together the conditions that have accelerated global warming

Acting in concert with the massive industrial processes
of extraction, production, and consumption
That have subtracted forests, and depleted topsoil
And profoundly reduced ocean productivity
While creating a vast chemical outpouring into the atmosphere
Onto the lands and within the waters
That all together constitute this Force Majeure
Initiating what might become the sixth mass extinction

We of the Center are grateful for the opportunity
To join in this perilous conversation
Where the discourse in general

Concerns time, money, power, justice, sex, politics
Personal well-being and survival
In many combinations and recombinations
Attending somewhat to social injustice
And much, much less to ecological injustice

This discourse points to human activity
Every day continuously attending to its needs, desires, and wars
With too little attention paid to that which is not itself
Leading to intrinsic value switched for extrinsic value
With human creativity generating technologies
That, while useful to many, appear not to like whatever is not themselves
Sometimes becoming the reverse of their original intention

There is modest conversation drifting toward “green”
As industry and people think about doing well by doing good
“Good” being green industries in many forms
Arguing that green entrepreneurialism
Creates sustainability

We at the Center assert
As do others, yet too few
That in the face of multiple tipping points
Passed and nearly passed
From CO₂/methane to nitrates/nitrites
And more and more
All of these efforts and all of this work
Are better to be doing than not to be doing
But on balance, are endlessly insufficient

The Force Majeure is so obvious even in the now
Generating a modest ocean rise
That will increase for years to come

Forcing the ocean’s food chains to simplify
Compelling glaciers and snowpack to melt
Creating flood and drought at continental scale
Which is the outcome for rivers
As they flow down through Asia from the Tibetan Plateau
And true for many rivers in the Americas and Europe

For instance, the trajectory of drought is predicted to proceed
From Portugal to the southern parts of Germany and beyond
Reducing the ability of more than one million
square kilometers of farmland to produce food
That now feeds over 450 million Europeans

Populations will grow
Ocean waters will rise
Food supplies will shrink
People will need to move upward
The rich will continue to do well
Not true for the middle class
and devastating for the poor
Think Asia, the Americas, China
Wherever populations are growing
And resource exploitation is attempting a co-expansion

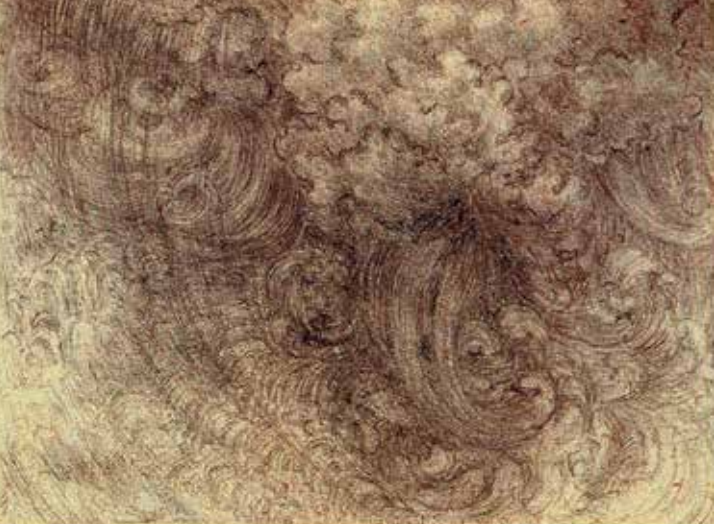
The Force Majeure reflects
Both science and technology’s power
To generate resource transformation
With the concomitant increase
In entropy within systems large and small
From which resources have been extracted
and no energy return or exchange established

Thus a planet-wide rise
In local systems entropy has been created

in which older, more time-tested, biodiverse
and botanically rich ecosystems
are forced to expel useful energies to their disadvantage
We at the Center believe counterforces can be found
First understanding then collaborating with
Nature’s response to catastrophe
Which when energies are available
Recreates itself
Recreating order and complexity
Lowering entropy in living systems large and small

Look to the advancing of glaciers
The yielding of ecosystems
The increasing of uniformity over millions of square kilometers
Then look to the retreating of glaciers
The advancing of succession ecosystems
more able in warmer environments
to increase local energies available for emergent systems to do work
over millions of square kilometers
Yes, counterforces can be found easily enough
Harnessing them and co-creating with them
For the common good is the urgency at hand

So we at the Center conclude
That counterforces are available
That can in some measure mitigate a possible 6th mass extinction
But unless created over the next 50 years or much less
Civil society in many places will experience perturbation, then col-
lapse
Keeping company with ecosystems
Experiencing perturbation and then simplification



Sometimes it happens that we do a work out of time. We had designed *The Garden of Hot Winds and Warm Rains* with the intention of including a global-warming motif in the first *Future Garden*, which was the *Endangered Meadows of Europe*. Wenzel Jacob, the director of the Kunst- und Ausstellungshalle, had refused it out of hand as being too expensive. Dieter Ronte, the director of the Kunstmuseum Bonn across the way, adopted it and attempted to do it. It posed the question, “What would Bonn look like if the temperature rose three degrees Celsius?” It was a wild prediction 20 years ago but a highly probable outcome of global warming today. It turns out that this work is a twenty-first century work, not a late twentieth-century work. It is, in retrospect, the first *Force Majeure* work.

The CIWEM prize had just been awarded to us. We were remembering our first impulse to do work at a global scale that happened in the late 1950’s when Sputnik went up. We had seen this event as a heroic global performance; about science, yes, but really much more about engineering. At the same time, we began to look with total astonishment at Leonardo’s deluge drawings. In our minds, the drawings broke away from all known art. We remember wondering whether we could reach a point at which the subject matter we were working with and the seeing that determined our behaviors would drive us into what we understood from Pierre Teilhard de Chardin’s use of the term “noosphere,” or what Leonardo was projecting in his deluge drawings or Fuller in his *Spaceship Earth*. Chardin’s ideas had a common property, suggesting to us the “end of the world of seeing, thinking and believing as we knew it.” We understood that the *Force Majeure* works were our version of some admixture of Teilhard and DaVinci. We include this image as homage and as self explaining. We include no other artists’ imagery, though we have been influenced by many. The debt to Da Vinci, however, is profound.

The Force Majeure

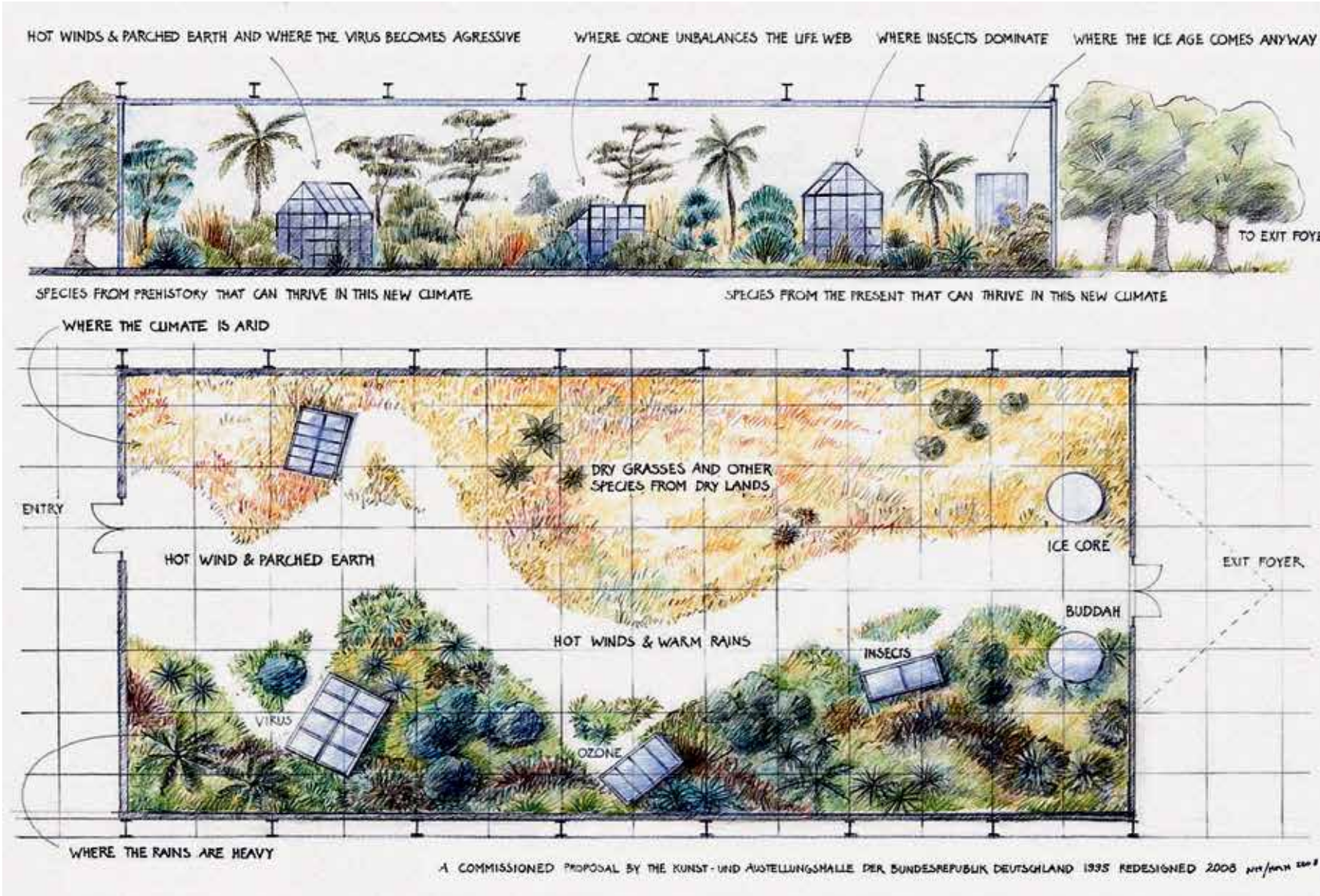
The Garden of Hot Winds

and Warm Rains

2003 Ronald Feldman Fine Arts,

New York

Presented variously at conferences



THE GARDEN OF HOT WINDS AND WARM RAINS

IT IS A MULTI-LAYERED STORY TOLD WITH ARTIFACTS, MEDIA EVENTS, TEXTS, AND LIVING MATERIALS, WHICH ALL TOGETHER ENGAGE THE PROBABLE GREENHOUSE FUTURE DIRECTLY. IT IS A WORK OF ART THAT WILL BE GARDEN, PREDICTION, AND PROMENADE, A VOYAGE OF SORTS, MAINLY ENCLOSED IN A GLASS "GREEN HOUSE" TO MAINTAIN A CLIMATE CONSISTENT WITH THE SUPPOSED 5 TO 6 DEGREE CENTIGRADE RISE IN TEMPERATURE OVER THE NEXT 100-150 YEARS. THUS THE GLASS HOUSE BECOMES THE VEHICLE FOR MAKING THE PHENOMENON OF THE GREENHOUSE EFFECT AND CERTAIN OF THE POSSIBLE FUTURES, THAT IT WILL ENGENDER, DIRECTLY ACCESSIBLE TO THE HUMAN SENSES. THE VISITOR IS TAKEN THROUGH A NUMBER OF INSTALLATIONS THAT COMPRISE THE NARRATIVE. THE STAGE SET FOR THIS IS A SERIES OF POSSIBLE FUTURES THAT HAVE THEIR SOURCES IN SUCH CONCERNS AS: THE GREENHOUSE EFFECT, THE ENDANGERING OF THE FORESTS OF THE WORLD, THE REPLACEMENT OF FORESTS AND MEADOWS BY A MONOLITHIC MONO-CULTURAL AGRICULTURE AND THE VAST LOSS OF BIO-DIVERSITY IN THE OCEANIC AND TERRESTRIAL ECO-SYSTEMS.

THE TWO MAIN INSTALLATIONS WILL SHOW A SUBTROPICAL FUTURE CLIMATE SUCH AS MIGHT EXIST IN ANY TEMPERATE CLIMATE, AS THE GREENHOUSE EFFECT BECOMES MORE EVIDENT. BOTH THESE FUTURES ASSUME THAT THE WEATHER HAS WARMED AND THE OCEANS HAVE RISEN. HOWEVER, ONE FUTURE REPRESENTS AN ARID WORLD AND THE OTHER A HUMID ONE WITH HEAVY RAINFALL. IN BOTH FUTURES THE INTRINSIC VALUE OF BIO-DIVERSITY IS RECOGNIZED.

THESE FUTURES WILL LOOK TO THE PAST AS WELL AS THE PRESENT FOR INFORMATION. THAT IS TO SAY THE FLORA WILL BE DRAWN FROM

THE MEMBERS, OR THEIR EXISTING RELATIVES, OF THE LIFE WEB THAT PREVAILED DURING PERIODS OF EQUIVALENT TEMPERATURE IN THE PLEISTOCENE ERA, THE TIME BEFORE THE LAST GREAT GLACIATION THAT RESULTED IN A MASSIVE LOSS OF SPECIES. AND SPECIES WILL BE DRAWN FROM PLACES THAT ARE NOW EXPERIENCING CLIMATE CONDITIONS EQUIVALENT TO THOSE THAT ARE PREDICTED.

THE TASK WE SET FOR THIS WORK IS THE EXPLORATION OF ECO-CULTURAL COLLABORATIONS THAT WOULD MAKE FOR A FUTURE NO LONGER BASED ON EXTRACTION. THUS, BOTH HUMID AND ARID GARDENS WILL MODEL THE PRODUCTION OF FOOD FOR HUMAN CONSUMPTION, WHILE SIMULTANEOUSLY CREATING, ENHANCING AND SUSTAINING A COMPLEX INTERDEPENDENT ECOSYSTEM. THE PRIMARY OBJECTIVE BEING THAT THE HARVEST WILL PRESERVE THE SYSTEM RATHER THAN DEplete IT.

THEREFORE THESE GARDENS LOOK AT WHAT A FUTURE COULD BE LIKE IF CONSCIOUS, MUTUALLY BENEFICIAL COLLABORATIONS BETWEEN HUMAN CULTURES (CIVILIZATIONS IN ALL THEIR COMPLEXITY) AND THE CULTURES OF NATURE (THE LIFE WEBS COMPLICATING AND DIVERSIFYING UP TO THE SPACE AND ENERGY AVAILABLE) BECAME A NORM.

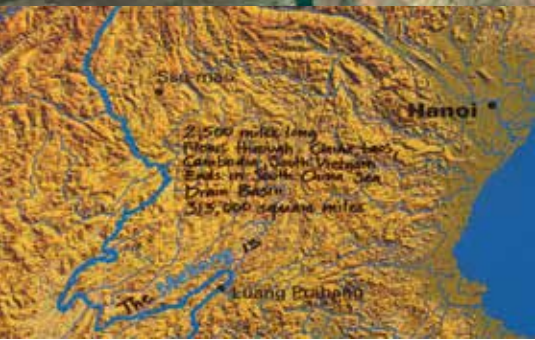
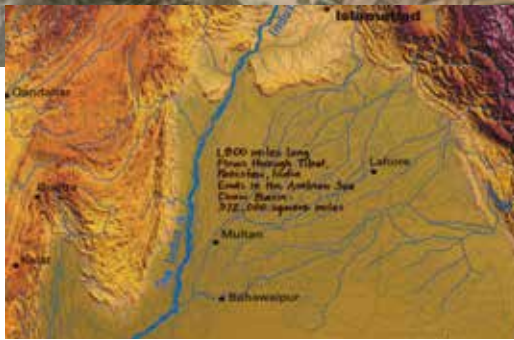
HOWEVER, WITHIN THESE POSITIVE FUTURES, A SERIES OF UNCOMFORTABLE, SOMETIMES SHOCKING GUMBIES OF OTHER POSSIBLE FUTURES WILL APPEAR IN SMALL GREENHOUSES. IN SUM, THIS WILL BE A PHYSICAL AND METAPHORICAL EXCURSION THROUGH POSSIBLE FUTURES WHERE THE VISITORS WILL EXPERIENCE THE EXPECTED AND THE TOTALLY SURPRISING, THE HUMOROUS, THE TRAGIC AND EMPIRICAL AS WELL AS THE PLAYFULL.

The seven rivers and their headwaters that flow from the Tibetan Plateau. Their constant flow endangered by rapidly melting glaciers and the disappearance of snow melt.

Brahmaputra headwaters

The Indus headwaters

The Mekong headwaters



The Force Majeure

Tibet Is the High Ground

Parts II, III, and IV

2006–2008 *The Missing Peace: Artists Consider the*

Dalai Lama, organized and traveled by the Committee

of 100 for Tibet and the Dalai Lama Foundation

2009 Kala Art Gallery, Berkeley, CA

2013–2016 Traveling exhibition *Vanishing Ice*, 6 venues

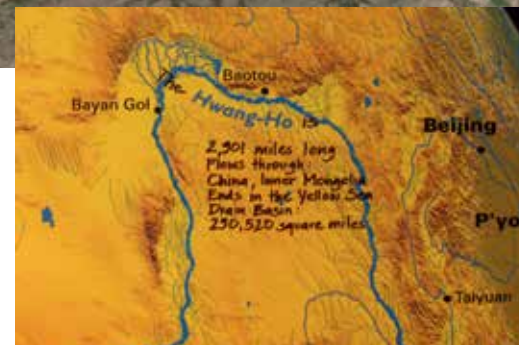
et al.

Late in 2005, we were contacted by people who were putting together an exhibition called *The Missing Peace: Artists Consider the Dalai Lama*. We were told that many well-known artists would be in the show, and they wanted to include *Tibet Is the High Ground*. We argued that we wished to do the work over again, as we had been reading recent research of glaciologists and climatologists from China, India, and the UK in relation to the Tibetan Plateau, and the original proposal was no longer sufficiently relevant.

The research papers pointed out with varying degrees of urgency that the glaciers were retreating due to global warming. They predicted that temperatures on the plateau would rise as much as five degrees Celsius (maybe more) and that as snowpack and ice retreated, the rainfall in the region might stay the same or increase but surely be more intermittent. Therefore the seven great rivers that flowed from the Tibetan Plateau were likely to suffer flood during the heavy rains and drought during the dry seasons. With the disappearance of snowmelt and ice melt which supplied waters slowly and steadily into these rivers flood and drought and the suffering of many was a logical outcome.

Our new proposal was complex: Paleobotanical, hydrological, and bioregional research needed to be done to reveal species ensembles from the region—from its paleohistory, and likely from areas at lower elevation—that over time would do well in those places where the glaciers had withdrawn. The question posed was whether species ensembles could be discovered that were biodiverse, were extremely drought tolerant, and that held water in the ground such that the earth would become a sponge (as it has done in many other places under similar conditions). Such a sponge would release water slowly, mirroring in some measure the snowpack and glacial melt that originally provided a constant flow of water to these great rivers. We understood that a water-holding landscape would have to be a mosaic, created where the hydrology indicated: Rainfall, topsoil depth, and groundwater needed to be at appropriate levels. We understood that for many parts of the Plateau where soils were thin, the sponge effect would not work.

So we produced a new text panel to go with the old imagery. The curators looked at the text panel in relation to the images and made an aesthetic decision to eliminate it, leaving the



original images virtually incomprehensible (but nice looking). They believed that the image should carry all the information necessary for understanding—with the possible exception of a title. We had long believed that our images could not hold all the information we wanted to convey, and therefore they needed text. The curators (whom we found obdurate to say the least, and very narrow-minded), refused to put the text panel back. We then asked for funding to produce a new image; this image had the new text embedded in it, giving the curators no option other than removing the whole work, which they were not authorized to do.

The new text has undergone various transformations, most recently becoming a triptych of three images of Tibet; one focused on the rivers, another focused on glaciation, and a third that addresses transformation. Doing the big numbers in the third panel was a lot of fun; it turned out that what we proposed would take (by very rough calculations) several trillion dollars. But several trillion, spent over 50 years to rehabilitate

The Salween headwaters

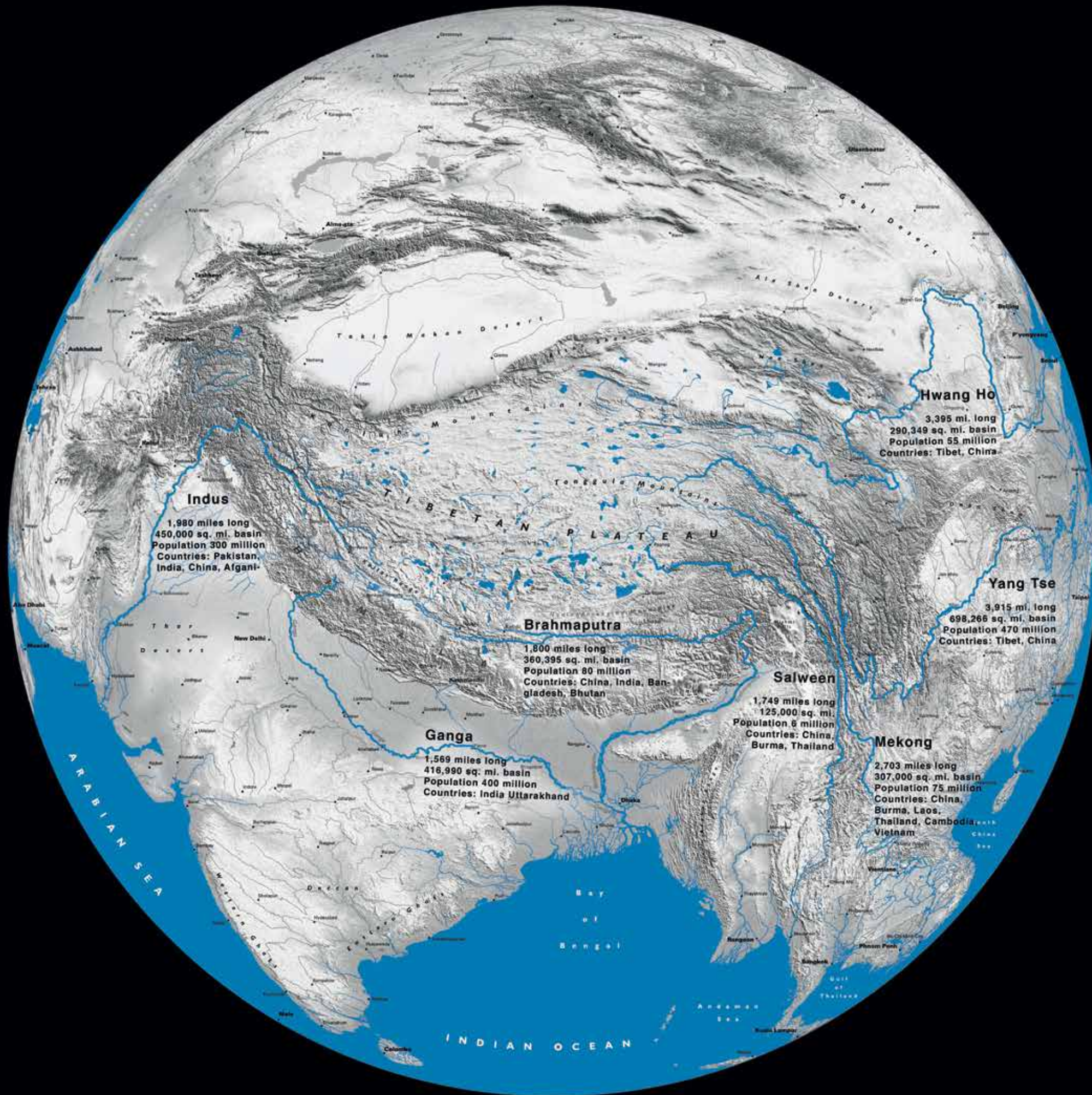
The Ganges headwaters

The Hwang Ho headwaters

The Yangtze headwaters

several million square kilometers, seemed to us a very modest cost, given that it would reduce the likelihood of wars between the countries competing for waters coming down from the plateau, improve food production, and sequester water and carbon in meaningful quantities. Given that the leadership of the United States had spent more than two trillion in just a decade on two hugely destructive wars of very dubious necessity, using mostly monies that came from the taxes on fewer than 300 million people, we thought that several trillion spent over 50 years for the well-being of more than a billion people should hardly be noticeable, even to a somewhat reluctant world economy.

Unfortunately, it does not appear that state capitalism, the ecological apparatus in the science community, and the one-person one-vote democratic community can collaborate to get much done along the lines of what we proposed. If any country could work at the required scale, however, it would be China.



Tibet Is the High Ground

Can it be that in this 100-year moment or less
Both our collective history and destiny
Are being spelled out by glacial ice melt
As temperatures rise six degrees Celsius in the high
grounds

For instance
By mapping the Tibetan Plateau
As most of the field
In an azimuthal equidistant projection map
And intensifying the rivers
It is not difficult to see
That these seven rivers
Flowing from the Plateau
Nourish much of continental Asia

It is not difficult to see
That the people in these seven drain basins
Totaling 6 884 800 square kilometers
With a total population of 1 440 000 000
Including complex agriculture and farming systems
Are at great collective risk

For the Force Majeure is at work
With accelerated global warming
Working in collaboration
With accelerated industrial processes
Co-entangled over
The past 100 years
And beginning
To experience exponential growth

The result for Asia
As well as for the High Grounds elsewhere
Is that whole ecosystems
Are becoming erratic yet
As the Force Majeure becomes stronger
No counterforce remains visible



For instance
The research of Chinese glaciologists
As well as those from India appears to be right
And more than 80 percent of the glaciers in Tibet
And surrounding areas
Will disappear in the next 35 years
As the temperatures rise
Five degrees Celsius or more

Thus producing conditions of
Flood and drought negatively affecting
The Salween, Mekong, Hwang Ho
Brahmaputra, Yangtze, Ganges
And Indus River systems
That nourish both the ecosystems
And the well-being of those living within them
The Force Majeure
Will work to the disadvantage
Of about one-sixth of the earth's population
All those who live in these seven drain basins
That constitute so much of continental Asia

The countries of China, Burma, Laos, Cambodia,
South Vietnam, India, Bangladesh, and Pakistan
Will need to put aside
Differences of culture, governance
Race, religion, and legal systems
In order to create a counterforce
At virtually continental scale

Thus, we make an unlikely proposal
That industry in tandem with government
Can offer a mediating role

In this highly stressed probable future
By requesting the generation of funding and initiatives
That will enable both local bioregional
And paleoecological research
To locate forest and savannah ecosystems
That existed in millennia past
Particularly in the Pliocene 5.3–2.6 million years ago
When temperatures and other weather systems
Were similar to those which are in the process
Of happening in the now

And thereafter
Search to locate similar local
Ecosystems that exist in our now
Particularly at lower altitudes
And to begin designing
And in part creating through assisting the
Migration of species ensembles
Able to replace or restate
Those now coming under extreme stress
Thereby generating new forest
where soils are sufficient
And grassland in the shallow earths which could replace
In part the slow water-releasing
Properties of glaciers and snowmelt
By creating a sponge mosaic where hydrology indicated
To secure lands
From flood and drought

Thus an adaptation comes into being
Both ecologically provident
And at sufficient scale to sequester
About three gigatons of carbon every decade



Thinking about the greening of Tibet
Thinking about the greening of approximately 2 007 200 square kilometers
Which is 80 percent of the 2 509 663-square-kilometer Tibetan Plateau
Looking at this vast, rolling
Partly mountainous terrain
We imagined
A domain that was about 80 percent savannah
And 20 percent open canopy forest

Not knowing the hydrology we imagined thin soils
And over a rather large area specialized future biota
Moving there as warming continues
We saw this terrain as a less productive
But carefully managed pasture land
With topsoils averaging 10 to 20 centimeters
Capable of holding waters and sequestering carbon
At about 200 tons per square kilometers
Or about two tons per hectare
Then we imagined that about 20 percent of these lands
Where soils were more appropriate and deeper
As able to sustain an open-canopy forest
Capable of sequestering about 400 tons of carbon per square kilometer
Or about five tons per hectare
Thus we calculate about three gigatons of carbon per decade
Would be the automatic sequestration for this new
2 007 200-square-kilometer potential landscape
On the Tibetan Plateau

For a productive, self-sustaining, self-complicating landscape to develop
Bold experimentation becomes an absolute requirement
For instance with glaciers retreating
We imagined assisting the migration not so much of species
But of species ensembles that form the basis
For a succession ecosystem to form
That follows glaciers uphill
We then imagined a water-holding landscape
Where terrain was appropriate
And subtly terraformed so that rains
Stayed on the lands on which they fell
In order to locate species groupings
That would form the basis for generating
A uniquely functional future landscape
Where harvesting preserved the systems

We propose paleobotanical exploration
Drawing botanical information from the recent Pliocene
When the weather was the same
As that predicted in the near future
Taking on the problem of inventing an edible landscape
Which will be self-seeding and perennial
Which will be self-sustaining and made resilient by its own complexity
A landscape unique in its food-producing qualities
As the harvest preserves the system
Over the long term we imagined this kind of thinking
And this kind of designing as endlessly repeatable

The proposed site for the *Future Garden* in the surrounding area of the Jiuzhai Huanglong Airport in China

Proposal for the Tibetan Plateau:
The White Retreating, the Green Advancing:
Retreating Glacier Co-joined with an Advancing Ecosystem

For some years our Center for the Study of the Force Majeure has been looking at the retreat of glaciers in mountain regions. We note particularly that in Europe, the Andes, the Sierra Nevada, and the Tibetan Plateau glacial melt is proceeding rapidly, revealing either raw stone or typical gravelly subsoil. It is well documented that over long periods of time an especially adapted ecosystem forms on such soils. Over still longer periods of time, this process leads to the generation of topsoil; thereafter, succession continues until often forests form.

We wish to participate in a work of botanical invention by forming a team who would first select and then assist in the migration of species, creating a succession ecosystem designed to literally follow a glacier as it retreats upward. The first activity would be to discover an appropriate terrain with a retreating glacier; then we would begin with research and then with planting. We would hope to have cameras on site to take still photographs that would be reformatted into a dramatic and educational film, putting to work the voices and character of people working, which would add clarity and feeling to the film. Furthermore, we feel that the ecological benefit of this kind of experiment would be rich—not only from the perspective of carbon sequestration, and enhanced biodiversity, but also that of holding waters within the landscape and reducing somewhat the increased albedo that is the result of retreating glaciers. We believe that what we propose, if successful, would be scalable, and would be beneficial in many parts of the world, initially contributing to the scientific discourse and simultaneously enabling the production of powerful works of art, by others as well as ourselves.

Proposal for the Tibetan Plateau

To locate a site on the Tibetan Plateau that has topsoil, percolation rates, and perhaps an aquifer appropriate for creating a water-holding landscape.

The landscape we propose has little precedence.¹ It would become a teacher for generations by establishing a post-monocul-

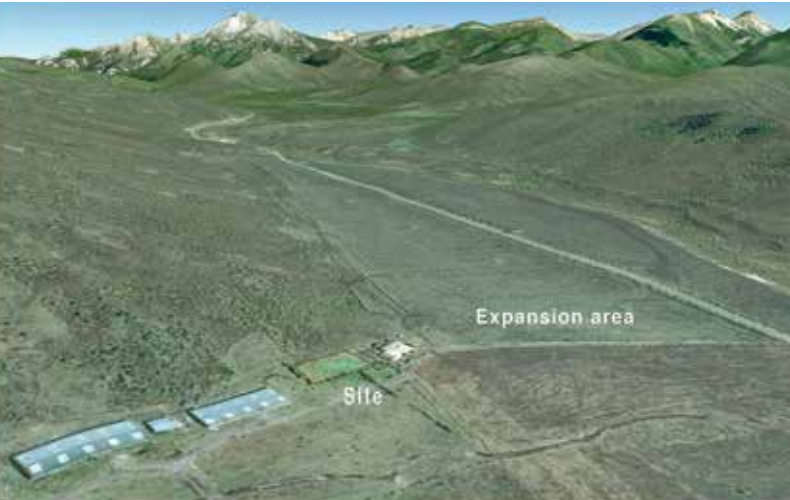
tural food system in which the harvest preserves the system and the system enriches the topsoil. It would be a complex system in which biodiversity and food production are in co-operative relationship. Using analogue ecosystem understandings combined with permaculture techniques, it would be designed to self-complicate and self-organize. It would be sustainable in the same ways that all healthy natural ecosystems maintain continuity and stability through time, although far from equilibrium. It would be designed to behave as a highly productive organism having the many properties of self-maintaining dissipative structures.

1 The land The area chosen should be large enough so that food production and biodiversity can coexist and be mutually supporting.

2 The rain Assuming sufficient rainfall and perhaps a relatively high water table or aquifer, the land would be shaped, using moderately small machinery and handwork, such that rainwaters are kept in place with runoff minimized and percolation maximized.

3 Habitat search The intention is to create a new landscape in response to the predicted five-degree-Celsius (or more) temperature rise. What species would come to live (or want to live) in this new climate? Moreover, what species ensemble would make the most sense in expressing the intentionality of this work (which is to co-entangle biodiversity, food production, and human habitat)? One of the serious questions that would have to be asked regards carrying capacity: How many people could productively live and work in this landscape without ultimately destroying it?

4 Species selection We often recommend paleobotanical research. We argue for a number of bores that would reach into paleohistory. For instance, if the temperature rise can be held to that predicted, then plant species (or their nearest living relatives) from the Pliocene period, three to five million years ago, are a pretty good bet to be propagated and later put to work region by region. From such a listing, a tentative landscape—



Site and expansion area



Site snow covered at ground level

perhaps only a few hectares—should be created as a test bed. A second test bed would be planted with species taken from an earlier period, when the temperatures were only three or four degrees Celsius warmer than those at present. Botanical expertise would be required to create a species ensemble that would be in good part edible, yet sufficiently biodiverse, so that the biodiversity acted in partial support of other species and in partial support of that which was harvestable.

5 Experimentation The methodology would be comparative, varying the species ensembles and producing perhaps half a dozen sets from each temperature range. We suggest that a second experimental set be established in which the species groupings are selected from lower grounds (where the temperature is already about four degrees Celsius warmer) and the experiment repeated.

6 Training People who would come to live and work in this future environment would need a different education than is typical for current farming communities. For example, there will be a double role for those who harvest: They will need to know their environment from both botanical and nutrients perspectives, so that the process of harvesting is simultaneously the process for preserving the system. In this rather specialized experiment, food production would not be maximized; instead, sustainability through time would be tested and valued, and monoculture is understood to be a disadvantage.

This experiment is designed with two outcomes in mind. The first and most important is to lower the entropy and raise the overall available energies in a microregion, and to test the scalability of the approach. The second is to put on the table an alternative and ecologically provident system of food production that, even if unacceptable for very large populations, would in fact be ideal for a smaller population. If scaled up, this process of co-entangling food production and biodiversity tuned to carrying capacity, would increase its planetary resilience and viability in facing the exigencies of accelerating climate change and potential massive species die-off.

¹ The best example we’re currently aware of is the Tamera Healing Biotope in Portugal.

² Talking to UCSC climatologists who are using isotope analysis, we see a different picture emerging. Unless drastic changes are made, we are probably looking at a time in our near future that would be more like the Eocene (approximately 35 to 40 million years ago)—in which case we could experience and have to adapt to a 40 000-year heat wave.

As we searched for an ecology group with whom we could work in Tibet, our friend Betsy Damon (who had done a lot of successful work in China, and was well regarded there) arranged that we contact Tang Ya, a scientist working at Sichuan University. Tang Ya flew over in June of 2015 and we spent a few days here and we agreed to work together. We would find the initial funding, then he would fly us over after finding the initial site and beginning planting. Tang Ya immediately got what we were after; he thought that the *Glacial Garden* we had in mind might well become a research station. We all loved the idea of a work of art that was simultaneously a research station and vice versa. Our grandson Michael, a chef of some distinction, produced a dinner at our home studio for Tang Ya and for some colleagues at UCSC, and we became friends.

A little later that year Lauren Bon (director of Metabolic Studio) called, deeply distressed that China was damming the rivers on the Tibetan Plateau which would harm the ecology and economy, both locally and in downriver countries like India. She asked whether Metabolic Studio could commission our Force Majeure group to produce a planning document that would lay out how to avoid the catastrophes that she saw looming. Metabolic Studio could take the plan, and we could collectively present it to the powers that be. We did some research and found that to develop that kind of planning in China would take three to five years and cost 800 000 to 900 000 dollars (although we already had some notions of what such planning would yield). What we had in mind was too complex for her and her group, but she said that she would be happy to support the *Glacial Garden*.

Where a *Glacial Garden* Turns into a *Future Garden*

Also we had become good friends with Lauren who turned out to be a visionary and very powerful artist. We were beginning to like the Annenberg Foundation, as they had just given us a 55 000 dollars Lifetime Achievement award. We had asked Tang Ya how much it would cost to get a first planting done, and he had said about 30 000 dollars, so we decided to dedicate most of the award to the *Glacier Garden* project—except there was a little problem. Tang Ya could not get us close enough to a retreating glacier unless we spent a few days on horseback! Bringing a team to a remote glacier was absolutely beyond our means. And, being in our eighties, we didn’t see four to five days going and another four to five returning on horseback (equipment,

seed stock, and all) as an adventure we would return from in anything like good health. At any rate, Tang Ya insisted (correctly, we all thought) that we had to choose a site that was easily accessible by car and not far from Sichuan University where he and his team of students worked. We settled on a site not far from the airport and only a few hours from the university.

Our little problem of site location now forced us to completely change the work, perhaps into a better one. Tang Ya’s site was typical of the overall growth in a valley about 3 200 meters above sea level. We assumed that 10 to 13 centimeters of topsoil would be needed to support the growth we saw, and we know that nature takes in the main 800 to 1 000 years to produce 2.5 centimeters of topsoil. The amount of growth at the site thus indicated that glaciers could not have been in the valley for between 3 000 and 4 000 years. Therefore it was flat-out impossible to chase a glacier uphill from that place! So we invented a new work on the spot. We had been doing a series of works called *Future Gardens*, and we proposed one for Tang Ya’s site.

There would be three growth ensembles, and the species selections would all be based on what would grow in the region with a six-degree-Celsius temperature rise which would be the constant. The first garden would be tuned to a lower rainfall than what now existed in the region, the second would have plantings that would respond to typical rainfall for the region, and the third would have a species palette that would respond well to an increase in rainfall. Selections would need to be drought-tolerant, as whatever rainfall came to pass would be erratic. Paleobotanical research would again come into play, as would the location of species that exist in perhaps lower altitudes where temperature was indeed higher and the rainfalls were equivalent. We expected that around 50 years from now the trajectory of temperature rise and rainfall would have become clear.

We liked the idea of this work because it tuned so much to what we were doing in Sagehen and in the series of *Future Gardens* that we were planning. There was a real probability that one of the three proposed gardens would produce species groupings that could replace existing species unable to adapt to temperature change far more rapidly than would normally happen. If our modest experiment worked, then it would be replicable over much of the several million square kilometers of the plateau.

It was becoming clear to us that doing a *Future Garden* of such a specialized kind so far away in Tibet, in a dramatically different culture than we had experienced before would carry with it difficulties that were unpredictable, interesting, and perhaps would force our creativity in directions we had never taken. We thought it useful and hopefully interesting for readers of this work, particularly students, to understand how much about dialogue its early beginnings were. This is true for many of our works. As Tang Ya and ourselves skyped and e-mailed back and forth we continued locating common ground, exploring possibilities, and enlarging the vision. In some cases finding limitations to our approach and in other cases extending the frame. The conversation was evolving into simply what was the best thing we could do for this place and how could we go about co-creating toward a common good. A discourse fragment follows:

Dear Newton,

Apologize for my very much delayed response. I thought I could do this Monday when I completed an online interview of a huge project on environmental protection, but I could write only two lines before I was interrupted again.

Very useful skype conversation last week. I think the work, *A Future Garden for the Sichuan Province*, is beginning to take shape, at least that is the name for the work that occurs to me. I would like to take a first attempt at defining roles, looking at what information needs to be gathered first, and how one might locate appropriate species and so on.

Yes, critical is what species we use first in the garden. As a botanist by training, I am thinking of those collected from lower elevation with similar habitat of rainfall pattern.

The *Force Majeure* group's role or work is to articulate this work of art that is a work of science and above all a work of public service in such a way that it is also clear, as you suggested, to everyday people, so we need to be considering a number of issues:

An overarching plant list. This seems to me very difficult to do, but if done effectively, the outcome can be marvelous. This would be to select species to inhabit an over story and under-story and ground plane of approximately a four-hectare site that collectively does what we discussed in our skype conversation, which is to be both, a very public work of ecological art and possibly a research-based field station.

a) This plant list would need to have the following properties: the species should be able to exist comfortably in a warmer climate, a climate that is at least five degrees Celsius warmer than presently exists.

b) While there is scientific agreement about how much temperature will rise and generally about the time frame, there may be less agreement about precipitation. We understand that the region has a drying trend, but we suspect this will be mediated by the ability of warmer air to carry and release either as much or more moisture than it presently does. Therefore, it seems to me that our first plant designs should take into account the five

degree temperature change. We understand that you have suggested our species selection be from dryer lowland areas, therefore we might make species selections adapted to dryer warmer climate which can adapt to intermittent increased precipitation if that turns out to be the case.

Temperature rise in Tibetan Plateau is indeed at a larger scale than other regions in China. In the past 60 years, at Songpan (altitude 2 852 meters, not very far to our site), there is a 1.5 degree Celsius increase in annual mean temperature and a very weak trend in precipitation increase. In general, the patterns of climate change on the Tibetan Plateau so far higher scale of temperature warming and increasing precipitation. I think it will be interesting to do an analysis about the pattern in the past 60 years in this part of the plateau, which will provide with us useful information for our plant list.

c) I think our agreement is clear that the species selection should have three properties to it, they are:

1. This kind of an ensemble will be designed to generally follow the architecture of an open canopy forest. However, it is more like a scaffold then a fully developed natural system. Wherever we have seen such scaffolds they were self-complicating. By self-complicating we mean not only attracting other plant species, but mammals, birds, reptiles, and insects. I can give you an example in Sri Lanka of such a situation where its success is simply nature exploiting an unexpected opportunity.

2. The overarching value that we see in developing *Future Garden* is that this experiment will serve biodiversity, water retention, carbon sequestration, top soil generation, while at the same time having many species that are harvestable by people and communities. Thus, the act of harvesting can become the act of conserving or even growing the system.

d) The unique property of this work is to prove that maximizing harvest, as monocultures do at the expense of all other natural systems in a region, is not sustainable in the long term, indeed it is self-cancelling in the long term. Whereas what we propose here is actually self-expanding as all natural systems do when energies are available. Some studies already suggest that this kind of food production can be in the long term more profitable when all energy inputs are calculated than in monocultural work.

Though it is not easy to have multipurpose plant species that have most of the above services, it will be very useful to test and very important to have these in mind during the species selection process.

We see the art of it in the intelligent and artful species selection, propagation, and presentation on the site. That is, how do the visitors see it, move through it, and understand it. Hopefully the work will inspire. After all, important things sometimes have very modest beginnings. The modest beginning we have in mind is the site the plantings, the mini structures protecting the plantings, and the narrative that holds together and makes clear what this work is about and what this transnational collaboration is about. For us, it is about the future well being of the Sichuan region, which we understand to be somewhat over 450 000 square kilometers, inhabited by slightly over 80 million people.

Great ideas and we all will work on this!

We are very much looking forward to initiating this garden before we come and give talks, first at the conference and then at your university. At that time I am hoping that we can put together the academic group or team that will enable this work to continue through time and to be part of the teaching that goes on at the university. At present, I am seeking ways to see if we can generate some kind of collaboration between the Sichuan work, the Sagehen work, and the *Future Garden* that we are planning for the arboretum on the 600 hectare campus at UC Santa Cruz where we are research professors returned to work after taking early retirement from UC San Diego.

I talked to some people but not found those with strong interest in this project. Unlike universities in the USA, most in China do not have field research stations, some stations are managed by research projects, which are temporal and will close down with completion of projects. However, this may change as some universities are planning to have field research stations. If this garden goes well, we can plan for a station for collaboration for scientists from China and and other countries. Collaboration and involvement of UC Santa Cruz will be a good start.

All the best, Tang Ya

From Peninsula Europe III



The Force Majeure

Peninsula Europe

Parts II, III, and IV

2009 Kala Art Institute, Berkeley, CA

Cardwell Jimmerson Contemporary Art,

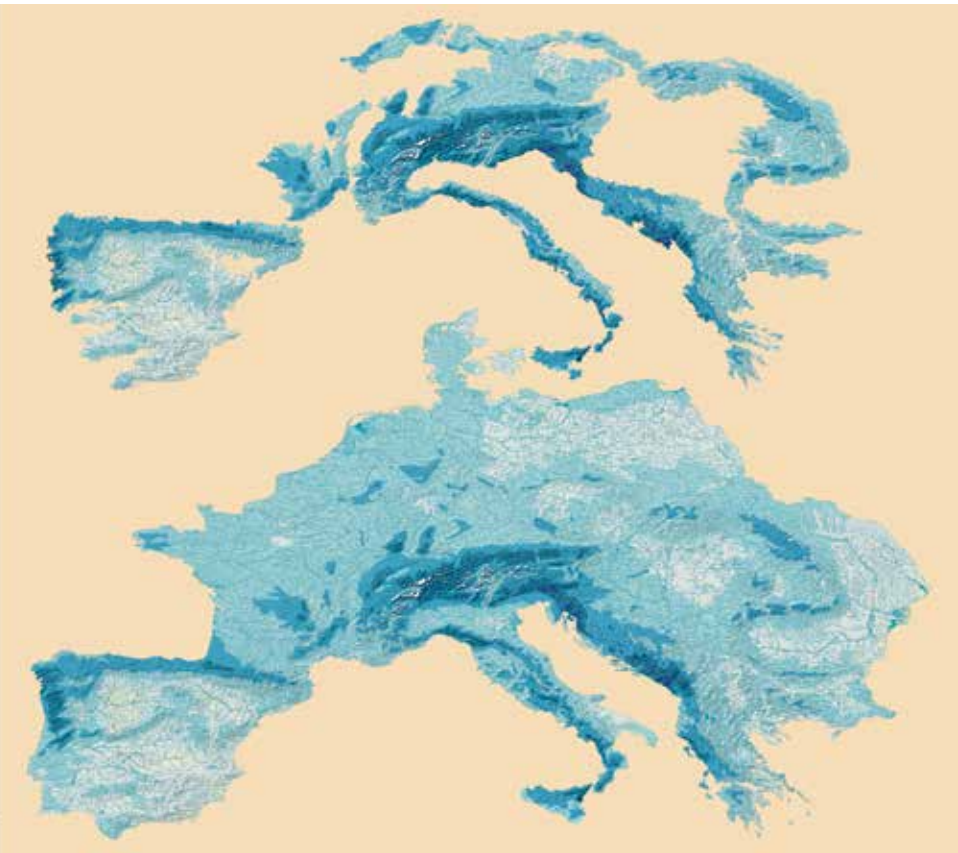
Culver City, CA

2011 Ronald Feldman Fine Arts,

New York

et. al.

In 2007, we received an invitation from the Natural World Museum to make a global warming work to be included in *Envisioning Change*, a traveling exhibition co-sponsored by the United Nations Environment Programme, which began in the Nobel Peace Center in Stockholm and ended in Brussels. We decided to do an extension of *Peninsula Europe*. We called our mapmakers at Act’Image in Toulouse who had on file the original mapping images for the piece. We asked them to first research how much land the Peninsula would lose if the oceans rose five meters, and how many people would have to move to higher ground, then, to make a new *Peninsula Europe* map about 2.4 meters square that reflected these changes, and reproduce the original map as well, so that comparisons could be made. This was done and became *Peninsula Europe Part II*. Their calculations revealed a 95 000-square-kilometer loss of land were the waters to rise five meters, with 23 million people in need of moving upward. (These numbers would be roughly halved with a more likely rise of two and a half meters and about doubled with a much less likely rise of 10 meters.) *Peninsula Europe Part III* followed about a year later, using the same mappings but with somewhat different text. The best weather predictions in 2007 to 2008 were for drought moving across Europe from Portugal, almost reaching Germany, with the suggestion that the loss of about 20 percent of Europe’s food production was quite likely. By that time, predictions



From *Peninsula Europe I*, 2001

A Few Figures Writ Large upon the Icon

45 000 000 people
1 463 550 square kilometers of land,
averaging 300–600 meters in elevation
1 030 000 square kilometers of farmland
147 000 square kilometers of grassland
565 000 square kilometers of forest
3 000 square kilometers of glacier
2 100 square kilometers of urban land
1 430 000 000 cubic meters of rainfall above
300 meters in elevation per year
1 185 000 000 cubic meters of rainfall above
600 meters in elevation per year

A Few Figures Writ Large upon the Land

The Peninsula
420 000 000 people
3 315 000 square kilometers of land
2 300 000 square kilometers of farmland
650 000 square kilometers of forest
340 000 square kilometers of grassland
25 000 square kilometers of urban land
2 693 000 000 cubic meters of rainfall per year
500 kilometers average organic waste
per person per year
210 000 000 metric tons of organic waste per year

that temperatures would rise disproportionately in the high grounds were proving to be true, as glacial melt accelerated and snowfall decreased, increasing the probability of flood and drought. This work, *Peninsula Europe Part III*, was concerned with what might be done about the situation. *Peninsula Europe Part IV* took shape in 2012. Unlike many of our other works, there was no commission involved, no request to go somewhere or address something. We were on the jury for the annual Fuller Challenge prize, sponsored by the Buckminster Fuller Institute, and were extremely critical of the rest of the group, both the jury and the Fuller team, who seemed obsessed with simple cause-and-effect operations. For example: Someone in an African village invents a better way of making charcoal for cooking, which has a by-product that is good fertilizer, and only a simple mechanism is required to do the work. It’s repeatable, it’s scalable, it’s good for the environment to do this work, and turns out to be profitable to the maker. It’s all very Buckminster Fuller—at least in the simplest of terms. But we believe that if Fuller were alive today, he would be worried about planetary carrying capacity, adaptation to global warming, and rising entropy in local ecosystems due to human exploitation. Above all, he might be worried about what to do in response to these circumstances. We had come to feel considerable affinity to Fuller after looking at his work in the beginning of our career, and meeting him casually.

Later, when Stanford acquired our archives and said that we could best be understood if our work was presented historically between Buckminster Fuller and György Kepes, we felt a lovely kind of affirmation.

Peninsula Europe Part IV argues that where possible on drought-impacted regions, across the 2.4 million square kilometers of farmland on the Peninsula of Europe, the topsoil become a sponge and again hold water, percolate it downwards, and normalize the water cycle. Just as 2.3 million square kilometers of the Peninsula have been terraformed into a farm over the past few thousand years (and mostly over the past 500 to 600), it is not difficult to imagine the transformation by simple means of much of this terrain that is drought impacted into water-holding landscapes. In this new iteration of the work, we found ourselves enlarging the proposal to include temperature rise; drought was already acknowledged, but temperature rise required a different kind of research regarding the types of species that could live under these new conditions and how we might become collaborators in the process of adaptation.

In March of 2014, we participated in a panel discussion called Art in the Biosphere (at UC Santa Cruz) along with mathematician Ralph Abraham and artists Kathelin Gray and Frank Galuszka and discussed the work. In the audience was an elderly, long-haired man who, when he heard that we were arguing for subtle but real transformations of the shape of the earth and of farming across much of Peninsula of Europe, declared, “What hubris!” Who did we think we were, that we should suggest such giant changes to the landscape? (And, he wanted us to know, he was one of the climate-change-denying community.) We replied that farmers had for millennia terraformed these millions of square kilometers of land for farming, so why shouldn’t we argue to re-terraform the land to hold water as it once did naturally? Why was it okay for them to transform the land, but not for us to do so? He said they had the money and therefore were entitled; we didn’t have the money and therefore were not entitled. (We did not part on friendly terms.)

Peninsula Europe Parts II, III, and IV are one work in which the principal image is repeated with changing texts (first with water rising and then with drought indicated). As more information came in, we simply did the work over. As in so many of our works, the loose ends are far greater in number than the problems solved. We note that this kind of predictions, based on exsisting data, tend to be risky, but in general whatever we predict has become worse over time, as more information becomes available.

From *Peninsula Europe II*

The decision is taken to reject the alpine treeline definition of the high ground, instead locating where rivers begin in order to define the High Ground, discovering that rivers begin mostly at 366 meters and above. Lifting the shape off the map, we discover an area of 1.46 million square kilometers at the 366-meter-level that, if rehabilitated according to the concept of the upward movement of species, will reduce the impact of the predicted temperature rise, flood, and drought. Later, the shape was redrawn to see if it could function as an icon. It did not.



From Peninsula Europe IV



Are the conditions in place yet
That require a bold experiment
At unprecedented scale and cost
And with unpredictable outcomes

For instance, out of 2.3 million square kilometers
of farmland
20 percent probably, possibly much more
Will yield to drought

Out of 650 000 square kilometers
Of mostly monocultural forest
80 to 90 percent will yield to fire, disease, flood,
and drought
In the high grounds
With the predicted 5.5° Celsius temperature rise

Out of 340 000 square kilometers of grassland
Typically monoculture
30 percent will yield to drought

As 450 million people become 500 million
And waters rise
Forcing the upward movement of people
And as food production drops
And markets are harshly stressed
If business continues as usual
The best likely case is food rationing
The worst case in many places
Is the collapse of civil society

Better much better
That resources are diverted in the trillions of dollars
To assist the soils of the subcontinent
In becoming a vast sponge mosaic
Encompassing the high grounds
Where the rivers begin
And continuing from high grounds
To low grounds to ocean's edge

Understanding that 2.3 million square kilometers
Originally forest and grassland ecosystems
Were terraformed into farmland

Understanding that the value
Of this vast human labor
Does not account for the loss of topsoil
The loss of seed stock
The loss of forest
And ecosystems and species
Above all the loss of earth that holds waters

From the perspective
Of the laws of the conservation of energy

All of the losses noted and yet to be noted
Represent energies now
Not available in the Peninsula life-support system

Human indifference is operating in the exploitation
Of our life-support systems
Indifference to the second law of thermodynamics
which says
Energies that are transformed
From one form to another incur a net loss
From the perspective of the laws
Of the conservation of energy
The whole landmass of the European Peninsula
Has experienced through human industry
A dramatic rise in systems entropy
Given that warming will take place
Even if dramatic carbon reduction is achieved
Entropy will continue to increase
And the systems' ability to support life
Will very likely decrease

The only response available that we see
Is collaborating with life-support systems to enable
the reduction
Of entropy peninsula wide
It is the only whole-systems response that we can imagine
As a counter to the Force Majeure
How would one begin?

By making subtle changes on the terrain
That would re-terraform the majority of arable land
On the Peninsula of Europe
Into the water-retention landscape it once was
So that all waters remain upon the lands where they fall
Simultaneously recharging aquifers enhancing biota
Lowering the entropy of the topsoils thereby

What would live and grow, and might even thrive
In the dramatically changed landscapes
That a warming planet will require
In particular on a warming peninsula
With some places wetter some places drier
And temperatures rising following predictions

The question then arises
Given the loss of seed stock
And the systems shock of rapid heat rise
And the presently degenerated properties of topsoil
How will species reform ecological niches
And habitat for themselves and others
In a new landscape mosaic
Parallel to and on a similar scale to
The reenergizing of 2.3 million square kilometers
Of topsoil across the Peninsula

We suggest a second bold experiment be undertaken
The intention of which is to assist the migration of species
Presently so under stress from rapid temperature change
Changes in soil and earth and reduction in seed stock
We propose paleobotanical research be conducted
To create a research library peninsula wide
Particularly focused on the Pliocene
Approximately 120 000 years ago when climate was
very similar
To that which is predicted in the next 100 years or less
We propose a second species research library be established
That looks at species and ecosystems
That inhabit the planet in places
That presently are close to the climate predicted over
the next 100 years or less

We propose a vast research effort be put in place
Charged with doing the investigation and experimentation
That would be the basis for assisting the migration
of species groupings
That would form the basis for establishing adaptive ecosystems
That if successful would self-complicate
In this new climate that seems to be our future

We see two learning curves in need of taking place
The first one is developing the methodology
For collaborating with natural-systems well-being
The second is reinventing food production systems
In which the harvest preserves the system
The system preserves the topsoil

Such would be a new beginning
An adaptation
To a very different world than we now inhabit

The greatest difficulty in this new beginning
Is not so much the research required
Or the science or the experimental design
In which concept and design can be tested in small patches
Rather it is overcoming the inertial properties
Embedded in the major cultural forces that define
Most human behavior toward our life-support systems
They are
Democracy and capitalism
Technocracy and some religions

For this level of experimentation to succeed
All must yield agency enforceable by law
To the lives that are not ourselves
Dare we say Nature or better yet, the life-web

The Force Majeure

Peninsula Europe

Part IV:

The Oasis

The Tamera Group

Example of a

Water-holding Landscape

We pose the question: Can our million square kilometers of drought-stressed factory farming in the Peninsula of Europe acquire oasis-like properties and regenerate, becoming productive and self-continuing?

We propose re-terraforming the predicted future million square kilometers of drought-stricken farmlands in the Peninsula of Europe into a multitude of small catchment basins. These basins would act as water-percolation systems for aquifers below to create highly productive and biodiverse water-retention landscapes. This suggests a new kind of farming where within each mini catchment basin water-demanding crops grow at the center, drought-tolerant crops at the perimeter, and silva culture is practiced in appropriate topsoil that accept forests. In this model, subtle redesign of the lands will guide excess rainfall to low points which act as reservoirs, protein reproduction sites, and biodiversity sanctuaries. Then carbon sequestration and food production can be accurately calculated and tuned to human populations. We suggest a new carrying capacity model can then come into existence—a model that is repeatable and able to self-regulate and continue and continue.

Note: We could not locate precise before and after matching photos, in this case the tent was moved and the photographic angle changed, but the sense of what a water-holding landscape could provide ecologically seemed clear enough.



Before water-holding landscape design



After water-holding landscape design



Tamera Lake

Late in 2012 or early in 2013, we were approached by Laura Rogers, who said she was the curator for a show called the *Blue Line*, which was the brainchild of an extremely ambitious person who intentionally is not named here. The idea was for local and international artists to make proposals for indoor and outdoor sites along the San Francisco harbor; a great boat race was planned and they thought that they could capitalize on all the excitement around the race to gain attention for the exhibition. We asked if there was any money for the project, and the answer was no; we asked how they expected to get support and were told that there was a very intense belief that once the work was produced support would come. We said okay and did a quick proposal, some text, and a few images drawn from our earlier *Sacramento Meditations*.

The proposal noted that with a two to three-meter ocean rise the dike system and the bays would very likely be overwhelmed, and a giant estuarial lagoon would form over the next 100 years, reaching Sacramento. Who was going to take responsibility for assisting a viable ecosystem to form? We made arguments against leaving such a vast occurrence to chance. And we made additional arguments as to why we should be permitted—indeed, encouraged and certainly well funded—to form a scientific team to help to give birth to this estuarial lagoon. We expressed the need for paleobotanical research—that is, if you go down to the Pliocene, perhaps a couple of 30.5 meters down, you come to a time when the temperatures were higher, the waters were warmer, and part of the Central Valley was an inland sea. We saw the Pliocene as a teacher, much as we saw other such lagoons far south along the coast as teachers. Paleobotanical research would reveal what lived when both the temperature and sea level were much higher.

It was delightful to be forming these thoughts and images which fit in well with our work in the Sagehen watershed, as the Sierra Nevada would be supplying fresh water to the lagoon, making it estuarial in nature.

We found resistance to our proposal coming from folk who had brought advisors from the Netherlands. They were from engineering firms that knew how to build dikes. Plans evidently were afoot to find out how much it might cost to protect parts of the reclaimed lands around the bay, or even the airport, in the Dutch manner. Reflecting on this, we began a second work entitled *Only Fools Pick a Fight with the Ocean: Wise Folk Dance with the Rising Waters*. The new work we had in mind was to take a look at how many other outfalls into the world ocean from major rivers would find themselves in positions similar to that of the bays of San Francisco where possibly very productive estuarial lagoons would be a natural outcome of ocean rise.

As part of our research we had a lot of fun doing a mini-review of the field. For instance, in his book *What is Life* published in 1944, the physicist Erwin



Schrödinger addresses the question of how entropy can work in ecosystems as differently as it does when it is applied to the laws of thermal dynamics. Later he raised doubt about his own analyses. Most recently, diverse researchers have added marvelously to ecological thinking by reframing the first three laws of thermodynamics in ecological terms. We particularly like the metaphor when describing lowering entropy as expelling entropy from a system, and we also like the invention of the term exergy, which means the raising of available energy in a system. However, big-systems thinking was oddly absent from the ecological analysis at that time. When we told Bill Fox that we were looking very hard at entropy and its relationship to the ecology he turned us to a book we found very useful, entitled *Into the Cool* by Eric D. Schneider and Dorion Sagan and which was about exactly the subject matter we were struggling with. Interesting that hostile and affirmative reviews appeared in almost equal number.

One day a letter came from *Blue Line* saying how happy they were that artists of our type were willing to participate. They went on to explain what it meant to participate: We had to finish our proposal on time; we might not get the 50 000 dollars to do the project that they had originally suggested would be available; nonetheless, in the interim would we kindly acquire several million dollars' worth of insurance to indemnify others harmless if a lawsuit were to happen. (The money for this insurance was to come out of the nonexistent 50 000 dollars.) Suddenly the whole operation began to look like a mini Ponzi scheme, and we withdrew. Finally everyone else withdrew as well, and the originator sort of disappeared, as did the boat race. However, it was interesting to consider how an estuarial lagoon would behave and equally interesting to think that this was an opportunity for adaptation at great scale. So we did what we never do—which is to work without invitation—and wrote the following proposal and began showing it around.

The Force Majeure

The Bays at San Francisco

Become a 162 000-hectare

Estuarial Lagoon

2013 Ronald Feldman Fine Arts,

New York

2015 Verge Center for the Arts,

Sacramento, CA

Los Angeles Municipal Art Gallery, CA

Proposal for the Bays at San Francisco

For the purposes of this investigation and work of art, we pose a limit to the ocean rise of about three meters, which is enough to generate the vast estuarial lagoon this proposal suggests. The lowest predicted water rise over the next 100 years is approximately one meter, the highest approximately five meters; we choose the three-meter mark, somewhat arbitrarily, as the most probable. We also note that climatological research suggests a three- to four-degree-Celsius temperature rise in the region.

In an estuarial lagoon, the mixing of fresh and salt waters creates a particular and highly productive ecosystem that evolves with a tolerance to waters of varying salinity and temperature. We therefore propose a planning group that will first analyze the terrain and then investigate the species that might move there from warmer parts of the Pacific if they could. Such a group will be tasked with the design and framing of the planning and research necessary to do the work; particularly important will be to come to an understanding of whether and how to assist the migration of species such that a healthy, vibrant, and productive estuarial lagoon could come into being. Serious paleoecological research will be required to discover which species lived in the Central Valley when salt waters were present and when the temperatures were, on average (and as predicted), four degrees Celsius higher. Such research will shed light on how a new ecosystem might both look and behave.

Moreover, it is our intention to locate on the Pacific shores, possibly in Mexico or farther south, what we have come to think of as a “mother lagoon”—that is, an estuarial lagoon that has presence in a desert and is fed by mountain streams and exists at temperatures as high as or higher than those to come in the Central Valley. Studying the ecology in such a lagoon, like studying the Pliocene, will very probably help us to understand how we might assist nature in bringing forth a viable estuarine ecosystem in the remains of the Central Valley. For example, from an economic perspective, a 162 000-hectare estuarial lagoon will produce approximately 1 100 kilograms per hectare when it becomes a low-intensity fish farm. In that case we will be looking at an annual production of 182 million kilograms of protein (wet weight). Those who harvest the system will be required to maintain the system, so that the top predator and the top conservator are one and the same. Moreover, monocultural practices simply no longer apply. By this we mean that ecologi-



cally balancing the act of harvesting can preserve the systems complexity and resilience. Actually, some Native American harvesting process did this. This approach is in direct opposition to the monocultural cropping so typical of modern farming. Therefore, we see the lagoon as self-continuing, self-complicating and self-growing.

For instance, let us assume an algal bloom and the introduction of small algal-eating fish and filter feeders which then become a large new nutrient source. This nutrient influx causes a species like the mangrove crab to massively overproduce. This overproduction creates a mangrove crab monoculture putting at risk the diversity that normally maintains and sustains the resilience of the complex ecosystem living in the lagoon. The harvest in this case does the work of exporting usable excess energy in the form of overproduction in the crab community. Now, speaking from a sustainable ecosystem perspective, one can see the act of harvesting here as an ecologically appropriate act of exporting excess energy because such exporting serves to protect the underlying ecosystem by removal of a potential monoculture. Thus, harvesting increases or at least maintains the energy in the overall system available to do work. At another time in the life of such a lagoon, many different species might be harvested in small measure by putting to work the natural processes of disruption as carefully managed harvesting increases species productivity. It is in this sense that we mean the harvest is designed to preserve the system. We believe that great benefit would be the outcome were the science to be done that tests this hypothesis. Such research may even open doors to how entropy works in large over-disrupted (exploited) systems. The Bays work argues that conceiving and planning for adaptation at scale has a virtual efficiency that needs to be enacted in the now; this virtual efficiency is found in initiating coping processes well prior to extreme future need.

We see this probable formation of a highly productive estuarial lagoon as a result of the Force Majeure at work, raising the question, “Can we adapt to this scale of change in a way that benefits a changing culture while collaborating with an evolving ecosystem?” Consider that the ecosystem of the Central Valley of California was first replaced in part by small farms, then by large farms, supported by irrigation (often requiring

one to 19 million liters per year per hectare in order to produce five or seven crops per hectare per year). To accomplish this, most of the rivers on the west face of the Sierra Nevada were dammed and, in some cases, diverted. In all cases, the surface entropy of the region was raised and the energy available for nature to do work in the terrain reduced. As in our other *Force Majeure* pieces, the subject matter addresses the consequences of the indifference of our processes of production and consumption to the laws of the conservation of energy. We then pose the question, “Can an estuarial lagoon, brought into existence by the Force Majeure, and coupled with nature’s will to self-complicate and human creativity, generate energy available to do work in this region as great as or greater than those that were dispersed by its transformation into an irrigated farming system?” If this were to transpire, then exergy would be at work. If exergy can be encouraged, place by place, as suggested here at the bays of San Francisco, then planetary resilience has the possibility of being restored. We suggest that bioregional entropy and energy balance can be regulated by research and human collaboration with the life-web, always assuming that nature itself has been given agency.

A Brief Flow of Fantasy

All of this got us to imagining that a vast complex system like the world ocean could be imagined as a finite number of microbiomes automatically accompanied by a finite number of ecotones that could be collectively added up to a particular number. For example. these could include the North Pacific Gyre if we are looking at the million square kilometer scale, or the bays of San Francisco becoming an estuarial lagoon if we are looking at smaller systems, simply by applying our guiding metaphor, “How big is here?” Imagine that these could be grouped into a finite number. If this determination could be made, then the sum of available energy in each microbiome to be exported might be established. In each case when the harvesting was appropriate it could then be designed to preserve at the very least the system and, at the most, assist the system in its growth. Since the sum of available energies in each microbiome would of necessity always be changing, might we then test the idea of reframing Feynman’s “sum over histories” and put it to work in ecological thinking? Finally, a question: are we looking at a way to restore resilience to global metabolism?



Installation, Ronald Feldman Gallery, New York, 2011
13.4 meter-long collaged aerial photograph of the Sierra Nevada range
Kneeling and looking closely, seeing into a tired landscape.

The Force Majeure

Sierra Nevada:

An Adaptation

2011 Ronald Feldman Fine Arts,
New York

2012 Nevada Museum of Art,
Reno, NV

2015 Verge Center for the Arts,
Sacramento, CA
et al.

Earlier we got a call from Bill Fox, an author and the director of the Center for Art + Environment at the Nevada Museum of Art in Reno, who said he was interested in our work. It was 2009, just before our show at the Kala Art Institute in Berkeley. (The content of the show was pretty close to that of our exhibition at Ronald Feldman Gallery in New York earlier that year, consisting of *Greenhouse Britain*, the *Tibet* and *Peninsula Europe* works, and related pieces.) To our surprise, the Kala show was more intellectually and visually powerful than the previous one at Feldman’s. This was due in good part because our son Gabriel, a rather formidable exhibition designer, did the designing. Then, out of nowhere, Susannah Hayes an artist, thinker, photographer, and teacher at the San Fransisco Art Institute, appeared. She sort of adopted us, organized a conference and then an interview with Peter Selz. Then made sure that the interview was published by Roger Malina in *Leonardo* magazine. Thereafter, she pushed the publicity, introduced us to Fritjof Capra, and more and more. At this point, partly because of this interview, we had finally come to clarity and to focus on the Force Majeure. Going back to the call from Bill Fox we said, “Go see the Kala show and then we’ll talk”—but he was too busy. A few months

later we heard from him again; this time he told us what he did, and we also became interested in his work at the Center. He said that they were building an international archive of environmental projects, and that the museum was going to commit a significant amount of its time and energy to documenting, showing, and standing for the emerging art and environment movement. He said that our work had a prominent place in that history and that we should talk. We said, “Invite us up. We’ll talk. We’ll investigate. Maybe a work will emerge.” There was a silence, a little uncomfortable. He said, “Maybe that’s premature. My director, David Walker, and I and some of our staff would like to talk with you, so why don’t you fly up?” One or the other of us said, “Why waste the money and the time? Let’s skype. We will all know quickly enough whether it’s interesting to proceed.” Late one afternoon we had a session with David Walker and Bill Fox. After some introduction, we began to talk; clearly it was testing time. They had a big vision; we wanted to know how they would enact such a vision (it was very ambitious and would be costly). In addition to collecting an archive, they were mounting exhibitions on the art-and-environment theme. Both of them were

big thinkers. So we asked how they would feel about a 50-year project, whether they would be willing to put us together with ecologists to think about a counterproposal to what was projected to happen in the high grounds of the Sierra Nevada. (There was agreement among glaciologists that temperatures would rise 5.5 degrees Celsius, snowpacks and glaciers would disappear, and fire, disease, and the bark beetle would appear as forces to devastate the ecosystem of the high ground. Flood, drought, and erratic river flow would be the long-term consequences.) We said that we had been thinking about a counterargument to the loss of the snowpack that was ecological in nature, that would require assisting the upward migration of species—and were they game for a 50-year plan? They asked how large an area we were talking about, as they didn’t think the museum could afford to buy a lot of land—we argued that we would need only a small watershed, with patches at different altitudes, but first we wanted to devise an exhibition that would make clear the ideas. The outcome of the conversation was that trust was established; we came rapidly to believe that they would do what they said they would do, and they thought the same of us.

We went to Reno and met with many scientists from the forestry service and the Desert Research Institute (DRI). We asked the DRI to make a film and an image; when they asked what kind of image we were talking about, we said that it should be an answer to the question, “How big is here?” We had concluded that the entire 62 400-square-kilometer footprint of the Sierra Nevada range was “here”, and to express this idea we wished to make a map, 12 to 15 meters long, that people could walk on. We would use aerial photography to make a manifestation on the floor where everyone could see what was happening to these mountains. In the five or six paces that it would take to walk from one end to the other, the viewer could see the mountain range from the air—and then, bending down on one knee, see the mass logging operations that were going on. At the DRI’s request we wrote an explanatory proposal, and thereafter began the research and design for an exhibition that would lead to a 50-year project.

A studio was rented. Museum personnel were made available. The floor map arrived in sections, on time. The watersheds were worked out. (Marked at large scale were the Truckee and Yuba watersheds, the one carrying water into Nevada, the other to the Central Valley of California.) First the work was shown in New York and was well reviewed; then it moved to Reno, and we heard that it was much loved, particularly the floor piece—we were told that several thousand people walked on it and it still looked good.

The stage was set to begin the experiments on the ground. Initial arrangements had been made to work in the Independence Lake watershed, managed by the Nature Conservancy. With the collaboration of scientists from the DRI, particularly Derek Norpchen, with Peter Weisberg and Tom Albright, ecologists from the University of Nevada, Reno, and permaculturist Joel Glanzburg, we had produced two five-minute flash videos that ran in parallel, one showing the watershed with normal forestry practices, the other showing the same watershed with the upward movement of species per our design. The Nature Conservancy, upon seeing the videos, said that their Independence Lake watershed was not a place where we could work. They did not believe in the upward movement of species. They felt that any change in their policy would endanger their very existence; in fact, they wanted their name and any reference to them re-

moved from our work (Obviously they were risk-averse). After hearing their position, we immediately agreed to remove their names and any reference to them in the Sierra Nevada work. We had no desire to endanger the Nature Conservancy. Actually, we experienced considerable regret that we had not, before completion, reviewed this work with them. We had asked the museum to set up a meeting with them but the request slipped between the cracks. Later I realized as an artist and free agent, I was remiss in not setting up the meeting myself.

However, without terrain to work in, without a way to test our concepts on the ground, the project would come to a halt. Jeff Brown and Faerthen Felix of the Sagehen Creek Field Station were in the audience; Sagehen was the next watershed over from Independence Lake. Jeff stood up and said that the Sagehen watershed was 3 240 hectares and part of the University of California, Berkeley, reserve system; he said, “We invite you to work at Sagehen.” We said yes, and the Nature Conservancy people left the room. (It was an odd moment.) From this was born the Sagehen work. Grants were awarded, a team was formed, sites were chosen, and the difficult process of species selection was begun. The 50-year project was beginning to take form.

Sierra Nevada:

The Force Majeure: On the Ground

Adaptation at great scale

Requires an unorthodox knowledge base

For instance within 100 years

Temperatures rise six degrees Celsius

In the high grounds of the Sierra Nevada

Glaciers and snowpack disappear

Intense rainfall happens a few months yearly

Rivers function erratically, drought increases

Then assisting the migration of species

Especially in the high grounds

To help create the new ecosystems

Adapted to climate shock

To again produce on a more constant basis

The water-holding earths

The carbon-sequestering earths

For the forests, the grasslands

And river systems that are threatened

First studying the west side of the Sierras

Where almost all the rivers are dammed

90 percent used for irrigated farming

A bit for and industry

And the rest for urbanity

It’s just possible to cognize

The depletion of available systems energies

That happens with this kind of transformation

From the perspective of the laws of the conservation of energy

The river systems that spring from watersheds

That collectively constitute the 62 400-square-kilometer footprint

Of the Sierra Nevada

Have experienced over the last 100 years

A profound transformation

Moving from high energy but self-sustaining systems

To far more tenuous, high local entropy,

low overall available energy systems

Whose continuous flows of water are in doubt

Due to the accelerating presence

Of the Force Majeure

Flying over this terrain,

Then making a 14-meter-long, two-and-a-half-meter-wide

Aerial photo of the whole, able to be walked upon

The power of the mapping

Reveals a 62 400-square-kilometer, mostly exhausted landscape

That energies embedded in much of its once rich forests

Transformed into short-term cultural production

Revealing a treescape pattern of thousands of square kilometers

Of lumber extraction

From the perspective of the laws of the conservation of energy

The forest systems that spring from watersheds

That collectively constitute the footprint of the Sierra Nevada

Have experienced over the last 100 years

A profound transformation made manifest by clear-cutting

Moving from a low-entropy, high-energy,

self-sustaining system

To a high-entropy, low-energy system

Whose continuous self-regeneration is in doubt

Due to the accelerating presence of the Force Majeure

Then looking at a tree stump

Seeing the mark of topsoil before cutting

Seeing the mark of topsoil 50 years later

Looking at a 10-centimeter topsoil loss and knowing

That 2.5 centimeters of topsoil takes 1 000 years to produce

It becomes clear that a 4 000-year energy debt is the outcome

From the transaction between clear-cutting and erosion

A topsoil loss of uncountable millions of cubic meters

And billions upon billions of microorganisms

That constitute the topsoil eco-net

That collectively participate in the Sierra Nevada life web

Have experienced a profound transformation

Moving from a low-entropy, high-energy, self-sustaining

system

To a high-entropy, low-energy system

Whose ability to regenerate over time

Is no longer congruent

With the way such systems regenerate

Due to the accelerating presence

Of the Force Majeure

Recreating carrying capacity requires

Assisting the migration of species

Reenergizing stressed ecosystems

Of whole mountain ranges

Increasing the resilience thereby

What amounts to be an Eco-Security system is required

Supported by a quantum of the gross transnational production

In which nature and the protection and well-being of systems

Are given co-equal agency and protections

Under the law typically afforded to human populations

Done at large enough scale

Such an effort

Would re-energize planetary ecosystems

Reestablishing continuing resilience

A counterforce to the Force Majeure

High Sierra imagery



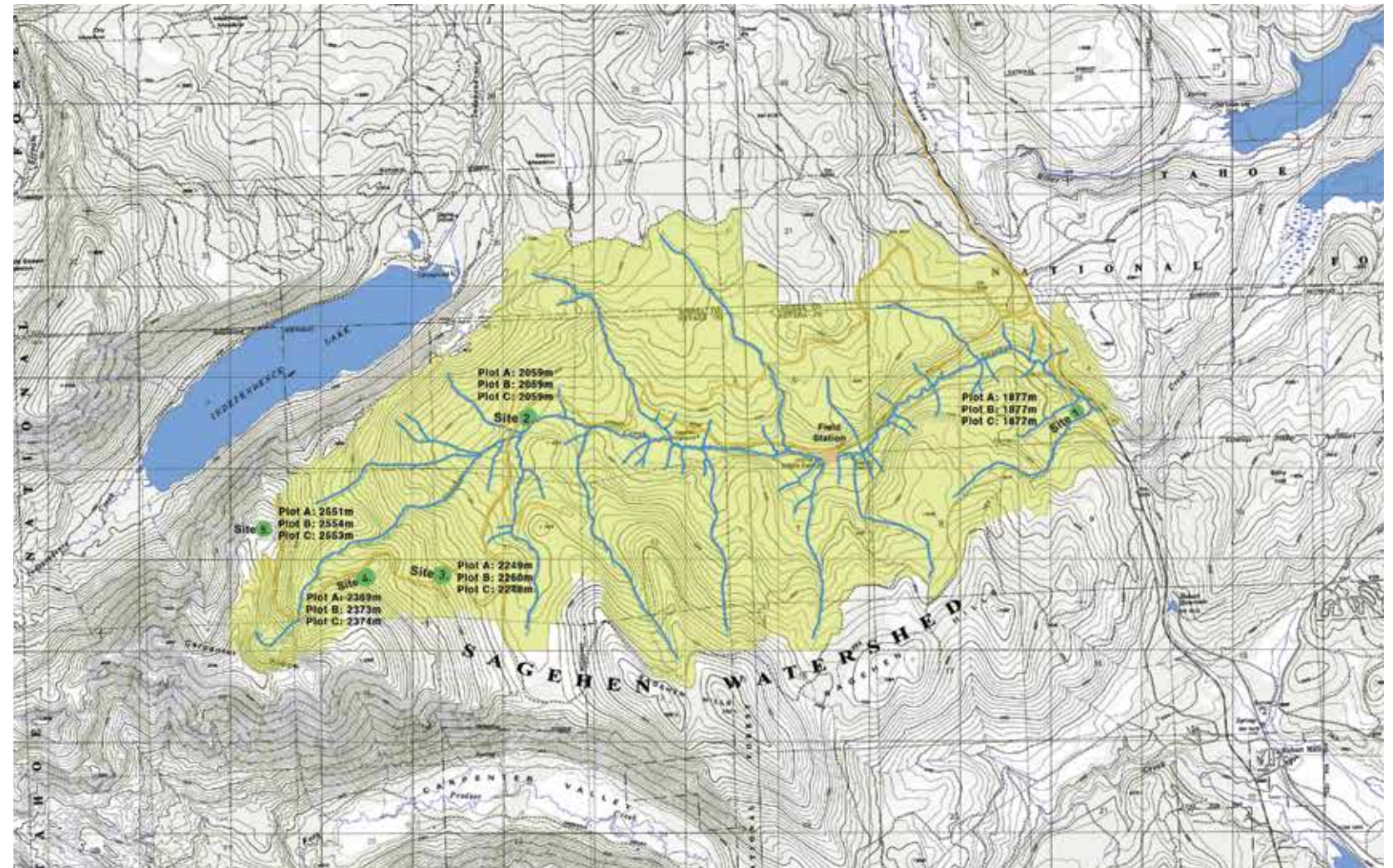
The 3 240-hectare Sagehen Watershed

The Sagehen River system and experimental sites

Jeff Brown and Faerthen Felix, Bill Fox and Sara Frantz (the director and archivist/librarian of the Center for Art + Environment) met with us at the research center site which was pretty much at the center of the Sagehen drain basin. Jeff and Faerthen began the process of educating us. The 3 240-hectare Sagehen Reserve was remarkable. It was one of the six components of the system of Central Sierra Research Stations maintained by UC Berkeley—which includes reserves, experimental forests, and research centers. They had a documented 50-year history of fires, species types, floods, and drought. It was an amazing place to be: The sounds were beautiful; the smells were almost intoxicating.

The on-the-ground history of this 50-year project entitled *Sagehen: A Proving Ground* begins with a 220 000 dollars grant from the Annenberg Foundation. These monies were granted by the Metabolic Studio which is an independent research center and ecological art studio run by Lauren Bon. This grant happened in an amazing way. We had gotten to know and respect Lauren’s work as an artist while doing a reading at her studio. When we went there to make our request Lauren asked me, Helen, to do a reading. The room was quiet. I was asked to do another and another. At the end, Lauren asked how much we needed. We said about 220 000 dollars. She said okay and put us in touch with the people at the Annenberg Foundation that would do all the paperwork. Later we would become close friends.

With the Metabolic Studio monies we hired Brett Hall who is the research director of the UCSC Arboretum to do research for the project since he also lived near Sagehen during the summer. He told us that he knew the watershed well. Over the course of several months he collected approximately 16 species living at various altitudes from the Sagehen basin. As per our request, the majority of the chosen species were resilient to temperature change, can survive at various altitudes, and were drought tolerant. With this collection he propagated almost 13 000 seedlings at the UCSC Arboretum with the help of a student team. Students were also hired to install fencing, plant seedlings on the sites, and water the plantings for the first few months during a period of drought. Jeff and Faerthern intro-



The Force Majeure

Sagehen:

A Proving Ground

2011–ongoing

Presented in various conferences

Species propagation at UCSC Arboretum

duced scientists to our work, and soon a hydrologist joined the experiment, as well as a species modeler. Also we sought the forestry group's permission to let us address the question "Could our five sites be reused for repeating the experimental design using trees?"

The idea was to test a representative group of plant species at five different altitudes across a 915-meter transect to see if enough individuals would survive heat, drought, and altitude variation to create what we call a "resilience ensemble." We would then test this smaller grouping at higher altitudes. If proven correct, which seemed likely, this smaller ensemble would be the source to re-establish both the ecological regeneration and the water-holding properties of the earth much more rapidly than would happen under much warmer conditions were nature unassisted. If the forestry group was interested in re-using one of the three plots from each of the five sites at the five different altitudes chosen for arboreal experimentation, we would then have from the forestry perspective both understory and overstory resilience plant species ensembles. Such a grouping could then be the basis for the upward movement of a partially developed ecosystem that could self-complicate. This would re-frame the arguments around assisting the migration of species. Reflecting on these possibilities was exhilarating.

Almost all our work begins with a question. The question we posed for the 3 240-hectare Sagehen drain basin was straightforward. Simply put, we asked, "Is there enough biodiversity in the species existing in Sagehen to survive and possibly thrive when the High Grounds of the Sierra experience the full impact of global warming 50 to 100 years from now?" This would include the prediction of temperature rise and its outcomes. We were beginning to believe that there was a real probability that there is in fact enough existing biodiversity. If so, we had a repeatable, scalable, and affordable means to assist the migration of species upward, thereby mediating the impact of global warming watershed by watershed.

A year passed; it was as if prophecy had speeded up. Instead of 1.2 to 2.4 meters of snow pack, there were 10 to 20 centimeters

of snow pack. Everybody was talking global warming big time. After the snow had melted, instead of three months of drought it rained more than normal, although the drought continued. Therefore, our experimental patches began to show promising growth. In reflecting on all this, we then posed the question: Has our Sagehen watershed survived flood and drought with temperatures six degrees Celsius above normal? It appeared the answer was yes. Through a process of ecological interrogation we suggest the notion that if the watershed had genetic memory of living through such a period, could we find the species that had survived in these conditions and propagate them? Therefore, along with assisting the migration of species upward, we would be able to assist the migration of species through time, from an earlier warm period to a later warm period. We began to call this the Sagehen theory, imagining that place by place, if defined geophysically, we could propagate the future in the now.

Then, in the *Future Garden* format, every place becomes a story of its own becoming.

The Force Majeure Center and the 3 240-hectare University of California Sagehen Creek Field Station are engaged in and committed to a 50-year research project (*Sagehen: A Proving Ground*)—a response to global warming. It is intended to be a work of art, a work of science, a work of bioregional planning, and a call for policy change.

The project is designed to field test, in an appropriate setting, core concepts with which the Harrison Studio acting as the Force Majeure Center has been working for the past five years; in brief, to test the value to ecosystems, under climate stress, of assisting the migration of species ensembles. The project will be designed as a first answer, on the ground, to the question posed in the *Force Majeure* Thesis: Are there ecologically available responses that will replace, in some measure, the value once provided by disappearing glaciers and snowmelt to river systems and both the ecosystems and the human cultures they support?





Site 1, adjacent to Highway 89: plots A, B, C. Elevation: 1 877 meters

The Experimental Design

1 Five sites were chosen by us with Brett Hall. Three other botanists, who know the area, were chosen for an advisory committee to add breadth and diversity to the process of selecting species that would be most appropriate in this field test. Approximately 18 species were selected from the watershed.

2 The five sites were chosen for their similarity of earth type and disturbance. Each site is approximately 165 meters above the prior one; their placement spans roughly 825 meters of altitude upward from Route 89, which is close to the bottom of the Sagehen drain basin, to Carpenter Ridge, which is at the top.

3 The physical experiment takes the form of three six-by-12-meter fenced areas that will act as controls for one another on each of the five sites. Each fenced area covers 74.3 square meters and will be slightly overplanted, one plant per 93 square centimeters, with the same species groupings planted in each site.

4 Within these 15 fenced areas (three per site), the species groupings will be selected with particular emphasis on their ability to adapt to drought, hold water in the ground, and enhance the sponge effect, be fire tolerant, and function well collectively from a biodiversity perspective. They would also need to function well in lower as well as higher altitudes.

5 Each 2.4-meter fence will be removable in the winter but otherwise protect new growth from the encroachment of deer and small game.

6 If funding is made available, a camera will be mounted on each fenced area. These 15 cameras will take pictures daily, and the images will be systematically archived. The images will be used for a comparative review from a scientific perspective, and they will also be used as visual feedback, creating a narrative that will carry the aesthetic power and meaning of the experiment to a nonscientific audience, the Sagehen Creek Field Station, interested art avenues, and the internet. The process will also be recorded utilizing field observation.

7 We cannot predict which species will survive and do well at all altitudes; the first has passed and species counts are being done. In the second and third year we will replant those species that have survived at all altitudes, which will form the first evidence that the ensemble concept is workable.

8 It is our intention in the long term to investigate glacial succession ecosystems in order to both test a concept and answer a question: By following the model of assisted migration, can a simplified first-succession ecosystem be designed or otherwise enabled to follow a glacier as it retreats? The benefits of this experiment, if successful, are many.

Clearing by hand at site 4

Clearing and installing fencing at site 2

Watering seedlings at site 1



Lead botanist Brett Hall conducting a species count one year after planting.

Gathering seed at site 2



The 2.4-meter fence posts as measure
the higher the altitude
the higher the snowpack
the greater the snowmelt on the site
the greater the waters in the ground
the more abundant the growth
We will know in late summer

Site 5: 2 253 meters elevation



Site 4: 2 373 meters elevation



Site 3: 2 248 meters elevation



Site 2: 2 059 meters elevation



Site 1: 1 877 meters elevation



This was the state of things when I, Helen, began speaking about the need to find a way, and the value for us, of combining Native American environmental wisdom with modern science and art during our presentation of the Sagehen work at the *Art + Environment Conference* in Reno. We were speaking particularly in the context of the kind of knowledge that Kat Anderson had documented in her book *Tending the Wild*. At this point, Benny Fillmore, elder of the Washoe Tribe and their representative at the Reno Conference, stood up and asked if we would be interested in having the young people of the tribe work with us on this experiment. We said, “Yes.” Later we called Benny, suggesting that an initial meeting be held at a tribal meeting place with the museum people, tribal leaders, ourselves, the leadership at Sagehen, and hopefully several of the scientists, with interested people from the Washoe community as hosts. The intention was to help work out how to proceed. The meeting took place on November 4, 2014. We expressed our desire to establish a training ground for a small cadre of young people whose ancestors lived on and nurtured this land, to be

Washoe elder



its future regenerators. We posed the question, “Is there interest in the other tribes to form a coalition to educate their young to be capable of coping with the changes predicted?” The response was “Maybe.” New meeting times were set and agreements made. Finally the elder spoke. He said that the tribe, his people, were in danger of disappearing, along with their language, culture, and their knowledge of the land. We could feel in the room a will not to let this happen. We had long believed that if we chose an “ennobling problem” to work with, the problem itself would become an attractive force. It turns out that creating an ecologically based rapid-response system to predicted High Sierra fire, disease, flood, and drought due to intense temperature rise was such a problem. Research monies had come easily. Our work was sought out and was joined by scientists and foresters on site at Sagehen. At the same time the meeting was put in place with the Washoe Native American community. Still more was on the horizon. Our son Joshua had joined these processes, providing leadership. With all this happening all at once, what we meant by the ennobling problem was working itself out on the ground. Self-reorganization was happening almost too quickly for us to adjust. We had the feeling we were experiencing the miraculous and that the best outcome would be the melding of a work of art, science, and ancestral ecological wisdom into an unexpected new form. While all of this was happening, an unexpected anxiety appeared in a museum e-mail to us. Some fear was expressed that our work might insult some of the Native Americans that the museum was working with. I, Newton, received a rather harsh telephone call from the director, with the museum staff attending. He demanded that the museum have involvement, presumably oversight, with our work with the Washoe, or funding would be removed. I replied with an equally harsh note, to both the director and attending staff, that oversight would negatively affect the creativity, so I refused. Thereafter, relations with the museum were awkward. A year passed. Our work with the Washoe didn’t appear to insult anybody.

The Japanese Kudzu in its native environment is used as forage, mostly for cattle.



In an environment where it behaves as an exotic it can consume a house, tendrils growing 0.3 meters a day.



The Kudzu as an exotic will consume a meadow, a forest. As an exotic, it has no friends and is free to consume at will as it has no enemies.



The Force Majeure

A Very Incomplete

Conclusion

After making the *Force Majeure* works it has become obvious to us—as the *Manifesto* that begins this last body of work suggests—that the majority of humankind’s practices of extraction, production, and consumption operate with almost complete indifference to the workings of the laws of the conservation of energy. Human beings appear to be rapidly and measurably raising local systems entropy on a planet-wide basis.

Low entropy in a local ecosystem means that the energy in the system is capable of doing work; that is, keeping itself in balance, in part by exporting unusable entropic energy away from sensitive surfaces and thus allowing the species that live in it to continue living. High entropy in a local ecosystem implies the reverse: that the usable energy required for the system to do the work of sustaining itself (and perhaps even growing more resilient over time) has, to a dangerous degree, been lost or dispersed and the unusable inert energy has been increased. Local low-entropy systems, over millennia, have evolved a kind of dynamic equilibrium, most often depending on the sun’s energy while drawing on free energy in their environments. Nature’s processes manifest themselves by self-organizing, self-

complicating, self-evolving, and self-stabilizing, with resilience as a norm—whereas the productive, creative human race is far along in a contrary process, transforming local low-entropy systems (which we can call collectively the ecosystem of the earth) into rising-entropy systems that might well be called Humanity’s Preferred Cultural Landscape.

New understandings, insights, and intuitions appear in bits and pieces in our lives, and knowing happens in fits and starts, rarely in convenient times and places. Such a moment occurred in our studio at UC Santa Cruz one day, after a class. One of us posed the notion that we take an extremely long view and look at humankind as creatures having had a several-million-year existence, yet living among and in transaction with millions of other species, most with far longer histories. The other said, “What is clearly common to all of us creatures is that we improvise our existences as best we can with the materials at hand, facing indeterminacy as a constant.” Then a new question emerged: “What is the property common to all living things, but which is enacted by humankind such that it puts much of the rest of life at risk?” It seemed uncomfortably obvious that this common

property was the will to expand and procreate, using all energies available—and that the human twist was to refuse limitation of any kind. Biology tells us that all of nature’s other living ensembles have encountered and resolved this question of limitation in what has amounted to a several-billion-year experiment; in contrast, humankind acts as the exception, behaving as an exotic in any system it chooses to exploit. A biome (such as a swamp, a forest, or a vast prairie), at a certain point in its expansion, reaches a limit at which necessary energies are no longer available, and it can expand no further. Such limitations can be imposed by a water’s edge, a mountain range, a temperature gradient, or the absence of water, among other features. For smaller biomes there is typically an ecotone, a boundary zone that evolves between adjacent biomes (supporting some of the species of each biome, along with other quite different species, not present in either). The ecotone, which can range in extent from a few meters to a few kilometers, is in discourse with the biomes at its perimeter; its message, put in human terms, is something like, “I am your ring; pass not.” Humankind has become skilled at avoiding, transforming, or otherwise ignoring the messages

that ecotones have evolved and transmit, permitting our own growth to continue even when to do so exhausts the resources of the systems on which all life depends.

In 1997 we got to know Dennis Meadows; we were both in Bonn to give presentations to an international biodiversity conference convened by Wilhelm Barthlott (among others). Back in 1972, Dennis, along with several co-authors, had published *The Limits to Growth*, a groundbreaking study of the interactions of human and natural systems, commissioned and supported by the Club of Rome, and they had recently come out with an update (*Beyond the Limits: Confronting Global Collapse, Envisioning a Sustainable Future*). In the new book, they made clear arguments that systems from which too much energy had been extracted (that is, without sufficient return or exchange) entered into a state of perturbation. A given perturbation might last years or only a day, but if the processes of extraction that caused perturbation were not in due course transformed or reversed or at the very least removed, the system would lose its ability to regenerate and would thereafter collapse. We asked Dennis, “Where is the last chapter in your book about the limitations of growth?” He asked, “What chapter are you talking about?” We said, “Why, the chapter that says what you would do about this state of affairs since you make it obvious that if enough systems collapse, the whole ensemble will experience collective collapse. Then we would have an ‘end of the world as we know it’ disaster.” “Oh, that last chapter,” he said; “that is for you artists to work out!” We suggested that this was a cop-out of some magnitude; he just laughed.

We began to imagine that nature possessed, in all of its collective livingness (including the livingness in our own bodies), a kind of decision-making power. This idea came to us not from the Earth-as-Gaia metaphor but from watching as a lion chased and then captured a gazelle, which, when caught, offered its neck for a quick death. Impressed by this image, we wondered whether humankind, having been caught out, was accepting mass extinction—essentially presenting its neck for a quick death. (“Quick” in this context meaning that the time it would take would be only a tiny percentage of a three-million-year existence.)

We further supposed that the decision-making power we were for the moment attributing to nature could invent a set of responses to itself, should the process of evolution make a mistake (by, for example, creating a dominant species that pushed everything living toward mass extinction). We said to each other that if the sixth mass extinction were actually to come to pass, it would have a surprising significance from nature’s perspective: rather than a type of mass suicide initiated by humankind, it would simply be nature taking a decision that evolution had erred in the formation of humankind, and the way forward was to begin again. We arrived at this assessment by first considering nature’s lifetime on our planet—about 3.5 billion years, from its beginnings to now. We then saw that it had taken nature some 50 million years after the fifth mass extinction to evolve into its present advanced state, with humankind operating as the top of the food chain. A startling insight emerged from this long view: if two to 300 million years remain before the sun’s slowly increasing temperature makes most (if not all) life on earth impossible, that would give nature—with awareness, in the sense of the antelope’s awareness—as many as four to six 50-million-year cycles in which to begin again and try to get it right! We then imagined a learning or wisdom behavior taking place in some future version of humankind that is capable of creating exchange-based civilizations, relentlessly tuned to the way nature has learned to use energy.

Reluctantly setting aside our imaginings and returning to present concerns, we began to look at belief and its costs. The systems of rationalization and ideology that underpin most cultural inventions (particularly those of state and corporate capitalism, various socialisms and democracies, fascisms, and religious states) stand in the way of the counterforce that we see on the horizon. Capitalism values and rewards the exploitation of living systems through the unchecked growth of resource extraction, market production, and consumption, with concomitant concentrations of capital (Yes, it is certainly true that nature can vigorously grow while not charging a profit). Democracy privileges people’s freedom to do whatever they choose (within a context of legal permissions that favor capitalism). Majority rule permits a citizenry who are not eco-literate to vote against environmental well-being.

Perhaps the most dangerous belief—which is deeply and almost mystically held among the leadership of many modern nations—is that there is an ingenious, scientific engineering feat ready to happen in the near future that will solve urgent ecological problems (such as the overproduction of CO₂), after which business and growth can continue as usual. In fact, the most immediate (but by no means the only) urgency is to reverse two of humankind’s most destructive occupations: the forcing of long-stored carbon back into the atmosphere (to its detriment) and the dispersing of carbon necessary to the well-being of life in natural systems (for instance, by the clear-cutting of forests). And yet, even if we were to successfully balance carbon inputs with the planet’s ability to absorb CO₂, that would by no means resolve the dramatically increasing entropy in so many other local systems.

Coming to the finally quite obvious (but initially unexpected) conclusion that lowering the entropy near the surfaces of over-exploited planetary life systems is a precondition for the continuation of many species, including our own, we simultaneously concluded that a new field of endeavor is in need of formation. We tentatively call this field Large-Scale Complex Systems Entropy Analysis. The laws of thermodynamics are currently being reframed ecologically by researchers, yet systems thinking at planetary survival scale do not appear to be under serious consideration. Though small-scale systems entropy research can yield beautiful insights (such as the Entropy Bath, an explanation of how microorganisms take energy from their surroundings and then release their waste, which is used by others in turn) or the question that we desperately need to address is, “Can this type of thinking be applied to large systems like the world ocean?”

The works from our *Force Majeure* series all say the same thing, in one way or another; a redundancy has appeared in the works which suggests that they are repeatable—not precisely, but systemically. In contrast to the exact repeatability of a closed system (such as that of an automobile, or even a carbon-saving cooking stove), when nature creates a new system, it is never precisely the same as that which it replaces. Most importantly, the quantum of energy embedded within the replacement can

equal or in some cases even exceed that of the system that is renewed. The estuarial lagoon that we predict for the bays of San Francisco (with a three-meter ocean rise) may well have lower local entropy than the semi-desert ecosystem (later transformed into irrigated farming) that it replaces.

In the *Force Majeure* works, we set out to find methods of adaptation at the scale of the two frontiers that we have noted: the wave front of heat affecting all surfaces and the wave front of waters affecting all land in contact with rising oceans. (The collective behavior of these frontiers is what we mean by the term Force Majeure.) Through these works, we seek to partially reverse the rising surface entropy of large human-built systems; to do so requires that we operate in as much as million-square-kilometer increments, sometimes at trillion-dollar costs, and it requires that we evoke, collaborate with, and assist nature’s ability to self-create and self-complicate when facing great stress... always being mindful that the sun is the primary engine.

Nonetheless, even the successful regeneration of large systems, enabling them to adapt to heat and drought and rising oceans, will simply be insufficient without what we might loosely call Ecology Legislation: the creation of legal systems that internalize the mandates of ecosystem survival in a revised rule of law. This evolved legal system would give protection to all living things, with particular regard for the habitats that support them; political entities would have to be reimaged such that they reflect processes in nature, so often ignored.

There are signs that these processes of change we describe may have begun. Ecuador, in 2008, became the first country to codify the Rights of Nature formally in its constitution; Bolivia, in 2014, passed the Ley de Derechos de La Madre Tierra (Law of Mother Earth), holding the land sacred as a living system with rights to be protected from exploitation and creating 11 distinguished rights for the environment.

Still, it is a quite open question whether the population and leadership of countries large and small—their environments under deep stress, having experienced years of transformation from low-entropy to high-entropy states—can reverse these situations by tuning consumption and production and population to the carrying capacity of place.

In the concluding moments of this writing we begin imagining an exchange-based society behaving as the life-web, where exploitation is dysfunctional behavior and growth self-limiting. For instance, nature obviously grows by availing itself of and putting to work a virtually inexhaustible supply of free energy. This energy comes from the sun and the outpouring of energy is formally ingested, then dissipated, and put to use by other organisms or systems. This excess is what we mean by free energy. Typically, in the civilization we envision, redundancy is opportunity. An example would be when a crab produces 3 million eggs, 35 hatch, and other species eat the rest almost as a collective form of nursing. We predict that the science of this future society will move toward analyses and use of biological excess rather than treating whole systems that create biological excess as themselves to a “free lunch.” Simply put, all natural systems treat free energy as an opportunity. Hence, the difference between opportunism and exploitation. Obviously there are exceptions.

The social imperative to be learned from how nature works is that the intent to exploit is simply impossible to act out. Impossible in the sense that all species and systems do three things: One is to process and dissipate energy in order to continue; the second is to grow using free energy; the third is that nature has devised a way to be productively self-limiting, the biome ecotone relationship being an exemplar.

What kind of civilization would evolve if it was understood prima facie that free energy for all is inexhaustible? What would a civilization look like if exploitation the way it is now practiced with people, systems, et al. was fundamentally impossible since exploitation would not carry reward with it in the sense that it now does? Could we be looking at a society wherein every act of power would require an equal act of generosity?

We begin imagining a coming together of inspired generalists, with the odd specialist, self-tasked with generating the conceptual building blocks for such a civilization whose activity is to go about putting to work an inexhaustible supply of available energy beginning with the sun, the waves, the winds, the overproduction of biota, then more and more, especially human creativity itself in order to continue. Our imagined group would be further tasked with looking at the productivity of life around us and beginning the design of an exchange-based civilization that harvested only excess.

We see no alternative, whether forced or voluntary for civil societies but to recreate themselves and most of their social organizations to compensate for the stresses that they have forced on natural systems

We see no alternative than yield to nature’s agency accepting a new form of global governance that reflects surrendering the idea that humankind is a special case understanding that we are simply even humbly, a species among species

So what would be the work of such a global government that faces heat shock to all systems drought, the rising of waters the reduction of the planet’s ability to produce food the stress on the world ocean.

So what would be the work of a new global government composed of 8 or 9 billion of the dominant species behaving presently as a collective exotic massively destabilizing formerly resilient ecosystems

So what would be the work of a global government where the dominant species had divided the world irrationally generating a great diversity of cultures and religions some killing each other all seeking advantage often giving disadvantage

We see its first priority as behaving like an ecotone or margin that acts as boundary between the whole human race treated as a biome and all other companion biomes

We envision a more ecologically grounded human population supported by global education in eco-literacy, as well as the government representing both humanity and multispecies ecosystems co-equally

We envision such a governing ensemble putting to work our pooled creativity and resources to increase local systems available energy to do work

while developing a complex reward system awarded when lowered local entropy and greater availability of free energy for systems to do work is the outcome.

A bit of labor for this government we are imagining is To cease waste beginning by criminalizing war and all associated industries.

So what would the schools be teaching but how nature survives and grows and flourishes through not charging a profit but by infinitely improvised processes of exchange With teaching, learning and doing becoming the fun the high excitement of participating directly in the work done by all life on the planet that is going about the business of becoming, continuing and being

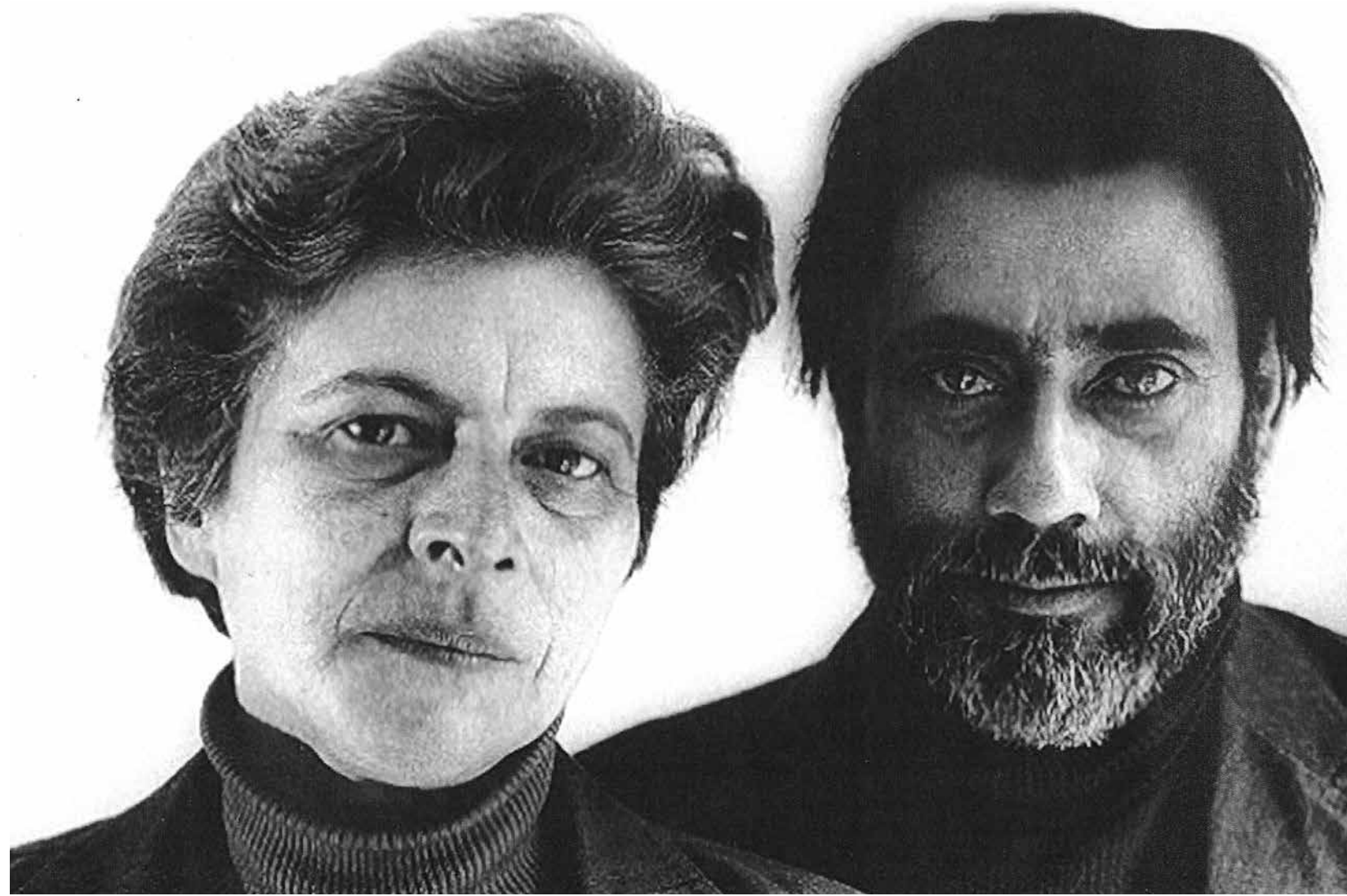
So who will go about thinking through the details the bits and pieces that all together might make up such a government whose principle work is attending to the well-being of the global metabolism.

Assuming that those who created these problems are not those who can solve them outsiders might find it appropriate to gather and do this work

Are we looking for a new hominid species to evolve? Might we name it the inspired generalist, A new species genetically tuned to maintaining the well being of the polycultures from which we have evolved

So having taken responsibility for a deeply stressed planet, if possible at all what services would new global governance offer to both its human and biologically other citizenry

Pacem in terris: the entirety, nothing less.



So say we the artists, "Travelers, let us continue the serious labor of re-enchanting the planet."

The Essays

We understand well that inviting eight authors to write essays from a diversity of disciplines is outside of the norm for an artists' book, but then at the book's beginning inviting the reader to begin at the beginning or read it backwards from the ending or indeed beginning anywhere is also outside of the normal expectations about how books are put together. Our play with the book form also includes what amounts to be a 45-page hand written novella in the form of the *Lagoon Cycle*. Thus we have framed at least in our minds, a book within a book, with the diverse works including backstories functioning somewhat like a picaresque novel and the essays grouping almost as a monograph.

Normally one would not include the people who have designed this book in such an introduction. However, the book design itself, while managing to make our seeing and thinking clear also behaves as a kind of essay or meta-study on what is understood as transdisciplinarity, with the book itself becoming a sort of transdisciplinary artifact.

The people we invited to write and design are people whose work we have admired and have learned from. In turn they have also learned from us. It is our intention that readers take away something of value from this group as we have.

Helen and Newton Harrison

The Art of Inquiry,

Manifestation, and Enactment

Anne Whiston Spirn

ing the same decision, began to build off his projects. At first, Newton was the artist, Helen the researcher and creator of performances. This changed in 1973, the year Helen found a book by Gilbert Plass, a physicist who predicted global warming in the 1950s. Together, she and Newton created *San Diego as the Center of a World* (1973), a collaborative work that addressed the prospect of climate change and the need for action. From then on, the two worked as co-equal partners with a shared mission. By 1976, the Harrisons had “invented” their “fundamental contract”:

We would go to a place only by invitation; we would accept an invitation only if it included some means for networking into a larger community; we would agree only to go for a week or two at first, to think and research. To earn our way we would sing for our supper, so to speak, by speaking or performing.

If an idea emerges, and patrons or sponsors agree to support the work, the Harrisons may agree to remain and develop that idea. But they assert their freedom to define the problem and determine the product.

Defining the Problem: “How Big Is Here?”

The problem, the field of play, and the product emerge from the work itself. All three, as defined by the Harrisons, are usually quite different from their sponsors’ preconceptions.

For example, people asked them to help with a nature reserve along the Sava River near Zagreb. The Harrisons found that plans for the reserve itself were developing nicely, but discovered that its health was threatened by pollution from factories and agriculture upstream. The problem was how to clean up the river. The field of play enlarged to become the entire watershed, and the product, a plan to control pollution (*A Breathing Space for the Sava River*, 1989–1990).

The Dalai Lama wanted an ecological “peace park” on Tibet’s high plateau. When the Harrisons looked at Tibet in the context of Asia, they discovered that the high plateau was the source of seven great rivers that fed the continent and that clear-cutting forests in the mountain headwaters threatened those rivers. Instead of a peace park, they proposed to create a large model of the Himalayas and its river systems, which would serve as a meeting place for people from all the watersheds to gather and discuss an agenda for restoration (*Tibet Is the High Ground*, 1991). They heard nothing further from the Dalai Lama.

“Almost all our work begins with a question.” Given the nature of the Harrisons’ work, the questions are inevitably eco-political and often subjective. What ecosystems are present, what is their state of

health, and how are they entangled with human activities? “What’s good here, what’s bad, what’s horrible?” “How big is here?” What is the territory or field of play required to understand a problem and address its solution? What are the pertinent ecosystems and political and social systems? What processes sustain those systems and what territories (fields) and boundaries (frames) do those processes create? For example, “Pay attention to the flow of waters / pay attention to the integrity of the waters flowing / pay attention to where the waters desire to flow / ...attend to the integrity of the discourse between earth and water / the watershed is an outcome” (*Sixth Lagoon: On Dialogue, Discourse, and Metaphor*, 1978)

The Harrisons formulate questions to frame their research. “How much would a crab hectare cost, and how much would it earn?” (*The Fourth Lagoon: On Mixing, Mapping, and Territory*, 1974). “What would Bonn look like if the temperature rose three degrees Celsius?” (*The Garden of Hot Winds and Warm Rains*, 1996). “Is there enough biodiversity in the species existing in Sagehen to survive and possibly thrive when the High Grounds of the Sierra experience the full impact of global warming 50 to 100 years from now?” (*Sagehen: A Proving Ground*, 2011).

For the Harrisons, every work is a research project, a work of art, and a call to action. Their collective work is a model for what it means to practice art as a form of research. It is also a brilliant example of action research, which uses the process of enactment as a way to study how to bring about change in a system.

Inquiry and Discovery: “Finding a Field of Play”

By the 1970s, the Harrisons had worked out a set of research methods, which they deploy on every project.

Field Work: “It’s All about Seeing”

The Harrisons start with an open mind: “What’s going on here?” In Baltimore, in 1980, people said they feared imminent riots in the streets. The artists saw vibrant streets, but they also found dead streets. “Every street that was working well was a promenade.” On the dead streets, the “promenade systems ... created by people over time” had been broken up by city plans, setting up “conditions for further alienation of street life” and making it difficult to access the harbor from the neighborhoods, which further aggravated resentment about the neglect of low-income inner-city neighborhoods in the face of enormous investment in the redevelopment of the harbor. Reconnecting the promenades became the focus (*Baltimore Promenade*, 1980).

The Harrisons look for things amiss. In 1977, they “looked at the Sacramento River and went along its borders, except it didn’t look like a river; it looked like a canal, a big canal.” This observation led to their investigation of the entire water system of irrigated agriculture in California’s Central Valley and to *Meditations on the Sacramento River, the Delta, and the Bays of San Francisco*.

The artists are not detached observers. They look for what a place has to tell them—to what stories it holds. They heed the feelings it evokes: The Sierra Nevada “looked tired.” Its waters, forests, and topsoil had been exhausted by damming and clear-cutting, and the ability to regenerate was in doubt. “What would wake the place up?” This question prompted their 50-year research project at Sagehen (*Sagehen: A Proving Ground*, 2011).

Dialogue: “Talking Things Over”

Helen and Newton are “always talking things over,” and writing “is talking things over with a pencil.” Newton writes the first draft, Helen recreates it, Newton evolves the work further, and Helen finishes. In the process, they make discoveries.

They are also in continuous dialogue with others and with the places themselves. In the Sierra Nevada, they “interrogated” a watershed to learn how to help it survive the stresses of climate change, then consulted with ecologists, hydrologists, botanists, foresters, archivists, and Native Americans (*Sagehen: A Proving Ground*, 2011). At Knowle West (2007), a low-income neighborhood of Bristol, Great Britain, they learned from local residents that the neighborhood’s wealth lay in its forested hillsides, meadows, open space, and backyard gardens, and they gave that land a name: Green Commons. In the Netherlands, conversations with planners, landscape architects, engineers, sociologists, farmers, and public officials revealed that powerful misconceptions were blinding the Dutch from seeing alternatives to plans that would destroy the country’s Green Heart; in response, the Harrisons devised a perceptual shock (*Green Heart Vision*, 1994).

Mapping: “We Use a Map to Meditate”

When asked to write a book about the future environment of Europe (*The World as a Garden*, 1998), the Harrisons began by putting together a large topographic map. “After a few days spent penciling out the roads and enhancing the rivers, something formerly invisible became very clear”: Europe was a peninsula, surrounded by water on three sides, separated from the Russian Plain and the Eurasian continent by rivers and marshes. “When we stood back and looked again,

we saw that the salient feature in the newly visible Peninsula was the high ground, the mountains. It looked to us like we had a field of play.” Thus emerged *Peninsula Europe*: “I said / ‘It’s an array of drain basins cradled by the mountains / formed by the pouring forth of the rivers / that begin in the high grounds.’ / You said, / ‘Most of Europe’s water begins there.’”

Through mapping, the Harrisons search for a “frame” (the waters), which creates a “field” on which to focus (Europe as a peninsula), then they look for significant figure-ground relationships (the mountains that stood out as “figure” against the “ground” of the lowlands). The process of mapping delineates both the field of play and the problem. In this case, the mountain ecosystems, source of Europe’s water, threatened by overuse and climate change. “Would it be possible to regenerate the 1.3 million square kilometers of the high grounds of Europe ... to enhance and guarantee the flow of fresh waters?” (*Peninsula Europe*, 2001). Mapping is a means to discover the overlooked and to create a new whole. The Dutch needed 600 000 new homes. They planned to build on the agricultural land at the center of the country because they believed that there was no more space in the cities. The Harrisons decided to map all the open land in and around the cities and found enough space for all 600 000 houses, which made it possible to preserve the country’s “Green Heart,” its ecological and cultural treasure (*Green Heart Vision*, 1994).

Libraries and Archives: “A Penchant for Research”

In the 1970s, Helen would go to the library and scan the shelves, her “antennae” searching for books that might inspire a project. That was how she discovered the greenhouse effect and the predictions of climate change that would become a focus for the rest of their career. It took six months of research in the archives of the Institute for Water Resources at the University of California, Berkeley, to produce *Meditations on the Sacramento River, the Delta, and the Bays of San Francisco* (1977). Such research—both the serendipitous encounter and the deliberate search—underpins the Harrisons’ work.

“A Guiding Metaphor”

The Harrisons search for metaphors to inspire and guide their thinking and designing. In Leipzig, when confronted with the problem of reclaiming a landscape scarred by open-pit coal mining, they imagined a “300-square-kilometer park that would take its shape and meaning from the ‘turned earth.’” Mining had turned the earth, but turning the earth is also a metaphor for cultivation. The park would

be both “a memorial and an example of reclamation” (*A Brown Coal Park for South Leipzig*, Germany, 1995).

In *Greenhouse Britain* (2005–2007), by choosing the word *settlement* in place of the term development, the artists employed a “metaphorical flip” to help them imagine how, as sea levels rise, the upward movement of people “might happen gracefully.” “The differences between settlement and development are profound ... The term ‘settlement’ has embedded in it the idea of habitat for ourselves and of niches for other living creatures.” Language matters. In Baltimore, “promenade” became a guiding metaphor for the design of an exhibit and for performance (*Baltimore Promenade*, 1980). To the Harrisons, promenade is both activity and place, “a stage on which people in a community meet and mix,” “tuned to a common movement and rhythm,” in a collective reaffirmation of community. The promenade is “an arena in which the communal drama can be publicly enacted, an arena in which to experience constancy and change, to define self and group.” To break up a promenade system is thus to destroy essential functions that sustain a community. Perhaps the planners and public officials had thought they were dealing only with streets of asphalt and concrete. When promenade as metaphor was enacted in a citywide performance, it brought forth “a new state of mind” among the participants, including planners and public officials.

“Bringing Forth a New State of Mind”

Helen and Newton Harrison design their work to “bring forth a new state of mind,” because the state of mind that created a problem is unlikely to solve that problem and may even prevent people from perceiving it at all. The Harrisons help people see things fresh. To transform what they think is possible. To spark their imagination. To inspire action.

To accomplish this, the Harrisons bring to bear ingenious strategies of performance and storytelling, and they construct environments that prompt people to see, feel, think, and discover. In Baltimore, they created an exhibit of their proposals with aerial photographs blown up in scale large enough for people to find and touch their own homes. They enacted the work in a citywide performance event that “promenaded the design.” The parade began at the exhibit site and traced the proposed promenade route, stopping at various points, where the Harrisons told stories. A multitude showed up, marching bands played, the mayor joined in. Afterward, the city pledged 15 million dollars to build one section of the proposed promenade, and the Harrisons’ proposal became part of the city’s official plan (*Baltimore Promenade*, 1980).

Metaphor

In Baltimore and elsewhere, the Harrisons use metaphor not only to guide their own thinking, but also to overturn preconceptions, to challenge conventional thinking, to shock the system. In *Green Heart Vision* (1994–2001), they took the metaphor from the Dutch themselves, then turned it on them: How can you build on your own Green Heart? To drive the point home, they plotted the proposed plan to build houses on the Green Heart on a map of the country, then reversed the map. Planners were outraged: How could the Harrisons present the map backwards? Because it’s a backward plan informed by backward thinking. Thus was the critique imprinted indelibly on people’s minds.

Performance

Performance has long been integral to the Harrisons’ work, from *Making Earth* (1969–1970) to their latest project of biorestitution at *Sagehen: A Proving Ground* (2011), and performance takes many forms. At *Knowle West* (2007), they performed harsh public critiques of the City of Bristol’s plans to develop the neighborhood’s Green Commons, which planners saw as open land. For *Meditations on the Sacramento River, the Delta, and the Bays of San Francisco* (1977), the performances included putting up posters on streets and public restrooms in San Francisco (“What if all that irrigated farming isn’t necessary?”), commissioning billboards emblazoned with the word WATER, drawing sidewalk graffiti (“Let every community empty its wastes upstream from where it takes its drinking water”), posting advice to public officials in the personal column of the local newspaper, and telling stories at the San Francisco Museum of Modern Art. The performance at SFMOMA, consisting of 10 texts read by two voices, was an experiment to see “how much information you could compress and in how short a reading time for understanding to take place of extremely complex eco-political observations.”

Storytelling

Narrative has been central to the Harrisons’ work since the 1970s. *The Lagoon Cycle* (1974–1984) is an extended narrative of images and words in seven parts. There are “stories nested within stories,” rich in metaphor, with diverse characters. “*The Seventh Lagoon: Ring of Fire, Ring of Water*” (1980) opens with “Let me tell you a dream.” Imagine that “all ice has melted, the oceans have risen, civilization is under stress, and ecosystems are under stress.” At the end is a new beginning: “And in this new beginning / ... you will feed me / when my lands can no longer produce / and I will house you / when your lands are covered with water / and together / we will withdraw / as the waters rise.”

Stories are a way of imagining alternative futures, conveying moral values, and guiding action. In their Baltimore work, the Harrisons considered themselves “storytellers of a specialized kind, who were generating a new urban narrative that would underpin more humane urban design.”

Exhibitions

The Harrisons’ exhibitions invite touch and are designed to engage both body and mind, to make ideas tangible. Maps and photographs are printed large (often 2.4 meters high and many meters longer). Ideally they are hung five to 10 centimeters from the ground so that, as people approach, the image joins the floor plane and fills the visual field, which means that people feel like they can walk right into the map or photograph.

To help people comprehend what was happening to the Sierra Nevada, the artists made a “manifestation on the floor,” where they placed an aerial photograph, 13.4 meters long, of the entire 62 400 square kilometers of the mountains on the floor of the gallery. “In the five or six paces that it would take to walk from one end to the other, the viewer could see the mountain range from the air—and then, bending down on one knee, see the mass logging operations that were going on.” Moving the image from the wall to the floor completely changes one’s bodily response to it.

For the exhibit of their *Green Heart Vision* (1994–2001) for the Netherlands, they placed two 2.4-square-meter maps side by side on the wall: the “backward” map of the proposal to construct 600 000 houses in the Green Heart and the plan of their own proposal (which portrayed the country in its correct orientation). The floor of the exhibit was an aerial photograph of the entire Green Heart with their proposal superimposed, printed on Delft tile, so that people “could see the location of their own house, their school, or their business” in relation to the Harrisons’ proposal. The artists were pleased “to see grandmas bring their grandchildren to look at the mappings and crawl around on the floor”: a democratization of art, planning, and policy.

Gardens

The Harrisons’ designs for gardens immerse people in an all-encompassing “manifestation,” where they can experience ideas directly through the senses. *The Garden of Hot Winds and Warm Rains* (1996), for example, would provide visitors with a “physical and metaphorical excursion through possible futures,” where they could

experience the potential effects of projected changes to climate. This was the artists’ first “future garden,” designed to be part of the *Endangered Meadows of Europe* (1995–1998), an installation on the roof of the Kunst- und Ausstellungshalle in Bonn. The “future garden” was deemed too expensive, but the *Endangered Meadows*, designed to bring alive issues of biodiversity, was planted and inspired the city’s park director to ask for another meadow artwork, *A Mother Meadow for Bonn*, created with seeds from the rooftop meadow.

The Enacted Work

The Harrisons works are calls to action, but the artists recognize that “simply having the opportunity to make the proposals” does not mean that they will be implemented. Nevertheless, they have a remarkable record of influential works that have been enacted in policy and in built form. And the projects often give birth to new initiatives. Their proposal for *A Breathing Space for the Sava River* (1989–1990) inspired a similar project for the adjoining watershed of the Drava River. Together, the two watersheds provide about 50 percent of the clean water for the lower Danube River.

The *Endangered Meadows of Europe* (1995–1998) is no longer installed on the roof of the Kunst- und Ausstellungshalle in Bonn, but lives on in the new meadows it has seeded in Bonn and other German cities.

The *Green Heart Vision* for the Netherlands was shelved after elections in 1994 but was ultimately enacted after a new government came into power in 2000. The vision will affect the entire country for decades to come.

Perhaps most remarkable in terms of its potential impact—in the Sierra Nevada and the world at large—is *Sagehen* (2011), a projected 50-year experiment that promises to develop and demonstrate innovative ways to help ecosystems adapt to climate change. It is part of the mission of the Center for the Force Majeure, which they founded in 2009 in order to explore “ecologically available responses that will replace, in some measure, the value once provided by disappearing glaciers and snowmelt to river systems and both the ecosystems and the human cultures they support.” Projects in the works, yet to be enacted, advance this quest. Their proposal for *Tibet: The High Ground* (2005), for example, would transform lands exposed by retreating glaciers into a water-holding landscape where appropriate soils would gradually release water to feed the headwaters of the great rivers.

Reflections of a Designer/Planner

I view the work of Helen and Newton Harrison through the lens of a landscape architect and planner. For me, that work is breathtaking and inspiring. To follow the story from *Making Earth* (1970) to *Sagehen: A Proving Ground* (2011) is to embark on an adventure in which the encounters between consistent mission and approach, diverse places and people, and serendipitous events lead to a thrilling and satisfying whole. The work unfolds in a dialogical progression in which one work informs the next. At times the narrative of a particular story is abruptly broken by circumstance but then is taken up again years later.

I recognize in the Harrisons’ approach and methods many similarities with the best works of my profession, but the distinctive aspects of their work are telling. Designers and planners can learn much from the artists’ brilliant use of “guiding metaphor,” for example, not only to advance their own thinking, but also as a way to transform others’ perceptions. If designers use metaphor, they often do so in a shallow manner: using the form of a leaf or tree as the basis for the layout of a park, for example. Similarly, designers and planners routinely use figure-ground diagrams—where buildings are shown in black (figure) and the spaces between them in white (ground)—in order to study urban form. The Harrisons’ use of figure-ground perception as a method for discovering the invisible is more complex and promising. Meanwhile, for designers and planners who want to consider how practice can be a form of research, *The Time of the Force Majeure* is a textbook; the research questions alone are an inspiration.

What strikes me most deeply, however, is how the Harrisons design almost every aspect of every project to “bring forth a new state of mind” in themselves and their audience and the ingenious strategies they employ to accomplish this transformation. This is an essential step missing in most design and planning practice, and it is in this area that we have most to learn from the Harrisons. We need to apply this kind of thinking not only to everyday projects, but also to the major challenges facing humankind. Human societies cannot successfully mitigate and adapt to the stresses of climate change without a new state of mind, and designers, planners, and artists have an essential role to play. The Harrisons have been demonstrating this fact for more than 40 years. It is time to join them.

All quotations are from *The Time of the Force Majeure* and from conversations with Newton Harrison on February 15 and 20, 2016.

Mapping

the Entropic

William L. Fox

Allow me to begin by offering a provocation: Helen Mayer Harrison and Newton Harrison are landscape artists. I write this not to limit the Harrisons to a genre, but rather to expand what we generally take to be the relationships among artists, art, land, and landscape.

Land is what you encounter when you enter a space that has yet to be altered by human presence. Landscape is what happens the second you see land. Literally. You come over a hill and see before you an untrammeled valley, and before you are conscious of what you are doing, you have already attempted to scale the view to your size. That is, you begin to query, “How large is this place and where would I go in it, if I chose to enter, and how long would it take me to cross it? And are there animals present, other people, water, shelter?” This is a matter of human cognition hardwired to survival.

With that distinction in mind, it is possible to generalize that the primary use of landscape in the great tradition of Southern European painting, which existed from the late Middle Ages through the nineteenth century, was as generic backdrops to depictions of biblical and human history. The painters of Italy and France lived in environments oriented around the Mediterranean Sea, a body of water bounded by land and already navigated, charted, and assimilated for centuries. There wasn’t any land, only landscape, and its utility to painting was

to provide scenery behind the stage of human action. Northern European landscape painting, on the other hand, was all about mapping land previously unexplored by Europeans, and about the process of converting it into landscape, or changing terrain into territory. The Dutch and English lived on a great open ocean with far shores, the contours of which were unknown. The explorers, military men, and natural philosophers were sailing into a void to create history, not retell it. Their job was to discover new lands, and they took artists with them to record what they found and to sell it to their funders upon return so that colonialization could proceed.

This strain of landscape art was, by necessity, topographical, specific, accurate, intimately concerned with matters underfoot, in the water, and overhead as weather. It was less about heaven and earth and more about sky and ground. From the 1600s until the mid-1800s, landscape artists working in this tradition were mostly concerned about cataloguing the world—making pictures of its natural contours, animals, and indigenous inhabitants. Starting in the mid-nineteenth century, the modern human footprint was becoming evident enough worldwide through the spread of both population and industry that artists began to document that as well. Painters, and then photographers, were assembling typologies of the built environment that ranged from the monuments of antiquity through mining and logging operations in the “wilderness.”

After World War II, when the massive engines of the military-industrial complex were shifted from prosecuting a global war to creating a worldwide market for consumer goods, the spread and activities of humans began to alter noticeably entire earth systems in the atmosphere and oceans. Terraforming had been going on for some time, humans beginning to move more dirt than rain did more than 1000 years ago. Our species had become the most powerful geomorphological force on the planet. What was new was that now we weren’t just resculpting the surface of the planet but radically altering its global chemical and energy systems.

This prompted the rise of the environmental movement, which coincided with a reaction against the Vietnam War and other toxic by-products of the aforementioned complex. And that is when the Harrisons begin to make art about the environment. It wasn’t enough for them to make pictures of places or to catalogue the metastasizing human presence therein. Circumstances required that they address the effects that humans were having on the planet’s ecology. The Harrisons had moved to the University of California, San Diego, in 1967, where Helen was hired to direct extension education programs

and Newton working in the art department was soon to become its chairperson. He worked alongside, and in some cases actually hired, other artists such as Eleanor Antin, Jerome Rothenberg, and Allan Kaprow. David Antin was improvising “talk-poems,” monologues that were also critiques of the military-industrial effluent of global capital—texts that were soon published as long prose poems. Eleanor was creating performance art, not just on stage, but in the streets. Kaprow had developed hybrid multimedia events that he called happenings, and Rothenberg was inventing the field of “ethnopoetics,” which brought together diverse ethnic traditions and knowledge with a newly rediscovered sense of the sacred and environmental responsibility.

This rich milieu, which was also gestated by artists in Europe such as Joseph Beuys, was deeply imbued with science, in particular the environmental warnings penned with increasing frequency after World War II. Marine biologist Rachel Carson had published *Silent Spring* in 1962, a book that had as much to do with launching the environmental movement as did the Sierra Club’s collaboration with Ansel Adams to produce *This Is the American Earth*, the club’s first coffee table photography book, published in 1960. The Russians launched Sputnik 1 in 1957, which prompted the USA to racket up its own space program—which resulted in the first photograph being taken of the Earth by a NASA satellite in 1967. Stewart Brand, a biologist educated at Stanford University, used that photograph on the cover of his first *Whole Earth Catalog*, published in 1968. Land and landscape were now irrevocably unified in the public imagination. All three books proposed that the planet was a single complex system under the influence of human behaviors.

In 1968, the polymath Buckminster Fuller published a 44-page book, *Operating Manual for Spaceship Earth*, which is a primer in synergy, systems thinking, and entropy. Near the beginning of his text he declares what he believes to be the fundamental issue underlying the environmental, political, and economic threats he saw rising on the horizon.

Now let us examine more closely what we know scientifically about extinction. At the annual Congress of the American Association for the Advancement of Science, as held approximately 10 years ago in Philadelphia, two papers were presented in widely-separated parts of the Congress. One was presented in anthropology and the other in biology, and though the two author-scientists knew nothing of each other’s efforts, they were closely related. The one in anthropology examined the case histories of all the known human tribes that had

become extinct. The biological paper investigated the case histories of all the known biological species that had become extinct. Both scientists sought for a common cause of extinction. Both of them found a cause, and when the two papers were accidentally brought together, it was discovered that the researchers had found the same causes. Extinction in both cases was the consequence of over-specialization. Fuller’s answer was to urge people to think at scale, develop alternative energy sources, and regenerate the landscape, lest we perish. His thinking would be formative throughout the career of the Harrisons in that their own work has taken on ecosystems at increasingly large scales, and now proposes to “reduce the entropy of planetary ecosystems in the face of human-induced climate change.” They did so by working as nonspecialists, literate in art, economics, urban and land-use planning, and environmental sciences.

The Harrisons began their collaboration as art practitioners in 1969/70 through a mapping of endangered species, expanded their skill set with small urban farming and soil reclamation projects, moved into decoding the environmental needs of lagoons and watersheds, and then began to scale up seriously during the late 1980s with bioregional planning to rescue large tracts of Europe from overdevelopment. Along the way they created notable public art projects and plans that weren’t merely site specific, but system specific. Their work with *Peninsula Europe*, undertaken in four phases from 2001 through 2012, is an example. What they looked at were rising sea levels that would compress the population upward toward higher ground, drought caused by climate change that reduced food supply and the consequent need to redesign the landscape.

During the last 1000 years, humans in Europe drained and filled swamps, felled forests, and leveled ground, in the process sculpting some 2.4 million square kilometers of land to make it easier and more productive to farm. In the process, they destroyed entire ecosystems and dramatically reduced the diversity of species. The Harrisons realized that this left the entire peninsula vulnerable to drought. They proposed creating an array of transnational forests to hold and regulate fresh water flows and to reengineer those flows into catchment basins that would continually store and clean the water. From 2007 to 2009, the Harrisons worked on a somewhat similar proposal for *Greenhouse Britain*.

From these two large-scale, complex system proposals, two ideas became apparent. The first was to acknowledge a condition: that anthropic-induced changes in climate were not going to be stopped in time to prevent massive environmental changes that could take apart

human civilization as well as many of the ecosystems on the planet. This was the Force Majeure, what was once in insurance called “acts of God,” or “the force of nature,” and in international law those “forces beyond the control of the state”. The Force Majeure the Harrisons defined was the inevitable coming home to roost of human actions, “the pressure of global warming on all planetary systems.” The second idea was the response: they would design projects that would allow humans and other species to cope with the change. They would think in terms of resilience in the face of change.

The scientific disciplines and related skills into which the Harrisons have plunged throughout their career is startling in breadth and diversity: biology, botany, and geology, as well as smaller subdisciplines such as pluvial geomorphology, and the larger metadisciplines such as cybernetics and systems science. This was, in fact, the mature skill set necessary to understand and react to the Force Majeure. The means through which they have manifested both the knowledge gained and the proposals is through cartography, poetry, visual art, and political dialogue. Yet, something was still missing from their work, some larger idea by which one could quantify the environmental condition at planetary scale.

During the early 2000s, Newton recalled what he and Helen had discovered during that first mapping of species project: that the most endangered species wasn’t an animal or plant, but a system, the topsoil of the Earth. That insight arose from the fact that they, unlike their scientist counterparts, were non-specialists. In 2009, once again relying upon his memory, this time of a conversation with physicist Richard Feynman, Newton and Helen realized that there was one final step to be taken in their work, one that was necessary to both understand and reframe earth systems science in a manner that would make positive change possible: injecting entropy into the discussion. Perhaps the most daunting set of tasks and skills now relate to their thinking about entropy, that mechanism by which the universe lessens gradients between states of high and low energy. When you transform matter from one state to another and create energy—taking fossil fuel and burning it, for example—you liberate and disperse energy, which you can’t retrieve, and are left with inert byproducts. You have increased the entropy of the system, and if you do that over a long period of time on a large scale, you end up with a cold dead planet. At the largest scale, this is known as the heat death of the universe.

Living systems tend to keep entropy low by making small transformations of energy and matter into one another—sunlight into plants,

for example—and by mediating the difference gradually along gradients. Those systems don’t simply use energy resources, but exchange them in a way that increases entropy much more slowly than most of the ways in which humans use energy. Many of the scientists with whom the Harrisons have talked about reversing or even slowing the global flow from low to high entropy think the idea impossible or unlikely, but other scientists and thinkers, such as Eric Schneider and Dorion Sagan, have made cogent arguments about why it is absolutely possible.

The Harrisons are landscape artists in that they have developed an art career that takes the Earth as their client. At this point, they are proposing a solution that is very much in the tradition of Buckminster Fuller: the creation of a world government to apply what they have coined as “Large-scale complex systems entropy analysis” to the state of the planet. And then they ask yet another in their endless series of questions, “So who will go about thinking through the details the bits and pieces / that all together might make up such a government whose principal work / is attending to the well-being of the global metabolism... Assuming that those who created these problems / are not those who can solve them / outsiders might find it appropriate / to gather and do this work.”

Landscape art and architecture are, when practiced at scale, terraforming. As mentioned earlier, humans have been moving more dirt than rain for the last 1000 years, and as the NASA geophysicist Benjamin Fong discovered more than 20 years ago, using the then-new tool of geospatial data, humans had stored so much water behind dams in the northern hemisphere that they had altered the rotational periodicity of the planet and even slightly moved the tilt of the Earth’s axis. But those were unintended consequences of the collective human endeavor. The Harrisons are, along with scientists such as Nobel Laureate Paul Crutzen, suggesting that we geoengineer our way out of the dead end we’re creating for human civilization.

Terraforming as a term is generally accepted to have been coined by the science fiction writer Terry Williamson, who in 1942 named a concept that had actually been around since the early twentieth century—that humans could alter the environments of other planets to resemble that of Earth. To apply the term to Earth itself is, therefore, a bit ironic, as it implies sculpting the planet to return it to itself. But in essence that is what the Harrisons propose and have tested on a small scale. Working from their Center for the Force Majeure at UC Santa Cruz they mapped the biome of a northern Sierra Nevada mountain valley that was undergoing change due to global warm-

ing. Their objective was to test experimental ensembles of plants that would be resilient in the face of rising temperatures; their goal was to create a methodology that would lower entropy and could be applied down the entire 640-kilometer-long mountain range and elsewhere in the world. They currently have 15 test plots growing at five different elevations in the valley, early stages in a 50-year project that the Center for the Force Majeure, the Sagehen field station and the Center for Art + Environment will monitor. The Nevada Museum will present the results through time. Now the Europeans and Chinese are interested in similar projects.

The latest thinking of the Harrisons verges on the edge of acceptability in the scientific community in that they propose the following: “We suggest that bioregional entropy can be regulated by research and human collaboration with nature, always assuming that nature itself has been given agency.” Scientists state that to regulate something you need to know the beginning state of the system, the initial conditions, and you have to quantify that. Measuring the entropy of the European peninsula or the Pacific Ocean, to give two examples, is thought to be impossible, as they are too large, too complex. But the Harrisons suggest that such large systems are aggregates of a finite number of microbiomes and ecotones, the energy levels of which can be assessed over time. You can calculate a “sum over histories,” to adopt Feynman’s term, which means that you wouldn’t necessarily know perfectly the state of any one system at any given time, but you would know the trend. And you could design projects to address those trends. What they are asking is whether there might be “a way to return resilience to global metabolisms.”

The topic of what the Harrisons are calling “large-scale complex systems entropy analysis” is how the flow of energy interacts with life to create complexity, which tends to ameliorate entropy. The process is governed by the second law of thermodynamics, and entropy-based ecosystem work is now at the forefront of environmental science and is planetary in scope. The physical and temporal scale of this overarching study and related projects within the Force Majeure works by the Harrisons qualify their work as terraforming (or, as they prefer to call it, “re-terraforming”). And that brings us back to landscape art, as the Harrisons are not geoengineers, but artists.

Science is terrific at collecting environmental data and creating ecological knowledge from it. But it’s a long steep step from scientific analysis to policymaking and political action. Helen Harrison has pointed out that the essential step in between is the creation of empathy for a place. If people understand the knowledge *and* care about

how that works out in a specific place for which they have empathy, they are much more likely to force bureaucracies and politicians to react to the knowledge. People force the hand of government to preserve what they love. And artists—in particular landscape artists—are adepts at creating empathy in people. They do so by showing us pictures of landscape, revealing the spread and effect of humans on a landscape, and proposing changes, remedies, and alternatives. And, in the case of the Harrisons, actually creating change.

Art is good for another thing as well, and that is transmitting knowledge from generation to generation. Aboriginal Australians have been presenting, preserving, and transmitting environmental knowledge through art as a survival strategy for more than 50 000 years. Their traditional culture, which includes stories governing the deployment of fire on a large scale to manage Australian fauna and flora, has been described as the most successful nontechnological system of knowledge in the world. It enabled them to survive and even thrive for tens of thousands of years on the harshest continent on the planet outside of Antarctica. It’s precisely by correlating through multiple disciplines the success of an ancient culture with contemporary art that we understand how necessary Helen and Newton Harrison are to our collective survival.

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Dancing with

the Waters:

Helen and Newton

Harrison’s

Call to Action

Eleanor Heartney

From the perspective of the 2010s, the 1970s shine as a beacon of lost opportunity. An awakening ecological consciousness was emerging in tandem with critiques of patriarchy, militarism, and industrialization. Together they opened serious discussions about the limits of growth, the dangers of reckless technological development, and the potential for disastrous forms of environmental backlash that resonate today. Helen and Newton Harrison were then young artists just discovering their great subject and collaborative working method. With *The Lagoon Cycle*, a monumental piece created in sections between 1974 and 1984, they articulated many of the themes that have remained central to their work over succeeding decades. In *The Seventh Lagoon*, created in 1980, they draw a line at the 100-meter level on a map of the Pacific Ocean and asked, “Will you help me when the ocean rises, will I help you when your lands, covered with water, can no longer produce?”

This question has turned out to be tragically prescient. While politically motivated “climate change deniers” continue to blind themselves to the obvious, the scientific community argues about whether we have already passed the tipping point, and if even drastic worldwide reductions in carbon emissions will be enough to stave off planetary wars over ever more scarce allotments of livable land, water,

and natural resources. Where once they were content to provide feasible blueprints for the ecological reclamation, restoration, and reinvention of specific watersheds or finite environmental systems, today the Harrisons have borrowed a term from the legal lexicon to underscore just how dire our current situation is. From a legal point of view, force majeure is a contractual clause that nullifies an agreement in the face of extraordinary circumstances or events. Sometimes described as “acts of God,” such conditions are considered beyond the control of the parties. The Harrisons have adapted the term to cover circumstances that follow from acts of humans but have spiraled beyond their control. Referring to the Center for the Study of Force Majeure, which they set up at the University of California, Santa Cruz, they note, “In the Center’s Statement of Purpose, we define the Force Majeure as the pressure of global warming on all planetary systems, in collaboration with the industrial processes whose negative effects on the environment have perhaps co-equally accelerated over the past 100 years.”

In practice, the effects of those pressures are frightening. The consequences of the Force Majeure are a dark future of rising waters, storm surges, and shrinking coastlines as a wave of heat sweeps over the earth and a wave of water engulfs the shore. Such environmental changes will set off human disasters as populations press outward for livable conditions. Land masses that that will probably disappear include the Marshal Islands, 17 percent of Bangladesh, and large portions of America’s coastal cities, while droughts will spread over large portions of the United States, southern Europe, Southeast Asia, Brazil, Chile, Australia, and most of Africa. Accompanying these events is what is being termed the sixth mass extinction, a loss of biodiversity that could result in the disappearance of half of the world’s higher life forms by 2100.

The only reasonable response, the Harrisons now argue, is a set of prescriptions that demand the drastic reordering of human society and the physical landscape along lines that embrace the agency of nature. As outlined in this book, these include relocating ecosystems that are adaptive to the new conditions, creating water-holding landscape in drought-prone areas, and fostering systems that reverse the entropic loss of energy and CO₂. These, they concede, would require radical limits on growth, development, and population under the aegis of a world government.

Only such a planet-wide approach, they argue, will stave off “the wave front of heat affecting all surfaces and the wave front of waters affecting all land in contact with rising oceans.”

The ideas the Harrisons present here reflect the magnitude of the threat facing us. Radical as they appear, these ideas do not come out of nowhere. In fact, they have roots in the ecological discussions that were already taking place in the 1970s. For instance, the Harrisons' critique of capitalism, mainstream religion, and democracy's fetishization of individual freedom finds reinforcement in the ecofeminism movement that emerged in the 1970s. Ecofeminism paired the liberation of women with the restoration of the balance of nature. The movement found its most resonant voice in Carolyn Merchant's 1980 book *The Death of Nature*. A historian of science, Merchant challenged the valorization of the scientific revolution that stands at the heart of the prevailing narrative of Western progress. Instead of framing the ideas of Descartes, Hobbes, and Bacon as laudatory advances in human civilization, she linked their triumphal subjugation of nature to a more general paradigm of domination and exploitation that pertained equally to women and the natural world. "A view of nature can be seen as a projection of human perceptions of self and society onto the cosmos," she noted.¹ In keeping with this idea, she traced the replacement of an organic, female-centered vision of nature by a mechanistic, patriarchal order organized around the exploitation of natural resources.

This order was supported by a conception of science that regarded nature as inert matter to be exploited for human gain. René Descartes, one of the fathers of this kind of thinking, used the metaphor of the clock to envision the physical universe as an instrument with perfectly moving parts. But while it appealed to logic and reason, this mechanistic philosophy found support in some of the central tenets of Western religion. If the universe was a clock, God was the clock maker, a brilliant designer who set the instrument in motion and left it to run on its own. This belief in an unmoved mover reinforced the philosophy of "Dominionism," which derived from a biblical passage that seemed to sanction the wholesale subjugation of nature to human needs. Genesis 1:28 states, "And God blessed [Adam and Eve], and God said unto them, 'Be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth.'" Though open to multiple interpretations, this passage has provided cover for believers committed to everything from imperialism to theocracy. In recent years, it has been advanced by the Christian right as a primary justification for an antienvironmental stance.

The ecofeminist critique of Western culture and religion proved inspirational to numerous artists and art writers. In her 1983 book

Overlay, Lucy Lippard explored the idea that prehistoric societies were organized along matriarchal lines, with an emphasis on natural cycles that grew from the ancient identification of women and nature. Such ideas encouraged artists like Mary Beth Edelson, Carolee Schneemann, and Nancy Holt to look back to prehistory and imagine more organic and communitarian models of art and life to replace the egocentric, shortsighted ethos that characterized patriarchal societies. Such ideas dovetailed beautifully with the Harrisons' evolving practice as they explored solutions to environmental problems that worked in tandem with the processes of nature and were grounded in dialogues with stakeholders from all disciplines and walks of life. Around the same time, Buckminster Fuller was broaching the notion of a world government. Fuller coined the term *Spaceship Earth* as a warning to an insouciant humanity that our planet is a finite entity whose resources cannot be indefinitely plundered. In his 1969 call for sanity, *Utopia or Oblivion*, Fuller argued for a more intelligent use of humankind's mental and physical resources. He argued, "It is scientifically clear that we have the ability to make all of humanity physically successful. Industrialization itself relates to the resources of the entire earth, the entire universe. The industrial system is a comprehensive system and if reversingly fractionated will fail."²

To counter the destructive impulses of modern civilization, Fuller set up the World Game Project, an educational alternative to the military's war games. The World Game was a manifestation of Fuller's progressive thinking and optimism about the future, and directed participants to investigate scenarios for making human life sustainable on the planet, ensuring cooperation between disparate groups and using the earth's valuable resources more efficiently and equitably. In keeping with his positive attitude toward technology, Fuller envisioned a worldwide computer network that would cut across existing territorial borders to discern the most effective way to overcome energy scarcity and redistribute world resources.

Fuller's optimism was matched by György Kepes, the visionary thinker and founder, in 1967, of the Massachusetts Institute of Technology's Center for Advanced Visual Study. Kepes advocated the collaboration of artists, scientists, engineers, mathematicians, and designers in a marriage of technology and art for the betterment of humankind. In his 1972 text *Art and Ecological Consciousness*, he suggests we are taking "the first timid steps toward what might be called 'self-conscious evolution.'" He believed that together, art and technology provided vital tools for such evolution, noting, "Through the communication of the knowledge and insights of creative men in many fields

we have the opportunity to make all that is valuable in man a shared possession—a new 'common' property of all who seek a higher quality of life."³

Such ideas found their way into activist art. It is surely no coincidence that the first flowering of environmental art in the 1970s and '80s was dominated by artists from Jewish backgrounds. In contrast to the Dominionist philosophy, which sanctioned human exploitation of nature, Judaism takes a more holistic approach. Due to its origins as an agricultural religion, Judaism is organized around natural cycles and recurrent rituals tied to planting and harvest. This focus provided fertile ground for a more interactive model of the relationship between humanity and nature. The Harrisons, along with ecopioneers like artists Mierle Laderman Ukeles, Alan Sonfist, Hélène Aylon, Betsy Damon, and Aviva Rahmani, can be seen as participating in the Jewish ideal of "tikkun olam", literally, "repairing the world." The concept involves both the pursuit of social justice and also taking responsibility to repair what is broken. As such it seems an apt metaphor for the approach that the Harrisons were developing throughout the 1970s. From early projects in California, they found themselves roaming widely over the world as they undertook projects that ranged from restoration and reclamation of specific watersheds to the full-scale reinvention of troubled ecosystems. In all their works, they emphasized working with nature, rather than against it, while trusting its ability, given sufficient help, to heal itself.

However, even during the halcyon days of the 1970s, when an emerging environmental consciousness began to take hold in many segments of society, another more apocalyptic approach to environmental matters was also gaining strength. While the hopeful strain of environmental consciousness spawned Earth Day and national legislation like the Clean Air Act and the establishment of the EPA, in other quarters an ecological despair was beginning to surface. In art, the sensibility was most forcefully articulated by Robert Smithson. Now considered one of the most influential of the "earth artists" whose work involved the massive reshaping of the natural environment, Smithson was a prolific writer as well as an artist. He borrowed from thermodynamics the scientific idea that the creation of order in one part of a system results in even greater disorder elsewhere. Applied to human systems, he presented entropy as a metaphor for the destructive potential of human activity, as the push to provide a growing population with energy, food, and space creates as its byproduct an exploited and devastated natural world. He saw no real chance for a change of direction. Instead, throughout his short career, Smithson

was drawn to industrial sites where he could dramatize this process of disintegration. There is more than a trace of Christian eschatology in Smithson's notion of entropy, with its vision of a linear arc of history from creation to destruction and its sense of the inevitability of the end.

Smithson's pessimism continues to haunt much thinking about environmentalism and environmental art. His vision of nature is in keeping with the mechanistic mentality that views nature as a machine running down. In this view, there is little or nothing that can be done to stave off the coming catastrophe. From the perspective of the mechanistic view, "solutions," if there are any, take the form of technological and engineering fixes, market-based solutions, and an embrace of the "posthuman" substitution of virtuality and artificial environments for the now supposedly outmoded natural world. What these have in common is an inability to envision the agency of nature. Such blindness was predicted by Carolyn Merchant, who remarked in her 1980 tome, "Mechanistic assumptions about nature push us increasingly in the direction of artificial environments, mechanized control over more and more aspects of human life, and a loss of the quality of life itself."⁴

In the art world today, "eco art" swings between these two poles—taking the form, on one side, of admirable but small-scale efforts to clean a site polluted with industrial wastes, create a sustainable farm, or create mechanisms for the reuse of agricultural byproducts, and on the other, of critical gestures that point to the direness of our situation with varying degrees of irony. The interest in the subject is palpable, but there has been little evidence of art's ability to conceive of new possibilities on a scale commensurate with the crisis. Which is where the Harrisons come in. Having struggled for over 40 years with problems wrought by industrialization, development, and environmental disregard, today they find themselves balancing between bleak pessimism and cautious optimism. Their long joint career has been focused on finding workable solutions to environmental problems, some of which have been implemented in part or whole. Now, however, in the face of the Force Majeure, they acknowledge that these measures have not been enough to shift the balance away from irreversible climate change. However, they refuse to despair. Instead, working from the current state of things and basing their proposals on the best information available about future trends, they have envisioned a future that still holds a place for human civilization. With bracing realism, the Harrisons take up Smithson's idea of entropy but challenge its inevitability. Arguing that the concept has been

misapplied in connection with ecosystems, they explore instead the idea of exergy, which they describe as raising the energy available to do work in a system. Similarly, just as they reject the inevitable entropic nature of natural systems, the Harrisons also reject widespread assumptions about the inevitability of societal inertia. In this they share the hopeful idealism of Fuller and Kepes (a point of view that has earned them a position between these two visionaries in the Institutional Archives of the Stanford University Library Archival collection.) Political, economic, and religious ideologies are powerful, but they are not immutable. The Harrisons acknowledge the huge economic and social price tag for their proposals but point out that the alternative is far more costly. Similarly, they admit the hurdles that stand before an international government but, again, point out that failure to join together in a common cause may spell extinction for the human race.

Is it all just a utopian dream? Or are the necessary changes in human action and consciousness actually possible? That is the stark question that stands before us. As writer and activist Naomi Klein remarks, “Our economic system and our planetary system are now at war.” Can peace be made? Is it possible to alter the prevailing paradigms of unchecked growth, industrialization, and territorial sovereignty that underlie our vision of modernity? Can a clear-sighted understanding of the consequences of climate change become a catalyzing force for positive change?

Central to all the Harrisons’ thinking is the need to make partnerships, not just with other humans, but with other species and indeed with all of nature. We must bury the mechanistic model of nature alongside the egoistic model of society and replace them with new kinds of relationships. Drawing on their marvelous ability to choose exactly the metaphor that will make an issue come to life, the Harrisons proclaim, “Only Fools Pick a Fight with the Ocean: Wise Folk Dance with the Rising Waters.”

¹ Carolyn Merchant. *The Death of Nature*. New York: Harper and Row, 1980. Reprint edition, San Francisco, CA: HarperOne, 1990, p. 69.
² Buckminster Fuller. *Utopia or Oblivion*. New York: The Overlook Press, 1969, p. 242.
³ György Kepes. “Art and Ecological Consciousness”, *Arts of the Environment*, ed. György Kepes. Henley, UK: Aidan Ellis, 1972, p. 8.
⁴ Merchant (see note 1), p. 278.
⁵ Naomi Klein. *This Changes Everything: Capitalism vs. The Climate*. New York: Penguin, 2015.

Force Majeure:

Performing

the Data of

Climate Change

Roger F. Malina

Introduction

I am currently obsessed with the idea that we, as humans, are fundamentally badly designed to understand the world around us. As an astronomer, I am humiliated by the fact that we now know that most of the matter and energy in the universe are of a kind that is incommensurate with current human perception and cognition. Dark matter and dark energy seem to be the dominant forms of structure and content driving the evolution of the universe. And it emits no light.

Since the dawn of human history, astronomers have in effect been studying the “decoration” in the universe. An analogy would be asking a historian of human civilization to use only the archives that are available from populations who eat tomatoes at least once a day, or those who live in areas of the world where there is permafrost. How reliable can our view of the cosmos be if it is so biased by the human senses and the history of technology tied to those senses?

Astronomers, like other scientists, struggle with bringing phenomena and nonhuman scales into human perception and cognition—scales of time and size, but also of different ontological categories. As I write this, astronomers and physicists are inter-

preting the first direct detections of gravitational waves, phenomena predicted by Einstein’s formulation of a theory of gravity. There is nothing in human experience, thought, or language that is of the same kind of phenomenon, in which space itself changes in structure. We struggle with the concepts of quantum mechanics because at our scale of size and time, quantum phenomena aren’t directly accessible to our senses. We don’t experience time dilation except psychologically. And we see things that are either objects or waves, and not both at the same time.

As we experience the work of Helen and Newton Harrison done over the decades, I am reminded of the key role that artists play by bringing phenomena and realities that are not directly accessible to the human senses into human cognition and experience and culture. Scientific discoveries are often incomprehensible, and the work of artists often appropriates, reconfigures, and performs these discoveries in ways that are multidisciplinary translations and reinterpretations. This reforming and reinterpretation can also feedback and change or add dimension to the science that is being reconfigured in the first place; therefore, new knowledge is co-created.

Through these performances, we become intimate with new parts of the natural world and with new phenomena for which we have no language yet. And a new cultural imagery is built by the constructive interference of the arts and sciences.

Force Majeure and Human Culture

For a defendant to invoke force majeure in French law, according to Wikipedia, the event proposed as force majeure must pass three tests:

- 1 Externality: The defendant must have nothing to do with the event’s happening.
- 2 Unpredictability: If the event could be foreseen, the defendant is obligated to have prepared for it. Being unprepared for a foreseeable event leaves the defendant culpable.
- 3 Irresistibility: The consequences of the event must have been unpreventable.

There are many phenomena in astronomy that constitute force majeure for human life and societies. Some of these are now fully understood, predictable, and integrated into human culture as “benign” events. Solar and lunar eclipses, once incomprehensible and viewed as dangerous for human beings, are now integrated into our contemporary belief systems as benign, predictable, and innocuous phenomena. Others, such as collisions with asteroids and meteor fragments, are no longer mysterious in nature. But we cannot yet fully predict im-

pacts which in previous eras were a force majeure for the evolution of all forms of life on our planet. Space agencies and ground-based astronomers have begun to put in place the detection systems to anticipate collisions of asteroids. There are early projects in intercepting and destroying such Earth-crossing asteroids, beginning with their exploitation for mineral resources. Within the foreseeable future, perhaps asteroid collisions will no longer fall under the category of force majeure.

We now know that solar activity has direct impacts on the planetary system. The 11-year solar cycle is now well studied and largely predictable, though not sufficiently to allow preemptive preparations for new mini ice ages. Solar storms can now be detected before they strike the Earth’s plasma sphere, and the first systems are being put in place so we can save the satellite systems that would be perturbed and brought to a standstill. A society with all the GPS and telecom satellites down would indeed be facing a massive catastrophe. Other astronomical phenomena are still clearly force majeure events. We know that as our sun rotates around the galaxy, periodically our solar system is subject to large-scale environmental changes as the solar system oscillates through the galactic arms. As the Earth’s plasma sphere is perturbed, cosmic rays that used to be excluded at the magnetopause enter and perturb the inner solar system. And as pointed out by the Harrisons, on the time scale of hundreds of millions of years we now know the solar flux will increase as the source of fusion energy in the core of the sun decreases.

Redesigning Culture: Intimate Science

As far as we know, anthropogenic climate change on earth is unprecedented in the types of variations of the Earth system it engenders. In the past, human cultures either died or moved when faced with force majeure events. Human culture has never been designed; it has always evolved in response to various external stimuli. As the Harrisons emphasize, the “arrow” of entropy is now pointed in the wrong direction to allow a stable planetary ecosystem compatible with the way human beings evolved. The new situation is that we can now redesign culture in anticipation of future events. Artists such as Helen and Newton Harrison are key actors in this unprecedented process of redesigning our own culture through the Center for the Study of the Force Majeure. Carbon dioxide does not smell and we cannot taste it. Alexander von Humboldt in the early 1800s already anticipated the impact of human activities on climate; during his South American trips he noted the

impact of human activities on the ecosystems he was studying¹. He noted the impact “through the production of great masses of steam and gas at the industrial centers.” Svante Arrhenius in 1886 wrote an article titled “On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground.”² Charles Keeling, of Scripps Institution of Oceanography, began to make frequent regular measurements of the CO₂ concentration at the South Pole and in Hawaii in 1958.³ We have plenty of warning. The Harrisons go beyond warning about climate change, and its mitigation, to the conclusion that it is inevitable and that it is too late to “conserve” nature. So, part of the problem is that human senses cannot perceive a key “driving function” that is a key perturber in the entropy of the system. If solar brightness had been increasing at a similar rate, we would have reacted quickly as human societies. It seems to me that a new role that artists are playing is translating data inaccessible to human senses into forms that are accessible, making data intimate and developing new sensory and linguistic vocabularies appropriate for these phenomena in terms and experiences that make cultural sense. Over the recent decades, artists have played important roles in making the data intimate. Beginning in 2002, for instance, Katherine Moriwa-ki with her “Inside-Outside” handbag converted sensor signals from pollution and gases, such as CO, into patterns on handbags⁴. Andrea Polli, through a number of artworks, has visualized data, such as the work *Particle Falls*, which makes visible data on particulates that are not visible to the eye, making the data intimate to people in urban spaces⁵. Much of the Harrisons’ work occupies this terrain of making data intimate.

The problem of climate change goes beyond, of course, sensing the changing composition of the atmosphere and predicting future conditions. The Harrisons entered this terrain first with the *Garden of Hot Winds and Warm Rains* in 1996, imagining future ecologies that re-stabilized for different temperature regimes. More recently, with *Peninsula Europe*, we are forced to imagine the reconstitution of human settlements with changing sea levels, making dramatically visible the necessary redesign of culture that has from prehistoric times taken advantage of specific features of the landscape as structuring principles.

The next stage goes beyond anticipation to proposed interventions as part of their project *Sagehen: A Proving Ground*. They begin to address the second aspect of force majeure legal frameworks, namely, tackling unpredictability. Since the event can be foreseen, the “defendant” is obligated to have prepared for it. “Being unprepared for

a foreseeable event leaves the defendant culpable.” This takes the scenario into active interventions related to the concept of “terraforming” for extraterrestrial planets. The landscape gardener becomes planetary gardener. In their words, “we wish to participate in a work of botanical invention, by forming a team who would first select and then assist in the migration of species, creating a succession ecosystem designed to literally follow a glacier as it retreated upward.” Few artists have entered this terrain, except ironically. Cultural design then reaches from the microscale to the mesoscale, not only looking at reorganizing human settlements but also forcing ecological mutations and modifications that allow sustainable human cultures. The Harrisons assert that “ecologically based, large-scale systems of adaptation to the extreme changes in the ever-warming environment are necessary for collective survival, and so must be invented.” In fact, their most recent iteration of *Peninsula Europe* delineates a design concept for terraforming a million-square kilometers of farmland in response to drought.

In the recent decade, there has been an active and growing international movement to reintegrate the arts and humanities into science and engineering. This harks back to the ways that Humboldt and Huxley, among others, viewed human knowledge holistically. Sometimes called the “STEM to STEAM” movement in the United States, there is a growing recognition that the last 100 years of institutional development of the arts and sciences have made it remarkably difficult to bring to the table the expertise needed to tackle problem-driven situations such as climate change. Ben Shneiderman, among others, has pointed out that the problem of reintegrating art and design into science and engineering is compounded by the frequent separation of pure or basic science from applied science and engineering⁶. The Harrisons are seeking, indeed, to bridge the observational to the experimental and engineered, and the arts and design to science.

In Praise of Hybridity
Reimaging the Role and Modes of Artistic Practice

Thomas Huxley in 1880 advocated integrating the arts and crafts into the education of scientists in his Mason Science College lectures at a time when science and engineering were not yet integrated into the school curriculum⁷. In 150 years we have come full circle with the current STEM to STEAM movement to reintegrate the arts and design into the teaching of science and engineering. Every generation has sought new mechanisms to stimulate cross-disciplinary activities within institutions organized through the disciplinary structure of the

“Tree of Knowledge.” Slowly we move from the structural metaphor of the “tree” to that of the “network”, or a network of networks, a field of fields. Robert Root-Bernstein has documented in his study of the most successful scientists that they have deep involvement with the arts of all kinds, and to a much deeper extent than their less successful peers and colleagues⁸. Numerous examples of fully hybrid individuals with successful careers in both the arts and sciences include Samuel Morse, a landscape painter of Morse code fame, and more recently, Carl Djerassi, co-inventor of the contraceptive pill and a publisher, writer, and playwright. A still more recent example is Francois-Joseph Lapointe, PhD in microbiology and researcher on micro biota and a PhD in dance⁹. We are now seeing the emergence of small teams of artists and scientists working on common projects. Examples are Jim Crutchfield and David Dunn with their work on bioacoustics and forest ecologies and Brandon Ballengée, who has collaborated with scientists on understanding frog maladies. It is within this framework that the Harrisons’ Sagehen initiative falls, with its multimodal objectives at the outset. It is “intended to be a work of art, a work of science, a work of bioregional planning, and a call for policy change.” The Harrisons immediately change the framework and situation with an emphasis on a multigenerational time scale, 50 years. They articulate artistic interventions as accelerators of policy change, landscape, and human use redesign.

Concluding Thoughts

Andrea Wulf states, “In 1844, he [Humboldt] prophetically listed three ways in which the human species was even then affecting the climate: ‘Through the destructions of forests, through the distribution of water, and through the production of great masses of steam and gas at the industrial centers.’”¹⁰ We have had plenty of warning. Beyond this, Humboldt, with his concept of the “cosmos,” interlinked the natural world which exists independent of our cognition, with the same world that has given birth to human consciousness. Through the arts, human inventions, and science we create a representation of the cosmos that is evolving and dynamic. And now in our local part of the cosmos, planet Earth, the Harrisons argue that human consciousness and the natural world are in effect part of an interlocking, cross-linked system; they focus on the growth in entropy in the terrestrial ecosphere. But they go beyond this; we must not only observe and understand and mitigate, but we must also intervene to survive; we must terraform the Earth and in many cases act as re-terraformers.

As an observational scientist in astronomy, I was not able, in general, to conduct experiments on my objects of study, nor in general are naturalists able to conduct large-scale experiments. While I was director of the Observatoire Astronomique de Marseille Provence, our Observatoire de Haute Provence set up an ecological observatory¹¹; it involved active interventions including changing the rainfall on part of the site to try and understand how the ecology of the Mediterranean region will inevitably change as rainfall decreases over the coming decades. In general, such controlled, limited experiments are not controversial. But the Harrisons’ agenda intends to go beyond their controlled experiments at Sagehen to active large-scale interventions to ensure that ecosystems survive by moving them geographically. Shall we “conserve” nature? Or shall we modify it so that the new ecosystems are compatible with human societies? This necessarily means redesigning our own human societies and cultures so that our symbiosis with nature creates a new kind of “Cosmos.” As I indicated earlier, human societies have always adapted to climate change, which in general occurred on long enough timescales that migration was feasible; if not, those civilisations disappeared. In this present situation, however, migration will not be sufficient, and as the Harrisons argue, and are doing, we must create a new cultural imagery for the new coupling of consciousness and nature. Necessarily this foregrounds the role of artists in our societies. First to “make science intimate” by making sensible to our own cognition the forces and energy driving climate change. But second, artists and scientists must collaborate to provide the basis for the redesigning of our cultures. The Sagehen project is an exemplar in this kind of art-science collaboration that Humboldt would have championed.

Coming back to the three conditions for a force majeure, we are forced to take a legalistic turn:

1 Externality: The defendant must have nothing to do with the event’s happening.

Unfortunately anthropogenic climate change is caused by collective action of humans, so at least we have collective guilt.

2 Unpredictability: If the event could be foreseen, the defendant is obligated to have prepared for it. Being unprepared for a foreseeable event leaves the defendant culpable.

We have had plenty of warning, at least since the time of Humboldt in the early 1800s. But unfortunately societies have not yet demonstrated the capacity to redesign themselves. We are culpable as charged.

3 Irresistibility: The consequences of the event must have been unpreventable.

Indeed the Harrisons argue that all efforts at mitigating climate change through emission controls and green energy will be insufficient, and we must actively intervene so that the human-nature system co-evolves in a way that allows human societies to survive. The coming “Force Majeure” can be both mediated and adapted to. The trans-humanists would go beyond this kind of active intervention that is needed to keep human societies compatible with the climatic conditions. Human beings, through the process of natural selection, are well tuned to a given ecological and climatic system. Perhaps the force majeure is such that we will not be able to implement the redesigning of our culture quickly enough, and we must redesign human beings themselves. This is a risky proposition given our limited knowledge, the science of genetics is not yet intimate. But there are risks everywhere, so we should proceed with the manifesto proposed by the Harrisons. Artistic performance takes on a new meaning.

1 Andrea Wulf. *The Invention of Nature: Alexander von Humboldt’s New World*. New York: Knopf, 2015.

2 Svante Arrhenius. “On the Influence of Carbonic Acid in the Air Upon the Temperature of the Ground,” *Philosophical Magazine and Journal of Science*, 1896, v. 41, series 5, pp. 237–276.

3 <https://scripps.ucsd.edu/programs/keelingcurve/>. March 19, 2016.

4 <http://www.kakirine.com/?p=8>, March 19, 2016.

5 <http://www.andreapolli.com/>. March 19, 2016.

6 Ben Shneiderman. *The New ABCs of Research: Achieving Breakthrough Collaborations*. Oxford, UK: Oxford University Press, 2016.

7 *T. H. Huxley on Education: A Selection from his Writings* (Cambridge Texts and Studies in the History of Education). With an introduction by Cyril Bibby. Cambridge, UK: Cambridge University Press, 2010.

8 Robert Root-Bernstein. “Arts Foster Scientific Success: Avocations of Nobel, National Academy, Royal Society and Sigma XI Members,” *Journal of Psychology of Science and Technology*, 1, 2008, pp. 51–63.

9 <http://www.fjlapointe.cal>. March 19, 2016.

10 Wulf 2015 (see note 1).

11 <https://o3hp.obs-hp.fr/index.php/frl>. March 19, 2016.

Life Is a Force:

Growing Home

Reflecting on

the Harrisons’

Force Majeure Work

Paul Mankiewicz

Dorion Sagan

Life is a force. Surviving meteor impact, hot, oxygen-less Archean aeon air, shortages of food and resources (e.g., hydrogen, sulfide, nitrogen, and water), evolving photosynthesis, making complex compounds at room temperature, “learning” through cooperation, and the differential reproduction of natural selection and death to tolerate its own deadly wastes, it was a complex geological force long before any reasonable definition of man. Long ago, life left monuments and scars of its overpopulating ways in the fossil record—uranium oxides and rust, the result of the first and greatest pollution crisis, when free oxygen levels rose, not a few parts per million, like carbon dioxide in the present atmosphere, but 20 million percent, from under 1 percent to 200 000 parts per million, or about 20 percent, where it has stood since that Archean aeon.

Life is a force. The dominant life form in the Archean was already a community structure informed in resilient building. Inconspicuously appearing as rounded rocks, extant to this day in remote places like Shark’s Bay, Australia, layered structures called stromatolites still grow in shallow salty waters. Three billion years before urban humans spread like dots on a planetary petri plate, earth-changing green bacteria began living on top of each other, slipping out of their polysaccharide sheaths, creating food and shelter for other life forms,

making rounded rocks as they slid toward the sun. With such “sky-scrapers,” built billions of years back, we can see that urban humanity is a modern variation of an ancient theme. As the stromatolite example shows, crowded life is nothing new, but it works better in biodiverse, recycling collectives.

The deadly Archean oxygen rise (life hadn’t evolved to use oxygen yet) was due, ironically, to the wastes of “green technology,” that of cyanobacteria finding a way to plunder the hydrogen of water for use as an electron donor during photosynthesis. Life, itself 70 percent water, was already living in water. But at the time oxygen was a globally reactive gas that would have singed, burned, and even killed most surface life forms with its free radicals. Oxidizing, however, is now largely under life’s control, for example in the deployment of free radicals to shape your embryo and to destroy cancers by apoptosis (“programmed cell death”). And of course now we, partial progeny of microbes that evolved to tolerate and then use the gas, breathe oxygen. As in the eco-art recommendations of the Harrisons, a crisis turned opportunity.

Life has shaken off at least five mass extinctions to come raging back. The sixth extinction, fomented by humans, was preceded by the Cretaceous, which killed the last of the dinosaurs and allowed the mammals, now free of such super predators, to venture forth in daytime. The Harrisons’ position on mass extinctions is that if 200 to 300 million years remain before the sun’s slowly increasing temperature makes most life on earth impossible, nature then has several 50-million-year periods to evolve a “learning or wisdom behavior taking place in some future version of human civilization, relentlessly tuned to the way nature has learned to use energy.”

To mature, we need to understand life’s energetics. “Only a fool picks a fight with the ocean,” the Harrisons say. Although it is often said that life violates entropy, associated with disorder, the opposite is true: Complex life necessarily produces wastes from using free energy. Because energy flows and cascades through the body of life, it produces entropy. Most of this outflow takes the form of heat, but, unlike urban humanity, land plants produce it without imperiling their sensitive surfaces. In a science-engaging way that recalls, in an ecological space, the dual artistic-scientific engagements of Leonardo da Vinci and Buckminster Fuller, the Harrisons look to nonequilibrium thermodynamics, making good use of the terms dissipative structures and entropy. Thermodynamically, life is a member of a class of natural complex systems called dissipative structures, ornate self-similar

processes that cycle gases, liquids, solids, and chemical reactions in regions of energy flow, from cyclones to stromatolites. Measurements of ecosystems as well as nonliving complex systems show that they in fact produce more entropy than less organized regions of matter. Entropy, a measure of the spread of energy, is increased by life, and especially by biodiverse ecosystems. But producing too much heat near the surface—which we now see at a scale that can be considered global thermodynamic dysfunction—imperils entropy-producing systems themselves.

Like beach-loving humanity, life has long loved edges. Lush surfaces of co-evolving symbionts, plants, animals, fungi, and microbes, ably detox and provide free energy to be utilized—used but not used up—by life’s mixed forms. At the edges, life does its best work. The flows of heat, nutrients, and minerals become embodied in roots and rhizospheres, reefs, branches, and leaves of corals and shrubs, grasses, seaweeds, and trees, structuring flows of matter and energy. The Harrisons argue for a new form of governance, in which the human race as a whole is treated as a biome and ecotone, in which human behavior functions as biospheric exchange, as opposed to behaving as an exotic, consuming other biomes they choose to exploit.

In 1849, hundreds of thousands, drawn by dreams of gleaming gold, made their way to San Francisco. Now, in the twenty-first century, a green dream beckons. Unlike the Spanish explorers, driven by the lure of relatively passive gold, this time the City on the Bay promises a more interactive and ultimately valuable hope: Can we not only enrich ourselves but also make a bet that improves our own livelihood while making the whole of nature richer, better? Some would say that civilization, such as it is, owes that much to Mother Earth. Native Americans of the northeast did exactly this, with mosaics of moving agriculture, fires opening understories to shrub and herb growth. Gathering, hunting, they became conservators of an even richer biodiversity in the richest temperate landscape on earth.

With global warming and sea level rise, we set in motion forces now poised to create hundreds of square kilometers of fringing marshes, perhaps the most productive ecological matrices on earth. As oceans become one to three meters deeper, 1.5-meter tides will come to surge even farther inland. San Francisco Bay will flow through the San Pablo and inland, pushing an epicontinental sea into the lowest-lying hollows of the Central Valley. The Harrisons’ Bays of San Francisco work proposes that a three-meter ocean rise would generate a 162 000-hectare, highly productive estuarial lagoon in the low lying areas of the Central Valley of California. They suggest that human

cultural practices could enrich and diversify new habitat for life in and around these waters as they flow into our future. As ocean levels climb just meters, hundreds of square kilometers of the Central Valley will flood an ever-expanding lagoon, salt and freshwater marshes filling in the edges, carrying the most productively exuberant of the planet’s natural systems inland. Were fringing marsh to cover just a tenth of this area, it would be on the scale of the landfill created around New York City—but the biodiverse reverse, enhancing life’s ecosystemic edge-making rather than truncating it—from the wetlands that were filled in around the city to straighten the coasts of Manhattan, the Bronx, and Brooklyn, not to mention the runways of LaGuardia and Kennedy that were made at the cost of cordgrass and oyster reef.

To the economic question of opportunity cost the simple answer is that we know of no better way of carbon capture or wildlife creation than nature’s evolved edge-making. With 305 meters of freshwater marsh or cordgrass running upland along each linear meter surrounding the new Central Valley Bay, we’d see biomass production of 1 000 tons per year along each kilometer of shoreline, adding tens of tons to fishery and shell fishery in the process. A bane could become a boon as a long-blinkered humanity, too long butting heads with nature, instead tends to it with understanding hands, turning an expected 160 kilometers of shoreline from flooded Central Valley into one of the most productive polycultures on Earth. Just as Newton and Helen Harrison’s first work entitled *Making Earth*, done some 45 years ago, found that sand, clay, sewage sludge, animal manure, and leaf litter could, with microbial action, make sweet-smelling strawberry-feeding earth, so the transformed Bays of San Francisco could help inaugurate a new relationship of Homo sapiens to its home planet.

Could something like a *Living Shoreline of San Francisco* program be initiated even before the water arrives? The Harrisons suggest this as a form of proactive eco-art. Can we prepare, shine a light into the shadow of warming climates and sea level rise cast by our industrial economy? It is possible. Oyster reefs in front of just one tenth of the shoreline to come will create 30 000 square meters of protection along 80 linear kilometers of shoreline, the buffer and leading edge of an imagined future agricultural landscape.

Future artists and engineers, postmodern landscapers of neo-waterways, are needed for us to adjust to sea level rise. Attuned to the power of images, the Harrisons create *Peninsula Europe Part I*,

a lean dragonish icon reflecting lands that remain elevated despite sea rise. Rising sea will bring water to new landscapes, crafting new peninsulas, outcroppings, productive shoals and habitat where land meets water. In *Peninsula Europe Part IV* they make a proposal to reshape as much as a million square kilometers of drought-impacted farmland into water retention landscapes to mediate the impact on civilization of extreme drought. Moreover, the Harrisons have taken the legal term force majeure and framed it ecologically, referring to accelerated global warming produced by the vast industrial processes of extraction and CO₂ production.

This is an act of Gaia, if we may say. Rising waters and temperatures will not be stopped by humans, but we can meet nature half way. At regional and global scales, the former island of Georges Bank is still one of the greatest fisheries of the North Atlantic; so, too, when the Central Valley fills, structures and features in place there would invite seaweeds, sea grasses, oyster and/or mussel beds, even corals or mangroves.

New York City is a center for 9 000 000 people, about the same population as San Francisco, Oakland, and San Jose. New York City produces 19 500 tons of waste concrete, brick, and glass each and every day, the equivalent of wave-break habitat three meters wide by 1.5 meters high running three kilometers in length. In a hundred days, concentric rings of islands could be made along the whole 320-kilometer periphery of this emerging inland sea.

If the Romans grew oysters 2 000 years ago by spreading shells (used by larvae as substrate) in the shallows of the Mediterranean, if the Fordhams of City Island made their fishery sustainable in the 1830s at the edge of what is now the Bronx by dumping oyster shells back near their harvest sites (in a human discovery similar to agriculture, serendipitously started by the dropping of seeds), why should twenty-second-century people with their backs to the climate wall let such an artful opportunity elude them?

What happens on the land as sea levels and temperatures rise? Continuing loss of productivity and biodiversity under the hard press of human footprint, concrete, asphalt, and expansive sprawl, impasse, rapid runoff, desertification, and urban heat islands wherever industrial human beings call home. But are there other options?

Sim Van der Ryn showed, now four decades back, that by amazing coincidence, the quantity of nutrients leaving wastewater treatment plants in Los Angeles equals that coming into the households of greater Los Angeles in the form of produce and food from the Central Valley.

The parity of nutrients in and out is no coincidence. This central feature of nature is an example of mass balance: Inputs and outputs are perennially found to be equal. And if there is one irreversible stunning move of life over these 3 000 million years of history, it has been to put a creative twist on material flows. In living systems, from organisms to ecologies to the biosphere and Gaia herself, material flows curve back on themselves, turn into circles, transforming outputs into inputs, for the next season’s growth, successional stages, generations. Material cycles have a simple cause—stuff on this planet is limited. Among the elements is phosphorus most especially, but also sulfur, magnesium, potassium, and many others, from macronutrients to trace metals. Just looking at such a fact of nature, one would infer that if life has a purpose, it would be to capture and dissipate energy, cycling materials in the process—or perhaps (at this late stage in the game) vice versa, to stay alive by cycling matter, and capturing and dissipating energy to do so.

How do we keep or even enhance the biodiversity and ecological productivity of a mosaic of landscapes in a warming world with variable rainfall? Ecological systems are remarkably adaptable, but only where the flow of diversity through migration between changing environments is built in as habitat connectivity. Apex or top predators, often with expansive ranges, play major roles in optimizing, even maximizing diversity, facilitating energy flow. The reintroduction of wolves in Yellowstone brought prairie grasses back to life around streams and water bodies; the wolf pack that crossed Lake Superior to Isle Royal ended the periodic devegetation by its moose population. Lynx live in a national park in Warsaw. Bobcat and cougar prowl within Austin, Texas city limits. The nuclear disaster at Chernobyl created perhaps the greatest enhancement of biodiversity in Europe since the Black Death. The little ice age opened the land to reforestation and the return of wildlife and major predators, including those most social of beings who have kept us company for thousands of years, the canids, the dogs of our houses, and the wolves, who have helped keep nature whole. We too, are predators, but have gotten a little out of control. It is time to reintegrate ourselves into the more baroque, edgy, biodiverse cycles of nature.

The great spurs to evolutionary thinking were the fantastic biodiversity of the archipelagos of the Galapagos which inspired Charles Darwin, and in the case of Malaysia, Alfred Russel Wallace. As Robert MacArthur and Edward Osborne Wilson showed in 1967, population islands connected by corridors establish diversity through an equilibrium of immigration and extinction. Their message to the future can be

found in today’s Natural Community Conservation Plan in California and the California Essential Habitat Connectivity Project. But human-built infrastructure and settlement have, of late, imposed impassable barriers to movement of plants and animals. With human capacity for habitat destruction carried out on a huge scale, and with restoration done only in patches, with spare to absent connectivities, we have institutionalized a formula that seems to guarantee us a place on the decay curve of both biodiversity and ecosystem growth and development. Local losses virtually guarantee that populations will disappear in certain places. If not replaced by immigration from neighboring populations, biodiversity diminishes, and with it the health of ecosystems.

Two thermodynamic sides to this are worth noting: The greater the length of diverse edges and area of surfaces, landscapes, and water features, the more niches for species, the more energy captured and moved into biomass, the more free energy dissipated, the greater capacity to do the work of building living form, capturing and cycling more material, directing, driving more energy through these living bodies and their by-products, capturing, holding, and processing more water, producing more entropy. The Harrisons take up this issue in the Leipzig *Brown Coal Park* work, where they complicate a several-kilometer-long edge of a brown coal excavation that was becoming a lake in order to increase biodiversity.

The second thermodynamic boon comes from elevating shoots, branches, and leaves into the fluid atmosphere to capture sunlight and carbon dioxide. In this vertical lift, land plants can process or move a hundred times more heat, but mainly as water vapor, thereby cooling the surface in the process. Integrating flows of water and radiation, terrestrial plants dramatically drop the body temperature of the world around them.

When water is scarce, leaves work as blackbody radiators, running temperatures higher than ambient, bubbling off excess heat like convection ovens, reradiating energy in proportion to the fourth power of their absolute temperature, T4. But supplied with water, plant communities move three or four times more energy as latent heat, with 580 calories extracted from the system with each gram of water evapo-transpired.

The architecture of cities has produced the urban heat island, sometimes killing hundreds of inhabitants in a single, brutal heat wave. The living architecture of plant cover with water, however, every day reverses thermal loads. Cooling marshes, meadows, forests, vine-covered buildings and plant-covered roofs represent an enviable green

technology older than man. Every 125 liters of water evaporated over such surfaces each day does the work of a ton of air-conditioning, contributing 84 kilowatt-hours of cooling. Just six millimeters of plant-based vaporization over a hectare are doing the equivalent work of 15 tons of dynamite each day—cooling the surroundings for all inhabitants.

With or without us, life is a force, but for us to live in the long term, in the biosphere that spawned us, and the ecosystems that sustain us, we need to study and implement nature’s long-evolved means of energy use, waste recycling, and biodiversity generation. “To change the quality of the day, that is the highest of the arts,” wrote Henry David Thoreau. But in this book, *The Time of the Force Majeure: Counterforces are on the Horizon* the Harrisons propose to change the quality not just of the day but of centuries. Mix the old with the new, countenanced T. S. Eliot, and the Harrisons do, going forward by returning to the past, not in a simple regression, but rather in evolution’s own way, according to ecologic returning, but at a higher level, involving more species, advocating ways, thankfully, to include our own. Intelligent, aesthetic ways, working with nature rather than fighting it, including, if necessary, climate change. Instead of trying to lord it over nature, trying to figure out what she’s doing and then helping her do it, expanding the cycles, working with, rather than against the sum of species that support us. The Harrisons show the way, promoting a new ecoethic and aesthetic, an architectonic poetics, one that looks to the past, to the heat-resistant Pliocene plants, to the Gabrielino Indians and other indigenous cultures, whose mythology and iconography seem to encode—like a gift to the future—still pertinent secrets of ecosystems’ metastability. Reading the Harrisons’ work ethic and experience—refusing jobs that don’t relate to ecology, parlaying social connections on a global basis, recruiting scientists from multiple disciplines—one is reminded of life’s own successful strategies for building and maintaining ecosystems by partnering diverse life forms. Instead of destroying the topsoil by irrigating rivers to feed monocrops, we need to protect the natural alchemy of topsoil-creating polycultures. Nature doesn’t help those who help themselves so much as it helps those who help others and themselves. We are, cellularly, already collaborative eco-artworks billions of years in the making. Following the Harrisons, or striking out on our own, we may not be able to return to the halcyon past but, by studying it, we can grow home.

What Poetry Does Best:

The Harrisons’ Poetics

of Being and Acting in the World

Anne Douglas

Chris Fremantle

Introduction

“Simply paying attention guarantees the transformation from a nature supposedly asleep to the work that displays nature’s strange vitality. Art is what attention makes with nature.”¹

This observation by Michel de Certeau, noted French philosopher of the everyday, writing the introduction to Helen Mayer Harrison’s and Newton Harrison’s (hereafter the Harrisons) seminal work *The Lagoon Cycle* (1974–1984), gets to the heart of the Harrisons’ project to understand and work with the agency of all things, and to recognize that attention is central to being and acting in the world.

A question arises about how our attention, as listeners, readers, and viewers is drawn into a work of art, or more specifically, how the Harrisons draw our attention through their poetics.

One of the salient features of the Harrisons’ work is attention to what is actually present in the sense of suspending disbelief. The particular form of attention that the Harrisons exercise aligns with the forms of attention found in improvisation—being in the moment of an experience and using the materials at hand. They see improvisation within the rich potential of inconsistency and contradiction in human relations with environments. This acts as a stimulus to the improvising of new futures.

A Poetics of Gaps and Spaces

In poetry, we experience the gaps between the words as much as the words themselves. In the visual we experience the space between objects or images as much as the images/objects themselves.

In *Atempause für den Fluss Sava – A Breathing Space for the Sava River* (1989–1990) the Harrisons construct “breathing space,” which simultaneously describes an ecological issue, creates an opportunity for action, and embodies a metaphor worked through the visual and textual elements of the work.

A New History for the Sava

Yet we know from having been there that a new story

A new history

is being written for this river

A paper mill is the new history

A coal mine and black water is the new history

An atomic energy plant and heated water is the new history

A fertilizer factory and acid water is the new history

Subtracting the floodplain

and farming to the edge is the new history²

The fundamental character of the Harrisons’ poetics is one that invites seeing the world differently and offers the possibility for the reader/viewer to become an actor in that landscape. The Harrisons frequently juxtapose a likely future of increased human impact on ecological systems, as in the example above, with alternatives of ecological well-being.

The example evokes the “new story”/“a new history” unpacking the content of this history through vivid and relentless forms of industrialization and their impact on water quality—a paper mill “writes” the history along with a coal mine and its black water, an atomic energy plant and its heated water, a fertilizer factory and its acid water. This new history “subtracts” the floodplain through new farming practices that also reduce biodiversity. The staccato rhythm of the text is mimicked in the cuts in photography that form an intrinsic part of the way the story unfolds. These in turn mimic the breathing in and out of a single living organism, creating momentarily “a break, a pause which renders routine viewing difficult and, for a moment, interrupts continuity.”³ This break constitutes an opportunity to change position.

The balance between word and image is by no means a given one. Word and image cocreate the work of art. Their quality of relationship needs to be formed, judged with each project to avoid one overpowering the other.⁴

The careful pacing and layering of word and image, idea, and experience in this work, its sense of a living body in the environment, is more like encountering music or a poem than reading a novel. All three—poem, music, and novel—involve a narrative that unfolds sequentially through time, but poetry and music bear a different relationship to time and the human imagination than the novel. It is impossible to understand them as a continuous sequence of events, even if we read the text or hear the stories in narrative form. Like a musical score, the meaning of the poem here is conveyed by bundles of events that appear at different moments in the text and its underlying story. To grasp their meaning, it becomes important to recognize the reoccurrence of certain themes, to connect what is being conveyed now with what was stated earlier, and to remain conscious of the whole.

This resonates with Claude Lévi-Strauss’s understanding of the way myths operate. He observed that it is impossible to understand myth as a continuous sequence of events, even if we read the text or hear the stories in narrative form.⁵ The Harrisons start stanzas with “It happened / that people here asked us if...”,⁶ or “And from this envisioning / a new image emerges...,”⁷ intentionally mirroring the structures of mytho-religious texts.

Just as in music, what is occurring in the poem is a continuous restructuring of the work in the mind of the reader/listener. The “new” narrative of industrialization in the Sava River work gives way to another, a new story that draws on and threads through a much older story, opening up yet another trajectory in terms of environmental recreation.

Such aesthetic principles underpin the Harrisons’ work within each work and across some fifty years of making art as an ensemble. The reoccurrence through repetition of familiar but not identical themes, of parallelism, of pace, and of interval, function to restructure the work and its issues in the mind of the reader/listener. The reader, in turn, needs to pay attention, noticing the difference between a first appearance and a later development.

A Poetics of the Plain Spoken

Above all, as the Harrisons explain when speaking of their practice more generally, their aesthetic intention has been to present information purposefully but sparingly, in other words, to speak plainly and avoid the kind of specialized language that excludes, and in particular excludes inhabitants of places. *Peninsula Europe: The High Ground—Bringing Forth a New State of Mind* (2000–2007) has been

developed in three further iterations through to *Part IV* (2012). The work analyses the stresses and consequences of a warming climate on the landscape.

For instance, the outcomes for the Peninsula of Europe are unfortunate

The numbers have been crunched

Revealing the trajectory of drought predicted to proceed

From Portugal to the southern parts of Germany and beyond

Reducing 2.4 million square kilometers of farmland

That now feeds over 450 million Europeans, by almost a third within 75 years more or less⁸

The Harrisons draw into a shared space the ecological and cultural knowledge derived from science along with ways of knowing that emerge from the arts. These focus on everyday incidental experience in the present, past, and future within timescales that can only be imagined. The timescales that the Harrisons address stretch deeply into the past and project far into the future.

This entanglement, enmeshing the reader in a struggle of contradictory forces, is distinct from the poetry of individual experience with which we are perhaps more familiar.⁹

The formal discipline was to condense, yet keep clear, this much information and to imbue it with our thoughts and our feelings in about a 20 minute read. The idea was to present a vision that would explode in the mind of the interested person. The aesthetic discipline was to find the linguistic means to do it. The work is a chant and was made to be read aloud.¹⁰

The Harrisons’ intention is to deeply influence their audiences, and they draw on an understanding of the impact of the performed word, seeking to create a written form that encourages readers to “speak it to themselves.”

From the late 1960s/early 1970s, David Antin and Jerome Rothenberg, both key figures in the ethnopoetics movement (along with Eleanor Antin, a seminal performance artist), were at the University of California at San Diego and Newton Harrison was Chair of the Department. Ethnopoetics focuses on how to represent in text and performance the aesthetic richness of indigenous peoples’ storytelling, how to represent words that start in the oral and performative in a written form. The Harrisons’ texts emerge from dialogue with scientists and inhabitants, first spoken and then written and then performed. The aim is to create texts that remain with the reader over long periods, enabling them to be and act in the world differently.

A Poetics of Improvisation

The Harrisons challenge art to address what has traditionally been outside of art. This is a space of differing values and autonomies that cannot be rationalized into a false sense of resolution, “solved” as a problem.

We hold that every place is telling the story of its own becoming, which is another way of saying that it is continually creating its own history and we join that conversation of place.¹¹

Clarity of thought, combined with the instability of language and meaning, demands a particular kind of attention that is at once poetic and improvisatory.

The Lagoon Cycle is perhaps the metawork in the Harrisons’ oeuvre. At the heart of *The Lagoon Cycle* is the understanding that improvisation is actually common to both nature and culture. Improvisation in nature shares the same qualities as improvisation in culture—conflict, coexistence, and cooperation perhaps equate to predation, parasitism, and symbiosis. Although the Harrisons work all over the world, and *The Lagoon Cycle* rotates around the life of a Sri Lankan crab transported to the West Coast of the United States, the value of diversity is a critical aspect of their understanding and practice. The lagoon is selected because it is a place of high diversity, resulting from the mixing of salt and fresh waters. Both nature and culture are fragile in the face of unexpected changes. Both nature and culture strive for equilibrium by adapting.

The dialogue across *The Lagoon Cycle* includes two passages that speak of human and ecological improvisation.

In The Lagoon at Upouveli, The First Lagoon, the Witness says,

But people are tough and resilient and improvise

their existence as best they can very creatively with

the materials at hand but the materials keep changing

Only the improvisation remains constant¹²

In The House of Crabs The Third Lagoon, the Lagoon Maker says,

Life in the lagoons is tough and very rich

it breeds quickly Like all of us it must improvise its

existence very creatively with the materials at

hand but materials keep changing Only the

improvisation remains constant¹³

It is important to understand that improvisation here is not the performance of improvisation we find in jazz. The Harrisons’ works, as seen in exhibitions and books, are carefully crafted, complex, and even symphonic in scale and intent. They highlight improvisation as the condition of a living world as opposed to a specialist approach to

making art. Life itself is unscripted. They encourage the reader/viewer to participate in improvisation. The Harrisons conceptualize this as “conversational drift.” The drift references the unplanned journey and emphasizes that as authors of the artwork, while they do not know where or how, it is their intention that the work or its lessons will be taken up by others. This is exemplified in many of their texts, such as in *Casting a Green Net: Can it Be We Are Seeing a Dragon?* developed in Great Britain during the late 1990s.

Many said,

“Some of these changes are already happening,

and can be seen here and there.”

Others said variously

“How could such a green net be actually done on the ground?”

And you said,

“By shifting subsidies

by modifying certain development patterns

and by forming and funding a new category of infrastructure

whose task it will be to birth the green net

over the years..”

For instance

imagine an act of generosity

an act of consensus

that would invite permit and value

such an entity as a biodiversity net

to come into existence at all?

I said

if not here then elsewhere

You said

If here

then elsewhere will know how to proceed¹⁴

The final stanza highlights the intention of conversational drift that, whether the ideas embedded in the work are taken up in the particular locality or not, they are applicable in other places too.

Their observation resonates with that of Gary Peters, philosopher and free jazz improviser, who, in developing Theodor Adorno’s critique of popular forms of improvisation, arrives at a different construct.

“A successful work... is not one which resolves objectives in a spurious harmony, but one which expresses the idea of harmony negatively by embodying the contradictions, pure and uncompromised, in its inner structure.”¹⁵

Rejecting the more familiar understandings that privilege the contingency of a moment, Peters questions a closed conception of a past

in which the past simply repeats itself in the present. Instead, he locates the past as a point of origin, a point from which to reopen and reimagine the past in the present. The improviser undertakes this reopening and reimagining as an individual in order not to be trapped by the habits and expectations of his/her surroundings.¹⁶ In *Santa Fe Watershed, Lessons from the Genius of Place* (2002–2005), the Harrisons looked at the ecology of the arroyos, the disappearing tributaries of the Santa Fe basin with a view to finding ways to bring water back into the river and reestablish the biodiversity of the region. Simultaneously, the work paid particular attention to topsoil regeneration.

Studying the Tewa symbols
Made in earlier times by people who lived here
Not understanding these symbols
But feeling their vitality
We imagined an implicit narrative in them
And that narrative wanted to happen
So we asked our engineer
If for instance
A 12-meter zig-zag form
Or bowl forms
Or mountain forms
Or serpent forms
Could also be used in the riverbed
As forms that would catch earth
And forms that could create sinuosity in the river
Once the riverbed has been raised.¹⁷

The Harrisons in this work are drawing on ancient farming systems of check dams, large and small, at different points in the arroyos to catch earth and water and pace the flow. This combined with understanding of how the piñon, an indigenous tree with a key role both while alive and also in dying, changes the watershed landscape. The ancient imagery of Tewa symbols provided the clue to a more radical intervention at scale—this is the zig-zag form they propose to introduce into the modern river course. In this way, knowledge from the deep past of the region is rethreaded into a new conversation drawing in and expanding current ways of knowing that needed to take into account urbanization. Again the intention is to open up a different possible future. The form of improvisation at work here is not a quality of the products that would normally identify a work as art (text, image, exhibition, and book) but of a much larger movement, a discourse that is

never completed and of which the text, image, exhibition, and book are but a moment. Going back to the metawork, the dialogue between the Lagoon Maker and the Witness establishes a form that reoccurs in and characterizes all subsequent works in different ways. *Atempause für den Fluss Sava* is almost wholly structured by an “I said” “You said” dialogue, whereas in *Green Heart Vision* (1994) the dialogue is between two different futures, but the authorial voice is unified. The dialogue avoids exclusivity, sometimes specifically referring to named roles of witness, lagoon maker, or ornithologist, incorporating the wealth of perspectives that inform a work through knowledge of place. More often the roles are generalized to “I” or “you,” “some,” or “others,” in other words, indeterminate and inclusive. This overt forming of multivocality in the text is in fact a deep, foundational principle of the Harrisons’ poetics. It engages the reader in a different sense of being and acting in the world. Multivocality is not conceived simplistically as a babble of competing viewpoints, nor merely as a principle of democracy. It is a means to an end, addressing an “ennobling issue” or an “ennobling discourse,” i.e., an issue or discourse that is shared but, importantly, not necessarily agreed upon. By “ennobling” we mean envisioned actions that most people would accept as prima facie good to do, whether or not they believed they could be done.¹⁸ In this way, the Harrisons recognize the interconnectedness of the economic with the ecological and with the cultural, not as fragmented challenges for disciplines, but rather as an issue for everyone. The words “most people” and “everyday” are important because they position the “issue” or “problem” as a shared one, shared both by multiple disciplines and also by everyone participating in thinking critically in everyday experience. “Ennobling” is used to ask not for a unifying solution, but rather for shared recognition. The Harrisons are not seeking to remove friction between competing interests, or resolve inconsistency and contradiction. Instead, they are seeking to arrive at a shared sense of the common good, harnessing inconsistency and contradiction as a generative force. Their use of “ennobling” embodies empathy as an encounter with what is strange and foreign.¹⁹ We have come to believe that inconsistency and contradiction are generated by the processes of cognition, thinking and doing, and have the important role to play of stimulating and evoking creativity and improvisation which are inherent in the processes of the mind that have led us to do this work.²⁰

A Poetics of the Score
We have alluded to conventional poetics in which the poet effectively authors a perspective on the world out of complex experiences and presents this to the reader. We have suggested that this is not a form of poetics relevant to the Harrisons’ work. Instead, their poetics is one open to a struggle with contradiction and inconsistency engaging multiple perspectives. This second form of poetics risks the possibility that no single perspective will ever be reached. Nonetheless, each of the Harrisons’ projects is situated in a real ecological crisis that urges action to address catastrophe. We have also suggested that the potential for action is a quality of the way that the Harrisons imagine and form improvisation as participation in a discourse. This is a layered understanding of relationships between peoples and their relations to places that are at once intellectual, emotional, social, and cultural as well as practical. We have said that the texts are not in and of themselves improvised works. They are determined, fully crafted at the point of reception by a public, but nevertheless they function in the world as pivotal to improvisation. The Harrisons were also at University of California, San Diego, with Allan Kaprow, who joined the department in 1974, and it is interesting to consider the relation between their poetics and the poetics of the score for an activity as developed by Kaprow. *Calendar* from 1971 can serve as an example.
“Calendar
planting a square of turf
amid grass like it
planting another
amid grass a little less green
planting four more squares
in places progressively drier
planting a square of dry turf
amid grass like it
planting another
amid grass a little less dry
planting four more squares
in places progressively greener
Activity, A.K., California Institute of the Arts
November 2, 1971”²¹
Kaprow and the Harrisons share a deep sense of human community as a state of being. Kaprow developed a form of artistic practice describing this as a blurring of art and life. They both want us to see the wonder of everyday experience through art.

In Kaprow’s *Calendar* score the use of the gerund *planting* is open to be interpreted as a report on the experiential activity of the author, or an invitation to the reader to enter into an experience. In a parallel way, the Harrisons’ texts, maps, and models enfold us into the work and its issues, even to the point of using complex and eclectic linguistic forms, poetry as well as plain language, simple narrative and storytelling, and of using a certain kind of accounting, proposal writing, and anecdotes here and there as needed. Kaprow’s scores are not scores in the romantic sense that determines note-to-note procedure, telling us how to move from one step to the next. They are scores as a starting point to improvisation. They encircle the complexity of the issues at hand, holding them temporarily in a space in which those issues can be grasped, felt, and understood. The score in the Harrisons’ work is assembled in a complex way. First they raise fundamental questions in a specific site: How big is here? How long is now? They move from these questions into a dialogue that gathers and draws on the experiences of those most knowledgeable about the ecology and culture of a particular place. They compose a work (text, image, still and moving, exhibition, book) to make sense of the unfolding discourse to this point. By sharing this “score,” sharing an understanding of the issues, they reopen the circle to the chaos and complexity of a particular ecological challenge. This point of sharing is crucial to making possible forms of action and decisions.

Conclusion
Imagining *The Force Majeure* as a score in these terms we can trace a movement that gathers together all the previous projects, in which each project itself is a gathering together of different local insights. We can then see how the score of *The Force Majeure* becomes a point of departure and opens up the improvisation in the form of a new set of actions to come to terms with a changing climate and to improvise a future of ecocultural well-being even to the point of designing mediating strategies that address a sixth mass extinction. In *The Force Majeure* the Harrisons are addressing the flows of energy within ecosystems, asking questions about entropy within whole ecological systems that scientists are not yet able to answer. Yet the Harrisons even suggest research design strategies to address large-scale complex systems. Their intention, manifest in the poetics of their work, is to enable readers/viewers to see the world differently and for that new way of seeing to stay with readers/viewers so that they work differently and go on to other contexts through conversational drift. There is a parallel between the Harrisons’ understanding of the healthy transi-

tions of energy through an ecosystem such as a watershed and the way that their poetry and image works on readers/viewers.

They say,

In nature, mostly, the dispersal of energy from one system is put to use by another nearby. Hence, with the free energy sources being the sun and the available waste of others, nature can and does grow. The differences between how nature works and human industry works is that nature uses the waste it creates and industry in the main does not. Above all, nature does not charge a profit and as a consequence, nature in general does not exploit, rather it takes advantage of opportunity.²² The reader/viewer is precisely encouraged to take ideas (energy) from within the works and to combine it with other ideas elsewhere in the work (and the nature of poetry facilitates that) to come to new realizations. These new realizations in turn connect with unforeseen aspects of life. There is no waste in the Harrisons’ work.

Our aim has been to open up the poetics of their work to deeper understanding because it not only merits such consideration in itself but also because it can inform others (as it always has done). The Harrisons demonstrate the ways in which artists can contribute to public life and the ways in which the practice of the arts (and by this we mean all of the arts, design, and landscape/architecture) can affect people in particular ways.

Critical writing that engages with the Harrisons’ work has tended to address the work’s ecological content in relation to a world under stress. Such writing has rarely addressed the poetics that underpin the Harrisons’ artistic approach. It is this gap that we have sought to address in this particular essay.

We might ask where else other than in poetry could we find attention directed by plain language, integrated with storytelling, a certain kind of accounting, and proposal writing with anecdotes here and there to collectively carry complex ideas. Where else other than in poetry might we find empathy coexisting with the laws of thermodynamics? How is it possible for poetry to lead to action in the form of mediating strategies that address a sixth mass extinction, or design strategies that engage large-scale complex systems? Perhaps most important of all, where else might the environment become an interlocutor within a discourse that is situated between the human and nonhuman? In *The Force Majeure* the Harrisons create a dialogue with a watershed distressed by clear cutting, and with empathy ask how they may help. The entropy of the watershed has been increased by the dispersal of these energies. The energies so dispersed cannot be retrieved. What then, watershed, what then?²³

1 Michel de Certeau. “Pay Attention: To Make Art,” Helen Mayer Harrison and Newton Harrison. *Lagoon Cycle*, Ithaka, NY: Cornell University Press, 1985, p. 17. Many of the Harrisons’ publications and associated texts, including most referenced, are available from their studio website: <http://theharrisonstudio.net>

2 Helen Mayer Harrison and Newton Harrison. *Atempause für den Fluss Sava*. Ljubljana, Slovenia: exh. cat. Neuer Berliner Kunstverein, Berlin, Germany and Moderna Galerija, Ljubljana, Slovenia, 1990, unpaginated.

3 Ulrich Bischoff. “Shifting Metaphors: The Creative Technique of Helen Mayer and Newton Harrison,” exh. cat. 1990 (see note 2), unpaginated. This is further discussed in Anne Douglas and Kathleen Coessens. “Movement and Moment: In-between Discreteness and Continuity,” *The Somatechnics of Movement* (special issue of *Somatechnics*, v. 4.1), 2014, pp. 149–167.

4 In conversation Newton Harrison commented that the word/image relationship in the Sava River project was one of the most successful.

5 Claude Lévi-Strauss. *Myth and Meaning*, London: Routledge, 1978.

6 Helen Mayer Harrison and Newton Harrison. *Casting a Green Net: Can It Be We Are Seeing a Dragon?*, San Diego, CA: University of California San Diego Studio, 1998, unpaginated.

7 Id. *The Green Heart Vision*, 1995, p. 6.

8 Id. *A Manifesto for the 21st Century*, <http://theharrisonstudio.net/a-manifesto-for-the-21st-century>, May 2, 2016.

9 See Tony Hoagland. “Recognition, Vertigo, and Passionate Worldliness: The Tribes of Contemporary Poetry,” *Poetry Magazine*, September 2010. Available from: <http://www.poetryfoundation.org/poetrymagazine/articles/detail/69578>

10 Helen Mayer Harrison and Newton Harrison. *From There to Here*. San Diego, CA: The Harrison Studio, unpaginated.

11 Id. “Knotted Ropes, Rings, Lattices and Lace: Retrofitting Biodiversity into the Cultural Landscape,” *Biodiversity: A Challenge for Development Research and Policy*. Berlin, Heidelberg, New York: Springer-Verlag, p. 14.

12 Id. *Lagoon Cycle*, Ithaca, NY: Cornell University Press, p. 37.

13 Ibid., p. 60.

14 Id. 1998 (see note 6).

15 Gary Peters. *Philosophy of Improvisation*. Chicago and London: University of Chicago Press, p. 77.

16 Ibid., p. 2.

17 Helen Mayer Harrison and Newton Harrison. *Santa Fe Watershed: Lessons from the Genius of Place*. Santa Fe: Santa Fe Art Institute, 2005, unpaginated.

18 Id. “Public Culture and Sustainable Practices: Peninsula Europe from an Ecodiversity Perspective, Posing Questions to Complexity Scientists,” *Structure and Dynamics: eJournal of Anthropological and Related Sciences*, v. 2, no. 3, Article 3, pp. 1–2.

19 This understanding of empathy is fully explored by Reiko Goto in *Ecology and Environmental Art in Public Place: Talking Tree Won’t You Take a Minute and Listen to the Plight of Nature?* PhD Robert Gordon University, Aberdeen, UK, 2012. Goto used Edith Stein’s work on empathy in an analysis that draws on a number of artists including the Harrisons.

20 Ibid., p. 23.

21 Allan Kaprow. *Essays on the Blurring of Art and Life*, ed. Jeff Kelly. Berkeley, CA: University of California Press, 2003, p. 120.

22 Helen Mayer Harrison and Newton Harrison. *The Force Majeure*, in this book, p. 374.

23 Ibid.

A Little History in Lieu of a Résumé

The Harrisons first met in 1950 on Helen Mayer’s family farm. The attraction was startling, vivid and immediate. In 1953, they married. Newton was 20 years old and Helen 25. Helen Mayer Harrison’s background (born in 1927) was in educational philosophy (a focus on John Dewey) and English literature (a focus on Geoffrey Chaucer). She obtained an MA from New York University (NYU). Newton Harrison (born in 1932), became a sculptor’s assistant at age 14, doing life size sculpture by the time he was 15. He spent two years at Antioch College in Yellow Springs, Ohio, then enrolled at the Pennsylvania Academy of Fine Arts (PAFA) in Philadelphia, and was drafted during the Korean War 1953–1955. He returned to the PAFA by 1957 and received their certificate in sculpture and the Scheidt Fellowship. The pair, then with two children, spent three years in Florence, Italy, from 1957 to 1960, studying the old masters, Helen forming the first Montessori school in that region. Returning to the US in 1960, they began living on the Lower East Side where two more children entered the family. They became very active in the peace movement and anti-war movements, in fact, at this point, Helen had become the first New York coordinator for Women Strike for Peace (WSP). The group that they worked with included Julian Beck and Judith Malina from the Living Theater, Dave Dellinger from the pacifist anarchist community, Dorothy Day of the Catholic Worker, and people from both the War Registers League and the American Friends Service Committee. Newton then attended Yale, receiving his MFA in 1965. He next accepted a job as an assistant professor at the University of New Mexico (UNM) 1965–1967. Helen also accepted a teaching position at UNM in English Literature. Thereafter, in 1967, Newton accepted a position in the Art Department at University of California, San Diego, soon to become chairman, and Helen became the head of education programs at UC extension.

During this period, Helen began studying for her PhD in psychology with Carl Rogers. Newton, who had put aside sculpture becoming a painter in the late 1950s, moved into technological art and began executing his *Artificial Aurora Borealis*, first shown at the Expo ’70 in the US-American Pavilion in Osaka, Japan, and then at the *Art and Technology* exhibit in the Los Angeles County Museum of Art. During the very late 1960s, being influenced by Rachel Carson and becoming knowledgeable about ongoing ecological exploitation and probable systems breakdown, the Harrisons took a collective decision to co-join their diverse abilities and make a new kind of art that dealt exclusively with the well-being of ecosystems, each body of work being done with the sputnik-influenced long-term intention of engaging issues at a planetary scale. To do this, Helen refused an offer that would have made her the first female vice-chancellor at UC San Diego. The work in this book, which begins in 1970, is the story of an engagement that reflects how enacting a lifetime decision expresses itself in daily life.

This book *The Time of the Force Majeure: After 45 Years, Counterforce Is on the Horizon* has most of their work from the last 45 years and is an accurate reflection of their life journey. Therefore, typically their résumé would be included here, with exhibitions, which are many, performances and talks, which are many, awards, which are considerable, and the literature around their work, which is also extensive. This information however is easily available on their website: www.theharrisonstudio.net. Finally, Stanford University which has acquired their archive and the grant necessary to process it, is placing their work for theoretical reasons between Buckminster Fuller and György Kepes. The archive becomes available for study at about the time of the publication of this book.

To Those
Whom We Owe
Many Thanks

A large number of people were helpful to us and to our work over these many years. This thank you note is to those many who have worked with us, criticized our work, adding dimension, helped in the making, and in creating the exhibits. This ensemble contains students, scientists across many disciplines, other artists, and just plain close friends who stepped in at a right moment. The countries they come from include the Netherlands, France, Germany, Great Britain, Israel, the US, a few from South America and one from Sri Lanka. They are a lovely testimony to the diversity of people, places, and disciplines who have added value to our work. Again we say thank you.

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In the art world, our principle supporter for over 40 years, exhibiting our new work again and again, is Ronald Feldman and his very special gallery group on Mercer Street in New York. Also, there are Gabriel Harrison and Vera Westergaard who were the core of the Harrison Studio and instrumental in the production and exhibition of most of our work during the 1990s and thereafter, *Greenhouse Britain*. Then in these last years, there is Joshua Harrison, helping to both enable and take leadership of the later *Force Majeure* works. Finally, there are Kai Reschke and Petra Kruse, our friends, designers, editors and thinkers. This book is evidence of their fine work.

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Since the 1970s Helen and Newton Harrison have been creating art inspired by the earth. They established an international network among biologists, ecologists, architects, urban planners, politicians, and other artists to initiate collaborative dialogues about ideas and solutions which support biodiversity and community development. This definitive survey traces an influential joint career that has lasted nearly half a century. Organized chronologically, it features works from each decade, from their earliest installations to their continent-traversing work of the 1990s; and their most recent works educating people about global warming while proposing bioremediation sometimes at subcontinental scales.

HELEN MAYER HARRISON and NEWTON HARRISON, known jointly as "The Harrisons," are both distinguished professors retired from the University of California, San Diego. They are currently research professors at the University of California, Santa Cruz.

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