Global Undergrounds

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GLOBAL UNDERGROUNDS

Exploring Cities Within

Edited by Paul Dobraszczyk, Carlos López Galviz and Bradley L. Garrett

REAKTION BOOKS

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Global Undergrounds

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PREFACE:

Global Undergrounds

Geoff Manaugh

The signs are everywhere around us, evidence of another world. A line of drains extends across the sloping lawn of a local park; blacked-out windows on a Brooklyn town house suggest the building is not quite what it seems; the sound of wind blowing out of a hole in the ground of an empty meadow implies the presence of a massive space beneath. We live amid interpenetrating systems of space, knotted topologies that do not immediately reveal themselves but, instead, lurk in the shadows, under streets, below grade. These are the worlds – always plural – of the underground, and they are as tucked away as they are exhilarating to find.

In the autumn of 2013 I talked my way into a press conference held some 60 metres (200 ft) underneath Central Park, heralding the turning on of the first valve of New York City's famed Water Tunnel No. 3. The whole thing had the air of an old-school rave: we were never given an actual address, but were instead told to meet at a specific corner in Manhattan and to look out for a white van. Once inside the van, we were told not to relay any information of our itinerary for others to follow; yet, only minutes later, we rolled up to what was literally just a door in the hillside. You've probably driven past it yourself, if you've gone through Central Park by car. We hopped out, a guard popped open the door – and there, hidden inside like the stage equipment of a James Cameron film, were the elevators. And stairs. And pipework. This was the entrance to a subterranean valve chamber, a control room for the flow of New York City's freshwater drinking supply. Considering how easily this space behind such a simple door could be commandeered, it was no wonder the city wanted to keep it secret.

There we gathered, sixteen flights of stairs down from the surface world, listening to Mayor Michael Bloomberg opine about the long-term value of urban infrastructure. The cavernous, vaulted backdrop of the valve room loomed behind him, cathedral-like, a hydrological super-stadium buried with little fanfare at the literal centre of the city. It felt as though I had conned my way into a water cult, a new Age of Aquarius, an elemental ceremony performed among behemoth machines beneath the streets of Manhattan.

The underground lends itself well to mythology. There is great narrative resonance in going beneath the earth's surface, as if suddenly one's life has come to rhyme with the heroic spelunkers of the ancient world – with Orpheus descending into the darkness for his wife, Eurydice, or, of course, the Renaissance hells of Dante, whose subterranean journey still haunts subsurface explorations to the point of cliché. Hercules went to hell to capture a monster, the three-headed dog Cerberus; Theseus, vanquisher of labyrinths, went to hell to capture women. Even Jesus Christ, if you believe the Athanasian Creed, had his own colossal cave adventure, descending to hell in an act known as 'the harrowing', releasing a crew of

saints wrongfully imprisoned there. It was the ultimate jailbreak.

Indeed, if our cities didn't have undergrounds, we would need to invent them. Even in a subterranea-rich city like New York, urban legends arise of more rooms and corridors beneath our feet. There are the caverns of Grand Central Station, but there are also the mythic cow tunnels of Manhattan's West Side. A fabled bit of NYC food lore, these half-real, half-imagined hallways may or may not have been how cattle were formerly led into Manhattan to be slaughtered. Vague blueprints have even shown up online, purporting to show their location, and the city itself has announced that, if the tunnels are real, they will be subject to historic preservation. The deeper implication here is that, even where cities don't have an underground, somebody will be compelled to come up with one simply to help make sense of what happens above. Tunnels can be matters of faith as much as pieces of everyday infrastructure.

On the other hand, the poetry of descent can often be too seductive for its own good. It is all too easy to be swayed by the romance of it all, and consequently much harder to notice the politics: the fact that the underground is so inextricably associated with the under-represented, the oppressed, the forced-out, the resistant. This is where labour is performed, where the city is constructed, its goods processed, where minions toil and pollution accumulates.

An extraordinary example of this is found in Mexico City, a place of great underground archaeological interest, but also a city falling out of balance with itself: owing to the depletion of groundwater, the foundations of the city are subsiding, throwing off the angles of its sewer system. These pipes and cisterns thus get backed up, unable to flow using gravity as their designers intended. The city has devised an extraordinary solution: sewer divers. Human workers descend blindly into the muck, wearing full-body protective SCUBA gear seemingly more appropriate for deep-sea diving; they are then led from above by attentive technicians, who whisper geographic instructions to them via headphones. Walking through swirls of human waste and subsurface tides of discarded street rubbish, the divers have found corpses, trees and even half a Volkswagen. This is work that literally keeps the city running – or flowing, as the case may be – yet it is work that, almost by definition, remains invisible. The underside of the city is where the detritus goes, where waste, excreta and materials thought to have lost all value collect. Sorting through all that combines the political significance of overlooked urban labour with the strangely Freudian interpretive overlay – or is it undertone? – of the return of the repressed.

At other times and in other places, the signs that something lies below are almost impossible to discern – but the underworld nevertheless persists. Consider the extraordinary example of the English city of Nottingham. Nottingham sits atop a burrower's fantasy: labyrinths within labyrinths of private artificial caves carved from the region's sandstone. Stairways in

the backs of pubs, old cellars below houses, the lower reaches of shopping centres and car parks – all butt up against this hidden world. The vast majority of these nearly 500 caves leave no indication on the surface; there is no particular way or even reason to deduce that they exist. Yet strange signs here and there point the way to small components of the subterranean assemblage – sometimes very literally. For example, in the basement of a shopping centre, amid way-finding signage for shops and lavatories, there is an arrow pointing the way, almost comically, to 'Caves'. Along a handful of Nottingham's residential streets, there are locked steel security doors with no clear connection to the buildings either side; anyone attempting to guess at the purpose of those doors would be hard-pressed to imagine that they actually lead to an old sand mine whorled beneath the city through an elaborate network of old shafts and chambers carved into the darkness below.

I had the pleasure of taking a marathon tour of many of these caves with a Nottingham-based archaeologist. His name, of all things, was David Strange-Walker. Strange-Walker and his organization, the Nottingham Caves Survey, are determined to preserve these neglected underground spaces in whatever form they can – which, for now, means three-dimensional laser scans of their complex interiors. This raises a key point: the artificial sandstone caves of Nottingham are largely unknown outside the city, overlooked even within Nottingham itself, and widely abused by the people who now own them. Strange-Walker pointed out that many businesses and homeowners, learning that they have a cave beneath their foundations, will use that space as nothing more than a private landfill, a place to dump their rubbish. But these are historical artefacts – historical spaces – as much deserving of preservation as any statue in the British Museum.

Put another way, our historical museums are filled with narratively rich, materially compelling human artefacts – but the spaces from which those objects come are equally worthy of preservation and study. Sometimes the space itself is the heritage; in the case of Nottingham – or Cappadocia, or the Paris catacombs – it is history from below.

Other entrances to the underground are carefully hidden – deliberately disguised or camouflaged. Near my own apartment in Brooklyn, for example, is a classic New York brownstone that nevertheless seems a bit odd: the windows are blacked out, almost vampiric, with no light coming or going from either side, and no residents ever seem to step outside. Look closer, by peering through a crack between the front doors, and you'll see emergency transit authority signage inside the front hall. This isn't a house at all, in other words, but an emergency exit stairwell and maintenance shaft for the New York City subway system. The house's roots stretch all the way down to the 4-and 5-line tunnel that runs beneath the East River near by. The implication here is not only that your neighbour's house isn't quite what it seems, but that a New York City town house has the ultimate basement: a deep shaft of stairways that is, in

essence, a private entrance to the subway.

Portals to the underworld abound, of course, and their moments of discovery can be both inspiring and strange. Consider Derinkuyu in Cappadocia, Turkey: a man was simply cleaning out a room in his basement when he accidentally knocked a hole in the wall, revealing one of the largest underground cities in the world hidden on the other side. Or think of the Dupont Circle tunnels in Washington, DC, carved in the early twentieth century by an excavation-obsessed lepidopterist named Harrison G. Dyar; they were revealed only when a truck fell through the street. Those tunnels – located mere blocks from the White House – were initially thought to be connected to a Communist conspiracy. Or flip through the annals of burglary and bank crime, where groups like the 'Hole in the Ground Gang' from 1980s Los Angeles or Albert Spaggiari's crew in Nice pop up like moles beneath safe-deposit vaults, revealing both an uncanny knowledge of those cities' sewer systems and the fact that, even today, there is a vibrant subterranean fervour at the criminal heart of the modern metropolis.

The underground is also a kind of back-up for things that simply can't happen on the surface. Deep physics experiments, such as the neutrino detector assembled piece by piece in an old Minnesota iron mine near the US–Canada border, or the Hadean Hadron circles of CERN, reveal that what we can't find above ground, we simply engineer below. This is also darkly true for survivalist fantasies, which hold that some fiery apocalypse will require us to entomb ourselves if we hope to see the future. According to groups such as 'preppers' – who seemingly look forward to hunkering down after societal collapse – where the surface is blown away, all we'll have is what is left below.

From the mythic to the poetic to the political, what occurs beneath our feet is the secret knotting of the world, and it can be studied as such. This is where surface forms are woven together by camouflaged roots, and where buildings lead to caves lead to mines lead to bunkers in a dreamlike sequence that can be unusually difficult to catalogue. The vertiginous undoing of solid ground is this book's goal and speciality, revealing a worm-eaten world of catacombs and hiding places. Overlooked, romanticized, misused and vital: the underground is filigreed with significance and buzzing with unexpectedly intense activity. It's time to descend.

Global Undergrounds

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INTRODUCTION:

Exploring Cities Within

Paul Dobraszczyk, Carlos López Galviz and Bradley L. Garrett

Cities are sinking. We refer here not to rising sea levels but to the insatiable human desire to dig. Sprawling tendons of tunnels now stretch through the underbelly of every major city on the planet – conduits for transport, utility, communication, shelter and storage.1 The excavation of these spaces, at ever-increasing depths and speed, has changed our lives in ways that we tend to take for granted. This book is a broad collection of eighty stories of underground spaces that moves across every continent and through millennia. It is the most sprawling collection of subterranean stories assembled to date.

Such a book can never be comprehensive, but we nevertheless harbour three clear objectives in compiling these accounts. First, we wish to continue the process of unpacking the history of global undergrounds in the spirit of the cultural historian Rosalind Williams, author of the seminal book Notes on the Underground (1990), making it clear that human relationships to underground spaces have been intimate and diverse through time. We wish to defy any notion of the underground as simply a space of inaccessible functional infrastructure built by other people in other times.2 Second, we want to challenge notions of densely urban areas as the exclusive preserve of subterranea by including entries about underground spaces that might at first seem suburban, rural or indeed rather wild, but where connective imagination facilitates a richer understanding of the urban in an age of unprecedented mobility and network. Third, we seek to invoke subterranean imaginaries in spaces and times that are conceptual or semi-subterranean, or that are yet to materialize, making clear that the emergence of global undergrounds is an ongoing process. Through these three aims, we hope to expand our thinking about what it means to inhabit a world where the material stuff beneath our feet is constantly in flux, where layer upon layer of things, people and substances circulate, dream and dwell. In other words, we want to make it clear that we are all entangled in the subsurface.

Global undergrounds are places of hope, fear, work, memory and resistance – spaces not just tangentially connected to our daily existence on the earth's surface, but intertwined with it, inexorably and fundamentally. While to some, underground spaces are novel, bizarre, foreboding or off limits, the assembly of this collection of work shows that they are nonetheless central to our ways of being in the world and will become more so as cities sink and stretch to accommodate compounding population and materiality. The underground spaces in this book represent breadth and diversity across space and over time, encapsulating both long histories and futures in the making.

We are not alone in our preoccupation with the underground. In what might be termed a ‘vertical turn’, the politics of subterranea is a topic that a range of thinkers have turned increasing attention to. In the words of the urban scholars Stephen Graham and Lucy Hewitt, the ‘flattening of discourses and imaginaries [that] tends still to dominate critical urban research in the Anglophone world’ must be challenged.3 Graham and Hewitt suggest shifting the geographical imagination to underground infrastructure and super-tall structures as a means of combating ‘horizontalism’, a view of the world that recognizes problems associated with urban sprawl, for instance, while often ignoring the many layers of sprawl beneath and above us.4 The driving force behind this concern follows on from the architect Eyal Weizman’s writings in Hollow Land (2007), in which he used the example of the West Bank to describe the increasingly asymmetric warfare taking place around the world. To Weizman, airspace and undergrounds have become some of the world’s most contested spaces.5 Since the publication of Hollow Land, a clutch of new literature has sprung up that thinks through the geopolitics of the vertical.6 Yet much of this work has continued to see subterranean space as space out, over and under what we know – continuing to render it conceptual, forbidden and even exotic, the foreign territory of the ‘other’. The geographer Gavin Bridge has opened out a more politically (under)grounded potential for our engagement with subterranea:

Shafts, tunnels, mines and other holes into the ground serve as conduits connecting the plane of existence (the surface) to a radically different space below. As conduits, their function is to connect – to enable movement by bringing two spaces into relation.7

Bridge’s notions of conduit and connectivity are useful to us in at least three respects. First, we see the undergrounds collected in this book as intertwined spaces: in opening our imagination to the vertical, we do not wish to pitch it against the horizontal, for the cultural entanglements that move along and within both axes are enmeshed and inseparable. Second, conduits also connect places and meaning; undergrounds are vehicles of powerful narratives, from personal stories of labour and descent into shelter to more structural topics that perpetuate asymmetry across class, gender or wealth as we move up and down. Third, undergrounds crystallize one of the functions that is most essential to cities enmeshed in global networks today: circulation. Rather than imagining a separate infrastructure that is solely the domain of urban planners, tunnel and hydrological engineers or labourers (suggesting a sectional understanding of the city where people, goods, capital, information and waste circulate, cut off from the turbulent rhythm of streets and daily life), we want to foreground the connections between space and politics that converge underground.8

Wherever possible, we have tried to collate narratives that are based on experience, and we suggest that in reading this book you remain mobile in your own imagination to envision the underground as a collection of spaces and events in need of chronicling (in a historical

sense), but also as places of connection between surface, subsurface, practice and matter. Matter, as you will read, ranges from effluvia and debris through to human remains, archaeological finds, train carriages, seeds and nuclear waste. Practice covers shelters from war or religious and political persecution; everyday travel; exploration of off-limits places whether through tours or more alternative and alluring routes; both recovering and uncovering hidden natures. This approach moves us away from a sense of sites, surfaces and linearity, and closer to – following the philosopher Peter Sloterdijk's suggestion – spherical constellations of meaning that envisage urban space as an enclosed sphere stretched by shared habitation.9 No other definition better captures the multiplicity of the vast connections and movements contained within these covers. Central to these are the human dimensions of the underground that each entry explores: whether built to escape war and destruction or planned as a conscious critique of time running ever faster, these are spaces that speak of intimacy, enclosure, sharing and dwelling. These are spaces of function and meaning and also spaces of becoming. Product and process merge under the surface through a subtle meld.

Aldwych cables in the GLC pipe subways under the Strand, London.

One very important component of a richer awareness of the underground is a reflection on where we look for the discourses and practices of subterranean space and how they have been transformed in the past. This view tends to privilege those who have the power to plan, transform and manipulate urban space: the architects, engineers, emperors, kings, popes, aristocrats, wealthy merchants, artists and politicians who often have the resources to dig. While we should never lose sight of the important historical contexts of those excavations, there are other stories that can be recovered: testimonies to labour, beliefs, mythology and subversive tunnelling and underground dwelling. The long histories of cities like Rome, Xi'an, London, Mexico, Naples and Paris are as much about processes of sinking as they are about reaching for the skies, not just through the successive stacking of material remains but through the laying of foundations. Recalling the cover of Harry Granick's book Underneath New York (1991), where an enormous hand reaches down from the sky to grab three skyscrapers and pull them up from the ground, we are reminded, at seeing the tangle of wires, pipes, conduits and foundations underneath, that these vertical cities now often perceived from the air do not stop at street level. Indeed, they never have.

The book is divided into thirteen sections: Origins, Labour, Dwelling, Refuse, Memory, Ghosts, Fear, Security, Resistance, Renderings, Exposure, Edges and Futures. Most, if not all, of the entries push us to think about themes not included and work to underscore intersections we had not anticipated. Central to that engagement is a questioning of what we call 'urban' at the porous intersections between nature and culture in cities, suburbs and wilds of various kinds.

How can, for example, a mountain deep in the Arctic Circle in Norway, built to house supplies for a doomed future, be a space that urban inhabitants hundreds or thousands of kilometres away might identify with? Imagining the morose future pilgrimage to the area to collect the seeds of annihilated plants to take back to labs and farms seemed one way. Equally, we wondered whether the storage facility for nuclear waste in the middle of Yucca Mountain in Nevada, a place where Western Shoshone and Western Paiute people came together in the prehistoric past, would ever be as truly 'lost' as its builders hope. We were challenged to think through the ways in which our urban existence inspires the creation of 'wild' places that must remain wild owing to our toxic legacy. How are we to conceptualize an artist's project to stage a unique experience of the cosmos inside a mountain in the Arizona desert? Who does he think will come? What is it he wants them to experience? Is the Swiss–French border near Geneva, where the Hadron Collider is buried, now as urban as a university campus? And is it significant that the Collider was built on the site of a fourth-century Gallo-Roman urban ruin? Questions like these enticed us.

Initially we sought more recognizable connections between cities and the sub-urban. As more implicit entries came in, however, we found that our imaginations were kindled – and there is nothing more you can hope for as an editor. Together, the entries thus comprise a broad approach to the social, cultural, political and environmental dimensions of urban and sub-urban worlds stretching from physical characteristics to meanings, representations and imaginings. Taken as a whole, the entries constitute a survey that fleshes out 'the awareness that we are in a very real sense not on the earth but inside it'.10 It is that insider's awareness that speaks to a more phenomenological sense of 'being in the world' that no doubt bolsters spheres of meanings even as it descends. Undergrounds are uniquely placed as sites of enquiry to provide powerful insights into what 'being in the world' actually means, since that world is, by stretching vertically, becoming more urban for more people on earth.

Our allocation of entries to the thirteen themes in the book might seem arbitrary, given the overlaps inside those spheres of meaning. However, while it might make sense to bring Rome, Cappadocia, Xi'an, Mexico City, Maastricht and Istanbul together under Origins, for instance, we also saw connections to other themes that we could not ignore. The terracotta warriors of Xi'an, for example, made relatively early in history, also speak of labour, dwelling and ghosts. Likewise, architecture – real and imagined – under the East Antarctic ice sheet is as much about bringing to light the construction of nuclear facilities that could never withstand the materiality of ice as it is about the 'environmental front line' that Greenland and Antarctica represent for our own urban futures as that ice becomes ever more vulnerable.11 The themes are also a means to treat less exotic undergrounds, such as metros and sewers, differently. Telling the story of Philadelphia's Broad Street subway, for example, reveals the African

American labour used there and the erasure (whether intentional or not) of their history from that space. The metro in Prague, in turn, spoke to us of memory and resistance, while sewers and drains in cities such as Melbourne and Las Vegas were both shelters and dwellings, places to hide and regroup for better or worse. Significantly more upsetting are the lives of drain-dwellers in Bogotá, where people shelter in sewers from the brutality of the police and roaming death squads on the pavements above – a reminder of the failure of increased security to create a 'cosmopolitan hub of commerce and creativity' in Colombia.12 The underground there revealed a disjunction between rhetoric and reality, as it often does. Spheres of meaning incorporate multiple forces: positive and negative, and anything in between.

And so the list of connections that the entries stress is long and rich, calling forth a vertical imagination that is deeply entrenched in time. Underground spaces are populated with the bodies of workers often invisible in historical accounts or with people who live underground by choice or force. The entries detail the waste that we inhume, from household to nuclear, and that never disappears; the multiple layers of memory, their distinct non-linearity and their manifestation as unforeseen spectres, particularly in the process of spatial rediscovery, the fear of war, death and terrorist attacks. They speak to us of security in an age characterized by surveillance from above – remote but also mundane and part of everyday life – where underground spaces become reservoirs, conduits for traffic, arenas of resistance against aerial attack and drone wars. Resistance, in turn, involves places of social insurgency, but also stories of nature: for example, rivers that resist and survive, subverting the use for which at some point in their history they were intended. We encountered renderings that, perhaps, are more conceptual but no less poignant, especially when constructed by film, newspaper photographs and other media. Media exposure allows us to revisit physical processes of excavation and think through the role of new technology in reworking relationships between bodies and spaces. We found edges that mark out the boundaries of the subterranean from Russia and Cairo to New York, Bratislava and Cape Town; futures that point to past directions but also to novel conjectures about time, environmental preservation and the scientific quest to understand the origins of the universe.

We could have neither seen nor anticipated the wealth of connections that this global survey of undergrounds has laced; yet there is much that cannot be done within these pages. For instance, the non-human underground – spaces carved by elements rather than by people – is outside our remit.13 Similarly, there were cities that we were not able to include or sites about which we found little information or no writer who had experience with them.14 This book may be the most expansive and comprehensive collection of stories of global undergrounds assembled to date, yet, we certainly do not want to claim that these themes represent an exhaustive account of the urban underground; on the contrary, we assert that the

many meanings of the subterranean suggest more – much more – than we could hope to accommodate within the confines of this book. What we wish this book to do as it circulates through the world is less documentary and more aspirational, looking towards a further expansion of the notions of verticality that are beginning to be unpacked in earnest now across the social sciences and humanities.

There is one last aspect of the collection that is worth explaining. A number of entries suggest actual descents underground through holes into tunnels, vaults and bunkers – worlds less fantastical than Lewis Carroll's trippy rabbit hole. However, the entries here share with Alice's Wonderland the qualities of crossing a threshold: through your reading you will, like Alice, meet new characters, discover and explore and in so doing become wonderfully disorientated. Ludvig Holberg's Nicolai Klimii iter subterraneum (Niels Klim's Underground Travels), first published in 1741, went underground long before Carroll did. In the story, Niels returns home to Bergen, having travelled extensively in Europe, and discovers the mouth of a cave at the top of a mountain, known to locals as Flöien. Through it he descends into an unknown underground world, where, having fallen and reached a planet called Nazar, he writes:

This night light comes from the Firmament, which is nothing else than the reverse of the earth's surface, where the hemisphere gives a similar light than the moon casts upon us; so that only consider this, we can say that in the globe under question nights differ little from days, except that during the night the sun is absent, and that this absence makes the evenings a bit cooler.15

Niels's voyage takes him to cities in Nazar where he learns about the character of its inhabitants, their religion, governance and laws, universities, and other more remote places and imaginary beings. But this is a world presented as the reverse – and, we might add, the complement – of the world from which he comes. The light is similar; the journey preserves the familiar moon and sun; nights and days come closer. If metaphorically only, this is the spirit that we hope you find embodied in this book: the familiar made strange, the unfathomable rendered not only present but disturbingly near. We would hope that you, like Niels or Alice, are prepared for the underground to open out to you.

Keeping in mind our ambitions laid down at the outset of this introduction, our aim is to point to, and demonstrate, a fruitful way of exploring multiplicities, one that engages as many different perspectives as can be reasonably gathered; one that is predicated on exploration rather than on explanation. For some, this may seem like an abdication of the responsibility to commit, a revelling in ambiguity for its own sake; yet we believe in an orientation that listens, gathers and assembles rather than orders and makes coherent. We wanted it to be flexible enough to create new and unexpected constellations of meaning for readers. The book is a spherical constellation of urban undergrounds, if you wish. The angle from which you read it is

entirely your choice.

Roseberry GLC pipe subways, Islington, London.

Global Undergrounds

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ORIGINS

The vertical axis has always been principal to the experience of our species: very young children learn the meaning of ‘up’ and ‘down’ long before they have mastered the concepts of ‘left’ and ‘right’.[1] But when did our vertical orientation first result in human-built underground spaces? Wherever we look for the origins of cities – in the Indus valley, Central Anatolia or Southwest Asia (cities that are 4,000, 5,000 or even 12,000 years old) – they often feature burial sites where rituals of death transformed underground spaces into sites of symbolic and material meaning.[2] Early examples are the royal tombs containing offerings for the dead in Mesopotamia, a region often called the ‘cradle of civilization’.[3] Perhaps most spectacular are those contained in the funerary complex near Xi’an in China, where excavations have revealed an army of underground warriors and a moat of mercury.

Although new technology has allowed digging to take place in ways it never has before, it is clear that people were creating underground spaces long before the nineteenth century – the period that is largely viewed as the starting point for the cultural significance of tunnelling.[4] Although the first underwater tunnel was built in about 2160 BCE in what is now Iraq by the engineers of Queen Semiramis of Babylon (connecting the royal palace to the Temple of Jupiter on the opposite bank of the Euphrates), credit for the deed is often given to Marc and Isambard Kingdom Brunel, who built the Thames Tunnel in London some 4,000 years later, between 1825 and 1843.[5]

The urban underground that we take for granted today – the subterranean world of infrastructure – only emerged with any force in the Roman period.[6] The Romans invested urban underground space with a new kind of meaning: namely, as a site of order and rationality. Their elaborate sewer networks, underground quarries and heating systems brought technology beneath the city, technology that would complicate the existing associations of the underground with death and burial. Yet, as historians have demonstrated, the Roman underground was not merely utilitarian, for even their sewers were sacrosanct sites – spaces of ritual, myth

and magic.7 This is not surprising, since across the world, not least in the Mediterranean, sewers often stem from springs, life-giving sites where water bubbles from the earth.

The Romans' adept engineering of the urban underground, including vast cisterns and reservoirs, was handed down to Christian successors who imbued those spaces with their own distinct religious meanings. Some of the earliest Christian burial sites – the catacombs in Rome – testify to the renewed power of the underground as a site of transition from death to the afterlife. Engineered as both burial chambers and spaces for the enactment of rituals by the living, the catacombs provided a subterranean focus for the abiding Christian as a safe haven for future resurrection. And just as these early Christian burial sites were places of security protected from a persecuting world above, so later followers would make their homes in wholly underground cities on the plains of Anatolia.

The early Christian period thus handed down to us two of the principal – but contradictory – meanings of the underground: on the one hand, of safety and security; on the other, of danger and death. We may now live in a largely secular world, but that has not resulted in any lessening of these ancient meanings; for the two primary reference points – birth and death – remain unknowable parts of human experience, bolstering the conceptualization of subterranea as a place that can only ever be imagined.

On yet another continent, the ruins of the Templo Mayor in Mexico City have incited a different kind of enactment and meaning. To birth and death, we might add the reappropriation of time, not to mention the layering of sacrifice, conquest, destruction and rebuilding following the Spanish conquest. The Aztec calendar stone, or Sun Stone (Piedra del Sol), once a central connecting thread to the heavens, was found buried in the main square of Mexico City, excavated and mounted on the facade of the Cátedral Metropolitana de la Asunción de María (Mexico's Metropolitan Cathedral), the largest Roman Catholic cathedral of the Americas.

The physical spaces that honeycomb human habitation across the world today are no less imbued with multiple meanings than these ancient examples. This section of the book works to reinforce the long legacy of the human underworld, a space of ancient, intractable and often unexpected convergences.

Taming the Quagmire: Cloaca Maxima, Rome

Nick de Pace and Julia Solis

Entering the Cloaca Maxima ('greatest sewer') in Rome may bring tears to your eyes. Not because of its immense age, architectural beauty or historical significance, but because the fumes from the raw sewage are so noxious that they easily irritate any exposed skin. That is why members of the underground association Roma Sotteranea make sure that any visitors they bring into this sewer are protected from head to toe.

One especially scenic access point is in the Roman Forum, the ancient marketplace whose picturesque ruins have become a popular tourist destination. From a hatch amid broken pillars and monuments, a ladder leads into an arched stone tunnel large enough for a train. This, one of the main arteries of Rome's original sewer system, opens into a network of tunnels, all built to contain the city's effluent. The Cloaca Maxima – one of the world's oldest wastewater systems – is not used much today, but it played a significant role in the development of Rome.8 Infamous as the collector of all that is foul and rank, its greatest contribution to history was not strictly for sanitation, as we might imagine. Rather, it radically altered the formation of the city through diverting and urbanizing a swampy morass that would eventually become the Roman Forum, the symbolic centre of the Roman world.

Outfall of the Cloaca Maxima, Rome.

To get an overview of how this aquatic quagmire at the crossroads of civilization would have looked, we must first attempt to construct a mental picture of a primordial Rome devoid of the iconic architectural monuments that have survived the ages, namely its temples, arenas and archways. Then we must remove the millennia of building detritus that has obfuscated the extreme heights between the deep-cut valleys and hilly plateaus perched above a murky flood plain, before any attempts at water mitigation or land reclamation – only a stone's throw from a most advantageous crossing of the Tiber River, one that would eventually cross-fertilize the Latin and Etruscan cultures of the peninsula and help to engineer Western civilization.

The Cloaca Maxima was conceived as nothing more than a drainage system to provide common ground where the numerous and enterprising tribes who descended on Rome's hills would have a mutual forum for trade, worship and governance. Scholars have argued that as much as 20,000 cubic metres (700,000 cu. ft) of soil, gravel and debris were dumped systematically to fill the marshlands, simultaneously diverting a flowing rivulet through the construction of an open channel.9 It is still unclear how the trench wall held back the unstable sediments of the swamp while allowing the soil to subside and become compacted for paving, raising the valley floor 9 metres (30 ft) above the annual flood level of the Tiber.

The route and appearance of the conduit have been altered numerous times since the Tarquins in the seventh century BCE. Under the aedileship of his right-hand man, Marcus Agrippa, Augustus made significant modernizations in the first century CE, when numerous tracts of the Cloaca were rebuilt, enlarged and enclosed to channel the run-off from the many construction projects begun by Julius Caesar as well as the completion of Augustus' own forum.

Following the monumental building programmes of the Julio-Claudians, numerous public works from the era of the Flavian and Antonine emperors required additional modifications to

the Cloaca to drain many new civic spaces, administrative centres, basilicas and temples. As the immense impermeable area of pavements and roofs overloaded the original Cloaca, modifications were made that were so great in size that Pliny the Younger commented that the great sewer could be traversed by boat.10

By the Middle Ages, when Rome was dramatically depopulated and repairs were overdue, the Cloaca fell into disuse and stagnating floodwater plagued the area, not unlike the failure at the same time of the arcaded aqueducts that had once brought mountain-fresh spring water to Rome's seven grand residential hills. The ability to convey water, in spite of environmental and anthropogenic challenges, had become a characteristic of Roman cities during the imperial period, and has ultimately left its mark on the wider 'civilized' world.

The longevity of the Cloaca Maxima has given urban speleologists rare access to a narrative of long-term urban development in the heart of a city. The discovery of branch lines feeding into the drain – unknown to previous historians – provides an infrastructural map to shape scholarly understanding of the city hidden from sight. As a consequence, the Cloaca Maxima and other accessible conduits can be used to geo-reference the hidden forces – the flows of water beneath the ground – that develop urban form over time, without resorting to destructive excavation.

Mostly absent from the tourist agenda is the artefact that was the terrestrial signifier for the great drain in Roman times. Bestowing the Cloaca with the authority of chthonic forces and demarcating the point where the original drain passed through the Forum is the shrine of the Venus Cloacina, celebrating the purification of the sewer, emblematized through this goddess of love and beauty.

Journey of an Underground Army: Xi'an

Carlos López Galviz

Over 6,000 soldiers stand in orderly rows and columns, eager for the doors of hell and heaven to open, a mythological battlefield ahead. The myth is the very foundation of their being here in the first place: the fact that China's first emperor, Qin Shi Huang, mobilized the labour of about 700,000 people to build a funerary complex resembling his own palace. Most striking of all is the craftsmanship of more than 2,200 years ago. Each one of these stone soldiers has unique features, distinguished according to his rank and place in the formation and space of the complex. It is a crafted underground army for life after death.

The Terracotta Army was discovered in 1974 when local farmers in search of water dug a well in the foothills of Mount Li (Li Shan). The complex lies east of Xi'an, one of the famed ancient capitals of China, at the beginning and end of the Silk Road, a city that housed a million people by the eighth century CE or possibly even before.11 Historians from 300 BCE onwards tell us that jade and gold, of which Mount Li had plenty, explain the emperor's choice of

site for this magnificent underground complex. The army, not the gold or the jade, is what has attracted tourists in the order of thousands daily since the site was opened to visitors in 1979.

Terracotta figurines from the funerary complex of Qin Shi Huang near Xi'an, China.

There are three pitches as you enter the complex. My guidebook said I should start with pitch number three, move on to pitch two and leave pitch one for last: 'a grand finale', it said. The strategy paid off. There is little that resembles the underground space as the emperor intended it. The pits are working archaeological sites, covered by hangar-like structures. With patience – ignoring as much as you can the hordes of camera flashes around you – a fuller picture begins to take shape. Earth-rammed partition walls and beamed roofs shape shelters, corridors, crossings; there are horses and soldiers, some half-broken, some fallen into awkward positions, some yet to emerge from the clay and dust accumulated for centuries: half-wall, half-soldier.

Individual examples of the life-size figurines are displayed in glass cases at the entrance to one of the pitches: a general standing almost ceremoniously, his hands delicately crossed over his abdomen, one of his fingers giving a sign to move sideways; a kneeling crossbow archer; a frontman with a horse; an armoured middle-range officer; a foot soldier ready to fight with nothing but his hands.

The power of the arrangement is clearest at the gate that has been uncovered in pitch one, at its southern end. Crowding corridors, the soldiers stand side by side, one behind the other, their faces turned forwards, silent, expectant. They are ready for the mythic battle in the midst of the excavation that brought them to life, to our own time, the time of visitors and tourists.

Billions of commuters undergo a similar ritual to these ancient warriors: waiting for the doors of subway carriages to open in underground spaces all over the world, sometimes orderly, lines and all, often less so. To work, home, elsewhere – millions of journeys branch out in all directions: some go to heavens, some might lead to hells, big or small. If that ritual made us an army, who would be our emperor? No longer do we carry spears, arches or bows, or ride horses. Arguably, our weaponry has evolved: phones, laptops and tablets are the norm for the modern face of our mundane warfare.

In common with the Terracotta Army, however, we understand little of the aim and purpose of the conquest ahead; the voice leading us is as intriguing and diffused as that of the emperor. The effect of our combined efforts, as well as their consequences, like theirs, we will never know. Yet there we stand, waiting for the doors of the next carriage to open. And so do they, the soldiers, silent, erect, in full readiness: the clay of a myth leading nowhere.

Protective Labyrinths: Sint Petersburg Tunnels, Maastricht

Paul Dobraszczyk

Hemmed in between the borders of Belgium and Germany in the southernmost part of The Netherlands, the town of Maastricht has occupied a vital defensive position since antiquity. Built on soft sandstone, this beautiful and sophisticated town is also riddled with defensive tunnels, the first of them created when the Romans built a settlement there 2,000 years ago. The remains of the Roman fort in Sint Petersburg – 2 kilometres (1¼ mi.) south of Maastricht – mark the position of the first tunnels dug to quarry the soft marlstone. In a painstakingly slow process, the Romans and their successors over time created a network of tunnels that provided both valuable building material and a secure refuge on the many occasions when Maastricht found itself under attack.12 During the Second World War the tunnels were equipped to provide refuge for up to 25,000 civilians and contained a well, a storeroom, a kitchen, a bakery and a livestock pen; in the event, they were only ever used by a fraction of that number, perhaps because of their coldness and darkness.

The section of tunnels known as the Northern Corridor System is perhaps the most remarkable part that remains and is now accessible to visitors. Here, some 20,000 separate passages were hacked out of the sandstone from the Roman period onwards, at one time covering a total length of 200 kilometres (125 mi.) and stretching past the Belgian border some 5 kilometres (3 mi.) to the south. Tours of the tunnels begin from the pastoral landscape at the southern edge of Maastricht, where the entrance to the vast underworld is shrouded in a curtain of overgrown ivy.13 The low ceiling of the entrance tunnel gradually rises, and the walls change from small geometric blocks to grooved faces of rock, while the tunnel's cross-section changes from semicircle to rectangle.

Chapel in the Sint Petersburg tunnels, Maastricht.

Unlike many underground spaces that have been opened up for tourism, these tunnels are cold and completely unlit. Visits are conducted with electric lanterns held by the participants, and guides make a habit of interrupting proceedings by asking everyone to turn off their lights so that they can appreciate the darkness that usually infuses the tunnels. Without the residual light that we experience in all spaces above ground, the darkness experienced in these tunnels has its own unique atmosphere: oppressively heavy and utterly still. At the beginning of the tour, participants are shown a map of the tunnels drawn on to one of their walls, the torchlight revealing a veritable maze of spaces that resembles the street-plan of an enormous medieval city, an organic space that defies comprehension, even as the map suggests otherwise. In the moments of darkness, the memory of this labyrinth heightens the power of the tunnel spaces, as the overview of the map is collapsed into the tiny space of a blind body.