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I, ___ Brian Timothy Ringley ___

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___ PERIPH FLUIDE: Siege Tactics in Architecture ___

___

Student Signature: ___ Brian Timothy Ringley ___

This work and its defense approved by:

Committee Chair: ___ Rebecca Williamson, PhD ___

___ Vincent Sansalone, MArch ___

___

Approval of the electronic document:

I have reviewed the Thesis/Dissertation in its final electronic format and certify that it is an accurate copy of the document reviewed and approved by the committee.

Committee Chair signature: ___ Rebecca Williamson, PhD ___
PERIPH FLUIDE: Siege Tactics in Architecture

A thesis submitted to the
Graduate School
of the University of Cincinnati
in partial fulfilment of the
requirements for the degree of

Master of Architecture

in the Department of Architecture
of the College of Design, Architecture, Art, and Planning

by

Brian Timothy Ringley

BS Arch University of Cincinnati
June 2009

Committee Chair: Rebecca Williamson, PhD
Abstract

Throughout history the city wall has evolved in response to technological innovation and topographical serendipity. It has mutated from an integrated element of the urban fabric into an autonomous structure that blurs nature and artifice.

Though defensive infrastructure has long ago evaporated into the electro-magnetic spectrum of defensive radar and satellites, in many European cities its presence remains through urban artifacts. The most consequential of these traces are those of transportation infrastructure.

_Périfh Fluide_ is about the relationship between the defensive infrastructure of the past and the transportation infrastructure of today, specifically their shared role as a barrier to the movement of the city. The research aims to subvert this barrier by questioning our notions of nature and technology, primarily achieved through architectural siege tactics.

Architectural siege tactics avoid outdated notions of dominion over nature and centralized planning by acting as situational path-making tools, propelled by the energy of ballistics. Just as innovations in _ballista_ were the primary design driver for defensive infrastructure, the ballistics of the highway, automobiles, are harnessed to alter the very landscape they inhabit. Displaced material from excavations self-organize into additional path-making forms as a recollection of the earth-moving central to fortification design.

Rooted within the tangled knot of Paris’ Bercy Interchange, Periph Fluide is the provocation of a fluid urban periphery and a proclamation of the new relationship between the city and its surrounding landscape.
Contents

Committee Approval Form ... ... ... ... ... i
Title Page ... ... ... ... ... ii
Abstract ... ... ... ... ... iii
Table of Contents ... ... ... ... ... v
List of Illustrations ... ... ... ... ... vi

PERIPH FLUIDE ... ... ... ... ... 001
Glossary of Terms ... ... ... ... 002

Defensive Infrastructure ... ... ... ... ... 004
Topographical Serendipity ... ... ... ... 007
Defense-in-Depth (3rd Nature) ... ... ... 009
Mud City: The Poliorcetic Phylum ... ... ... 011
Urban Artifacts (Zone of Servitude) ... ... ... 017
VICTIM Hydrology ... ... ... ... ... 023

Siege Tactics ... ... ... ... ... ... 024
[Manuel De Landa’s Missile-Throwing Engine]

stage 001: propulsion
Supernatant Strategies ... ... ... ... ... 027
[aim]

stage 002: ballistic
Psychographical Machines + PeriFERAL Ecologies ... ... ... ... 029
[fire]

stage 003: impact
Hol(e)y Space ... ... ... ... ... 031
[trench]

stage 004: detritus
The Rooster Tail ... ... ... ... ... 035
[escalade]

Post-Script: Clinamen Urbanism ... ... ... ... 036

Bibliography ... ... ... ... ... ... 043
List of Illustrations

p. 006  f. 001 typical evolution of a river (author)

p. 008  f. 002 siege tower (Viollet-le-Duc, author)
        f. 003 Siege of Venetians 1668: example of tunneling (Duffy, author)
        f. 004 Siege of Ath 1697: negotiation of visibility (Croix, author)

p. 010  f. 005 evolution of city wall in Paris (author)

p. 012  f. 006 fortifications of Thiers (author)

p. 014  f. 007 RER and Les Halles turn Paris into a donut (author)

p. 016  f. 008 radar
        f. 009 Palmanova: the inhabitable portion of the city is dwarfed by its peripheral defensive infrastructure (Croix, author)

p. 018  f. 010 wall of the Fermiers Généraux: urban artifact (author)

p. 020  f. 011 le Périph: urban artifact (author)

p. 022  f. 012 Bastion #1: sign advertising Puits VICTIM (Rebecca Williamson, author)
        f. 013 TIMA schemes by SIAAP

p. 026  f. 014 turbine component: structure + skin + PV (author)
        f. 015 turbine system: highway + structure + skin (author)

p. 028  f. 016 metamorphosis of periFERAL ecology as it digs into a median space (author)

p. 030  f. 017 “He Shot Me Down” (R&Sie"
        f. 018 section: tunnel possibilities (author)

p. 032  f. 019 site plan: turbines + holes (author)

p. 034  f. 020 Afasia 1: paranoid anticipation at 600km/sec (Arcangelo Sassolini)
        f. 021 Afasia 1: form through detritus (Arcangelo Sassolini)

p. 038  f. 022 turbulence: plan-sections through Bercy Interchange (author)
        f. 023 turbulence: plans of Von Karman vortex street (Gustavo Assi)
PERIPH
FLUIDE
SIEGE TACTICS IN ARCHITECTURE
Glossary of Terms

approaches
trenches methodically dug to remain under cover fire

vattack
collective body of trench approaches directed toward the points of bastions

vartifact
handcrafted as opposed to being formed by natural processes; found object that shows the mark of a maker; spurious result of an experiment often resulting from the experimental process itself

v bachelor machine
ambiguous structure designed for the simultaneous communication of ecstasy and death; the bottom portion of Marcel Duchamp's Large Glass; proto-CNC machine featured in Franz Kafka's Penal Colony; symptomatic of a general movement in art to obfuscate or eliminate the visibility of the artist's hand in the work

wallistic
the projection and subsequent motion of missiles; the second of Manuel De Landa's three stages of a missile-throwing engine

v bastion
double-flanked triangular projection from defensive infrastructure to house and protect missile-throwing engines

camouflage
charge from explosives in the chambers of the countermines; subterranean cavity created by that charge

circumvallation
construction of defensive infrastructure; architectural response to a siege

vicinamen
inclination; indeterminate swerve and subsequent collision of atoms that serves as the basis for nature's existence as described by Lucretius

vc counter-approach
defensive trenches dug toward siege works by the defenders of the besieged fortifications

vc countermining
subterranean passage dug under offensive trenches by the defenders of the besieged fortifications; often incorporated in the original design of the fortifications; may contain chambers filled with explosives

vc counterscarp
slope from the bottom of the ditch to its outer rim; landscape element preceding the glacis in a defensive infrastructure

vdéblai
detritus material dug from the trenches; the space created by the removal of that material

vdétour
diversion or highjacking; Situationist (mis)appropriation of a familiar medium to create a new meaning that often runs contrary to the original

vdétritus
mass produced by the wearing away of a material surface by fluid movement; any accumulation of debris

venceinte
fortified enclosure; French for pregnant; "body of the place"

v escalier
cut into an earthen surface; furrow

v escalier
slope from the bottom of the fortification wall down into the bottom of the ditch; landscape element preceding the counterscarp in defensive infrastructure

verial
deadly nature; untamed animal or uncultivated ground; often (re)lapping into such a state after initial domestication

vflow
mass that moves in a stream; gradual deformation of rock without fracture or a loss of material wholeness

vfluid
particles in free flow that give way to any pressure

v glacis
gently sloping bank emanating from the counterscarp and extending the defensive infrastructure in order to meet with the natural surface of the ground, allowing the whole of the surface to be swept with defensive fire; alienating socio-spatial system that arises as a fringe condition of the city

vhoi
hoi full of holes; Deleuzian state between smooth and striated spaces as embodied by subterranean passage

v invisible
pertaining to the shore; fluctuating boundary produced by the changing tide as emphasized by Paul Virilio in the overturned Nazi bunkers of Bunker Archeology

v machine
structure designed with explicit purpose; military engine or siege-tower; the war machine of Gilles Deleuze and Félix Guattari; literary contrivance introduced in a narrative for the sake of effect; structure for transportation or conveyance; a motor vehicle

v maiglstal line
primary line of a defensive infrastructure

v out(e)er works
defensive infrastructure beyond the magistral line

v poliorcetics
science of the siege; "taker of cities"

v profile
section taken through defensive infrastructure

v remblai
deblai used in construction of defensive infrastructure

v rooster tail
flow of detritus projecting from CNC milling bit; (often undesirable) artifacts of cutting tool on material surface

v sieg(e)
the seizure of an urban area by the cutting off of flow into or out of that area

v strategy
organization of a series of tactics toward a greater purpose; highest element in Manuel De Landa's hierarchy of the machinic phylum

v tactics
serial use of military tools; middle element in Manuel De Landa's hierarchy of the machinic phylum

v trajectory
description of a curve by a missile's projection

v trench
cutting or digging into an earthen surface; furrow

v tunnel
subterranean passage; drain

v turbulence
violent agitation of fluid flow

v vessel
structure designed to traverse water; tube or duct by which fluids are circulated through the body

v vortex
rapid movement of particles around an axis; swirling mass of water

v vortex street
vortices created at the boundary of multiple fluid masses with differing velocities

v wake
mark left in a surface by a vehicle; often in contrast to what was previously smooth

v zone of servitude
area beyond glacis where non-defensive architecture is forbidden

PERIPH FLUIDE

Penal Colony; proto-CNC machine symptomatic of the counterscarp in defensive infrastructure; French for pregnant; "body of the place"

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Part One
DEFENSIVE INFRASTRUCTURE
The most important initial consideration in fortification design has never been the material comprising the wall or the geometry of its arrangement, but rather the topographical quality of the site. The site of fortification, (which is the site of the city, for the two are inseparable until the advent of modern weaponry), is often selected on the basis of its defensibility. Aspects of the landscape, such as bodies of water or steep slopes enveloping a territory, can be seen as the beginnings of a fortification system; nature yet to be manipulated into performing toward the purposes of man.

It is well known that man largely existed in a nomadic state prior to the onset of agricultural societies, but it is less accepted that the landscape is a migratory organism as well when considered over a geological span of time. Rivers generally follow local topographical minimums, but any deviation from a straight line, (any *clinamen*), is exaggerated when the river runs through relatively level territory. Convex runs of water erode the outer banks while concave runs build up inner banks with silt, resulting in larger meanders. Through a process called avulsion, the base of the meander is eventually cut off from the river, leaving crescent-shaped lakes as artifacts of its movement.¹

Prior to man's permanent settlement of the Ile-de-France region, the Seine most likely slithered across the landscape like a serpent, eroding the earth with its current, rebuilding it with soot, merging with other rivers and splitting off from itself. It's conceivable that the Bièvre River, which connects into the Seine from the south, once ran where the Seine is now, only to be aggressively merged with, and then overtaken by, the Seine. Later the Bièvre was diverted for agricultural purposes in the days of the city wall of Phillipe-Auguste² and subsequently buried under Paris during its expansion. Today the public and city officials alike are calling for the uncovering of the Bièvre. This is a sign of the collective desire of Parisians to relate the city back to its founding landscape.

One of man's greatest misconceptions of urban settlement is that it must exist in opposition to the nomadism of the ground; that an established city permanently fixes its respective landscape in place. This mentality inevitably translates to man's conception of his own movement. The lateral movement of the Seine has been restricted throughout much of modern history as a result of the infrastructural motivations of man, who, in doing so, has thusly chained himself.

¹ http://geology.about.com/library/bl/images/blrivermove.htm
² http://en.wikipedia.org/wiki/Bièvre_River
Prior to the powerful and accurate missiles of today that have forever changed the form of defensive infrastructure, taller curtains of stone were favored in fortification design. However, these walls presented dilemmas in defensive visibility. Because of the difficulty in seeing and thus protecting the exterior base of the wall from the interior bulwarks, attacking soldiers were able to tunnel beneath the walls. Two early solutions to this were the implementations of the projected gallery and the corner tower. The former is a box perilously cantilevering over the scarp and moat allowing for the release of projectiles through the floor, while the latter was perforated with arrow slots and constructed at intervals of twice the distance of an arrow’s shot, allowing for the full defense of each curtain section. Despite their drawbacks, tall walls were useful in the protection from arrows and the staving of escalades.

Escalades, or acts of soldiers climbing over the tops of the curtains, were performed at great risk to the offensive armies and came with an architectural apparatus all their own. In addition to more basic acts of mounting tall ladders, siege towers were employed as an act of architecture taking architecture en face. Siege towers were multi-storied, often equipped with a battering ram at the base, and covered in wet animal skins to resist the flaming arrows deployed by the defense. In response to siege machinery such as the siege tower, the catapult, and the trebuchet, defensive infrastructure began to manipulate the form of the earth, such as the moat, the glacis, and a whole host of outworks in order to make the terrain treacherous for the navigation of siege vehicles and optimized for defensive visibility.

As heavier and more accurate artillery missiles exposed the impotency of impact-absorption in stone curtains, the fortification wall transformed from a masonry to an earthen construction. The objectives for fortification design became primarily concerned with lowering visibility (to counteract the accuracy of the rifled gun-barrel), increasing the depth of the system (meaning more difficult feats of trajectory for the offense), and using geometry to calculate the most efficient design in terms of lines of fire and sight and impact control. This pivotal moment, in which defense-in-height succumbs to defense-in-depth, makes evident man’s blurring of nature and artifice.

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First Nature
That nature which is untouched by man. It is arguable that First Nature only exists as a concept.

Second Nature
That nature which is human artifice, such as architecture, transportation infrastructure, and automobiles. This is typically considered to be culture, though if one considers that man is a product of nature, so too must be human production.

Third Nature
That nature which is First Nature re-ordered by the will of man, such as the large-scale manipulation of landscape and extravagant gardening or agriculture. This is typically considered to be nature, though man has almost always had a hand in its manipulation.

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The term phylum primarily refers to a similarity in biological form resulting from shared lineages in evolution. This meaning can be extended to a vocabulary of operations (expansion, contraction, appropriation, siege, imprisonment, partition, and artifact) common to a type (defensive infrastructure) that results in a diverse but related set of forms.

In the case of Paris, a series of city forms arose, distinct but formally related, in response to the siege. The operations that have induced the evolution of Paris’ city wall can be linked to poliorcetics, meaning the science of the siege and literally translated as the taking of cities. It is the taking of the city (the predator) that spurs the form of the city (the prey). The city makes adaptations for survival no differently than a living organism.

1 http://framework.v2.nl/archive/archive/node/text/.xslt/nodenr-70071
2 Frank William Walbank, The Cambridge Ancient History, p. 56

(b) Ile de la Cité (contraction) mid-3rd century CE
This early city wall is constructed by the Romans under Saint Genevieve, the patron saint of France, as a retreat from an invasion by the Huns. It is constructed by the fire-blackened detritus of the Rive Gauche Parisii settlement of Lutetia (a), the city that “sprang from the mud”.

(c) The Philippe Auguste Ramparts (expansion) 1180-1225
King Philippe II constructs a new wall in response to the need to fortify the city. It is the first instance of the wall used as a tool for expansion, as the city has outgrown Ile de la Cité onto both banks of the Seine.

(d) King Charles V (appropriation) 1367-1370
Charles integrates the previously detached fortifications of the Bastille in the East and the Louvre in the West into the city wall.

(e) Expansion of Henry IV (appropriation II) 1589-1610
Henry extends the fortress westward from the Louvre, joining it with the Palace of the Tuileries.

(f) King Louis XIV (siege) 1670
Louis XIV’s notorious distaste for Paris has left the city’s destiny in the hands of his minister Jean-Baptiste Colbert. Paris becomes an open city for the first time in its history when the city walls, which have expanded tremendously, are torn down, a concession by Colbert that la banlieue is already part of the urban landscape.

(g) The Wall of the Fermiers Généraux (imprisonment) 1785-1789
Louis XVI’s wall is built to tax the flow of goods between Paris’ city limits. Designed by Claude-Nicolas Ledoux, it includes sixty-two tollgates called barrières. In 1795 the National Convention divides Paris into the first through twelfth arrondissements.

(h) Original Arrondissements (partition) 1795
Much of the Wall of the Fermiers Généraux is destroyed during the French Revolution. The National Assembly divides Paris into twelve administrative districts in order to better manage the city.
Under the reign of King Louis Philippe, Adolphe Thiers designs a fortification system of ninety-four peripheral bastions and seventeen detached forts that spread the zone of servitude to upwards of two miles beyond the magistral line.

While razing the Wall of the Fermiers Généraux under the direction of Napoleon III, (or at least what little of it remained after the destruction of the Revolution), the thirteenth through twentieth arrondissements are annexed through the urban dictates of Baron von Haussman. The spiraling arrondissements of Paris become one of the most telling features of its tendency to territorialize.

The bastions of Thiers are demolished by the July Monarchy and replaced by urban artifacts such as parkscape, athletic facilities, and low-income housing. This is primarily in response to Paris’ continual housing shortage, though the buffering of the city from the future highway (and the suburbs) were taken into consideration as well.

The RER, along with the pre-existing regional train system, directly links the inner city with the suburbs for the first time, (though this link is largely subterranean). The periphery becomes donut-shaped as the primary exchange between Paris and la banlieue begins to occur at the central station of Les Halles.

The government constructs a highway system atop the residual space where Thiers’ bastions once stood, making Paris’ boundaries explicit once more.
f. 007 RER and Les Halles turn Paris into a donut (author)
f. 008 radar
"Curtains of radar may be seen as a modern day mutation of the old fortress wall of earth."
Manuel De Landa

As the power, accuracy, and speed of missile-throwing engines have improved in contemporary warfare, defensive infrastructure has increased its own level of sophistication by developing real-time radar detection, night vision, and x-ray technologies. This aggressive positive feedback loop continues to feed an arms race that threatens to spiral out of control in its systematic elimination of time and space in war.

The most pronounced effect of the ballistic-defense feedback loop is that defensive infrastructure has altered beyond physical form. We have entered an age of real-time ballistics, an age in which weapons can be fired instantly from any point to any other point on earth. Virilio's notion* of the fleet in being is critical to our understanding of the current stalemates of cold warfare.

With the full implementation of satellite-controlled laser arms which will travel at the absolute speed of light, the notion of duration is lost. Without duration, there is no terrain to maneuver or to defend. This, coupled with the devastatingly high energy impact of contemporary arms, has rendered physical defensive infrastructure obsolete.

Defensive infrastructure as the visual detection of the enemy has evaporated into the paranoid electro-magnetic surveillance systems of continental radar and global satellite2

However, the physical ramifications of the old city walls have not disappeared in their entirety. As a result of the mark-making of the old circumvallation, there remains a social zone of de-territorialization on the outer edge of a city. This area, traditionally known as the zone of servitude, is a vast tract of land where, historically, civil construction is prohibited in order to maintain defensive lines of sight. From the development of agriculture and the ensuing need to fortify, to the last physical littoral of Nazi Germany’s Atlantic Wall, defensive infrastructure with respect to the zone of servitude has dramatically expanded in depth, shifting its role across history from an integral component of the city wall to an autonomous system of defense no longer associated with individual urban settlements. This widening of the peripheral no man’s land, largely brought on by the positive feedback loop occurring between missile-throwing engines and the defensive infrastructures created to stop them, distances and displaces the urban core from its suburban fringe, effectively creating a barrier between the two.

1 Paul Virilio, Speed and Politics, p. 41.
2 Manuel De Landa, War in the Age of Intelligent Machines, p. 77.
3 Christopher Duffy, The Fortress in the Age of Vauban, p. 299.
The perpetuation of the zone of servitude has allowed for the development of athletic facilities, parkscape, and, most prominently, transportation infrastructure, which can be read as the residual effect of the city wall; in other words as urban artifacts.

These tracings exacerbate the city-dwellers’ alienation by reinforcing the division between the city proper and its suburban counterpart, retarding the growth of the contemporary city, dictating formal routes of entrance and exit into the city, and terrorizing man with the new ballistics of today: the vehicles of the highway.

Today, the urban artifact is ubiquitous in Paris. All that remains of the Wall of the Fermiers Généraux are four gateways and a collection of transportation infrastructures that trace the old enceinte as dynamic artifacts of the old, static system. On ground level, the wall of the Fermiers Généraux has been replaced by a series of boulevards: Courcelles, Batignolles, Clichy, Rochechouart, la Chapelle, la Villette, Belleville, Ménilmontant, Charonne, Picpus, Reuilly, Bercy, Vincent-Auriol, Auguste-Blanqui, Saint-Jacob, Edgar-Quinet, Vaugirard, Pasteur, Garibaldi, Grenelle and the Avenue Kléber. Below and raised above ground level, it has been replaced by the metro lines of the 6, which is predominately Rive Gauche, and the 2, which is primarily Rive Droite.

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4 Horst de la Croix, *Fortifications*, p. 7. Croix describes these artifacts as “urban determinants.” I use the word “artifact” here to understand from which “marks” transportation infrastructure follows in order to get a sense of how it determines the evolution of the urban fabric relative to its historical influence.
The bastions of Thiers, with the notable exception of Bastion #1, are almost entirely wiped out by parkscape and le Périph, Paris’ surrounding highway system. Le Périph connects to the A15 (Cergy / Pointoise) and A1 (Lille / Roissy / Charles de Gaulle) in the north, the A3 (Roissy / Charles de Gaulle) and A4 Marne la Vallée / Nancy / Metz) in the east, the A6 (Orly / Lyon) and A10 (Nantes / Bordeaux) in the south, and the A12 / 13 (Versailles / Rouen), and A14 (St. Germain en Laye / Poissy in the west. This highway exits into Paris via the various Portes de Paris, its off-ramps acting as the contemporary version of city gates.

One should be cautioned against the thought that Paris is no longer a walled city. In fact, with the lack of pedestrian rights-of-way and peripheral urban development, it is in danger of being more constricted than ever. For Paris to be an open city once more, the schism between a Paris Propre and la banlieue must be eradicated in order to learn from Louis XIV’s minister Jean-Louis Colbert: the urbanism of the suburbs shall be recognized and conjoined with the urban core of Paris to form a united and ultimately liberated Ile de France.
Since the settlement of Ile de France by the Parisii people, the water flows of the region have become enslaved, codified, and ordered from First to Third Nature. The Seine, once free to roam the landscape as a naturally evolving organism, was frozen in place, a snapshot of a life cut short. Its counterpart, the Bièvre, completely buried. A city once named for its emergence from a liquid substance rapidly becomes obsessed with its control and regulation.

The sewers of Paris were once the natural streams that flowed from the Seine. Today les Egouts de Paris are the most structured and meticulously organized urban sewers in the world. Most streets in Paris have a corresponding sewer tunnel beneath them, complete with a matching street sign. A phylum of bizarre machinery emerges in order to keep the tunnels clear of detritus. Carts on tracks and watercraft adorned in gears and threaded rods are rigged with flat plates that push the filth out of the sewer tunnels while allowing the water to flow through. A hierarchical step above the sewers, Paris has a regional system organized by the State agency SIAAP (Syndicat Interdépartemental de l’Assainissement de l’Agglomération Parisienne) for managing storm water through a series of linked reservoirs, les Puits, called TIMA (Tunnel de stockage Ivry – Masséna - Austerlitz). To the northwest of the Bercy Interchange lies Puits Vincennes-Charenton, and across the Seine lies Puits Masséna. In one of the latest proposals, the subterranean shafts of the largely dormant Bastion #1 are being transformed into Puits VICTIM, an acronym standing for Vincennes-Charenton TIMA Masséna. Puits VICTIM, or VICTIM Shaft, is where Périph Fluide comes full circle.

In the next section, a series of siege tactics (propulsion, ballistic, impact, and detritus) will take a naturalist attitude toward the re-situation of the highway and its surrounding landscape in order to achieve a coalescence of the urban fabric, and ultimately to question the utility of the highway in the contemporary city.

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*1) Barriers in the urban fabric are unhealthy. It is important to recognize the alienation of the city from the peripheral landscape (turned suburbs) that was caused by the continual widening of the zone of servitude during the ballistic defense feedback loop and perpetuated through land-use artifact.

2) The end of man’s constraints on nature will free the possibilities of landscape urbanism. Nature should not be approached as a static element to be mastered by man but rather as a dynamic organism on a geological time scale from whose flows and energies we build.

3) The solution to the integration of the highway and the urban fabric requires a change in attitude toward the relationship between nature and artifice prior to any constructed change in infrastructure.
Part Two

SIEGE TACTICS

[Manuel DeLanda’s Missile-Throwing Engine]
In Manuel De Landa’s first stage of the missile-throwing engine, the propulsion stage, energy is gathered and released in order to power the ballistic flight of the missile. For siege tactics to work on the site of the Bercy Interchange, there has to be an energy source. In keeping with the tenants of the project, this source is harvested from a natural energy flow without attempting to master and constrain that flow.

Just as innovations in *ballista,* (the various missiles and machinery of the siege), were the primary design driver for defensive infrastructure, the ballistics of the highway, automobiles, are harnessed in order to alter the very landscape they inhabit. *Périph Fluide* is not interested in challenging the existence of the automobile, (it seems common sense that for now the car is something to work with and that a new mode of transportation will eventually arise), but in acknowledging the axiomatic existence of highway traffic as an untapped energy source for the manipulation of the peripheral landscape.

When combined with the natural wind flows off the Seine, the turbulent air deflection off the automobiles is the richest energy source available from *le Périph.* A skin of lightweight turbines, enriched with PV cells for further energy collection, is installed over the points of max speed on the highway. These points are typically the open stretches of motorway between the various interchanges and exit ramps.

The turbines are produced from the detritus of the Seine with a dam already in place, working much in the same way as the old sewer filtration machines of Paris. The ubiquitous waste component of the river (and arguably the world) is the plastic bottle. Once collected in sufficient amounts, these plastic bottles are injected with a PV gel and stamped into helical forms prior to being installed over the highway as turbines.

The energy collected from the rotation of the turbines will be transferred through wiring to the aloof *perIFERALs,* digging machines that characterize the second stage of architectural siege tactics.
De Landa’s second stage of the missile-throwing engine is the ballistic stage, in which the missile is projected from the point of release to the point of impact. The digging machines known as the periFERALs represent pure movement. They are children of the urban periphery that have, at one point, been domesticated and are now free to regain their wild status once more in a triumphant reverse engineering of Third Nature back to First. Powered by the energy pouring forth from the turbine system, they work as insects. This means that work is done as a hive: an emergent, intelligent organism formed by a multitude of simple machines following simple rules; chaos at a lower order giving rise to intelligence at a higher order.

Once powered, what is essentially a glorified auger encased in a protective plastic skin seeks out the nearest median space of the Bercy Interchange. It identifies the periphery of the median, then follows it from its nearest point in a clockwise direction around the circumference until it finds a space uninhabited by another machine. In the case that the entire area of the median is inhabited, it moves on to the next closest median.

Once linked into place, De Landa’s third stage, that of impact, begins. The periFERAL bores down into the earth until it has dug to the height of its own body, essentially the height of a stair riser, in anticipation of human occupation. In what can be likened to a molting operation, its plastic skin cracks open and the CNC component is transferred to the next periFERAL, who starts the process all over again. The auger injects deep into the bedrock to solidify the machine’s position, and the all-terrain mobile components of the plastic skin lift up and become platforms and handrails for human use.

As the periFERALs toward the center of the median space get deeper, they develop a stronger urge to move towards the periFERALs of another median’s cluster, eventually developing connective tunnels between the disparate median craters. It is a relatively slow process, and the total change may take upwards of a decade.

Gilles Deleuze and Félix Guattari

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1 Gilles Deleuze and Félix Guattari, Nomadology, p. 75.
2 Rodney A. Brooks, Intelligence Without Representation, p. 1.
Once the digging process is complete, the storm water from the highway above and the ground water flowing from the Seine below converge to further erode the peripheral landscape. For the first time since the Parisii people fortified the base of Ile de la Cité, the Seine is free again to evolve and affect the urban space of Paris.

The impact stage results in a holey space for the periphery, a “double betrayal” to both man’s attempt to constrain nature (relative to Deleuze and Guattari’s striated space) and nature’s tendency to wander as a vagabond (relative to the nomadism of smooth space).

It is a space that is neither fixed, as the periFERALS and ground water from the Seine slowly erode it over time, nor is it entirely fluid, as the periFERALS anchor themselves into the bedrock to allow for some form of human occupancy.

The impact stage, and later the detritus stage, are representative of the earth-moving typical to the construction of fortifications and largely responsible for the blurring of nature and artifice in the construction of defensive infrastructure. Deblai, the material excavated in the digging of a ditch in defensive infrastructure, is represented here by the earth that is removed from the medians of the highway by the periFERALS. Remblai, the same material renamed based upon its new use as the earthen body of the rampart, is used here in the creation of pedestrian bridges and parkscape over the highway; the escalade of architectural siege tactics.

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1 Gilles Deleuze and Félix Guattari, A Thousand Plateaus, p. 456.
2 Christopher Duffy, The Fortress in the Age of Vauban, pp. 297-299.
f. 019 site plan: turbines + holes (author)
The fourth and original stage of architectural siege tactics is disparate from the others, not only in the fact that it is not mentioned as one of Manuel De Landa’s stages of the missile-throwing engine, but also in that it is not representative of an action, but rather of an object: the waste of the process.

Thinking about the usefulness of waste in the detritus stage is a continuation of the thinking that led to the idea of using highway traffic as energy, typically limited to being thought of in terms of noise, danger, and pollution. This is also the thinking that led to the harvesting of plastic bottles from the polluted Seine for the formation of wind turbines; a fluid material-use strategy to complement a fluid landscape.

Detritus has a potential to create a myriad of forms that often goes unnoticed. In the ballistic sculpture titled “Afasia 1” shown at the Palais de Tokyo’s “Superdome” exhibit, the artist Arcangelo Sassolino uses a nitrogen-powered rifle to fire glass bottles, another ubiquitous symbol of waste, into a wall at 600 kilometers per second. These firings are done at irregular intervals. The resulting unpredictability of the noise of the firing and the impact injects paranoia into the people inhabiting the gallery space. Perhaps more interesting than this ballistic anxiety is the detritus that collects at the base of the impact wall, a emerald mound of glass dust that builds up over time into a seductive form. The deblai of the bottles collect into the remblai of the pile.

The form-making strategy of remblai and deblai are organized into the escalade of architectural siege tactics by the cut and fill operations of the periFERALS. Equipped with a system of conveyor belts, excavated earth is resettled into a series of nets installed over the Bercy Interchange. Over time these piles of earth self-organize into paths and bloom into landscape that the pedestrians of Paris can inhabit and use to navigate the previously perilous highway barrier of le Périphérique.
Post-Script

CLINAMEN

URBANISM
When atoms are travelling straight down through empty space by their own weight, at quite indeterminate times and places, they swerve ever so little from their course, just so much that you would call it a change of direction. If it were not for this swerve, everything would fall downwards through the abyss of space. No collision would take place and no impact of atom on atom would be created. Thus nature would never have created anything.

Lucretius

Périph Fluide recognizes that in order for the urban fabric, urban movement, and transportation infrastructure of our cities to successfully work together, (to become fluid(e)), our attitude toward the relationship between nature and artifice must change. New infrastructures for our cities should work to embrace both the city and the landscape as flexible, evolving organisms that are not defined by the old static forms but rather by the new forms arising out of turbulent flows and energies.

The richness in section of the old defensive fortification profiles could be rekindled in the transportation infrastructures of today by expanding the role of the architect to design not only buildings but also to critically engage landscape design, water management systems, and other civil infrastructures in order to exemplify the best of landscape urbanism. A highway should never be just a highway, and a building never just a building, but each should have a rich, interactive strata of all the systems that give life to a city.

Whether it's the natural swerve over geologic time of the Seine or the Bièvre from their current courses, or the proposed shifting of the peripheral highway landscape into new forms that embrace the future of the city and transportation, the lessons of Lucretius have a place in immersive environmental design today. If there is something to be learned from nature, it is to deviate from the course.

Manuel De Landa, War in the Age of Intelligent Machines, p. ii


