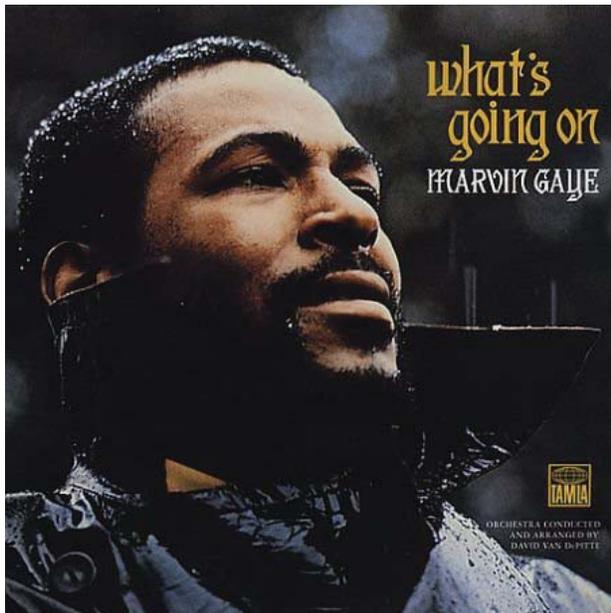


Mercy mercy me (our ecologies)

ELLEN GRIMES

School of the Art Institute of Chicago





"Oh, mercy mercy me
 Oh, things ain't what they used to be
 No, no
 Where did all the blue sky go?
 Poison is the wind that blows
 From the north, and south, and east
 Oh, mercy mercy me
 Oh, things ain't what they used to be
 No, no"

Marvin Gaye, "Mercy mercy me," *What's Goin On*, 1971

1. ECOLOGY AND ATTITUDE

Inspired by letters from his brother in Vietnam, Gaye's album, *What's Goin On* was conceived as a song cycle describing the experience of a soldier returning home from war. A controversial project at Motown, Gaye fought to release the title track, and its subsequent success on the pop charts convinced Berry Gordy to let Gaye record and release the entire album. "Mercy mercy me (the ecology)" was the second single to be released from the album, and it made both the pop and R&B charts in June of 1971, a year and a few months after the first Earth Day.

While the music is seductive, and Gaye's lyrics are elegiac, nothing's in balance. He's singing about an intimate relationship, and although he refers to the planet as a she, he's not talking about his mother. He's mourning old lover who's gone all trashy and bad. As always, the relationship has got its politics,

but it's not the idealized and transcendent model of a perfect nature, or the rascally sublime immanence of the romantic wilderness, both characterizations of biological systems that have haunted architectural discourse at least since Alberti.

Gaye may be on a mission, but he's not preaching. He's making a case about the planet that's visceral and mournful, cataloging abuse, and calling out for mercy, both for himself and his ruined reality. The complex desire for mercy, both an admission of responsibility and a confession that he's overwhelmed and undone, embeds a simple catalog of contamination with immediacy and urgency. He performs a very particular argument about the ecological, or to paraphrase Smokey Robinson, he "Marvinizes" it.¹ He's not trying to invent a technological fix or hoping for divine intervention. There's no solution, just a sensibility.

At the same time "Mercy mercy me" was climbing the charts, the Joliet Army Arsenal, along Route 66, just south of Chicago, was producing TNT for the bombs that were dropping on North Vietnam. Terrifically toxic and obviously dangerous, the munitions factories were buffered from surrounding communities and infrastructure by thousands of acres of fallow farmland and undisturbed prairie that were secured and closed to the public. By 1976, at the end of the US involvement in the war, the Army would close down the munitions manufacturing operation, and begin leasing out some farmland for pasture.

2. AN ECOLOGICAL EXPERIMENT AT MIDEWIN NATIONAL TALLGRASS PRAIRIE

The Center for Research in Urban Ecology (see <http://www.uic.edu/labs/crue/index.shtml>) at the University of Illinois at Chicago is a group of biologists and designers pursuing research on the ecological and evolutionary processes occurring in human-dominated landscapes. As a design researcher, my work as a member of CRUE has been to investigate new forms of integration among human activities and other species and biological communities. One obvious and challenging venue for this work is the site of scientific experimentation itself.

As ecology began to constitute itself as a formal scientific practice in the early 20th century, it left behind the observational protocols of the first

natural historians, and began to design elaborately controlled laboratories for experimentation in the 1920s.² Ecological research practice became even more abstract with the rise of systems analysis and the construction of elaborate mathematical models after World War II. This long period of laboratory-based research yielded insights which revolutionized our understanding of ecological processes, including ideas as important as the ecosystem. However, the limitation of these models gradually began to become apparent, as they failed to robustly predict some important elements of natural processes, such as the actual paths of ecological succession. In the face of these failures, more and more ecologists have begun to perform experiments outside the lab, integrating the abstract models of laboratory research with the complexity and indeterminacy of actual biological systems. Given CRUE's wide-ranging mission to produce both basic scientific research and to engage 'citizen' scientists and land managers, one of the center's first projects has been the development of a landscape-scale experimental complex on public land.

Known as the Great Restoration Experiment, or GRE, the project will be sited at the Midewin National Tallgrass Prairie, the former site of the U.S. Army's Joliet Arsenal. Located 40 miles southwest of Chicago, the reserve is the largest single piece of open land in metropolitan Chicago. Although officially the first national tallgrass prairie, only 1% of the site is undisturbed prairie, and the majority of the landscape is comprised of abandoned farmland, overgrazed pasture, and the ruins of a munitions plant. While the US Forest Service plans to restore a complex of prairie ecosystems over the next 25 years, a prairie reconstruction of this scale is unprecedented, and CRUE's experiments will serve as the primary scientific resource for the development of the national prairie's ecosystems.

Managed by the USFS and CRUE, the ecological experiments and their infrastructure will range across approximately 2,500 acres, an area about three times the size of Central Park. The experiments will include carbon sequestration analyses, investigations of nutrient and energy fluxes, and studies of interactions among mammals, birds, and plant life — and importantly, as part of the educational missions of both the USFS and CRUE, they will be publicly accessible.

As a member of the research team and a designer, my role is to plan the infrastructure that will bring advanced ecological inquiry into the public realm at Midewin. Our intention is to use the physical reality of the experiments to create a dynamic public interface, establishing alliances between scientific researchers and the general public, and producing new understandings of the role that prairie ecosystems play in human culture and metropolitan life. The GRE is a scientific enterprise, embedded in and dependent on a specific, designed environment, and particular disciplinary practices and ambitions. It's also a public project on public land, controlled by a federal bureaucracy. As a landscape, it's a virtual one at best. It is a prairie that doesn't exist, in a brownfield undergoing remediation. As a public project, it doesn't have a constituency; its audience will be constructed through its design.

Practically speaking, the design project involves the planning and development of infrastructure for scientists and visitors, including fencing, pathways, roads, storage, laboratories, classrooms and viewing areas. But our pragmatic efforts to make ecological inquiry public also raise a series of questions about our understandings of nature, science, design, and metropolitan experience. Is nature infrastructure? Can new models of nature that embrace risk and indeterminacy change the design of infrastructure? What past, present, and future styles of life, forms of experience, and material realities are enabled by ecosystem infrastructures? How do these experiences and sensibilities shape our understanding of public life? All these dimensions of the project hinge on a political question: how do we position or construct the public in relation to ecological inquiry?

3. THE CONTEXT

Midewin is part of what is known as the Illinois prairie peninsula. For almost as long as there has been human occupation in this area of the Midwest, it has been a managed landscape. Around 7000 BCE, climate change pushed the grasslands of the great plains east to Illinois, as a newly dry climate encouraged the growth of grass and the decline of forests. By 4000 BCE, another regime of climate change brought more rain but the forests did not return, because human communities that had recently appeared in the area used fire and grazing to maintain the grassland.

Europeans first encountered the site in 1673, when Marquette and Joliet made their journey through the Great Lakes and found a portage at Chicago to the Mississippi watershed at the Des Plaines River (which borders Midewin). They found a number of indigenous groups in the area, including the Sauk, Fox, Kikapoo, and Potawatami. All that remains of these groups now are three burial mounds on the site, the name Midewin (from an Algonquin term meaning 'healer'), and remnants of the ecosystems they maintained.

Over the next 150 years, the biggest change at the site was the precipitous decline of the indigenous communities. Very few European immigrants settled in the area, because they considered the grasslands a form of near desert, inhospitable to their agricultural practices. By 1832, after considerable conflict, the army of the new United States of America established control in the area, and indigenous culture finally disappeared. Eventually, by 1850, the new settlers finally discovered that the soil was extremely fertile.

Agricultural development happened quickly in order to support both the rapidly industrializing city 40 miles north and west, and the coal fields nearby, in Coal City and Carbon Hill. With the civil war, coal brought extensive railroad development to the area, which, with the shipping lanes of the Des Plaines River, connecting to Chicago and New Orleans, meant that this sparsely settled site was dense with transportation infrastructure.

Almost always industrial in scale, agricultural production radically altered the landscape, as creeks were channeled and the land was tilled and drained. Then in June 1940, just after spring planting, the families who farmed the site were given 30 days to leave because the US Army had appropriated over 36,000 acres for a munitions factory that would supply both fronts during World War II. Fourteen months later, munitions were in production, after the construction of over 1,000 buildings and 200 miles of roadway.

The new Joliet Army Arsenal would employ over 10,000 people and produce billions of pounds of explosives a year. Towns adjacent to the arsenal grew, and new immigrants from the south, part of the Great Migration, would establish a large community of African Americans in Joliet, the small city

5 miles north. The interstate highway system soon looped around and through the site. Route 66, running north-south, divided the arsenal in two, while Interstate 55 was built at its western border and Interstate 80 was located 4 miles north.

By 1976, at the close of the Vietnam War, the Arsenal had shrunk to 23,000 acres, and it was permanently closed, contributing to growing decline of industrial production in the region. It wasn't until 1993, however, that the Army considered turning the land over to other uses.

After a long and complex series of public deliberations and political debate, the decision was made to divide the area into four uses: an Army training ground, a new national cemetery, two industrial parks covering 3,000 acres, a 450 acre landfill, and the first National Prairie, created to protect an extremely rare ecosystem (the dolomite prairie, one of the rarest ecosystems on the planet³), and some endangered species (the northern harrier, Henslow's sparrow, the eastern prairie fringed orchid, and the leafy prairie clover) found on the site.

Embedded in the historic context of the Joliet Arsenal, the Prairie's existence emerges from the desire to 'preserve' a landscape that doesn't exist, part of a popular movement linked to some of the earliest studies of ecosystems and succession, at the nearby Indiana Dunes on Lake Michigan. Almost exactly 100 years ago, the Dunes became the site of intense ecological speculation by Leopold and other early ecologists, along with a popular movement lead, in part, by Jens Jensen, whose 'nativist' version of the English picturesque garden design would influence Wright, and even Mies.

After the National Park Service refused to take the site, the Forest Service accepted responsibility, and the Midewin National Tallgrass Prairie was established by law in 1996. The Forest Service began to open limited areas of the site to the public 2004. At this point, Midewin was at the center of the fastest growing suburban area in the Chicago region. Three different nuclear power plants are nearby, Braidwood, Dresden and LaSalle. One of the industrial parks created on arsenal property became the 2,500 acre Centerpoint Intermodal Center, employing 2,300 workers, with warehouses for WalMart, and other major consumer good retailers. Two refineries are adjacent to the intermodal center.

The Will County landfill, embedded in the southern border of the site, only open for four years, now towers over the landscape, the highest point for miles. Approximately 4,000 military veterans and their spouses are now buried in the national cemetery. These new complexes of a consumer economy frame the national prairie, but don't stand in contrast to it, at least for now.



4. RESTORING CHANGE: NEW STRUCTURES AND FUNCTIONS

When the Midewin was established, only about 2,000 acres out of the 20,000 acres controlled by the USFS were undisturbed prairie. The remaining acreage was either highly contaminated by the munitions operation or leased out as grazing land. The first national tallgrass prairie, was, at best, a tallgrass prairie in name only, and would require an unprecedented level of restoration. By the summer of 2008, there were 7,200 acres accessible to the public⁴, most of which were trails through remediated but not restored terrain. The development of the prairie has been delayed by the long and complicated remediation of most of the site by the Army Corp of Engineers, which has been declared complete on three separate occasions, only to resume once more toxic materials or live explosives were found. It has also been delayed by the extent and ambition of the restoration, which seeks to restore ecological function as well as biodiversity. Most people involved in the effort think the process will only be complete by the early 22nd century.⁵

The restoration process to date has been both a deliberate, straightforward enterprise and a process of trial and error. The development of 140 acres of native wildflower and grass seedbeds began immediately in 1996. Then, in areas where the Army has completed remediation, invasive species are removed, the hydrology is 'naturalized' in some manner, and native seeds are introduced. Fueled by 6,000 hours of volunteer work each year, after 10 years of effort, about 1,500 acres or just over 7% of the Prairie's total area was 'restored' to some degree by 2006.

The scientists and designers at the Center for Research in Urban Ecology, as advisors and participants in this effort, in early 2005, proposed a program for an experimental landscape, in order to put some of the unrestored agricultural acreage to use as a site for ecological investigation. Labeled the 'Great Restoration Experiment' (GRE), the proposal also became a way to make the restoration process a public enterprise, extending and amplifying the volunteer and education programs already underway at Midewin. Part of the challenge was to engage both the USFS and its constituencies in a more elaborate understand of Midewin's potential.⁶

Given climate change, the ubiquitous presence of invasive species, and the scope of the effort, a restoration, conventionally understood as a recreation or return to an earlier state, is impossible; Midewin cannot return to a pre-European condition. Part of the mission of the GRE, and its critical public project, is a transformation of what we understand as landscape or ecological restoration. Through the lens of the GRE, Midewin becomes a physical and social infrastructure linking research, education, and the odd beauty of the site, with a new attitude that understands 'restoration' as the restoration of certain ecological functions, not a recreation of an inaccessible past. In this way, Midewin becomes more than an amenity or resource; it contributes to the viability of metropolitan Chicago, emerging as a new infrastructure and a new institution, analogous to the development of the botanic garden in the 16th century or the development of natural history museums in the 19th century.

5. CONTEMPORARY ECOLOGICAL THEORY

Long a steward of natural resources, the Forest Service is reinventing its mission at Midewin. In

the wake of the logging controversies of the 80s and 90s, the USFS has started to shift its focus away from supporting commercial interests, and has moved toward a more complex role as the public manager of a range of ecosystems. While Midewin represents an insignificant part of the 193 million acres controlled by the USFS, it is the only USFS site in a metropolitan area and plays a critical role in the USFS's attempt to reinvent itself. In the words of Logan Lee, the US Forest Service officer who supervises the prairie, "Midewin was set up to answer the big questions."⁷ This willingness to speculate complements both the scientific and cultural mission of the GRE, and marks a lucky coincidence of political potential, a cultural desire for new understandings of environments and metropolitan life, and emerging models of ecological theory and practice.

Many theoretically-oriented ecologists would say that there are three broad areas where contemporary scientific practice transforms itself, and fundamentally effects a radically new model of biological processes. This model of nature creates an epistemology at odds with Darwin's assumptions, or even the perspective of relatively contemporary people like the sociobiologist, Edmund Wilson. These differences can't be said to form a coherent, unified theory, but they all derive from an embrace of indeterminacy, risk, disturbance and change. As LaTour and Plonitsky's work has pointed out, this also is about a new kind of subjectivity for scientific practice that happens when everyone realizes that every act of measurement profoundly changes the system being investigated.⁸ The dream of objective knowledge is over, and that happy security once afforded by the scientific method is as much an artifact of the past as Ptolemaic universe. You might say that the contemporary understanding of ecology abandons the kind nurturing figure of Mother Nature for a witty, speculative investor who has a cool passion for gambling on disruption and change.

Contemporary ecological thought challenges conventional understandings of nature along three broad dimensions.⁹

First, research practices that relied upon isolation and reductionism have been transformed into integrated investigations of systems. The isolation of the lab is being abandoned for the integration of

events, resources and conditions found in the field. Extensive examinations of networks and webs are supplanting conventional pair-wise interaction experiments. The assumption that abiotic systems are determined and discrete has been abandoned for the careful accounting of reciprocal abiotic-biotic influences. Simple models of linear causality have yielded to models characterized multiple causality, non-linearity and feedback.

Second, contemporary ecology has been forced to work with complex dynamics, and to abandon theories depending upon the balance of nature. New models of ecosystems assume that dynamics operate at all spatial and temporal scales, and must encompass both invariance and change. For example, successional models of ecosystems need to operate with multiple trajectories, in a temporal flux, sometimes moving backward, and jumping from one temporal pathway to another. What was once a largely non-spatial account of biotic processes has become profoundly spatial—from the spatial variations of patch dynamics and functional landscape mosaics, to the necessity of open cycles and loops of interaction in ecosystems. (Otherwise known as ecosystem openness.) While some of these characterizations echo complexity theory and the science of quantum systems, there are some particularly ecological issues, such as the reformulation of the role of structure in ecosystems. Once thought of as static frameworks for the flow of energy and resources, the structure of ecosystems has been transformed gradually, first to a notion of structures as processes, and more recently to the interplay of structure and function.

Third, and last: contemporary ecology has abandoned the notion that there are separate discrete realms dividing human life and culture from biotic and abiotic processes. At the very least, most biotic processes we know are now coupled to some extent with the processes of human life and culture. Human well-being and tangible (e.g., food, fiber, fuel, climate, disease storm impact regulation) and less tangible (e.g., moral, spiritual, aesthetic, recreational, educational) goods and services are produced by biotic systems. It is simple: as we create climate change, humans drive ecosystem processes across the planet.

Earnest talk about sustainability is simple self-interest, and veils a more radical reality that will

force us to change how our culture relates to its environments. For some contemporary ecologists this necessitates a form of direct engagement and manipulation of ecosystems that will enhance, rather than just maintain biological capacity and ecosystem services, a radical merger of 'nature' and culture. These strategies would mean maintaining and building natural capacity (regarding these resources as capital), replacing 'biological' work for unsustainable energy and materials, explicit use of natural processes rather than being inspired by or informed by 'nature's wisdom,' and guidance or "piloting" not the illusion of deterministic control. These models of ecological understanding are very different from contemporary practices in sustainable design, which, for example, deifies stable 'closed-loop' systems, and ignores human behavior.

Obviously, design discourse has been throwing around terms like 'bio-mimetic' and ecological design for a very long time without a corresponding theory or sense of rigor about the terms. At the very least you could say that work and discourse tends to sit either on the side of immanence (such as Sullivan's work in the 1890s, and Lynn's work now), where a design genetics creates a self-generating, self-referential system, or on the side of a kind of transcendence that responds and conforms to larger ordering systems (here we have appeals to the organic, technological change, and sometimes, complexity theory mixed with new age capitalism). Neither position--immanence or transcendence--is tenable. If, as Osman puts it, "Ecology was modernity's replacement for an ideal nature."¹⁰ what happens when we replace the idealized 20th century ecosystem with a messy, unpredictable assembly of 21st century ecosystems?

6. ECOLOGIES AS INDETERMINATE INFRASTRUCTURES

"Nature is design."¹¹ Daniel Botkin, ecologist and historian.

Ecological succession assumes that new worlds will come into being. Landscape scale 'restorations,' like the development of Midewin, invent new worlds through human intervention, as ecosystems are created through artificial means. Design also invents new worlds, and its disciplinary expertise in visualization, fabrication, modeling and com-

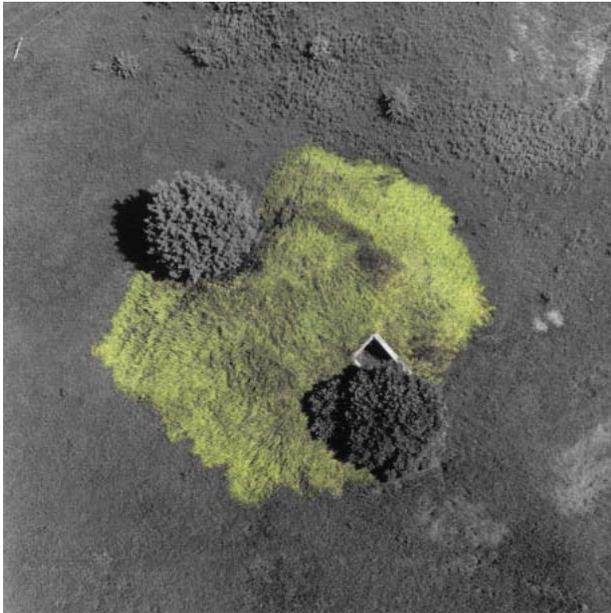
munication can make change legible, tractable and engaging. The current spectrum of conventional landscape planning and management strategies, ranging from preservation, conservation to restoration, can expand to embrace the invention of 'new worlds' and the enhancement of natural systems. Although a ready-made public discourse about restoration and preservation of an idealized 'native' landscape created the idea for Midewin, a new politics of invention is necessary to realize and manage a new form of prairie. One critical ecosystem function is restored however, and that's the inescapable link between human management and the existence of the prairie.

Designing infrastructures and buildings as elements of dynamic ecosystems asks for an amplified sense of scale across terrains, time and other measures. Singular notions of time and place fade away, as design logics engage integration, adaptability and accessibility in response to risk and change. This is not an expansion in scope, a change in technology, or the appropriation of a new domain for the design disciplines, instead, it is a sensibility or mood, that finds beauty in the nature of artifice, and artifice in nature.

This sensibility or mood aims to extend to styles of life, forms of experience, and material realities through a cool reciprocity with the virtual or speculative. It's not bio-mimicry or bio-philia, it's not about imitating or idealizing nature. It's an understanding that relations shape our lives more than objects and their boundaries. For example, the soft matrix of the prairie is distinct from the bounded enclave of the English park. The experience of a grassland is about shape and saturation, not mass or volume. The vague specificities of prairies open up an aesthetics of vastness that has to do with texture and atmosphere, not the sublime or the scenic. Imagine ecosystem infrastructures that create immersive and participative forms of spectacle, with an ambiance that's almost cinematic. Cultivating this understanding of the role of change and risk in ecosystems can contribute to a form of public life that is more plastic, less dependent on static understandings of identity and interest, and more cognizant of the environments and circumstances which create public life.

At Midewin, the program for experiment demands that we engage uncertainty and chance. Extend-

ing that openness to the public interface of the project means we have to extend the operation of the project beyond conventional displays and dissemination of information, and begin to think of the process of public engagement as an experiment in and of itself. The critical questions are not technical, they are social, and possess the qualities that Allen ascribes to infrastructure: a reciprocity that creates its own grounds, and a flexible, 'anticipatory' regulation of various flows.¹²



7. HAIRY TOPIARIES AND EXTRA EXPERIMENTS

"Midewin isn't polished or even finished, but it doesn't really need to be."¹³

As the Forest Service's mission turns to ecosystem services management, there is both a pragmatic and broadly cultural challenge to designers to conceive of these 'restoration' projects as the restoration of ecosystem function and a new form of public infrastructure. It's not about the nostalgia for a pure and mystically spiritual 'native' past, that inspired the Dunes pageants of the early 20th century. Instead it is a fluid politic of feedback and change, with an attitude that regards restoration as a continuous project of the development of new forms of ecosystem services, a 'designed experiment.'¹⁴

At the GRE, our approach will link speculation with the spectacle of the old Arsenal's abandoned frag-

ments of infrastructure to shape images and landmarks that cut across existing constituencies and produce a broader range of stakeholders. Each component of the project will attempt to exist within the odd, superposed prairie scale, where a texture is foregrounded against a background expanse, and the middle ground is forgotten.

An existing munitions bunker array built for the arsenal will be repurposed to serve as storage and shelter, and the experimental site will organize itself in response to the scale and repetitive character of the bunkers. The experimental plots, known as enclosures, will be approached through walkways organized along new seedbeds or enclosures, planted as intensive monocultures. The enclosures will refigure the scale of the grassland, and link to the odd and endlessly engineered topographic swells of the bunkers, setting up a series of figures in the site we call 'hairy topiaries,' visible from Route 66 and airplanes passing overhead.

While the hairy topiaries are fixed links to the history and material life of the site, a series of 'extra experiments' will make those images and landmarks accessible off site through a range of 'social experiments' placed alongside the experimental plots themselves. Curated by the USFS, these sites would engage questions outside the proper domain of science, and link the GRE to the broader mission of the national prairie directly. These experiments would attempt to make change and variation in the environment legible and open to understanding in educational and cultural experiments that parallel the ecological experiments.

8. MARVINIZING

Can we Marvinize Midewin? When he's singing "Mercy mercy me," Gaye's praying, he's asking for something—forgiveness, agency, knowledge, relief. Gaye reinvented the Motown R&B formula as a new mode of political expression, an extreme version of the personal as the political, seductively registering the effects of conditions that stood indifferent to the self, to any sense of autonomy or psychic coherence.

It's not the words—the meanings—that matter; it's the paradoxical and irresistible sticky cool of the R&B player. His performance and production of the song situate the sound of a voice in a particular

condition; covers of the song make it clear that a conventional rendition of the moralizing tone of the lyrics fall flat.

Gaye's performance—his vocalise, as one composer describes it¹⁵—is a claim to a certain relationship with the world. He doesn't rely on legislation or ownership. Instead he broadcasts a cool but intense intelligence about this intimate relationship he can't escape or control. He understands its pleasures, and knows he's dependent and responsible at the same time. His performance effects a new sense of an ecology, and suggests a mode for an infrastructural urbanism that doesn't need nostalgia or moralistic purpose but that instead seeks forms of relation that engage the multiscale, adaptive, reciprocal and dynamic interplay of structure and function in ecosystems. Or, to paraphrase Bateson, he's making a cool performance of the ecological,¹⁶ that's public and personal, seductive, serious and sweet, all at the same time.



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