

# Mexico City Morphologies

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## **Abstract**

This essay uses Google Earth images to examine urban morphologies in Mexico City. Vertical views of the world embraced by cartographers and planners have long legitimated claims to authority, truth, and temporal power. Since its introduction in 2008, Google satellite view has only reinforced such presumptions, particularly given the company's entangled relations with the U.S. Geospatial Intelligence Agency. Nevertheless, aerial photographs provide an undeniably useful source for architects and urbanists to study city form and metropolitan expansion. The vertical view is particularly valuable for its capacity to illuminate spatial relations that are otherwise difficult to trace on the ground, but which nonetheless shape everyday human experience. The goal of this essay is to discern a range of city forms in the rapidly expanding metropolis, and to contemplate the ways in which urban morphology frames everyday life in one of the world's largest conurbations. It is part of a longer-term study of Mexico City's urbanism based on fieldwork, mapping, and spatial analysis.

## Introduction

Throughout the twentieth century, Mexico City exploded across the landscape in great fits and starts. The result is a patchwork of urban forms, threaded together through a complex metropolitan infrastructure of roads, buses, subways, waterways, sewers, gas lines, and electric grids. While the social composition and built environment of the city change faster than a lover's heart (to paraphrase Baudelaire), the city-building process nevertheless lays down shapes that endure, persistent polygonal and curvilinear forms that are often difficult to apprehend on the ground, but which nevertheless frame everyday urban life over generations.

This essay takes a look at a range of morphologies that comprise the contemporary landscape of Mexico City. By morphologies (also referred to as forms), I mean the spatial organization of settlement created by the patterned relation of streets to the fabric they contain. As a field of study, urban morphology developed over the last fifty years as a concerted effort to understand the processes, practices, opportunities, and constraints that structure the city. While engaged in analysis of form, the broader goal of the field is to apprehend the social and temporal dimensions of urban life, particularly as these shape, and are shaped by, the material city (see the work of Hillier and Hanson; Conzen; and Oliveira).

The present study is part of a larger project that uses mapping, photography, and fieldwork to examine the varieties of urban experience in one of the world's greatest human agglomerations. It is neither an effort to quantify a spatial syntax, nor to derive patterns of human behavior, nor to establish instrumental practices for urban design. Rather, the goal is to use the vertical view afforded through satellite photography to illuminate the ways in which the city-making process shapes urban form and the spatial configuration of everyday life. Here, I have selected sites whose morphological conditions reveal the multiplicity of trajectories that have sculpted Mexico City. Most of the sites are located in areas developed in the 19<sup>th</sup> and 20<sup>th</sup> centuries, though locations such as Coyoacán and Xochimilco contain older elements, while El Carmen and other peripheral communities show evidence of additions well into the 21<sup>st</sup> century.

## Viewing the City from Above

There is a long history of representing cities from above across media, from drawings and paintings to woodcuts, lithographic prints, etchings, and eventually photographs. The earliest known urban map is that of the Babylonian city Nippur, found on a clay tablet dating from 1400 BCE. Ancient Chinese maps of cities tended to be highly diagrammatic and textual, whereas Medieval Persian, Arab, and European mapmakers favored the pictorial oblique (as

examined by Harley and Woodward). During the Renaissance, mapmakers evinced a greater interest in the imagined "God's-Eye" view, producing stunning depictions of cities from Bruges and Paris to Nuremberg, Venice, and Istanbul (see Miller). During the eighteenth and nineteenth centuries, cartographers increasingly emphasized accuracy. Louis Bretez, for example, produced an intricate map of Paris in 1739 comprised of 21 engravings bound into a book. Artists and geographers such as John Bachman and Camille Compton created richly detailed panoramic lithographs of U.S. cities from the 1850s through the 1880s, often aided by hot air balloons (consult Repts).

It was the medium of photography, however, that changed the view from above forever. Photography emerged in the 1830s and quickly gained status as a truth-telling device. Cartographers began using photographs taken from stationary balloons as aids to map making during the U.S. Civil War, but it would be decades before the process could be put to general use. During the early twentieth century, however, rapid exposure film, coupled with the advent of the airplane, radically transformed cartographic process, and the aerial photograph became the most relied-upon device for representing views from above (see Campanella). The development of satellite photography added a truly planetary dimension to aerial photography, from the earliest suborbital images taken from V2 rockets in 1949 to NASA's first orbital images in 1959, and finally to the creation of the Landsat program in 1972 (as Seto and Reba show).

Since their introduction in 2008, Google satellite images have only reinforced the notion of orbital photography as an objective, all-encompassing view from above. This notion draws on a technologically enhanced discourse of surveillance and ubiquity grounded in notions of the photograph as an instrument of truth telling (consult Pringle; Schumer; and Vandeviver). Such entanglements are underscored by the fact that Google produces its images using GeoEye-1, a satellite launched in conjunction with the U.S. Geospatial Intelligence Agency (see Chen). While there are certainly gaps in coverage, Google has captured a large portion of the planet's surface, and access to the images is available to anyone with a computer, internet access, and a web browser.

The images recruited for this study were taken from Google Earth and from the recently introduced 3-D mode in Google Maps. While these vertical views, afforded through the apparatus of locative media, capture important features of the landscape, they are no more "true" than other cartographic forms. Satellite photography, like other top-down representational modes, distorts geospatial configurations by flattening curvatures, compressing distances, and collapsing topological relief. Moreover, the "God's Eye View" of the mapmaker and urban planner has a long history of operating from presumptions of objectivity to legitimate claims to temporal power (as demonstrated by Wood and Crampton). It is crucial, then, that any artistic or scholarly work that makes use of satellite imagery does so in a way that avoids privileging the 'view from above' as the most accurate or objective (Kurgan 105-120). Nevertheless, given the spatial

detail afforded through aerial photographs, tools such as Google Earth provide an undeniably useful source for urbanists to study city form and metropolitan expansion. The vertical view is particularly valuable for its capacity to illuminate spatial relations that are otherwise difficult to trace on the ground, but which nonetheless organize everyday human experience (Kropf 2009 105-120). For example, in Mexico City uniform street walls often conceal complex parcel geographies, while buildings packed around a block perimeter give no hint of the multiple structures, passages, and courtyards that recede into the interior of the block (Figure 1). To be sure, spatial syntax and shape grammar neither determine human behavior nor reflect cultural proclivities in any straightforward way. However, urban morphologies certainly frame the ways in which social relations materialize, simultaneously enabling and constraining mobility, encounter, exchange, and habitat (Hillier 41-60, Griffiths 157-159).



Fig. 1. Street walls obscure urban form. These Google Street View images show the street wall condition on Cacama (top), Acamapichtli (middle), and Ilhuicamina (bottom) in the Zona Urbana Ejidal los Reyes Culhuacan. While by no means uniform, the walls, gates, and garage doors that line the typical street nevertheless mask the complexity of parcel geographies, the relations of houses to courtyards, the interior block circulations, and the uses of land. Some properties present a residential façade to the street, where others present garages or courtyard walls. Many residents use courtyards and passageways as workshops, storage, production facilities, and retail outlets for small businesses. The complexity of the city's morphology cannot be deduced from the ground level alone.

Morphological studies, then, have provided rich material in the construction of urban historical and geographic knowledge. From the tenement reform maps of the early 1900s to the figure-ground drawings of Le Corbusier, and from the emergence of computer-aided spatial syntax studies at University College London in the 1980s to the mathematical modeling of shape grammar by scholars such as Jose Duarte, research into urban morphology has yielded valuable new knowledge of how cities are organized and the “logics” of their growth and development over time (Duarte). Aerial photography has been key to these emerging modes of inquiry. It is in this sense that I make use of Google Earth views, not as a substitute for on-the-ground research, but as one part of a broader approach that illuminates the highly varied, imbricated, and cumulative nature of urban forms in the conurbation of Mexico City.

### **Mexico City**

At the center of the Aztec empire lay the valley of Mēxihco, dominated by Lake Texcoco. The Aztecs ruled from temple complex at Tenochtitlan in the middle of the lake, surrounded by a large and growing settlement. Founded in 1325, this “floating city” comprised an intricate series of islands (chinampas) built up with woven reeds and mud, intersected by canals and causeways. Spanish conquistadors looked with fascination on the indigenous landscape, commissioning a series of famous views of Tenochtitlan even as they destroyed it. The first view, printed in Nuremberg in 1521, as well as the second view by George Braun in 1575, both followed the oblique pictorial tradition of city maps. Subsequent maps, often crudely drawn, depict the varied colonies and settlements of the valley. Cartography and the view from above would prove central to the imposition of imperial rule (Rama 25-30, Mundy).

After the brutal conquest, successive Spanish viceroys directed the draining of the lake and the construction of a massive civil and religious complex on top of Tenochtitlan--today's Metropolitan Cathedral and Zócalo (Candiani 47-48). They established a uniform grid with blocks radiating outward from the central square, projecting an idealized city into its hinterlands without regard to terrain, water tables, or other geomorphic conditions. The development of the city over a drained valley lake has long-term consequences for residents, particularly in terms of land subsidence and frequent flooding.

The Aztec region of Mēxihco gave its name first to the imperial city, then eventually to the nation, known officially as the Estados Unidos Mexicanos. Today Mexicans typically refer to their country as La Republica, and to the conurbation as La Ciudad, "Day-Effay" (DF, from Distrito Federal), or simply México. After independence in 1824, the conurbation grew within the newly created Distrito Federal, which is neither a city nor a state but a special political entity belonging to the nation. The DF is divided into 16 delegaciones, each containing dozens or even scores of barrios and colonias (terms used interchangeably to mean neighborhood). Each delegation also includes parks,

schools, markets, police stations, and other civic institutional spaces. An elected Legislative Assembly governs the DF, with executive functions vested in a Head of Government.

Since Independence in 1824, the President of the Republic appointed the Head of Government of the DF, who, like the Prefects of Paris, exercised tremendous authority over the city and its hinterlands. During the Porfiriato (1877-1911), planners such as Miguel Angel de Quevado reshaped central districts of the city through the creation of new parks, grand boulevards, and tree-lined streets in an effort to bring a vision of Beaux-Arts Paris to the valley of Mexico (Tenorio-Trillo 33-40, 50-51). Even after the Revolution, the city remained subordinated to the political control of the national state, which sought to imprint the glories of the nation onto the fabric of the capital through grand public works. Thus, throughout the nineteenth and first half of the twentieth centuries, planners and architects working under the DF Head of Government enjoyed wide latitude to shape and reshape the metropolis.

In the decades following World War II, however, rural decline and the expansion of industrial and commercial opportunities in urban centers led to a rapid expansion of the city, overwhelming the state's capacity to control growth (Garza 43-48). The 1960s and 1970s proved especially transformative, as the city's population doubled and the settled landscape expanded dramatically in all directions. Finally, in the 1990s the Federal Assembly introduced a raft of neoliberal reforms meant to spur financial investment and real estate development, as well as political reforms such as direct election of the DF Head of Government. On January 29, 2016, the Federal Assembly reconstituted the Distrito Federal as the Ciudad de México, or CDMX, and converted the delegations into municipalities, each with its own head of government. CDMX continues to operate a central planning agency, but many of the key decisions about land use and development have devolved to the local level.

While the population of CDMX stands at nearly nine million today, the greater metropolitan area contains over 20 million people, making it the largest urban agglomeration in the Western Hemisphere, and the second largest in the world after the Greater Tokyo Area (Anzaldo and Barrón 53-65). It is a classic "primate city," as its political, economic, and cultural dominance remain unchallenged by any of the country's other large cities (Davis). Most of the major institutions of governance and global finance occupy the Centro Historico, the old urban core, and the Paseo de la Reforma between Chapultepec and the Alameda. However, throughout the twentieth century the city exploded rapidly outward in a riot of clashing grids and settlement patterns, forming a vast metropolitan expanse stretched across 148,000 hectares (573 square miles) of land (Ward, Aguilar 391-412).

### Urban Forms and Features

The aerial views shown here reveal just a few of the highly variegated urban forms present in Mexico City. Some are rigorously orthogonal and meticulously delineated, having emerged whole cloth out of a directing plan. Others trace irregular shapes around ancient paths, watercourses, lava fields, and other landscape features, evincing intricate, piecemeal, multi-directional trajectories of growth. In some parts of the city, particularly to the west, the city extends sinewy tendrils across mountains and ravines, filling in topographies once deemed uninhabitable. To the east, the expanse of alluvial flatlands opens the way for a succession of multiple gridded developments stretching beyond the boundaries of the Federal District (Figure 2). These highly varied forms would be difficult to see without the view afforded through satellite photography.

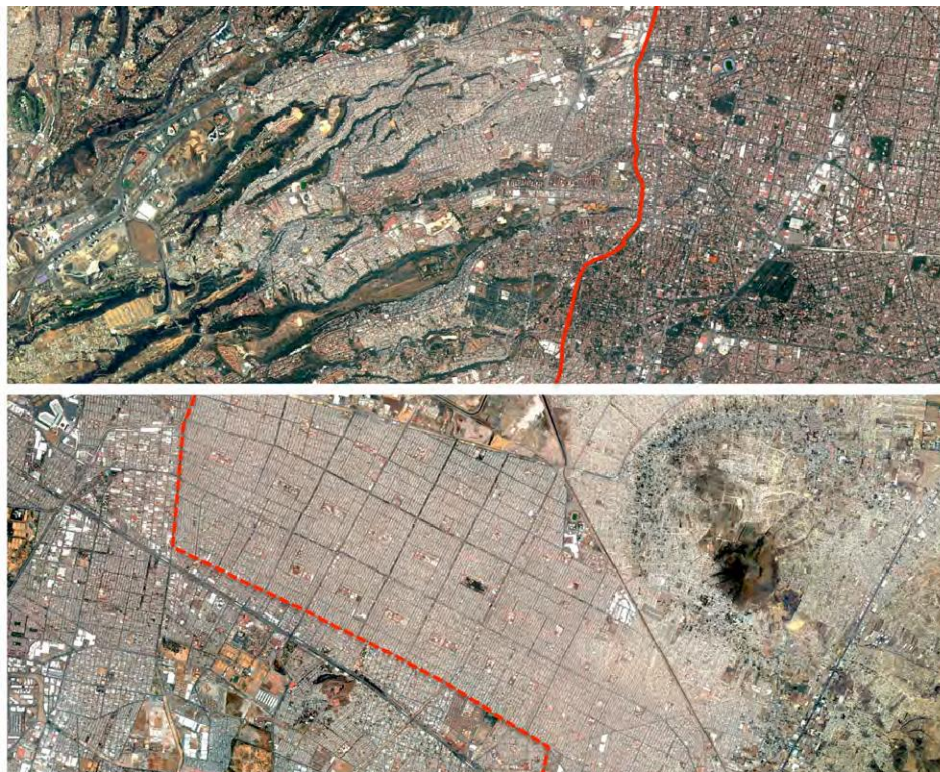


Fig. 2. Urban morphology at scale. These satellite images depict large swaths of Mexico City from an elevation of 37 miles. The most striking feature, beyond the sheer complexity of the conurbation, is the stark difference between the west and east. In the top image, the city's grids fizzle out to the west of the Anillo Periférico (solid line), giving way to an intricate cascade of peaks and valleys. In the bottom image, the volcanic flatlands spread over the eastern expanse of the conurbation across the boundary between the D.F. and the State of Mexico (dotted line). This creates an optimal landscape for grid forms such as the massive Ciudad Nezahualcóyotl, shown in the center, until the flatlands wash up against the volcanic cones.

Urban morphology consists of three basic elements: streets, block forms, and what urbanists call 'tissue' or 'fabric'--the subdivision of blocks into constituent parcels with their patterns of residential, civic, commercial, and industrial uses. These elements can be combined into a bewildering array of arrangements, from the rectilinear grids of New York and Torino to the winding blocks of medieval Bruges and the street hierarchies of the Marrakech Medina, based on Islamic principles of town design. Even seemingly similar grid forms derive from highly varied precepts: Chicago, for example, conforms to the "township grid" established by the U.S. Land Ordinance Survey of 1789, whereas the grid of Beijing emerges from principles of harmonious building first laid down in the precincts of the Forbidden City. Moreover, most cities today evince significant variations in urban morphology that reflect stages of growth and transformation. In the case of Mexico City, these varied morphologies spread over 1,375 square kilometers. As Taud and Parrot argue, the production of urban form in this megalopolis can best be characterized as an aggregation of urbanized fragments disseminated through the regional space of the Valley of Mexico and its surrounding elevations (Taud and Parrot 169).

Since the predominant land use in Mexico City, as in most urban areas, is residential, housing typology comprises a crucial part of the urban fabric. As in much of Mexico, the courtyard house prevails, even in relatively poor neighborhoods. Traditionally the courtyard house consists of rooms surrounding a central open space. Most twentieth century versions, however, are formed by a wall separating the house and courtyard either from the street or an adjacent property line. The dimension of the courtyard and its proportional relation to the house in plan vary considerably, creating a multiform figure-ground array (Rappaport 57-72). Some households use the courtyards to park vehicles, others to grow flowers and vegetables. Many use them as a stage for daily activities such as laundry, repair, storage, or home businesses (Figure 1). While the majority are single-family dwellings, many multifamily courtyard tenements--called *vecindades*--cluster in the Centro Historico as well as in peripheral colonias of the city (Rebolledo).

Morphologies vary considerably in the size and orientation of blocks, the width and direction of streets, the degree of variation in the street wall, the density of housing, the treatment of corners, the continuity and connectivity of roads, the number and dimensions of public spaces, and the articulation with surrounding forms (Kropf 2017 20-26). This study identifies six clusters into which these variations fall: unbounded grids, bounded grids, diagrams, contours, clashes, and tendrils. These clusters should be taken as heuristic rather than definitive. Some areas of the city bear a strong affinity for one specific form, while other areas show evidence of more than one.

### Unbounded Grids

To say that a grid is 'unbounded' is not to suggest that it is endless. Rather, it indicates that the creators of the grid imagined it could expand outward *ad infinitum*. The oldest districts such as Centro Histórico, Villa Coyoacán, and Xochimilco (Figure 3) reveal the early Spanish proclivity for tight grid forms around a central plaza based on the Law of the Indies (Rama 4-5). While rare in medieval Spain, the grid in Mexico City and other Spanish settlements constitutes an order-making proposition that sought to fix governmentality to landscape, irrespective of ecology and terrain. Their morphologies emerge out of a centripetal process that pushes urban space outward from a civil-religious core into the unbounded tabula rasa of the colonial imaginary. However, the highly orthogonal and controlled urban form preferred by Spanish conquerors broke down quickly in the face of the manifest complexity of city making, as the grids encountered a wide range of barriers, from natural forms and topographies to social unrest, economic downturns, and vectors of expansion from other parts of the region. While the unbounded grids are clearly 'bound' today, they seem almost to resist their containment by fragmenting, fissuring, and dissolving into their surrounding forms.

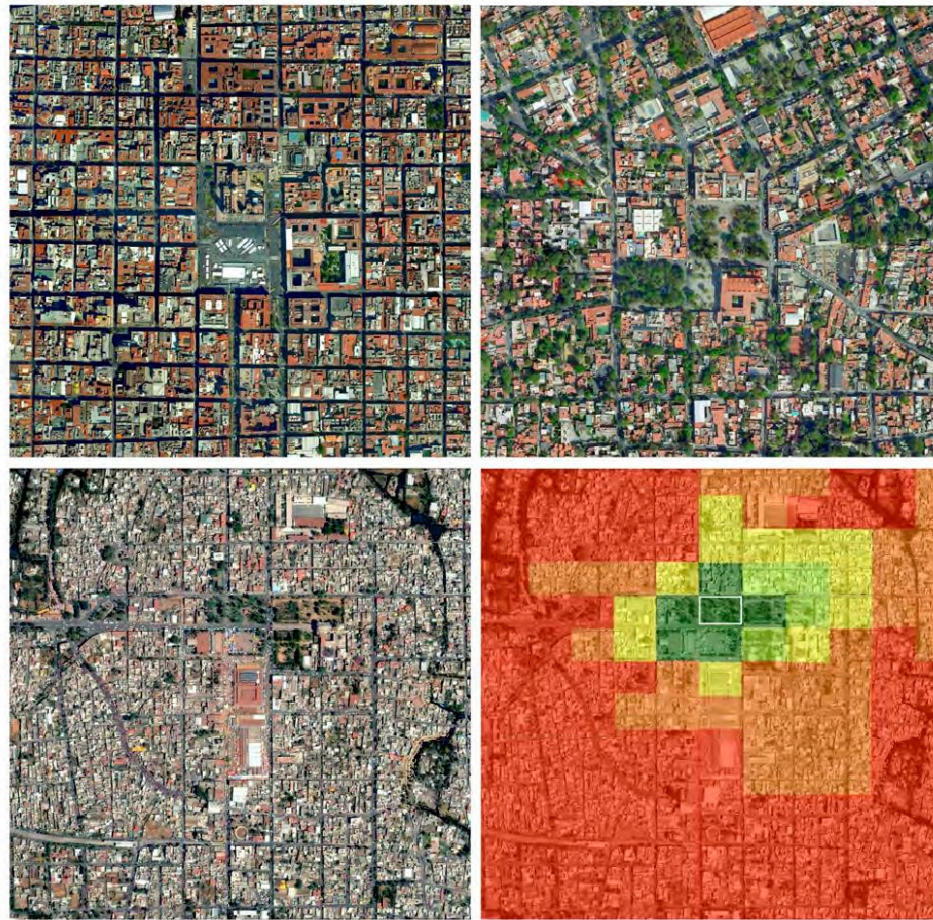


Fig 3. Unbounded grids. The largest of the unbounded grids in the city is the Centro Histórico (top left), which covers 700 hectares surrounding the Zócalo—the core of Spanish imperial rule. Much smaller is Villa Coyoacán (top right), a 16th century grid of some 9 or 10 blocks surrounded by varied urban forms: the 19th century Del Carmen grid marches in at an angle from the Northwest, while the irregular streets of several barrios fan out to the east and southwest. The bottom images show the 17th grid at Xochimilco, built over an indigenous village. On the right, color-coded squares trace the degradation of the old grid. The dark green square in the white box is the reference point, indicating the relatively unchanged central plaza surrounded by several intact blocks. Light green squares show blocks with small changes, yellow for more extensive changes that do not otherwise alter the shape of the block itself, orange for major changes such as the intrusion of large roads and new land uses, and finally red for blocks that are either totally transformed or were never part of the Spanish grid.

### **Bounded Grids**

By contrast, nineteenth and twentieth century neighborhoods present grid forms laid out within 'bounded' space in order to fill in the city (Figure 4). Their edges tend to be more regular than the unbounded grids, since they were devised within known limits. Santa Maria La Ribera and Roma, for example, are classic bourgeois landscapes of the Belle Époque, with leafy boulevards, plazas, fountains, promenades, and large homes. Their streets and blocks appeared at singular moments within the confines of existing boundaries (settlements, parks, thoroughfares) in order to accommodate the demand for new housing outside the center. Very often planners established these subdivisions on land formerly occupied by haciendas. Latter twentieth century grids developed along similar lines, but show greater variation. The vast expanse of low-lying valley spreading south of the center has filled with numerous subdivisions based on highly rectilinear grids intersected with large boulevards. Colonia del Valle, for example, emerged in the 1940s and 1950s as a modulation of long rectangular blocks without center. CTM Aragon, meanwhile, disrupts its own grid with a unique patchwork of linear parks, squares, parking lots, pedestrian paths, and dead-end streets reminiscent of the 'new town in the city' movement of the 1960s (Figure 5).



Fig. 4. Bounded grids. At top left, Santa María La Ribera is a late 19th century neighborhood carved out of an old hacienda, one of the first planned subdivisions outside of the Centro Historico. The dense residential fabric is composed primarily of large townhouses and courtyard buildings, many of which have been subdivided into *vecindads* (apartments). Colonia Roma (top right) presents a classic bourgeois urban landscape, built up in the early 20th century on former haciendas south of the center. The two round plazas were created during the massive reconstruction of the roadways in the 1920s and 1930s. In the bottom image, Colonia del Valle Centro was laid out in phases from the 1940s. The entire valley evinces a highly regular grid form with no discernible center. The colonia features a mixed residential stock comprised of townhouses on small lots and large apartment buildings of three to ten stories. The stair-step shaped complex is the Centro Urbano Presidente Alemán, a *unidad habitacional* designed by Mario Pani in 1947, and one of the first Corbusien-style projects built in the D.F.



Fig. 5. Bounded grid, disrupted. In laying out the Colonia CTM Aragón, planners played with the grid form by breaking it up. Financed by the Confederation of Mexican Workers (CTM), the colonia reveals several design features unusual for Mexico City. A series of 16 linear and square green spaces ensure that most households have one within short distance. Residential stock is comprised predominantly of single-family townhouses rising two stories on modest footprints, with the space normally allotted to courtyards redistributed to the various green spaces. The central module contains a church, market, and schools. Streets afford limited ingress, and there is no way to traverse the colonia in an automobile. More unusual is the neighborhood's interior parking system, with vehicles restricted to designated thoroughfares, and many houses only accessible via narrow pedestrian walkways. These various features are reminiscent of the 'New Town in the City' planning approach of the 1960s and 1970s. While manifestly a grid, the urban morphology of the neighborhood also has a diagrammatic quality to it (see Figure 6 below).

## Diagrams

Meanwhile, many areas show signs of high planning craft, reflecting moments when planners and designers had the opportunity to play with the city's form (Figure 6). Strikingly octagonal Colonia Federal, located just south of the airport, comprises 16 streets radiating out to form spokes, woven together with five circumlocuting streets. This infrastructure creates 80 irregular rhomboid parcel geographies densely packed with homes and shops. To the north, the colonia "Constitución de la República" presents a highly diagrammatic form, wedged into the surrounding 20th century landscape. The central design conceit is a diagonal grid of blocks set at a 45° angle to the trapezoidal box that contains them. In laying out Paseos de Churubusco, a well-to-do neighborhood just east of the central valley, planners created some 60 blocks in the shape of cartouches--rectangles with chamfered corners. Departing from the predominantly residential landscape, the Central de Abasto is the city's primary wholesale market. Designed by Abraham Zabludovsky and completed in 1982, it includes 62 immense sheds set in a rigid circuit of highways, streets, and access roads. Abasto spreads over 328 hectares--so massive and singular that it is readily identifiable from the uppermost part of the stratosphere.



Fig. 6. Diagrams. The spider web of Colonia Federal (top left and right) converges on a central plaza with playgrounds, small football ring, and cultural center. Though rigorously octagonal in plan, the 16 streets at the center resolve into a variety of land uses and architectural expressions. At lower left, the grid of Constitución de la República is at such odds with the surrounding morphologies that it seems to be inserted from another city altogether. The multiple angles result in many oddly shaped parcel geographies around the periphery. For the central juncture of the colonia Paseos de Churubusco (center right), planners resolved the misalignment between east and west sides with a chamfered rectangular block articulated to effect a graceful curve. And the immense circuit board that is Central de Abasto (bottom right) occupies 328 hectares on the city's east side. Designed by Abraham Zabludovsky and completed in 1982, Abasto is the city's principal wholesale food market.

## Contours

A common urban morphology found on the periphery of Mexico City is the contour, defined here as the shapes produced when the built environment adjusts to accommodate the slopes, ridges, floors, and courses of dramatic topologies. Much of the city is flat, as it spreads out over the central valley once dominated by a lakebed. However, the valley is surrounded on the north, south, and west by mountains (Figure 2), and even the east side is studded with several steeply sloped calderas. As the city expanded outward, the urban fabric ran up against a range of topological conditions that residents and builders have accommodated in numerous ways. The barrios and colonias on the western periphery evince numerous experiments in the art of draping a city over ridges and valleys (Figure 7). To the south, the barrio of El Tanque steps downward from the peak of the Cerro del Judío through a series of steep terraces (Figure 8). Meanwhile, the Avenida Paseo del Río winds through several neighborhoods to the south of Villa Coyoacán, its course determined by the Río Churubusco, now buried in a box culvert beneath the Avenida (Figure 8).



Fig. 7. Contours. When faced with significant topological barriers, city builders had to figure out strategies for extending the urban fabric. At top, the relatively ordered grid of colonia Presidentes ends where the folded forms of Piloto Adolfo López Mateos begin. At bottom right, houses and shops in working-class Piloto perch precariously on terraces sculpted into the sheer cliffs above Palmas creek. Very often the rooftop of one house meets the foundation of another as the neighborhood marches up the hillside. Streets wind along natural contours of the slope, tracing a topographical map of the barrio. An elaborate network of narrow staircases affords pedestrians vertical access between the long streets. Meanwhile, Presidentes, Lomas de Capúla, and other neighborhoods (bottom left) manage to retain gridded patterns, even if the aerial view obscures the often steeply graded streets. The grids persist right up to the edges of valley walls, at which point orthogonality dissipates into fractalated forms.



Fig. 8. Contours. The Cerro del Judio (top left), is an ecological reserve in the south of the city. The peak of the mountain can be seen in the center of the reserve, while the Rio Hidalgo traces the base to the north and west. Since the 1970s, new barrios have sprung up all around the park, with streets contoured along the topography of the mountain, creating gyres and eddies of built landscape. One of these barrios, El Tanque, can be seen at top right. El Tanque folds in ribbons around the Cerro del Judio with a series of eight contoured terraces that step steeply downward to the northeast. Each terrace level brackets a long undulating street lined with houses and shops. Many of the smaller streets that climb the slope are only one or two blocks long, so walkers and traffic must zigzag circuitously to climb or descend through the barrio. By contrast, the slopes of Xaltepec volcano (bottom left) prove too steep for building, so residents have wrapped the colonia San José Buenavista around the base of the cone. Following a watercourse rather than mountain terrain, the Avenida de Paseo (bottom right) runs on top of the Churubusco river, revealing one of the few remnants of the water's path. Massive Avenida Insurgentes, seen at far left, presents a dramatic contrast to the curvilinear Paseo.

## Clashes

Because the city has expanded in fits and starts, rather than following a central directing plan, the various morphologies appear to be ordered on discrete logics, merging, colluding, and clashing with those around them. Indeed, morphologies created through the clash of other morphologies constitute one of the most common features of Mexico City's landscape--so common that only a few examples of these highly variegated forms can be included here (Figure 9). In some instances, two distinct morphologies occupy either side of a relatively bright line--a large avenue, thoroughfare, park, watercourse, or industrial corridor. In such cases, they may retain their general form along the edges. In other instances, however, distinct morphologies collide with each other, creating novel conditions for architecture and urban form making. These clashes produce effects on the landscape such as wavering street lines, irregular parcel shapes, sharp or acute juxtapositions, blended zones, and disintegrating edges. The resolution of these morphological imbrications reveals the city making process as a series of discrete decisions--instances of problem solving among residents, contractors, delegation officials, planners, bureaucrats, and other agents of urban spatial production.



Fig. 9. Clashes. The image of Colonia Cabeza de Juárez IX at top left reveals the intrusion of centrally planned Unidades Habitacionales into a community of low-slung, self-built homes. Residents continue to protest against displacement, but the municipal government regards the area as ideal for high-density, automobile-oriented redevelopment. The conflict is readily discernible in the landscape as the two forms jostle for space. At top right, the rectilinear grid of Lomas deteriorates at its eastern edge, where it seems almost etched into the winding streets of Golondrinas. The collision of these distinct urban forms produces a complex and intricate series of parcel geographies that hug the contours of the steep hillside, resulting in a cascading foam of closely-packed, multilevel structures. At bottom, the dense urban fabric of the contemporary city marches inexorably toward the farms and canals of Xochimilco. Listed as a UNESCO World Heritage site, Xochimilco preserves the remnant form of the chinampas—woven reed beds floating atop the lake separated by an intricate network of canals. The chinampas once comprised the dominant urban form of the Mexico valley. However, the Spanish conquerors systematically drained the lakes to build the present city.

## **Tendrils**

In Figure 10, the lineaments of the great metropolis extend into the hinterlands, forming a series of straggling neighborhoods. Like sinuous tendrils or rhizomes, small extensions of built form shoot out from axillary nodes and form new urban fabric--streets, houses, shops, schools. These are some of Mexico City's newest barrios; many of the roads haven't been paved, and most buildings retain the grey color of concrete block. At this extremity, the urban fabric soaks into agricultural landscape, sometimes in a continuous thread, sometimes leaping over fields and farmsteads. Several processes produce these peripheral communities. Some emerge from the directing plans of municipal agencies, opening new areas for settlement in a city starved for additional housing. Other communities follow an old pattern of subdivision, where farmers sell off parcels of their land to developers or directly to buyers, with or without permission from the relevant agencies. Still other new communities form through 'illegal' land occupation as families desperate for shelter take direct action. In all cases, the extension of these settlements constitutes the city making process in its most raw and basic form.



Fig. 10. Tendrils. These images reveal the shape of the city as a work in progress. At left, the urban footprint reaches into the agricultural hinterlands at the southern extreme of the metropolis, just west of the Camino Real. On the right (top), the small barrio of San Juan Minas takes shape south of Route 113. The built environment comprises a mix of urban and rural land uses, part barrio and part village, part metropolitan part agricultural. Clusters of small buildings spring up along the main streets, interspersed with houses on larger plots and open scrubland. In the center right image, the colonias of San Juan Tezompa and La Luz encroach on farmland; while located just outside of the D.F. in the State of Mexico, these communities are part of the ever-expanding conurbation. Malacates, shown at bottom right, is officially the northernmost point of Mexico City. It appears less like tendrils than a cascade of settlement climbing the hills as far as it can reach. The uniformly bright grey color of Malacates reveals an emergent neighborhood, where concrete block construction and its attendant dust coat the environment. The character of these precincts reveals the city as an always unfinished proposition, constantly being made and remade by the people who live there.

## Urban Form and Social Structure

Without doubt, the view of Mexico City from above reveals a tremendous range of forms. In all cases, the combination of such manifold features creates unique urban environments. These varied environments, moreover, both express and reproduce social inequalities, sorting people's habitat, labor, and prospects into relatively discrete spatial envelopes (Rizo and Mercado; Aguilar and López 5-29). Wealthy areas present large detached houses and apartment buildings arrayed on curvilinear streets amid lush canopy of trees and grand open park spaces, as with the neighborhoods around Avenida de Paseo (Figure 8). As in most cities, tree canopy coverage is a reliable predictor of socio-economic status (Hope et al 8788–8792; Clark et al 48–59). Many wealthy neighborhoods have sprung up within the last two decades in the southwest districts of the city, particularly in the delegations of Miguel Hidalgo and La Magdalena Contreras. Other high-income areas have been home to well-heeled residents for decades, such as Roma and Condesa (Figure 4), or as far back as the 17th and 18th centuries in the case of San Angel and Villa Coyoacán (Figure 3).

Squatter communities, by contrast, present landscapes of small, low-slung, tightly clustered metal rooftops packed between narrow unpaved or crudely paved streets with few or no trees, plazas, or parks (Figure 9) (Mier y Terán et al 118-155). These barrios tend to be located at great distance from the center, with difficult access to employment, transport, and services. Of course, not all communities that formed through squatting and land invasion are poor or indigent. The Pedregal de Santo Domingo on the city's south side provides a case in point. In the 1960s peasant families migrating from Puebla and Oaxaca settled the Pedregal as an *ejido*—a collectively owned agricultural community—and built up the neighborhood slowly over the course of the 1970s and 1980s (Mancilla 2000). Today, it is a bustling working-class and middle-class neighborhood of modest, tightly packed concrete houses, with gentrification looming as the most pressing problem. Most squatter communities, however, and most working-class communities in general, remain highly marginalized with few infrastructure services, poor transportation, and makeshift housing with unstable land tenure (Duhau and Giglia 167-194).

Between wealthy and indigent areas, a wide range of working-class and middle-class neighborhoods resolve through varying settlement densities, street systems, and block forms. Typically such neighborhoods present modestly sized, one- or two-story attached concrete houses with flat roofs, arrayed in long orthogonal blocks between narrow asphalt streets. Often the street wall includes points of entry not only to street-facing houses or garages, but also to small gangways leading to additional houses built within the block interior (see Figure 2). Sometimes these additional buildings recede along a single property line, as a family builds additional houses, garages, or workshops. Other times, properties have been subdivided—not always legally—and new houses built on the subdivided parcels. In any case, the scarcity of land, coupled with the high

cost and seismic danger of vertical construction, have led to an intensification of land use and an increase in the figure to ground ratio across the city. Mexico City may be a horizontal metropolis, but it is a dense one.

In addition to the ordinary residential and commercial fabric, Mexico City is replete with urban forms like Centro de Abasto (Figure 6) dedicated to particular uses. Chapultepec, one of the world's great urban parks, stretches for 686 hectares across the city's western edge, interwoven with lakes, woods, trails, promenades, museums, monuments, and cafés. Large military and prison complexes interrupt the expanse of urban fabric in peripheral areas to the south and west. Across the city, social housing complexes known as *unidad habitacional* present design forms distinct from ordinary residential neighborhoods. Rather than multiple low-slung courtyard houses, the *unidades* typically feature long clusters of mid-rise buildings standing in their own grounds (Figure 9). However, even these singular modalities of land use show signs of collision, intrusion, and other forms of conflict over urban space.

Mexico City comprises a roiling, shifting landscape sculpted by thousands of daily decisions large and small. Some of these changes occur rapidly and dramatically, as when the municipal government clears a squatter community, builds a new roadway, or opens a new social housing complex. Most decisions, however, arise as intimate variations on themes, from the orientation and size of homes to the subdivision of properties, the construction of new buildings on extant parcels, the uses of courtyards for living and household production, alterations of streetscapes and façades, the porosity of block interiors to foot traffic, and the occupation of sidewalks and streets by vendors, markets, shops, and religious shrines. When such micro-level decisions, with all their variation, are repeated multiple times over, they produce scalar effects of ongoing urban transformation.

### **Morphology and Urban Life**

Of course, form is not destiny; rather, it is a framework within and against which people devise modes of living. The city's spatial grammar at once comprises the limits of people's mobilities and opportunities, and at the same time provide meaningful elements of urban experience in the shops, churches, parks, streets, and plazas (Sen 413-423; Ortiz-Chao 5-6). As *capitalinos* undergo their routines, they thread together spatial and social relations, working out the rough, knotted texture of everyday urban life. As they pursue their needs and ambitions, they do so through the urban forms that contain them. As they build, add, tear down, and modify their environments, they collectively conjure the shape of the city.

Meanwhile, the frenetic character of Mexico City, and the need to travel significant distances to earn a living, lead to countless daily encounters across lines of difference, particularly in the commercial pockets and nodes that mushroom across the vast, polynucleated metropolitan landscape (Ortiz-Chao;

Aguilar and López 5-29). While the movements of individuals through the city cannot be discerned in Google satellite imagery (thankfully), what we can see is the tremendous range of forms and environments people traverse in the making of everyday life. Moving across multiple morphologies, every *capitalino* builds up a nuanced, composite mental image of their city (Lynch). This image is at once restricted by habitual vectors of movement, and at the same time transects diverse localities replete with residues of memory and history. It is both ideational and serial-temporal, a kind of scenic imprinting of everyday material circuits onto the neurocircuitry of the urban brain in motion. And this "image of the city" is always changing, faster than a lover's heart, as the form and content of the city changes.

In the end, Mexico City is a place both bewilderingly spectacular and utterly mundane. And as it oscillates between these affective states from street to street and moment to moment, the everyday rhythm of the city unfolds through the figure-ground. These morphologies, so sharply delineated from the air, organize the raw spatial material of unimaginably complex human social experiences on the ground. Shapes are never destiny, but they are the stuff of urban dreams.

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