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Outside the Frame: Mapping and Urban Space in the United States, c. 1920-2014

Grace Avery Diliberto
Bard College

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The Division of Social Studies
of Bard College

by

Grace Diliberto

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"…In that Empire, the Art of Cartography attained such Perfection that the map of a single Province occupied the entirety of a City, and the map of the Empire, the entirety of a Province. In time, those Unconscionable Maps no longer satisfied, and the Cartographers Guilds struck a Map of the Empire whose size was that of the Empire, and which coincided point for point with it. The following Generations, who were not so fond of the Study of Cartography as their Forebears had been, saw that that vast Map was Useless, and not without some Pitilessness was it, that they delivered it up to the Inclemencies of Sun and Winters. In the Deserts of the West, still today, there are Tattered Ruins of that Map, inhabited by Animals and Beggars; in all the Land there is no other Relic of the Disciplines of Geography."

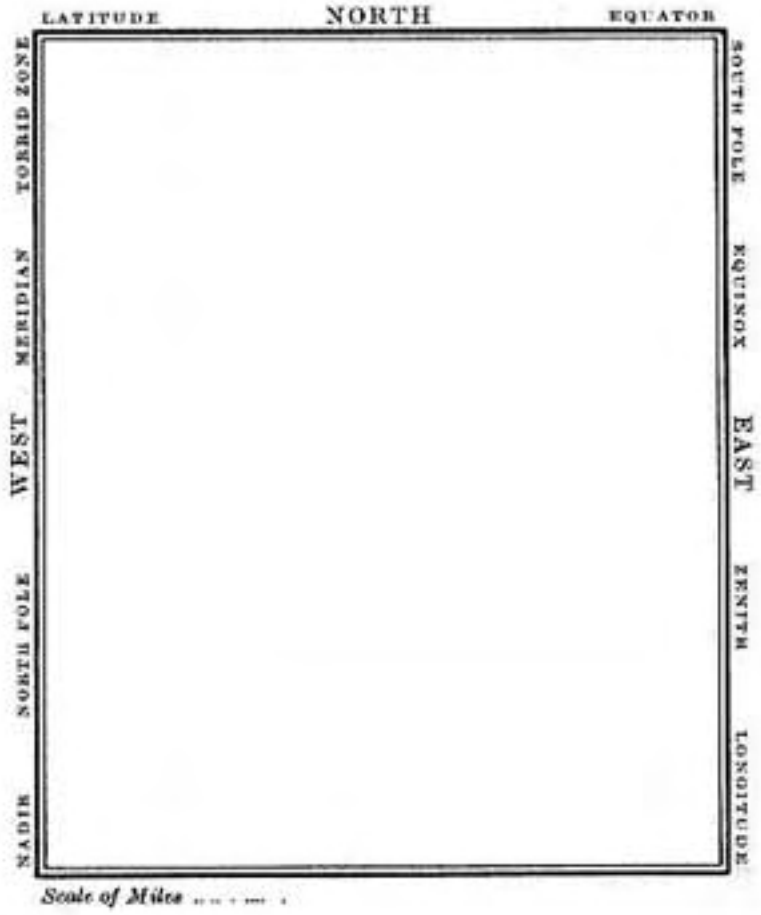
-Jorge Luis Borges, 'On Exactitude in Science', 1946.

He had bought a large map representing the sea,
without the least vestige of land.
And the crew were much pleased when they found it to be
a map they could all understand.

"What's the good of Mercator's
North Poles and Equators,
Tropics, Zones, and Meridian Lines?"
so the Bellman would cry,
and the crew would reply:
"They are merely conventional signs!"

"Other maps are such shapes,
with their islands and capes!
But we've got our brave Captain to thank,"
(so the crew would protest)
"that he's bought *us* the best –
a perfect and absolute blank!"

-Lewis Carroll, *The Hunting of the Snark* from 'Fit the Second - The Bellman's Speech', 1876.



Ocean chart

Henry Holiday: Illustration of “The Bellman’s Speech”

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Introduction

Upon initial contemplation the idea of a map appears as a fairly basic, understandable, uncontestable artifact. Yet, the literature and critical theory surrounding a cartographic history that is, in fact, highly contested, is expansive. The discourse on cartography, the multi-opinion, multi-theory nature of which extends back as far as the very conception of the discipline itself, pervades subjects as diverse as literature, fiction and non-fiction; the arts, from as far back as the Renaissance (if not farther) to contemporary art; the social sciences; and environmental science. The reason maps are such an attractive tool, used as a jumping off point for critique and discussion across so many disciplines, is that they stand simultaneously locked up in so many power/knowledge, technological, and institutional constraints, and at the precipice of countless possibilities for the re-appropriation and re-representation of ideas. In this thesis, I will focus on the way in which maps have developed and been used in or by the United States, specifically government and academic institutions, in the past century to create, control, and shape urban space. I will make use of formal analysis and historical context to examine three case studies in which "conventional" maps, meaning institutional (namely, government and academic) cartography, have been used, and, it will be argued, misused, to selectively include and exclude information and collectively shape our environment. I am investigating what – meaning what people, narratives, and experiences – is left outside of the frame of the map and to what effect.

Additionally, this thesis will follow chronologically alongside the simultaneous development and refinement of mapping technologies, focusing on how the advancements in technology were fueled by, and subsequently fed into, certain

understandings of the production of space. The conversation will emphasize issues of access, namely who is excluded from the spatial representations of their own communities, concerns about representation, delving into the production of space and how maps forsake this inherent interplay between person and space, and, finally, what sort of counter-mappings have sprung up along the way.

My methodology consists primarily of a combination of historical and visual analysis. The historical analysis will provide the contextual base of the case studies, whereas the visual analysis will deal with the formal elements of the maps I am looking at. Using the theory of spatial production in addition to the ever-expanding discourse on the history of technology, cartography, and critical geography, I will weave together a historical account and visual analysis to argue a concrete trajectory of the ways in which mapping has served to create and shape our environments by including and excluding specific narratives and perpetuating political objectives. This approach, focusing on three specific case studies, is necessitated by the complex, interdisciplinary nature of, not only my academic program, but the subject of mapping itself. Since my academic work in a major as interdisciplinary as Environmental & Urban studies has been so eclectic, it is only fitting that my thesis follow in this interdisciplinary tradition. My intention is to orient the extensive discourse on cartography towards an analysis of the way in which these visual artifacts intersect with lived space. I specifically want to call attention to the problematic of cartography in shaping and creating urban environments. Drawing on my engagement with urban history, art history, and environmental science, this examination of cartography and the active role its history has played in shaping the space we live in endeavors to bring together many different spheres of interaction with the subject. While

the objective of my thesis may seem vast at times, it reflects on the very complex, variant, and exciting construct that is the urban environment. Furthermore, the contemporary discourse on cartography is itself an ever expanding, interdisciplinary effort, reaching into the recesses of history, sociology, environmental science, the visual arts, art history, literature, philosophy, mathematics, computer science, and even the performing arts. Thus, it would be negligent to limit the scope of this project to a single discipline, when the very practice of mapping has become such an engaging, participatory, and varied activity. The fundamental purpose of this project, then, necessitates its wide-ranging, multi-faceted material.

The discourse on critical cartography – an umbrella term encapsulating notions of human geography, radical cartography, participatory mapping, and counter-mapping practices – is a direct response to the assumed truths and inherent authority harnessed by government and academic maps – the maps that are most widely distributed and popularly viewed. The maps commissioned and designed by government agencies and related corporations come from a position of power and operate based on the assumption of scientific accuracy and impartiality. Michel Foucault introduces this dynamic in his writings on the power/knowledge complex. Expanding on this discussion, in *Questions on Geography,* Foucault asserts that when knowledge is assessed in geographical terms (e.g. region, domain, territory), it becomes automatically imbued with notions of domination, control, and ownership over space. Geographic terminology allows for domination on the part of whoever is wielding the map, which, in the case of

governmental mapmaking, are those already in the position of power, who are conveying knowledge from that perspective only.[1]

Also integral to a discussion on geographic representation is Henri Lefebvre's writing on the production of space. Lefebvre asserts that an analysis of space cannot be separated from the contexts of society and culture, meaning that any concept or scientific construction of space should be embedded in an understanding of experiential lived space. When these two facets of space are separated in scientific practice, it is to serve predetermined ideological stances or further particular motives. In order to repair the fissure between the actual knowledge of space and the scientific representation of space, Lefebvre argues, a new, cohesive theory needs to be developed that draws together fields that have previously been deemed separate. The focus should be not on a preconceived or convenient representation of space, but on an understanding of the production of space – the cultural activities, historical contexts, and contemporary conceptions that are actively and constantly shaping the space around us. Space is produced through processes of the perceived, the conceived, and the lived. Geographical representation occurs through a scientific reduction of space to a code, this codifying process needs to be excavated and reoriented towards a more inclusive understanding of space and the forces that contribute to its production.[2]

Maps today are stuck in the difficult position between being indispensible objects of utility, yet also tied in with a past of colonialism and imperialism, restricted to the technical, ontological realm. This tension describes what the geographer Jeremy

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[1] Michel Foucault, "Questions on Geography," trans. Colin Gordon, in*Power/Knowledge: Selected Interviews and Other Writings, 1972-1977*, ed. Colin Gordon (New York: Pantheon, 1980), 69.
[2] Henri Lefebvre, *The Production of Space*, trans. Donald Nicholson-Smith (Malden, MA: Blackwell Publishing, 1991), *passim*.

Crampton has termed the "cartographic anxiety". The cartographic anxiety comes out of the past (and, it will be argued, present) of maps as tools for colonial expansion, military operations, and reinforcement of segregation and racisms. Additionally, playing into this anxiety is the constant requirement of neutrality and objectivity in map production, which, we will see, is fundamentally impossible. Further, this anxiety comes out of the uneasiness surrounding the fundamental power of maps in establishing finite realities.[3] The destabilization and deconstruction of the map that movements of critical geography and cartography have brought about in more recent decades call increasing attention to the source of this cartographic anxiety. Critical geography is at once an oppositional force treading the line between activism and practicality, and embedded in an extensive core of critical theory. Among the critical debates on the production of space, military control and technology, cartographic anxiety, and the politics of representation, one thing that persists for certain is that "the fact is that mapping today is escaping the discipline."[4] What this means is that the concept of a cartographic practice outside of the technological, scientific, objective framework that has previously been necessitated and even sought after, is coming to the forefront.

In response to the past decades' progression towards a scientific and supposedly objective cartography, Edward Soja addresses the need for a socio-spatial turn in geography. Soja brings forward human geography as a valuable lens through which to consider cartographic practice. This work connects to many of the themes of a social production of space introduced by Henri Lefebvre. Soja condemns the historicism of modern geography and its isolation from social theory, emphasizing the need for a

[3] Jeremy W. Crampton, *Mapping: A Critical Introduction to Cartography and GIS*(Malden, MA: Wiley-Blackwell, 2010), 8.
[4] Ibid., 26.

concept of spatiality. This focus on spatiality – the politics and production of space – connects to a foundation in French Marxism and contributes to a postmodern, post-Fordist, post-historicist socio-spatial geography.[5] In a sense, we see these geographic theories practicing an undisciplining and re-disciplining of cartography all at once.

The seminal cartographic theorist John Brian Harley, in his work *Maps, Knowledge, Power*, discusses more explicitly the history of maps in relation to these theories on critical human geography. He argues that maps are automatically absorbed into the law, thus becoming accepted and scientific truths instantaneously. This automatic integration exists because cartography is tied up in a larger system of political power since maps are associated with, made by, and used by powerful political agencies and academic institutions.[6] For example, throughout history, maps have been used as tools to best exploit the land available, or, in the case of imperial conquest and empire, assert ownership over an area, such as in the case of the European colonization of North America. Here, maps claiming land ownership were created even before that land was officially acquired, and these colonizers even went as far as to demarcate lines and divisions with no regard to the indigenous people already living there.[7] Maps are powerful tools, then, that can be used to promote political distortions or censorship, leaving out certain features which would traditionally be included, masking particular discrepancies or unfavorable sights – for example, the omission of nuclear waste dumps from USGS topographic maps.[8]

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[5] Edward Soja, *Postmodern Geographies: The Reassertion of Space in Critical Social Theory* (London; New York: Verso, 1989), *passim*.
[6] J. B. Harley, *The New Nature of Maps: Essays in the History of Cartography*(Baltimore: Johns Hopkins University Press, 2001), 62, 79.
[7] Ibid., 57-62.
[8] Ibid., 65.

Two critical geographic theorists to follow promptly in Harley's footsteps are Denis Cosgrove and Denis Wood. In *The Power of Maps,* Wood observes a way in which maps are powerful that is not necessarily directly linked to political structures. Simply put, maps convey what cannot merely be seen in one glance, or even a million glances all woven together. While this may seem a novel observation, the implications are significant. First of all, this statement further explicates the way in which maps operate from a nexus of power because their use necessitates trust since no map user can truly know whether the map is honest, distorted, "accurate", etc. Second, all maps are, then, abstractions, because they are condensing and minimizing vast amounts of topographical space, and making specific choices of what to emphasize, while excluding for the sake of concise representation other details deemed less crucial to the overall map image.[9] To reiterate, maps encompass more than what is physical seen, to include what is known and understood about space, and to render in the present past assumptions, ideologies, and activities. Wood goes on to discuss what comes after the critique. He articulates that, once the structures behind the map are brought to the forefront of cartographic production, the map can be utilized and harnessed as a tool for conveying diverse opinions, information, ideas, and experiences. Maps can still be used as instruments for analysis and reasoning, Wood insists, but non-governmental and non-institutional groups can also employ the tool to raise questions, provide new perspectives, and empower those who are frequently silenced.[10]

Cosgrove brings an additional valuable perspective into the discussion of critical geography with his emphasis on landscape as a central feature of geographic work. The

[9] Denis Wood, *The Power of Maps* (New York: Guilford Press, 1992), 4-7.
[10] Ibid., 182-4.

development of an understanding of landscape as tied in with geography, cartography, and urban planning has an interesting history, with roots in new ideologies and technologies. Further, he highlights the notion that geography is always intertwined with sight and interpretation.[11] With these two spheres of Cosgrove's geographic thought, he brings forth a divergence that exists between rational ordering of space and experiential conceptions of that same space. The former is based on a "God's-eye-view" – authoritative, detached, and generalizing – whereas the latter connotes diversity and personality, but also illegibility.

This theory serves as a jumping off point for my thesis as the main body of work that informs my own understandings of and arguments concerning the history of cartography and what role it plays in our society. The first chapter will focus on the use of maps in Philadelphia and the implications they have had for race and place in the urban realm. I will begin with a historical and visual analysis of the redlining maps created by the Home Owner's Loan Corporation and Federal Housing Administration. Redlining is representative of the way in which maps have been appropriated and used to oppress minority groups. Maps are particularly powerful in the way that they not only enabled the practice of redlining, but also served to regularize the process. In this context, maps were used to normalize a system in which banks could determine areas that posed a threat or risk, which translated via the map to areas with high concentrations, or even any concentration, of African Americans, and cut them off from investment. Not only did the federal government use these maps to discriminate and incriminate a group of people and their geographical locales, but these agencies also promoted a one-sided understanding of

[11] Denis Cosgrove, *Geography and Vision: Seeing, Imagining and Representing the World* (New York: I.B. Tauris, 2008), *passim*.

space and created artificial boundaries within cities through their simplistic maps. Originally a response to the startling increase in foreclosures following the Great Depression, the practices spearheaded by these maps continued in various ways within post-World War II housing and development policy. A system of disinvestment in some of the most needy areas of the city was enabled by these mapping practices, perpetuating an ongoing cycle of urban decline.

In Chapter Two I will trace the trajectory of Geographic Information System (GIS) technology development and the cartographic ideology that evolved alongside it. With roots in military mappings, specifically the use of maps in the U.S. military to enable air raids during World War II, when mapping and technology became increasingly synonymous, it was with this understanding of military intelligence and domination. Thus, GIS, developed within an institutional sphere, drew on this understanding of the utilitarian nature of cartography, to attempt to enable a post-political mapping. This aim for a post-political mapping came out of the cartographic anxiety articulated by Crampton. Unnerved by the power of the map, especially its use in military domination, academic geographers and cartographers coming out of the war desired a mapping practice that could stand outside of politics. Issues of access to the technology will be covered, in addition to the problematic foundation of the technology in military intelligence and the idealism of disconnected powers dominating foreign space.

In Chapter Three I will use as a case study the Million-Dollar Blocks project by Laura Kurgan and the Columbia University Spatial Information Design Lab (SIDL) to convey how mapping language and technology are used and re-appropriated by those artists, academics, and activists who have access to it. This project represents a synthesis

of utilizing the functional aspects of new mapping technology while calling attention to the risks posed by these systems, such as misrepresentation or oversimplification of data. The Million-Dollar Blocks project draws on theoretically contested mapping technology to exploit and expose the shortcomings in cartographic practices. In this project, governmental "crime maps" are juxtaposed with the more comprehensive prison pattern maps made by the SIDL. These comprehensive maps expose the patterns of incarceration in the United States and the raw facts that, a. most prisoners come from a small number of neighborhoods in cities across American, b. the amount of money spent on these prisoners amounts to millions of dollars for just very small segments, often mere blocks, within the city, and c. that a startling number of these prisoners, coming from these very small, specific areas, will be re-incarcerated within only a few years of their initial release. With this project Kurgan reveals the overly simplified picture popularly put forth by the "crime maps" that are used to streamline police operations and call attention to the areas where crimes occur. The Million Dollar blocks project instead creates both a zoomed out and zoomed in, top down and bottom up, image of the underlying patterns and overt issues with incarceration of urban America.[12]

Above all, in this thesis I seek to analyze the use of maps in creating our conceptions of space. The process of mapmaking inherently consists of a series of choices, made by the cartographer, artist, scientist, etc. Maps are not benign objects – objective, inoffensive, and scientifically uncontestable – but active artifacts. These works of data visualization and geographic representation actively take part in a process of inclusion and exclusion. Throughout history government, military, and academic

[12] Laura Kurgan, *Close Up at a Distance: Mapping, Technology and Politics*(New York: Zone Books, 2013), 188-9.

institutions have used maps to put forth a specific image of space that serves a pre-determined goal. Coming from a point of authority, these maps are largely accepted, when, really, they only represent one image, that is, one perception of space among many. I am interested in the many, and in this thesis I explore the ways in which those other voices, have come to be considered “alternative” or “counter” as opposed to an equal viewpoint in the multiplicity of perspectives.

Chapter One

Redlining in Philadelphia, c. 1920-1950:
The Map as a Tool for Geo-Profiling

I. Redlining: A Beginning

Zoom in on center city Philadelphia in the year of 1886. This is the year and location of W.E.B. Du Bois' intensive study, in conjunction with the University of Pennsylvania, of the Seventh Ward, a large stretch of downtown Philadelphia with a high concentration of the city's black population. Du Bois brought his study to life with the utilization of the map as an expressive tool, synthesizing this visual artifact with his extensive door-to-door survey (Fig. 1). The image of Philadelphia put forth by Du Bois in *The Philadelphia Negro* suggests a multi-layered and extremely diversified black population, intermingled with a smaller white population, inhabiting center city Philadelphia. For example, Du Bois describes, in analysis of his maps, how at Seventh & Lombard Streets one would find the worst of the black slums, whereas in the section outlined by Lombard, Ninth, Rodman, and Tenth Streets resided many higher-class, wealthier black families. Between Tenth Street & Broad Street, including many small allies and side streets such as Souder, Rodman, Iseminger, and Ralston, was the largest and most mixed concentration of the black population in the Seventh Ward, largely occupied by "respectable working people and some of a better class"[13], with slightly lower classes on the side streets, and even some groups moving up from the slum areas.[14] Here is presented a comprehensive view of a vibrant, if in some ways troubled, black corridor within the central, downtown portion of the city of Philadelphia.

[13] W. E. B. Du Bois, *The Philadelphia Negro: A Social Study*, ed. Henry Louis Gates, Jr., The Oxford W. E. B. Du Bois (Oxford: Oxford University Press, 2007),38.
[14] Ibid., 37-40.

Du Bois did not shy away from condemnation of the "vicious and criminal"[15] black classes and the hazards posed by the many deteriorating slums, either, but he also offered a multi-faceted account of a community that was much more diverse in class, occupation, and religion than traditionally assumed, in addition to being interspersed with white residents. By presenting such a complex account of a historically condemned population, Du Bois, while not vindicating the faults of the black population in Philadelphia, challenged many assumptions that were drawn about the race. Du Bois concludes:

> We can thus see that the Seventh Ward presents an epitome of nearly all the Negro problems; that every class is represented, and varying conditions of life. Nevertheless one must naturally be careful not to draw too broad conclusions from a single ward in one city. There is no proof that the proportion between the good and the bad here is normal, even for the race in Philadelphia; that the social problems affecting Negroes in large Northern cities are presented here in most of their aspects seems credible, but that certain of those aspects are distorted and exaggerated by local peculiarities is also not to be doubted.[16]

In his writing alone it is hard not to contrast Du Bois' cautionary surveying with the presumptuous and conclusive nature of the federal city survey program spearheaded by the Home Owners' Loan Corporation (HOLC) and the Federal Housing Administration (FHA) some forty years later. A visual comparison of Du Bois' map of the Seventh Ward with the redlining maps of Philadelphia conveys a stark disparity between the two images of the city. The Du Bois map and the HOLC and FHA maps are similarly color-coded, but the former uses color-coding to add richness to an in-depth and multifarious account whereas the latter applies harsh color-coding to condemn entire swaths of Philadelphia's inner-city neighborhoods. Where Du Bois showed blocks containing many different

[15] Ibid., 123, 218.
[16] Ibid., 40.

colors from parcel to parcel, suggesting a complex urban fabric, the HOLC and FHA maps dramatically shroud the entire district in an alarming red that reads: stay away.

In this chapter we will examine the way that the HOLC and FHA used maps as a means of rapidly collecting, simplifying, and conveying information to create a concrete conception of urban space. While these federal agencies intended the maps to serve a utilitarian functionality, the negative side effects of these supposedly objective artifacts are still felt in the urban landscape today. In this chapter, the path that led to the method and creation of these maps, to the implementation and effects the maps had, will be traced to evidence the politically one-sided and power laden nature of government mapmaking.

II. The Great Depression and the Reconfiguration of the Urban

During the Great Depression, one of the starkest measures of the effect these years had on Americans across the board was the number of home foreclosures. In 1929, approximately five hundred homes in the U.S. went into foreclosure daily; by 1933 that number had increased to one thousand homes per day; and by 1934 upwards of half of all urban homes were either in foreclosure or in imminent danger.[17] In attempt to reverse the severe number of housing foreclosures, following the Great Depression of 1929, President Hoover signed the Federal Home Loan Bank Act (FHLBA) on July 22, 1932. The Loan Bank Act established a board – the Federal Home Loan Bank Board (FHLBB) – to assist homeowners in need. They attempted to provide financial relief to homeowners by refinancing loans, creating lower down payments and longer payback

[17] Carl H. Nightingale, *Segregation: A Global History of Divided Cities* (Chicago; London: University of Chicago, 2012), 343.

periods, and extending mortgage rates.[18] However, the momentum of housing foreclosures persisted regardless of the Loan Bank Board's efforts, and, in 1933 President Franklin Roosevelt urged for another reassessment and safeguarding of home ownership and loan policies in the United States.

To implement Roosevelt's vision, congress launched a new organization, the Home Owners' Loan Corporation (HOLC) on June 13 of the same year, parented by the existing FHLBB.[19] In 1934 President Roosevelt also enacted the National Housing Act as part of the New Deal, which created the Federal Housing Administration (FHA).[20] This organization undertook a more comprehensive analysis and policy making endeavor to determine the safest way to allocate federal loans. The implementation of the FHLBB, the HOLC, and, soon after, the FHA marked the beginning of federal intervention in the national housing system, henceforth changing the urban landscape. With the FHA came the introduction of "the long-term, low-down-payment, fully amortized, level-payment mortgage."[21] This refinanced mortgage system widened the scope of who could afford a home to include the working- and middle-class families, but this expansion was limited to white people only, excluding African Americans from this new opportunity for home ownership and capital investment. It was never explicitly stated in the policy that the loans were only available to white people, but the number of black residents in a neighborhood was directly correlated with the desirability and, consequently, loan security in that area.

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[18] Kenneth T. Jackson, *Crabgrass Frontier: The Suburbanization of the United States* (Oxford:OxfordUniversity Press, 1987), 194-8.
[19] Amy Hillier, "Redlining in Philadelphia," in *Past Time, Past Place: GIS for History*, ed. Anne Kelly Knowles (Redlands, CA: Esri Press, 2002), 79.
[20] R. Allen Hays, *The Federal Government & Urban Housing*, 3rd ed. (Albany: SUNY Press, 2012), 89.
[21] Ibid., 89.

The discrimination, while not directly articulated, was a palpable part of the practice of neighborhood assessment and subsequent lending patterns. Neutrality of views concerning race and the perseverance of segregation into the 1900s reinforced racist public beliefs. While this post-Depression policy-making created new opportunities for homeownership among large portions of the population, the persistence of segregationist attitudes underlying the ideologies of the general population and, most effectively, those in power positions, kept these new opportunities closed off to minority groups. While the FHA mortgages were backed by private savings and loans and by mortgage bankers, thus some of the discriminatory practices stemmed from racist concepts of loan underwriting and general conceptions of good business, the assimilation of these attitudes into the federal government and public policy reinforced and further exaggerated a dual housing market.[22]

Whereas the HOLC primarily worked to get the economy moving again by aiding homeowners, guiding them away from imminent foreclosure with refinanced mortgages and loans, the FHA followed more of a clean slate program geared towards new construction and new long-term mortgages with lower down payments. This system, considered innovative at the time, was proposed by Federal Reserve economist Winfield Riefler who suggested that focusing on the construction industry, with the creation of "model homes", loans that could be paid off slowly, emphasis on owner-occupancy, and the overall sentiment of a fresh start, would jump start the nation's economy.[23] Thus, to determine what areas were safe to invest in, and which zones may prove risky, the federal

[22] Ibid., 91.
[23] Louis Hyman, *Debtor Nation: The History of America in Red Ink* (Princeton: Princeton University Press, 2011), 49-50, 53.

agencies implemented a new system to assess neighborhoods and determine the potential for future prosperity.

Perceived risk was instrumental in the neighborhood assessment process. Since the HOLC and FHA were implemented for the primary purpose of curbing home foreclosures, the entire reorientation of the lending system was based on safeguarding against risky loans. In reassessing lending policies, these agencies made a transition from property valuation as the main factor determining loan eligibility to a more complex system of "risk-rating" that would accompany the proliferation of new homeowners and new housing stock. This system was based more on an assessment of a neighborhood as a whole – what kind of people lived there, what the condition of the housing stock was, what prospects (or lack thereof) existed for the future of the neighborhood – as opposed to individual borrowers and single properties, and was conceived of to create an objective, all-encompassing computational tool to systematically determine the level of risk in making housing loans.[24]

Maps were the main tools for conveying and visualizing the neighborhood assessment data. The corporation made many of its initial loans prior to the creation of the neighborhood assessment maps. However, starting in 1935, the agency began to seek a more systematic approach to more strictly collect on the thousands of outstanding loans that still existed. Thus, to implement a model for future loans, the corporation began a rigorous neighborhood assessment project called the City Survey Program, which resulted in what are today known as redlining maps (Figs. 2-4).[25]

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[24] Jennifer Light, "Discriminating Appraisals: Cartography, Computation, and Access to Federal Mortgage Insurance in the 1930s," *Technology and Culture* 52, no. 3 (July 2011): 485-8.
[25] Hillier, "Redlining in Philadelphia," in *Past Time, Past Place*, 79-80.

Two separate economists and appraisers, whose work centered on an ecological theory of the city in order to explain neighborhood patterns, largely influenced the City Survey program. The first was Chicago appraiser and economist Frederick Babcock who, following in the groundwork laid by his father, William Babcock, harkened in a systematized practice of neighborhood assessment. This practice was based on factors such as land availability, land use, building type, and the class and race of residents. Babcock is known for writing *The Appraisal of Real Estate* in 1924 in which he discussed the "science of appraising", and developed his neighborhood life cycle theory. Babcock's neighborhood life cycle theory introduces class and race into the structuring of an evaluation system for urban space by claiming that the rise and fall of urban neighborhoods coincides with the introduction of lower classes and minority groups. Going on to be the chief appraiser at the FHA starting in 1934, Babcock brought much of this scientific method of appraisal, rooted in notions of class and race as primary factors determining neighborhood security, to his work developing and conducting a system of neighborhood appraisal and "risk-rating" with the federal association.[26]

Homer Hoyt was the second ecological urban theorist to join the FHA. During his tenure at the FHA, Hoyt wrote, in 1939, *The Structure and Growth of Residential Areas in American Cities,* a work that was the result of years of research on the patterns and factors that, he believed, influenced the rise and decline of an urban neighborhood. This work was a culmination of all of his urban ecological and housing theory that evidences the biases of the FHA in its discussion of race. At the FHA, he guided the risk-rating system, constructing the *Underwriting Manual* to influence subsequent policies. Hoyt transformed race and class into the core topics of his urban theory. Based on his analyses

[26] Nightingale, *Segregation: A Global History*, 345-7.

of urban growth and investment, he argued that the appearance of minority groups and some immigrant populations marked the imminent decline of a neighborhood, since residents viewed them as invaders and would flee.[27]

A risk-based approach in the assessment and mapping process is an inherently problematic practice. At the heart of why such a profiling-based strategy is innately troublesome is that it is rooted in incriminating individuals based on membership to a "high-risk" group, regardless of individual situations and narratives.[28] Promoting a risk-assessment approach means actively supporting discrimination, namely by ignoring personal achievement and individual standing for the sake of easily and concisely grouping together populations. As Du Bois writes in his study on the Philadelphia Negro: "…there is no surer way of misunderstanding the Negro or being misunderstood by him than by ignoring manifest differences of condition and power in the 40,000 black people of Philadelphia."[29] Thus, an early form of geo-profiling was born in the practice and implementation of redlining maps.

III. Maps Coming Alive

While the forces and motives behind redlining are a continual subject of debate, namely whether the true powers to blame are the Home Owners' Loan Corporation, the Federal Housing Administration, the Federal Home Loan Bank Board, or private banks, the lasting effects of neighborhood assessment maps still echo today throughout many U.S. cities. The FHA and the HOLC were separate, but essentially interchangeable

[27] Homer Hoyt, *The Structure and Growth of Residential Neighborhoods in American Cities* (Washington, D.C.: Federal Housing Administration, 1939), 58-71.
[28] Crampton, *Mapping: A Critical Introduction*, 120-1.
[29] Du Bois, *The Philadelphia Negro: A Social*, 221.

sectors of a single government, operating from the same nexus of power and promoting nearly identical ideologies. Neighborhood assessment maps regularized the process of redlining that contributed to the rapid suburbanization and the consequent decline of cities across the country by creating an easy and visually accessible way for banks and other private loan companies to cut off many inner city neighborhoods with older infrastructure and minority populations from desirable loans, or from loans altogether.

These government agencies were not the sole proprietor in institutionalizing the practice of redlining, nor were they responsible for creating the practice. The practice of redlining existing long before any of this post-Depression, New Deal-era policy was created. Yet, the use of these maps poses a particularly troubling display of power advantages. The maps were created at a juncture between the interests of private companies and public administration, and were compiled and drafted with the help of a large number of local realtors and bankers.[30] The maps were concealed from the public, but shared between the HOLC, FHA, banks, and other lenders.[31]

The interchange between the two primary organizations is readily evident. Not only did the two organizations draft identically color-coded and graded maps of a number of U.S. cities, the FHA's *Underwriting Manual* embodies the same ideals as the HOLC survey information. The first FHA *Underwriting Manual* was published in 1935, placing it contemporaneously with the series of HOLC neighborhood risk assessment maps. Whether HOLC mapmaking influenced the FHA guidelines or vice versa, or even a little bit of both, grounded in the racial politics of the time, both organizations hold responsibility for creating these race-based neighborhood risk assessment maps.

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[30] Kevin Fox Gotham, Race, Real Estate, and Uneven Development (Albany: SUNY Press, 2002), 54-55.
[31] Craig Wilder, *A Covenant With Color: Race and Social Power in Brooklyn* (New York, Columbia University Press, 2000), 185, 192.

The FHA *Underwriting Manual* was a series of guidelines and accompanying maps outlining loan risk assessments across neighborhoods in all U.S. cities. This activity was inspired first by the risk-assessment rating of private institutions and later by the emerging academic school of thought on ecological urbanism. Initially, grading criteria were left intentionally vague, allowing judgment calls to be made by the individual appraiser. Yet, as the agency became overwhelmed by the involved risk-rating system, which required extensive observation by multiple employees, Homer Hoyt, in 1934, suggested a map-based risk-rating system that would enable generalizations and ease the rating process.[32] His economic approach to cities negatively reinforced classicism and made the class construction of race evident. Based in the scientific and academic schools of thought on the city, pioneered by Hoyt and Babcock in particular, federal agents acted as if, and perhaps even believed, that their methods and motives were objective and apolitical tools. There was, however, a divergence between academic ecological urban thought, which sought to track and compare social and urban processes for the sake of insight, and the FHA use of these methods as a tool for making decisions. An additional divergence occurred when the agency began using these methods to anticipate future trends and, subsequently, project those trends as a finite rule of neighborhood cycles.[33]

Hoyt outlined basic criteria to classify neighborhoods. For example, “D” graded neighborhoods should exhibit low rents (in lowest ten percent group), visible repairs needed on more than ten percent of the structures, less than twenty percent owner-occupancy, high vacancy rate, and more than ten percent non-white residents. Neighborhoods that were given an “A” rating, conversely, would have demonstrated high

[32] Light, "Discriminating Appraisals: Cartography, Computation," 489-94.
[33] Ibid., 489-501.

rents, no noticeable need of repairs, almost complete owner occupancy, and all white and high economic bracket residents. Overall, the system was faulty and narrow minded, particularly in the lack of extensive data on the actual causes of defaults, and the preoccupation with simplifying the method, as opposed to refining and detailing observation and accuracy. The information that was being reduced to mere color codes on a map was much more complex and multi-layered, involving diverse terrain and people from varied backgrounds, beliefs, and social structures. The system became so systematized based on Hoyt's criteria that if an area received a "D" grade in the preliminary stage, no field appraisal (the next stage) would even be carried out, simply for the sake of cutting down on field time and the amount of work required for each loan request. The FHA proceeded, boasting the establishment of a scientific tool that could be used for rapid, fairly easy, apolitical and objective neighborhood assessment.[34] As the first high profile and active housing administration, the FHA had a great influence on residential patterns, not solely through the agency's policies and lending practices, but also through the influence that these standards had on private lenders.

In addition to establishing the informative factors of their risk-rating system, namely which factors (e.g. race, location, class, housing type) would supposedly denote a risky loan, the federal agencies also needed to visualize the results of the appraisers' research and, to provide brokers, realtors, and investors with a tool for their own lending patterns. The HOLC and the FHA presented maps as objective tools, capable of conveying information in a simple and straightforward manner, claiming them to be a universal apparatus, familiar and decipherable by most, for outlining the city. While developers were by no means explicitly required to follow the guidelines of the FHA

[34]Ibid., 512-15.

manual and maps, if federal financial backing was desired, there was little choice but to succumb to the regulations.

To create these maps, HOLC and, later, the FHA employed real estate assessors, brokers, and private banks. The HOLC and FHA wanted their maps to be precise, cohesive, and to communicate their content in a straightforward manner. As a result, these maps reduced whole regions to unified blocks. In order to convey clearly to agencies, the public, and interested parties their risk-assessment, these agencies reduced diverse neighborhoods to race- and class-based clusters, further equating risk with financial and social status. The assessors divvied the city up into concise blocks that were easily classifiable under a single rating, further reducing race, nationality, and built environment conditions to one color coded area. Behind this classification project, the idea was that white homogenous neighborhoods, which would be colored green, were ideal in terms of posing minimal lending risk and exhibiting promising prospects for future neighborhood stability, desirability, and prosperity. Conversely, areas that were colored red were explained as showing bad prospects for the future, based on the prevalence of older housing stock, lack of undeveloped land, and the infiltration of "undesirable populations".

At the hands of these federal agencies, the maps allowed for quick assessment of loan risk, condemning or approving a home mortgage according to the status of the neighborhood as either a poor-grade or high-grade area, as opposed to looking into individual backgrounds or situations. Green always corresponded to the "best" areas and red to the "hazardous" zones, with blue and yellow as the intermediate levels. The

divisions did not adhere to any preexisting wards, census tracts, postal zones, or local understandings of neighborhood boundaries.[35]

Evidently, maps stand in a very powerful position between creating and recording space, between being unique and utilitarian artifacts, and politically charged objects.[36] The HOLC and FHA redlining maps tend towards the side of creating, as opposed to recording, the city, in addition to putting forth the political motives of easily classifying information with no social or welfare cause in mind, as opposed to utilitarian purposes. With these maps the HOLC and FHA created an exclusive and suburban-centric metropolitan region in Philadelphia, among other cities across the country. The inner city was abandoned to decades of decline and decay. Those left behind in the city were those shut out from the suburban expansion – minority and immigrant groups.

The primary goal with the maps was to create, with little to no regard of actual local knowledge and understanding of space, place, and urban boundaries, coherent and easily classifiable groupings. The creators of these map exhibited indifference to the development of working class and poor communities, entirely lacking a social or welfare agenda. The powerful aspect of these maps is not that these agencies lacked knowledge, because, in fact, they most likely were aware of the artifice of their groupings, but the very fact that this knowledge was suppressed for the objective at hand. To safeguard against foreclosure and loan defaults, these federal agencies pushed forward a method with the detrimental effects described above of lifting up the white middle and upper classes while suppressing the poor, African American population. Red-marked areas warned investors against lending in that zone, hence resulting in abandonment of entire

[35] Mark Monmonier, *No Dig, No Fly, No Go: How Maps Restrict and Control*(Chicago; London: University of Chicago Press, 2010), 118-9.
[36] Cosgrove, *Geography and Vision: Seeing*, 169.

sections of the city. While the stated aim here was preventative, contributing to visions of a future economically stable city, with a simplistic and racialized execution, the federal government created an increasingly fragmented post-Depression Philadelphia, with the middle and upper class whites, fueled by these new loans, fleeing inner cities for new suburban developments.

The addendum that prefaced the entire collection of maps (Fig. 5.1, 5.2), in addition to the grading criteria sheets that accompanied each individual map (Fig. 6.1, 6.2, 6.3), are telling of the racial construction that informed this cartographic practice. The main evidence for a neighborhood's grade was the percentage of Negro or foreign born, the prestige of occupations (e.g. an unskilled laborer was not considered an honorable position while a business professional was), the age of the buildings, and the amount of land available for new development. These samples of the addendums that accompanied the HOLC maps of Philadelphia reveal that areas that the corporation gave an "A" classification were considered "hot spots", meaning that they were newer enclaves that still had room for new construction, and were also homogenous, constantly in demand, and overall on the rise; "B" neighborhoods were similarly racially homogenous, but were fully developed and, thus, considered slightly less desirable by lenders; "C" areas possessed older housing stock, inadequate infrastructure (such as transportation and public utilities), expiring or nonexistent racial restrictions and covenants, and exhibited the introduction of "a lower grade population"; the lowest category, those areas marked in red on the maps are grade "D" and are characterized as "hazardous", with an undesirable population, lower income brackets, low rates of home ownership, and poor maintenance of housing stock and infrastructure. This politics of

taxonomy reveals an exceedingly reductive utilization of map classification. The maps appeared as simple, but this representation masked the true complexities behind individuals and neighborhoods, such as the financial situation of unique families or the underlying systematic issues that created these "hazardous" enclaves. Made from an outsider with the purpose of capitalistic objectivity and the motive of smart investment, in classifying the urban landscape through this lens, redlining maps forsake the importance of the subjective spatial experience of local actors, and conceal the fact that, far from being universalized examinations of the city, they are really only a small sliver of a spatial reality that is tied up in preconceived notions of power and ideology.[37]

With the pretext of accuracy, these maps proved detrimental in the condemnation of whole groups of people and entire sections of the city. These classification sheets, paired with the color-coded maps, reveal anything but an objective tool for making the best possible use of homeowners' loans. The working of a map is contingent upon the ethics and politics of the group that assigns them. Thus, the maps are influenced by the main goal of the HOLC, FHA, and related organizations, which is to create an accessible tool for the ease of both their own home mortgage system and those of other non-governmental, private lenders.

During the post-Depression housing mortgage boom of the 1930s there were also private organizations that created versions of color-coded risk assessment maps. One of the most circulated of these is that created by J. M. Brewer of the Metropolitan Life Insurance Company in Philadelphia (Fig. 7.1-2). Brewer created a race and class based assessment map of Philadelphia in 1934 that does not resemble the HOLC and FHA maps specifically, but uses a similar basis of division and classification. Brewer went on to

[37] Nina Möntmann and Yilmaz Dziewior, eds., *Mapping a City* (Hamburg: Hatje Cantz, 2004), *passim*.

assist HOLC with their maps starting in 1935.[38] Thus, it would be difficult to imagine that Brewer and his private corporation were not only influenced by Homer Hoyt and the FHA assessment policies, but that he also went on to bring such biases into his work with the HOLC.

IV. Afterlives of Redlining

The changes mapped by the three successive HOLC maps of Philadelphia (Fig. 2-4) further exemplify the influence that political ideologies had on these maps, as opposed to serving utilitarian functionalism alone. As policy evolved and loan criteria became more defined, these three maps reveal an increasingly harsh perspective of housing conditions and neighborhood risk in Philadelphia. While not much changed economically in the years between 1935-1937, each map put forth a bleaker image of the city than the one prior.[39] By 1937 the swaths of red and yellow had taken over almost the entire core of the city, with the blues and greens reserved only for the outskirts. Visually striking, the amount of red covering the 1937 map of Philadelphia (Fig. 4) denotes a deteriorating city rife with "undesirables" that, instead of garnering aid and assistance, should (and would) be left to the cycle of disinvestment. Despite the lack of change on the ground during these years, the maps suggest an increasingly destitute urban center. Thus, the city's destiny was actually foregrounded by these maps. Colored almost entirely red, little new investment would be channeled to the inner city. Instead, the agencies increasingly favored the development of open land in outer suburbs, restricted to white middle- and

[38] Hillier, "Redlining in Philadelphia," in *Past Time, Past Place*, 87-90.
[39] Ibid., 86.

upper-class families only, causing the historic shift away from cities and towards suburban development.

Sociologists Melvin L. Oliver and Thomas Shapiro summarize the fundamental effect that redlining had on African American populations:

> Locked out of the greatest mass-based opportunity for wealth accumulation in American history, African Americans who desired and were able to afford home ownership found themselves consigned to central-city communities where their investments were affected by the self-fulfilling prophecies of the FHA appraisers: cut off from sources of new investment, their homes and communities deteriorated and lost value in comparison to those homes and communities that FHA appraisers deemed desirable.[40]

The practice of redlining, while not explicitly termed until decades later, was systematized through these color-coded maps. With the maps as a tool, it became very easy for banks to write off entire areas as too risky based on the danger posed to capital investment, and refuse to lend there or only lend at subprime rates. By cutting off huge portions of inner-city neighborhoods, these policies perpetuated continual decline in the downtowns of cities, further segregating African Americans into increasingly neglected inner-city enclaves across the country. This practice, which is known today as redlining, existed, unspoken and undefined, long before the policies and administrations that are criticized for responsibility came into being. As a result of segregationist and racist attitudes continuing into the 20th century, it is no secret that all policies, including housing policies, were exclusionary. However, a discussion of the institutionalization of redlining cannot be separated from these selected government organizations.

Since these maps were created by government agencies with the specific ends of producing a simplified, streamlined system for determining where to grant and where to

[40] Melvin L. Oliver and Thomas M. Shapiro, *Black Wealth/White Wealth: A New Perspective on Racial Inequality*, 2nd ed. (London: Routledge, 2006), 18.

deny home loans already in mind, they are inherently part of a larger system of political power.[41] These maps encompass more than what is physically seen, including what is known and understood about particular areas, thus rendering in the visual present, past assumptions, ideologies, and motives. Ingrained racisms and conceptions about certain income groups, races and ethnicities, and even preferred style of housing, were, therefore, translated directly into and reinforced by these maps. By connecting back visually to familiar legal codes, zones, domains and divisions in urban space, the viability, truthfulness and completeness, of the map went unquestioned.[42]

While the divisions rendered on the surface of the HOLC maps of Philadelphia are entirely artificial, without having this prior knowledge there would be no reason to assume they are anything but grounded in fact and reality. These artificial boundaries, created for the sake of concision and ease of representation may have served just that purpose, but at the expense of those living in the divided and misrepresented communities. The fundamental problem of these maps is the claim to objectivity and utility that they are used to make, when, in reality, the maps only showed a certain group's ideas about a place, not the reality of on-the-ground experiences or the inherent variations possible even between direct neighbors. Entire localities were subjectively defined on the basis of racial segregation and in promotion of capitalistic expansion with the development of suburbs at the expense of urban cores. These localities were then packaged up in a neat and organized manner that was presented as objective and quantitative truth.

[41] Harley, *The New Nature of Maps*, 79.
[42] Wood, *The Power of Maps*, 7-10.

V. Conclusions

Foregrounded by the implementation of racist lending patterns popularized and systematized by the redlining maps, African American people have, throughout the past century, been forced to rely on substandard options as, despite continued legislation to promote fair housing, redlining persists in various legal and illegal forms. While property owners and contract-sellers increase their wealth base, African Americans are often left with the worst options. Being closed out from prime credit and refinanced federal mortgages, African American people have been forced to settle for subprime loans or turn to substandard and overpriced rental properties. Not only are the effects of redlining maps still palpable on barren urban streets and dilapidated neighborhoods throughout U.S. cities, but also redlining as an active practice has not been done away with either. As the country still recovers from the 2005 housing bubble "burst" that caused a resurgence in housing foreclosures equal to, if not worse than, the wave following the Great Depression, issues of redlining are still concealed beneath the surface of lending policy today. Not only did African Americans continue to receive subprime mortgages at a rate estimated to be three times that of whites through 2006,[43] a disparity in foreclosure rates that holds across income brackets has persisted, with a disproportionate relationship between the share of origination and the share of completed foreclosures for African Americans.[44] Turning to rental properties often became the only option short of accepting a damning mortgage. Historically, black people were rented properties at rates

[43] Elvin Wyly et al., *New Racial Meanings of Housing in America* (Vancouver: University of British Columbia, n.d.), 1.
[44] Debbie Gruenstein Bocian, Wei Li, and Keith S. Ernst, *Foreclosures by Race and Ethnicity: The Demographics of a Crisis* (Durham; Oakland; Washington, D.C.: Center for Responsible Lending, 2010), 9-10.

disproportionately high to the condition of the building, paying more and getting less than what white people get in the same city. In his chapter on housing, Du Bois describes this particular phenomenon, observing how black people paid comparatively high rents for smaller and increasingly cluttered and subdivided accommodations, leading to both debt and overcrowding.[45]

Alternatively, African Americans were left with no options but to buy "on contract", which essentially had the same effects, shouldering the burdens of homeownership, such as utility bills and repair costs, yet none of the benefits such as accumulation of value on a property.[46] Today, following the height of the housing crisis, this disparate rental market has only become further polarized and increasingly systematized. In the wake of the foreclosure boom of the mid- to late-2000s, a new opportunity opened up for those with high levels of disposable income – that is, the opportunity to buy up large quantities of underpriced housing. That housing has then been turned around, either by individual investors on Wall Street or rental companies such as Invitation Homes, and rented back to those who have lost their homes at high rates and with little maintenance or care. Thus, people are forced to spend an unreasonable percentage of their incomes on substandard housing, and, most controversially, are expected, by these rental agencies, to put their own money into repairs, resulting in a worst of both worlds situation.[47]

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[45] Du Bois, *The Philadelphia Negro: A Social*, 209.
[46] Ta-Nehisi Coates, "The Case for Reparations," The Atlantic, last modified June 2014, accessed November 11, 2014, http://www.theatlantic.com/features/archive/2014/05/the-case-for-reparations/361631/.
[47] Rebecca Burns, "They're Still Redlining," Jacobin, last modified November 13, 2014, accessed November 11, 2014, https://www.jacobinmag.com/2014/11/theyre-still-redlining/.

While the HOLC and FHA most likely did not go into the original appraisal process with malicious racist intents, the evidence provided by historical patterns, the maps, and accompanying text, suggests a racism deeply ingrained within the process. For example, while one main criterion for a higher graded neighborhood is open land ripe for development, there are areas of Northeast Philadelphia that remained largely un-built into the 1950s and even 1960s that were graded poorly as early as 1935, raising the question as to whether certain factors, such as race and income, were weighed more heavily than others. While the fundamental motive may not have been malevolent, the oversimplification of urban space proved detrimental.

As Cosgrove argues, mapping urban space, while placed between creating and recording the city, implicates a divergence between perceived cartographic rationale and ordering of urban space, and real lived experience.[48] It is this sense of individualism and variance that the redlining maps forsook by relying on rigid classifications, created by culturally and socially biased individuals. Visualizing the HOLC maps of Philadelphia from 1935, 1936, and 1937 reveals not a city swathed in red, already moved to a point beyond repair, but the inflexibility, and, ultimately, unfairness, of classifications that analyze not just artificially segmented space but also targeted groups of people. The effect that redlining maps had on the overall health and investment in the city, and in the making and breaking of communities, was the stunting of urban growth for decades to come and, consequently, the feeding of a consumer culture rooted in suburbanization, segregation, and the rise of the automobile. Not only did legislation concentrated on the middle and upper class consumer culture serve to promote years of urban deterioration and disinvestment, but the maps also promoted segregation and the channeling of

[48] Cosgrove, *Geography and Vision: Seeing*, 170-1.

resources away from minority enclaves, with the lasting impact of leaving this underserved population behind in an ever disregarded urban core.

Instead of studying the actual factors and patterns behind home mortgages and the causes of these loan defaults, agencies instead relied on assumptions and generalizations inherent to the time period to make these decisions. The conclusions drawn about racial groups were embodied by the HOLC, the FHA, other government organizations, and private brokers, who were in the powerful, but also, as a result of the Great Depression, newly precarious position of holding and controlling large amounts of money. As opposed to studying the underlying factors that contribute to, as Lefebvre describes, the production of space as an inherently varied, lively, and individualistic social process, influenced by common prejudice, these powerful actors separated the lived experience of and inevitable differences that existed from person to person in the urban core of Philadelphia, from the analysis of neighborhood conditions and future prospects. Lefebvre further iterates that space is produced through all three processes of the conceived, the perceived, and the lived. Geographical representation forsakes this trifecta by reducing space to a code for distinctive and easily grasped visualization.[49]

These maps represent a severe reduction of space to a quantifiable margin that does not aspire to change the qualitative characteristics of that space, but rather to reinforce in them a form both biased and vague. The categorization of complex data concerning social and racial patterns, neighborhood life cycles, and groupings as blatantly subjective as “neighborhood desirability” into such simplistic, yet powerful, maps is disconcerting. The added fact that so much of this data was incomplete, through only initial analysis, narrow scope, or faulty focus – particularly in the admittance that the

[49] Lefebvre, *The Production of Space*, *passim*.

neighborhood risk assessment program was introduced as a stand in for actually studying the underlying patterns and factors causing individuals to default on home loans – only stands to further expose the abusive use of the map to sever geographic and demographic data from a more inclusive and comprehensive analysis of urban processes and localized experience. The continued reliance on the same neighborhood risk-assessment program, despite knowledge of the shortcomings inherent in the method, also holds greater implications for the power/knowledge construct that maps are irreparably entwined with.

An understanding of the map as active within the reality or information that is being conveyed is imperative in using the map as a powerful and effective tool. Maps are not passive, but active describers of one facet or perspective of a multi-layered reality.[50] In the case of redlining maps, the powers of the map are harnessed by the FHA, the HOLC, and private lenders to inscribe a capitalist agenda on the urban terrain, forever altering the physical and social landscape of the inner city. Since maps are universally recognized artifacts, they are extremely powerful because they are readily accepted and absorbed into our knowledge as fact-based, scientifically determined truths. Thus, maps and mapmakers operate from a powerful nexus of determining what knowledge to convey and what information to silence, by both underrepresentation and omission, and of inflicting these new truths upon populations, locales, and specialized enclaves. Whichever operator is wielding this geographical, knowledge determining language, then, holds the power.[51] In the case of redlining maps, the federal agencies and private brokers, knowing at least to some degree the holes in their method, wielded the power of the map to create a systematized way of determining what individuals, or what class or

[50] John Pickles, *A History of Spaces: Cartographic Reason, Mapping, and the Geo-Coded World* (London: Routledge, 2003), *passim*.
[51] Foucault, "Questions on Geography," in *Power/Knowledge: Selected Interviews and Other*, 69.

race, received home loans and what individuals were excluded from this newly implemented system.

As the Du Bois study and contemporary research on his work reveal, however, these central areas of Philadelphia were much more complex and multi-layered than the redlining maps so drastically suggest. As part of a current ongoing project – Mapping the Du Bois Philadelphia Negro - headed by University of Pennsylvania Design School geographer Amy Hillier, attention is called to the diversity of both the black and general population occupying the Seventh Ward in 1896. Comparing the Du Bois map with a modern day, multi-layered replication, made using resources such as fire insurance maps and information from the 1900 U.S. census, Hillier highlights with this project an area compact and highly populated by black groups, yet extremely varied in class level, background, and occupation – suggesting a much more economically heterogeneous African American zone than traditionally assumed. The Mapping Du Bois project also calls attention to the complexity of Du Bois' color-coded classification system, bringing to the surface an array of back-stories and contexts belonging to the individuals behind the statistics.[52]

The revelations of the Du Bois project serve not only to reiterate these distinctions, displaying lesser known facts such as the grouping of wealthy and lower class blacks throughout the district, but also to call attention to the ongoing struggles of racial exclusion. Additionally, the project highlights the dichotomy between conveying the concepts and meaning behind factual information and getting caught up in the formal

[52] Michael Dear et al., eds., *GeoHumanities: Art, History, Text at the Edge of Place* (London: Routledge, 2011), 278-81.

representation of mapmaking.[53] While Du Bois was certainly subject to the Victorian ideals that persisted in many American minds approaching the turn of the century, and he does not reject the role of the black population in perpetuating its own "Negro problem", he was unique in also addressing the substantial part that white racist attitudes played in keeping down and perpetuating the social ills that plagued the black population in Philadelphia in 1896. Further, almost as a direct assertion against redlining maps, Du Bois explains that the most surefire way to misunderstand the black population of Philadelphia is to group them altogether as one.[54] Yet, redlining maps did just that – formalizing assumptions and classifying under one label a vast and assorted population.

[53] Ibid., 285-6.
[54] Du Bois, *The Philadelphia Negro: A Social*, 221.

Chapter Two

The Development of GIS:
From Military Mappings to Commercial Technology

I. Zip-Code Maps as Contemporary Redlining

After years of discussion and debate, on April 11, 1968 President Lyndon Johnson passed the Fair Housing Act as part of the National Civil Rights Act of 1968.[55] The geographer Mark Monmonier has argued that zip codes, while created by the U.S. Postal Service in 1963 for the utilitarian purpose of an expedited mail service, are also used, or misused, perhaps, to quickly classify areas and serve as a modern, and legal, form of redlining.[56] Zip codes pose a way to essentially stereotype entire areas from an isolated locale, without requiring or privileging any supplementary information such as local experience, knowledge, and culture. For example, automobile insurance is determined largely, if not entirely, based on an applicant's zip code. As the Jeremy Crampton remarks: "Two people with clean driving records will pay different premiums based on where they live – not their personal records."[57] Thus, with one swift glance at a map, all individuals falling within a certain zip code automatically receive different, prejudiced, and lesser treatment.

The extent to which people can be generalized by zip codes is evidenced by a recently circulated interactive zip code map made by ESRI, complete with the subtitle: "What Your Zip Code Says About You". In an article introducing the map on the Philadelphia Business Journal website, it is celebrated as a use of modern GIS technology to provide "a revamped method of geographical categorization"[58] that presents "detailed

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[55] "History of Fair Housing," HUD.GOV: U.S. Department of Housing and Urban Development, accessed November 11, 2014, http://portal.hud.gov/hudportal/HUD?src=/program_offices/fair_housing_equal_opp/aboutfheo/history.
[56] Monmonier, *No Dig, No Fly*, 123-4.
[57] Crampton, *Mapping: A Critical Introduction*, 122.
[58] Dan Norton, "Interactive Map: Socioeconomic Breakdown of Every Zip Code in the United States," Philadelphia Business Journal, last modified October 28, 2014, accessed November 11, 2014,

socioeconomic descriptions of the people living in a particular ZIP code".[59] The map, as a whole, supports the notion that individuals can be geographically classified. Yet, this exemplifies a sweeping generalization by stereotyping entire zip codes, which, in urban settings in particular, tend to include hundreds, if not thousands, of people, under a few basic categorizations. The map does not even come close to capturing the inherent diversity that can exist within a single urban zip code, and it operates from a nexus of assumption making about what an individual's locale must say about them because, perhaps, some people in that same tract identify with certain behaviors, aspirations, attitudes, cultures, experiences, etc.

For the zip code 19121, a neighborhood in North West Philadelphia, generally made up of a mix of low-income African American residents and college age students, as a result of nearby Temple University, the interactive zip code map denotes three "tapestries" for this area: 37% "Modest Income Homes", 34% "City Commons" and 8% "College Towns" (Fig. 8-9).[60] From the simplicity and directness of the language and the use of generalizing language such as "We are this" or "We do that", suggesting complete and utter homogeneity of beliefs, histories, personalities, and interests, and the ease of being able to just type in a zip code and automatically have these descriptive "tapestries" brought up, this zip code map is making immense assumptions about entire populations.

This particular project sets up a number of questions that are central to the debate on critical cartography and mapping technology, and that will be explored in this chapter. First, there is the concern of GIS technology and how its proliferation in the public sphere

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http://www.bizjournals.com/philadelphia/datacenter/interactive-map-socioeconomic-breakdown-of-every.html?surround=etf&ana=e_article&u=khKElpWnBIrTz%2FYNf5hZ9IslTpE&t=1414529961.

[59] Ibid.

[60] For descriptions of each "tapestry" see Appendix.

has simultaneously served to open up mapping expertise to a wider audience, but has additionally exposed a number of the critical flaws inherent to the cartographic process, such as inclusions and exclusions, subjective decision-making, and lack of a framework for conveying local knowledge and experiences. Thus, there is a question of how GIS technology is used, or misused, and how reliable the maps being created with this technology, by professional and pedestrian alike, are. Second, the issue of access cannot be avoided, meaning, who gets to use this "new" mapping? Finally, there is the question of whether this new mapping, that of greater access, wider user base, and more inclusive mapping projects is simply a new façade covering up, and reinforcing, the same power constructs, or if a truly "new" mapping has arrived.

II. The Root of Technological Cartographic Ideology: Military Mappings

The development of Geographic Information System (GIS) technology followed chronologically alongside a greater divergence in cartographic thought. While it only rose to public prominence in the 1980s, research and implementation of the technology was in progress decades' prior. Between 1960-1975 research on GIS was well underway, but its development and use was confined to the academic sphere. Yet, these internal experiments in mapping technology drew on the even earlier ideas implemented by the United States government and military, technologically with the Global Positioning System (GPS), and also on a theoretical layer with wartime applications of cartography as military intelligence. Thus, while the roots of GIS technology are most concretely pinned to a small group of academics working out of Harvard University in the 1960s, '70s, and '80s, the basis for their understandings of cartographic thought can be traced earlier, to

the years surrounding World War II, the Office of Strategic Services (OSS), and the geographer Arthur Robinson.

Arthur Robinson was an academic geographer outside of the war, and a professional mapper inside of the war, which is illustrative of the longstanding relationship between the military use of geography and wartime intelligence, and the production of spatial knowledge in cartography. In World War II cartography took a lead role in the U.S.'s planning and operations. During the war, not only was the military's use of maps a fundamental enabler of the U.S. air raids on a practical level, this form of spatial understanding also created a psychological divide between topography and population that allowed for such catastrophic bombings and drastic events. David Fedman, of the Department of History at Stanford University, and Cary Karacas, from The City University of New York's Department of Political Science, Economics, and Philosophy, detail the way in which the maps division of the United States Office of Strategic Services (OSS), led by Arthur Robinson, used Japan's own geographic surveys, and the office's cartographic expertise, to map, and tactfully isolate, Japan's industrial infrastructure and topography, gradually severing any link between the built environment and its human inhabitants.

The OSS was, essentially, a precursor to the CIA. The office was originally established in July 1941 as the position of Coordinator of Information (COI), and was intended as a response to the lack of advanced intelligence on the part of the U.S. government and military. Its name was changed to the OSS in 1942 and its operations significantly expanded at this time. The office, which only really existed for about four years, represents the largest use of geography in compiling wartime intelligence.

Intelligence, while not strictly limited to geographic information is largely made up of and around geography. Geographers Jeremy Crampton and Trevor Barnes define intelligence as "information explicitly collected and analyzed with a view to forming or guiding tactical and strategic political interest, doctrine or policy, especially those of the government."[61] Further, it is the way in which the information is used, meaning to what ends it is directed, that makes it intelligence, not just the information on its own.

Preceding Arthur Robinson was General William Donovan, the original chief of the COI. Donovan's most notable innovation was the establishment of the Research and Analysis (R&A) branch of the COI, which not only extended the position into a more expansive office, but also employed a large number of geographers, for, perhaps, the first time ever, in government and military operations. The R&A branch was responsible for compiling an extensive database of maps, drawings, aerial photographs, and diagrams pertaining in any way to wartime intelligence and military operations. Further, all of the data collection and written reports were mandated to meet standards of strict objectivity and science, as an attempt to depoliticize the matter as a whole.[62]

Arthur Robinson, a graduate student in cartography at the time, joined the COI in October 1941, became Chief of Cartography by the Summer of 1942, and then chief of the entire Map Division by Fall 1942. Robinson's most significant cartographic contribution inside of the war was his design of a standardized base map in which he compiled large quantities of data on military operations on a grand scale, with micro-details on a smaller scale as well. This base map prefigures the next stage in cartographic

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[61] Jeremy Crampton and Trevor Barnes, "Mapping Intelligence: American Geographers and the Office of Strategic Services and GHQ/SCAP," in *Reconstructing Conflict: Integrating War and Post-War Geographies*, ed. Scott Kirsch and Colin Flint (Burlington: Ashgate, 2011), 228.
[62] Ibid., 229-33.

technology in two ways: 1. The big picture-little picture, zoom out-zoom in operation is reminiscent of functions of later developed GoogleEarth and GIS, and 2. The compilation of a large amount of data on the computer constitutes a technologically unwieldy data set, which raises a number of concerns and constraints about integration, interoperability, and usability.[63]

Additionally, under the leadership of Robinson, and the orders of the U.S. government, the OSS compiled the largest collection of spatial data and artifacts of any office, library, or institution in the world. This mass of geographic information put the military in a strong position of knowledge about the enemy's terrain, imbuing the U.S. army with significant power and leverage in the war. The maps of Japan's territory that came out of this operation illustrate the troubling mapping complex that has fallen under so much critique in the past few decades. That is, the OSS and the military used cartography to isolate the topography and built environment of Japan from any notion of its by standing population, thus rendering space separate from its social production. Using collected data and images, the OSS, under Robinson, produced around 8000 maps throughout the war.[64]

In a series of maps brought forth by Fedman and Karacas the gradual separation of topography from population is clearly evidenced (Fig. 10-15). They examine the terrain, identifying dense infrastructural and industrial areas. These areas were of particular interest to the U.S. military during the war because they were the main entry point to destroying Japan's recent prosperity. By tackling the infrastructure and industry of the city, not only would the U.S. military set back Japan's overall economy, they

[63] Ibid., 233-4.
[64] David Fedman and Cary Karacas, "A cartographic fade to black: mapping the destruction of urban Japan during World War II," *Journal of Historical Geography* 38 (2012): 308.

would attack the very site of wartime production as well. Using the language of maps, which focuses more on road networks, building locations, and major geographical nodes, enabled a distance from human population. Thus, in a series of increasingly bleak and zoomed out cartographic images of Japan's major cities (which, using the human-less language of the map, allowed a disregard for the population), the military was able to target centers of the country's prosperity and production for their air raids. First, the OSS started with a seemingly basic city plan of each city (Fig. 10), to get a grasp on the general network and system of the city. Then, the geographers would hone in on specific target zones, based on the topography, mainly the centers of production and industrial activity, and, essentially, the areas where a firebomb would inflict the most extreme damage (Fig. 11-12). These maps created by the OSS were strictly technical, leaving out any contextual, sociological, and, ultimately, any human information at all. Taking a further step in isolating the planned destruction from any sentiment concerning the human life impact that would be incurred, the OSS then produced maps reminiscent of aerial photographs, zooming out almost beyond the recognition of formal cartographic elements and, thus, any sentiment of real topographical space (Fig. 13). By zooming out to blur the features almost beyond identification, the OSS used maps to render lived geographic space as nothing more than a war target. While the maps were not inaccurate by any means, the cartographers were using the maps as a tool to visually fabricate an image of Japan solely through the eye and objectives of wartime operations. Finally, in maps that the OSS produced chronicling the aftermath of the extensive bombings, they chart the damage inflicted with huge swaths of black covering entire chunks of Japan's cities (Fig. 14). In a map used to report the destruction, an extremely simplistic, almost

crude, outline of Japan is displayed with large portions blacked out, and no other recognizable cartographic features beyond the shape of the country itself (Fig. 15). By separating topography and population, the maps produced by the OSS unveiled an image of Japan only in terms of military targets, sanitizing the language used to remove any thought of the innocent people outside the frame of the map.

A number of geographers who had worked in the maps division of the OSS during the war went on to hold positions as academic geographers and cartographers in the years following. Among these individuals were Richard Hartshorne, Edward Ullman, Kirk Stone, Joe Spencer, J.B. Appleton, Leonard Wilson, and the leader Arthur Robinson himself.[65] They primarily went on to pursue positions in academic geography and cartography at large institutions such as the University of Wisonsin – Madison, University of Washington, and University of California – Los Angeles. This correlation is indicative of an additional governmental production of space and knowledge even outside of wartime operations. As an active cartographer, with experience mapping for wartime operations, Robinson developed a practice of cartography that emphasized function over form and, even further, function as form. What this means is that Robinson believed that aesthetics and artistic imagination were too subjective, whereas scientific functionality could come closer to achieving objectivity. Thus, the form of the map was solely an expression of that map's strict functionality, to the exclusion of contextual, socio-spatial, and historical information. Further, a propagandist anxiety stemming from his experience with wartime map production led him to strive for a "disciplining" of cartography,

[65] Crampton and Barnes, "Mapping Intelligence: American Geographers," in*Reconstructing Conflict: Integrating War and Post-War*, 234.

divorcing the practice from anything not integral to the map's most basic and straightforward functionality (e.g. politics, sociology, aesthetics).

In response to these cartographic anxieties and functionality-driven ideals, Robinson developed the "map communication model", which centered on maps conveying scientific data, severed from cultural understandings and local knowledge (which hold the potential for subjectivity, whereas science maintains objectivity, Robinson believed), and, therefore, established the idea of a "proper map", and, necessarily, the opposite of that, the "transgressive map". To expand, with his post-war work in cartography Robinson created a clear divide. The "proper map" is the scientifically derived map, with qualities serving only the scientifically integral material. This map is fundamentally non-aesthetic, or, at least, the artistic nature of the map is only strictly serving the functional aspect. The "transgressive map", then, is the opposite. It is not imbued with its own set of qualities, but is simply not proper and not scientific.[66] These definitions primarily hinge upon a distancing of cartography from art, for the main reason that art serves an influential role in how geographic information is absorbed and perceived, and could be seen as propagandist. Thus, cartography moved more towards the realm of science. Moreover, the fundamental binary of post-war academic and professional cartographic practice was established. This academification, scientification, and professionalization of cartographic thought as disciplined, objective, and separate from notions of aesthetics, culture, and art, then, provides an appropriate backdrop for understanding the technological developments that occurred in the world of cartography in the second half of the 20th century. Thus, we go to Harvard, where the early stirrings of

[66] Crampton, *Mapping: A Critical Introduction*, 54-6.

what we today know as Geographic Information Systems (GIS) technologies were taking hold.

III. Development of Geographic Information Systems at Harvard University

Following receipt of a grant from the Ford Foundation in December 1965, the Laboratory for Computer Graphics was established as a subset of the Harvard Graduate School of Design (GSD). Howard Fisher, who was a graduate of both the University and GSD, founded the lab, which persisted in a variety of forms from approximately 1965-1979. The development of computer mapping and spatial graphic technologies came out of an academic desire to merge the tracking and effects of human activities and natural processes. GIS and its predecessors were created to serve as an aggregate of data that could, in turn, actually predict human and natural behavioral patterns. This emphasis on surefire predictability comes out of a dualistic phenomenon of rising insecurities in the 1960s. The first source of unease came from Cold War-influenced insecurities surrounding the mounting dualistic nature of international relations and concerns of enmity from the war and the potential spin-off effects of that. Secondly, on the ground in the U.S. in the mid-1960s, there was growing localized unrest surrounding the violent race riots springing up in cities across the nation, establishing what was promptly termed the "crisis of the city".[67] Overall, the psychological root of the development of these information systems and spatial data visualizers was a mounting desire for the capacity to predict human patterns and behaviors, which stemmed from growing unease and unrest on both the national and global level as the war and internal conflicts denigrated into

[67] Catherine F. McMahon, "Predictive Machines: Data, Computer Maps, and Simulation," in *A Second Modernism: MIT, Architecture, and the 'Techno-Social' Moment*, ed. Arindam Dutta, et al. (Cambridge: MIT, 2013), 437-43.

chaos and uncertainty. So, these information systems emerged as a safeguard against surprise, aimed at predicting what certain actors would do, and when.

The Harvard Lab started out using SYMAP (Synteny Mapping and Analysis Program) operations to produce graphics and maps for the purpose of aggregating and solving socio-spatial problems, particularly the sociological and political spatial problems of the city. SYMAP was the original thematic-mapping package at the root of this developmental timeline. Originally set in motion at Northwestern University in 1964, the system came to Harvard in 1965, and, for its time, was very technologically advanced and widely distributed.[68]

Some key players in the transition from SYMAP to GIS included William Warntz, professor of theoretical geography, Carl Steinitz, professor of landscape architecture, and Jack Dangermond, who received his MLA from Harvard. The distribution of the individuals most closely associated with the Harvard Lab is indicative of the much larger trends and connections that were coming to the forefront at this time, particularly between urban planning, landscape architecture, and mapping technologies. Steinitz is credited for the design studio he led in conjunction with GSD in 1967 in which he utilized SYMAP as a tool in analyzing and mapping urbanization and its connection to the natural systems of the Delmarva Peninsula. This workshop was a breakthrough in the trajectory of GIS development because the project exposed some of the constraints of SYMAP and initiated a departure from the vector-based operations of that program to a grid analysis system more akin to later geographic systems. The vector model of SYMAP consisted of a planar coordinate space and a collection of points, lines, and areas with

[68] Nick Chrisman, *Charting the Unknown: How Computer Mapping at Harvard Became GIS* (Redlands, CA: ESRI Press, 2006), 20.

thematic values attached. This model possessed all of the basic functions that still exist in mapping technologies today. For example, the SYMAP vector model had the capability of making maps of varying sizes with unique symbolism, legends, themes, titles, etc. Digitizing and printing alike were still fairly crude at this point. With Steinitz's project, however, the utility of a grid analysis system, which would be implemented into GIS, was realized. Grid cells allowed for more input and made managing information easier than it was with the linear form of the vector model.[69]

Steinitz's project also marked a greater transition, one that is cited as the early foundation for the developmental and theoretical basis of GIS. That transition was the greater cultural and academic shift to focus on issues of the environment as tied in with urban planning, architecture, and design concerns.[70] Some background information on Steinitz and what he was up to prior to his introduction to the Lab is useful in a wider understanding of the theoretical and academic basis for these technological progressions. Steinitz's work always held strong ties to a basis in objectivity and logic. He also adhered to a broader post-industrial shift in thinking of technology as not only the cause of structural, social, and cultural change, but also as the solution to those shifts.[71]

Also in 1967, Dangermond started working with the Harvard Lab, developing and refining the SYMAP technology. He went on to found the Environmental Systems Research Institute (Esri), which remains the most innovative and influential mapping technology corporation today. Then, in 1968 Warntz took up the position of director at the Lab. Warntz is credited with the responsibility of extending the operations of the Lab to a more in-depth system of spatial analysis. This changeover marks a leap towards the

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[69] Chrisman, *Charting the Unknown: How Computer*, 45-7.
[70] Ibid., 41-2.
[71] McMahon, "Predictive Machines: Data, Computer," in *A Second Modernism: MIT*, 443-5.

official advent of GIS.[72] This process was occurring alongside another greater academic shift in the post-World War II era marked by the social sciences aiming to become more "scientific", for example, focusing on fact-based urban planning and the "quantitative revolution in the field of geography."[73]

While this timeline is the simplest explanation of the trajectory leading up to GIS, the narrative was, in fact, centered on a much more collaborative and non-linear process, hinged upon a number of academics and mapping professionals exploring similar innovative and technological work:

> This interaction and sharing of techniques shows that it is fruitless to choose one or another as the origin of GIS. There was a collective process of communication spanning decades of experience, and rapid transfer of experience, and rapid transfer of innovation between dispersed centers of activity.[74]

The process, thus, is marked most distinctly by greater shifts in both the academic sphere and cultural understandings, such as a movement towards environmental concerns as central to larger urban, developmental, and geographical processes, and the "scientization" of the social sciences.

The two main phases of the Lab are marked first by the acquisition and refinement of SYMAP, and second, by the development of ODYSSEY. ODYSSEY is recognized as the next stage in GIS development, and is grounded in the concept of the topological data structure. The topological data structure came out of a function of spatial analysis based on these aforementioned shifts in academia. However, as the Lab moved towards commercialization of ODYSSEY, uneasiness about the rapidly climbing budget and hesitance to attach its name to a commercial venture on the part of Harvard led to a

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[72] Charles Waldheim, "The Invention of GIS," Harvard Gazette, last modified October 12, 2011, accessed March 7, 2015, http://news.harvard.edu/gazette/story/2011/10/the-invention-of-gis/.
[73] Chrisman, *Charting the Unknown: How Computer*, 56.
[74] Ibid., 43.

stagnation of operations surrounding ODYSSEY, a pulling of funds, and a gradual loss of core staff members at the Lab. This stagnation led to the gradual dissolution of the Lab.[75] Despite this quiet fizzling out of operations at the Lab, however, the group is still remembered, alongside these greater shifts and experiments, as laying the fundamental groundwork for what would become GIS.

IV. Carl Steinitz & Kevin Lynch: The Divergence of Mentor and Mentee

Steinitz's most influential mentor is repeatedly specified as the urban planner Kevin A. Lynch, most known for his manifesto-like work *The Image of the City*. Coming from an urban planner, Lynch's seminal work focuses largely on a few concepts he coins himself: imageability and place legibility. These two concepts connect to Lynch's use of mental maps to gain an understanding of what elements and features residents identify as significant in a city, namely what residents claim make a city maneuverable and understandable, or incoherent and confusing. Using pedestrian interviews, individual sketches, and mental maps, Lynch derived his own map sketches of what his findings were, emphasizing what pedestrians noted most frequently, and pointing out distinctive features of the terrain (Figs. 16-19). Lynch discusses the central features people use in describing and defining a city: paths, edges, districts, nodes, and landmarks. He argues that those more familiar with the space (such as residents) use more specific, small-scale, and localized identifiers and those less knowledgeable of the space rely on more general, large scale, and topographical characteristics.[76] Further, in his research and writing methods, Lynch was very focused on context, possessing a constant awareness of the role

[75] Ibid., 165-9.
[76] Kevin Lynch, *The Image of the City* (Cambridge: MIT, 1960), 49.

that the narrator plays in creating space, as much as the space puts forth an image for the individual. An image of an environment comes about as part of a two-way process, a back-and-forth between the observer and their environment. Overall, context, individualism, and culture were key to understanding, representing, and otherwise talking about space. In *The Image of the City* Lynch writes:

> The city is not built for one person, but for great numbers of people, of widely varying backgrounds, temperaments, occupations, and class. Our analyses indicate a substantial variation in the way different people organize their city, in what elements they most depend on, or in what form qualities are most congenial to them.[77]

This emphasis on individuality and localized perceptions poses a very different narrative of mapping and conceptualizing space than the technologically driven scientific mapping chronicled by the U.S. government, military, and the Harvard Lab. Whereas military mappings in World War II sought after particular objectives, using the map as an enabler of military operations, and post-war academic cartography responded by striving for a methodology of mapping that stands outside of (and above) any non-scientific context, Lynch's process was embedded in localized knowledge, historical information, and varied experiences. The connection between Lynch and Carl Steinitz, then, may seem surprising. In fact, while Steinitz did draw a lot of methodological and theoretical inspiration from Lynch, he diverged in some crucial ways in the development and implementation of his own methodology.

To begin with, in his project, Steinitz made use of many tools and methods that he drew from Lynch, such as interviews, data graphs, and maps with hand drawn notes and features, but Steinitz's method and ideology split off from Lynch's in some significant

[77] Ibid., 110.

ways. For example, in his Boston survey Steinitz chose to forsake historical context, favoring the promotion of pure method over any thematic detailing. The principal departure from Lynch's ideology, however, came out of Steinitz's use of the computer. The introduction of computer technology to his survey program enabled him to aggregate additional, external information, such as aerial photographs, Sanborn fire insurance maps, census records, and land-use plans. Yet, this supplementary data was external to the core survey ritual and, thus, detracted from the richness of first-hand accounts and observations of the city by adding in more top-down generated information. The problem, then, was that "these new kinds of maps codified emotive or subjective responses to the built environment of the city, while drawing certain conclusions based on demographic and social data sets."[78] Thus, Steinitz's method established social and individual complexity as a singular whole, given meaning only in relation to the built environment. Further, that already problematic meaning also becomes infinitely associated with the technological power-holder.[79]

With the fundamental goal, at the root of all of these simultaneous and rapidly developing technological phenomena, being a creation of concise classifications to enable rapid aggregation and analysis of data for the pursuit of clear-cut predictions, Steinitz developed his program through the lens of normative categorizations. As art historian Catherine McMahon remarks in her background of Steinitz in relation to these developments:

[78] McMahon, "Predictive Machines: Data, Computer," in *A Second Modernism: MIT*, 447.
[79] Ibid., 445-8.

> Furthermore, with this research we see Steinitz moving away from a focus on the autonomy of the individual subject and toward a focus on social cohesion and the establishment of normative and predictable behavioral problems amongst populations.[80]

Thus, it is apparent that this system was grounded in the establishment of norms to create the perception of spatial technology as a neutralized conveyer of information about populations and environmental design. The technology was all about behavioral normativity, homogeneity of populations, and generalizations about the built environment. Furthermore, since this systems approach aimed at identifying norms, it hinged on correcting abnormalities as opposed to accounting for or making room for these divergences within the analysis. The end goal for Steinitz and his likeminded contemporaries across the academic realm of geography was neutrality and applicability, neither of which had any room for abnormality or inclusivity. Working towards this goal meant, for academic and institutions alike, establishing a systematic, methodological tool for addressing, visualizing, and solving urban problems. Thus, these efforts toward establishing a neutral technology were contributing to a reduction of the complexity of urban issues. Finally, we see how the medium – the technological data processing system – becomes the central focus, instead of the actual geographical data, and at the additional expense of localized accounts.

V. Esri & the Commercialization of GIS

Jack Dangermond founded the Environmental Systems Research Institute, Inc. (Esri) along with his wife Laura in 1969. Dangermond remains the president of the company, which is based out of Redlands, California, with offices throughout the

[80] Ibid., 448.

country. Picking up where the Harvard Lab, and many other groups and individuals working towards similar cartographic goals, left off, Dangermond introduced the first commercially developed GIS through Esri in 1973. It was a GIS for the state of Maryland. Then, in 1982, Esri released ARC/INFO, the first commercially available GIS. In the twenty years to follow the official indoctrination of GIS to the public, Esri workers continued to tweak, redevelop, and reengineer the program to increase accessibility, usability, and interoperability.[81] These innovations went along nicely with the concurrent introduction of the computer to the general public, and its equally rapid evolvement in a series of stages of increasingly workable models. In addition to continually reworking the GIS interface, Esri boasted an ever-expanding user base, with a climbing number of partner organizations and the advent of user conferences – national conferences for likeminded GIS users to learn about new innovations and meet other computer mappers. In addition the national partner organizations and user coalitions, Esri also has a handful of international partners in Germany, Japan, Australia, and Canada.[82]

As the first company to bring GIS to the general commercial public, Esri has a significant status and hold over the computer mapping technologies community. As a whole, the company continues to dominate the commercial sector of GIS software production, and it is the largest supplier of the software today. Additionally, the company has risen to the ranks of multi-million dollar holdings, with $1.1 billion in sales, and Dangermond himself has an estimated net worth of $2.8 billion.[83]

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[81] "About Esri," Esri, accessed March 26, 2015, http://www.esri.com/about-esri/history/history-more.
[82] Ibid.
[83] "The World's Billionaires: #628 Jack Dangermond," Forbes, last modified 2015, accessed March 26, 2015, http://www.forbes.com/profile/jack-dangermond/.

In the early 1990s Esri introduced ArcView to the public as the premier version of GIS for the basic desktop computer. By the latter half of the decade, Esri had engineered a newer model, ArcGIS, out of the earlier ARC/INFO program, which the company says was created "to develop a modular and scalable GIS platform that would work on both the desktop and across the enterprise."[84]

Through the continually expanding global operation that is Esri, Dangermond has undertaken a number of initiatives to further access to and knowledge of GIS. With the dual constraint of its historical roots in military technology and colonialist domination, and the more contemporary complaint of the limits to the user base created by the high degree of technical, mathematical, and computer systems knowledge required, GIS is far from being an accessible and objective tool. Additionally, the current edition of GIS software from Esri, ArcGIS 10.3 Basic is priced as a whopping $1,500. This sum is not money that the average person necessarily has laying around to spend on a software package. That fact alone raises the question of the technology's accessibility.

VI. Deconstructing Post-Political Cartographic Aspirations

Beginning in the 1980s and early 1990s, computer savvy users and technology companies saw a significant leap in the applications of GIS technology. As Esri and other companies continued producing increasingly desktop-friendly versions of the software and expanding commercial availability, use of the system became more widespread. A large reason for why this technology saw such a rapid increase in usership is the concurrent wide commercialization of computers in these decades. Without the growing number of computer owners, a result of technological advances in that arena, GIS would

[84] "About Esri," Esri.

never have reached the levels of public awareness that it has. In the past few decades, from 1990s until the present, public participation in GIS platforms has become increasingly available, and the scope of its applications has broadened. Within the "new" mapping platform, we now have an opposition set up between "populist" cartography and the sovereign map. This populist cartography has come about with a rise in "peasant", meaning non-professional and non-academic users,[85] access to cartographic tools and is defined as "the democratization of cartography that occurs when mapping is no longer limited to the professionally trained guild of cartographers, but is opened up to people mapping what they care about."[86] Such innovations as Google Earth, publicly introduced in 2005 and OpenStreetMap (OSM), founded by Steven Coast in 2004, have resulted in an ever-widening scope of diverse mapping practices and map users. This expansion of what constitutes a map and who gets to create maps also coincides directly with the rising influence of the Internet. However, all of these tools are still owned by multi-million dollar monopolistic companies (e.g. Google, Microsoft), a fact that raises questions of control and accessibility. Who is actually controlling these devices? Is the wielder of power still coming from the same nexus of professional, governmental, and academic operators, just with a new façade of public participation? Who has access to these technological, internet- and knowledge- requiring tools?[87] Moreover, the question remains as to whether there is truly a new politics of knowledge taking hold here, or if a new façade has simply been applied to the same spatialized power/knowledge constructs.

Simultaneously, alongside this technological development – an innovation that its creators and users touted as possessing the abilities of perfectly reproducing space in the

[85] Crampton, *Mapping: A Critical Introduction*, 26.
[86] Ibid., 37.
[87] Ibid., 26-34.

digital realm – and its rising accessibility in the public sphere, a critical lens was also being directed in regard to these breakthroughs. This criticism geared increasingly towards a deconstruction of the very perceived objectivity and neutrality of maps that these technologies strived for, focusing in particular on digitally constructed maps. Many critical geographers argued that the many subjective points of decision-making in cartography are multiplied within the GIS database. For example, geographer Henri Desbois points out that GIS was developed following the advent of the Global Positioning System (GPS) as a tool for territory management and, being conceived with that objective in mind, simply cannot display diverse narratives.[88]

The attempts from government and academia to make mapping post-political have concentrated on the notions of neutrality that are described throughout this chapter. Largely in response to the blatantly motivated cartography from the OSS during the war, the geographers of academia sought to remove any sort of political motive or propagandist inkling from cartography. In short, neutrality was key above all else. Thus, as a part of this post-political, neutralized mapping, cartographers focused only on technological issues, and isolated the discipline from notions of culture, local knowledge, and experiences. In a sense, these geographers sought after a "God's eye view" of maps. The primary cartographic binaries of "artistic" and "scientific" maps that have come about as a result of this post-political, scientific mapping direction are as follows:

[88] Jean-Christophe Plantin, *Participatory Mapping: New Data, New Cartography*(Hoboken, NJ: John Wiley & Sons, 2014), 28-33.

"Artistic" maps	"Scientific" maps
aesthetic	non-aesthetic
autographic	anonymous
imaginative	factual
subjective	objective
inaccurate	accurate
manual	machine
old	modern
place	location[89]

Here we see just how deeply ingrained these cartographic binaries became in 20th century geographical developments, with strict isolation of certain types of information that academic cartographers considered too subjective, such as elements of artistry, culture, and personal experience. Yet, despite efforts to avoid this reality, the fact is that maps are always conveying the interests of a particular group or actor, and, in the face of these objective renderings, or at least believed and promoted as such, those interests are not usually made explicit. Further, maps are always embedded in culture, tied in with local knowledge, and cannot be isolated from this connection. Ultimately there is no God's eye view.

Critical geographers were not anti-science by any means in calling attention to these cartographic discrepancies, but they did want to highlight the fact that scientific-centric cartography does not portray the whole or only truth. Further, this "scientific" mapping practice is embedded in a tendency to exclude certain knowledge for the sake of perceived facts.[90] The purpose of the critique is not to question or dispute scientific fact, but to launch an investigation of how and why science came to prevail in cartographic thought, and to explore ways to counter or expand upon this severance. A critical

[89] J. B. Harley, "The Myth of the Great Divide: Art, Science, and Text in the History of Cartography" (unpublished manuscript, 13th International Conference on the History of Cartography, Amsterdam, June 26, 1989).
[90] Crampton, *Mapping: A Critical Introduction*, 85.

discourse on cartography then, "calls things into question"[91] and "examines the relationship of knowledge with power."[92] So, here we have a juncture between the disciplinary knowledge of professional cartography, which strives to tie facts down, and its critique, which seeks to open up information pathways. Thus, what is happening with this more recent discourse on critical cartography is an undisciplining of cartographic practice from regiment, from formulaic guidelines, and from decontextualizing norms.

Furthermore, critical cartography approaches the issue with the fundamental understanding that maps do not represent space, but create it by establishing norms of thinking about and understanding that space. Through maps, there is a production of space via knowledge. As a classic example, when Christopher Columbus came to America one of the first things he did was create a map. With this map, Columbus gave new, Western, Christian names to places, and, thus, re-inscribed and recreated the continent in the vision of Western Christianity. Columbus, then, created an entirely new understanding of the world, an understanding that was given meaning, volition, and popularity with his maps because he was in an authoritative position. This example beckons the constantly itching connection between cartography and colonialism that is so deeply embedded in the practice.

While striving to correct the colonialist roots and representational hypocrisy of academic and institutional cartography, even populist and community mapping may have its limits. While these internet-based, populist maps do open up the opportunity for a greater scope of users, this "Web 2.0" platform is itself a privileged guild. The most underserved and underrepresented populations still do not have access to these

[91] Ibid., 39.
[92] Ibid., 39.

applications. Specifically, this "new" and inclusive mapping is still largely limited to those who "are overwhelmingly young, white, male, well-educated, and tech-savvy."[93] Conversely, this raises the question of whether community development and urban planning offices can provide the missing link between people and privilege (a.k.a. technology). As John Pickles remarks:

> They [geographic information systems] provide more powerful tools for local planning agencies, exciting possibilities for data coordination, access and exchange, and permit more efficient allocation of resources, and a more open rational decision-making process.[94]

Further, the main venue through which these participatory efforts happen are community development corporations and local planning offices. This practice will, then, raise the question of whether that can and will suffice as truly public, communal, and participatory mapping from the ground up, or if, yet again, another façade has been fashioned. If some sort of institution, be it a university, a think-tank, a computer development corporation, or a city's planning office, always initiates the GIS or, even, the public participation GIS (PPGIS), can it ever be at truly participatory and inclusive?

VII. Conclusions

While at some points it may seem like mapping technology has been separated from its roots in military operations, and that concerns over the lack of widespread accessibility have been remediated, these structures of subjectivity and inequality still reside at the heart of cartographic thought and practice. The very fact that all mapping technology, academic geography, and cartographic thought come out of a colonialist and militaristic past means that these histories will forever be imbedded in the practice. Just

[93] Ibid., 37-8.
[94] Pickles, *A History of Spaces*, 148.

as we have seen within the practice of cartography that, despite the goals of scientific, post-political, objectivity put forth by institutional cartographers, maps can never be rightly severed from cultural, sociopolitical, and historical connections to space, neither can the practice itself be disengaged from its problematic past.

In the face of these critical realizations, efforts continue to make these technologies accessible. Given the persistently high prices of the software, education requirements on the part of the user, and, ultimately, the pre-determination of what geographic information is even available in the interface to begin with, the question of whether there can ever be a truly inclusionary geography endures. In 2004 Esri announced its new and improved desktop GIS, ArcGIS 9, boasting enhanced features and development capabilities for the desktop user, and again, in 2010 the company came out with another improved version – ArcGIS 10. In between these two releases, the company also went public with ArcGIS Explorer, a free program that allows the user to view and share geospatial information, but only a pre-selected group of information, curated for the free user. The emphasis here, then, is less on creating personalized maps, and catered more towards sharing pre-existing geographic assemblages under the guise of collaboration.

Recently, Dangermond has agreed to supply ArcGIS software for free to all K-12 schools in the U.S. At about 100,000 schools, this promise has a value of around $1 billion. This effort, put forth by Esri, is a part of President Obama's project to improve STEM education across the board in today's schools. The project is known as the ConnectED Initiative.[95] While it is, of course, still only a step, increasing accessibility to

[95] Liyan Chen, "Billionaire Jack Dangermond's Esri Pledges $1 Billion of Mapping Software to America's K-12 Schools," Forbes, last modified May 27, 2014, accessed March 26, 2015,

technology such as ArcGIS throughout youth education levels holds the potential for a significant leap in technological literacy, creative problem solving, and geographic proficiency. Introducing students to GIS technology at a young age can potentially build up skills that most people don't have access to until entering undergraduate or even graduate level programs, if they are able to enroll in such programs at all. While this innovation holds high prospects for improving technological, geographical, and critical proficiency in students, it may be found that there is only so far that this extension can go. For example, while all schools may have the ability to get the software, not all schools will necessarily make use of it, especially schools in more underserved districts where faculty is stretched thin as it is. Possessing the software can only achieve so much when the faculty is not equipped with the knowledge and skills to teach the program, or when a school lacks the time, space, and money for the additional class.

Even as geographic structures are re-examined, with increasing attention being drawn to these deeply embedded connections from academic, arts, and public spheres alike, whether the practice has or can be extracted from its roots remains in question. Further, there is the additional concern of whether a mapping practice severed from its roots should exist, or if this would simply add an additional layer of contextual separation to a practice that has historically sought to do just that in a fundamentally problematic way. Whether access to these geographic tools and technologies, and, therefore, power, has been or can ever be truly made all-inclusive on a comprehensive level will continue to be explored throughout the rest of this thesis. In the next chapter we will look at a project in which those who do have access to the technology in the most complete way

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http://www.forbes.com/sites/liyanchen/2014/05/27/billionaire-jack-dangermonds-esri-pledges-1-billion-of-mapping-software-to-americas-k-12-schools/.

(meaning, possessing literal access to the technology and necessary support systems, in addition to the knowledge to operate such complex software), also known as institutions and academics, try to re-appropriate the technology to more inclusive ends, calling attention to some of the politically and historically problematic functions of conventional cartography.

Chapter Three

Re-examining Urban Landscapes with Maps: Million-Dollar Blocks and the Creative Reuse of GIS

I. Pushing the Cartographic Frame Today

Contemplating the question of what role maps play in creating our understandings of space and the greater question of whose maps, in fact, matter, requires a more careful look at the role of academic maps. This category of cartography constitutes maps made or commissioned by educational institutions, often with some sort of research question or goal in mind. In this chapter we will look at the role that academic maps play in the larger conversation not only on cartography, but also on the intersection of cartography with shaping urban space. We will explore how these maps, coming from the often insulated and isolated realm of academia, change the way mapping is understood or practiced in a greater sense, if they do, in fact, have an effect in this sense at all.

With his extensive mapping project in *The Philadelphia Negro,* which was commissioned under the authority of the University of Pennsylvania, Du Bois operated within the familiar academic framework of mapping practice. Du Bois, however, imbued his survey with new, illuminating, and controversial survey methods, attempting to give voice to the statistics by conducting in-depth one-on-one interviews and weaving a multi-faceted, largely inconclusive geographic fabric. Within a similar context of academia and under different social circumstances, Laura Kurgan, who teaches architecture at the Columbia University Graduate School of Architecture, Preservation, and Planning (GSAPP) in addition to serving as director of the Spatial Information Design Lab (SIDL), sought an alternative mapping process to contest the patterns of conventional mapping practices. This comparison raises the question of why, even a century apart, these “alternative” mappings are still, more often than not, confined to the realm of academia.

This chapter will focus on Kurgan's work at SIDL, specifically on the Million-Dollar Blocks (MDB) project, to highlight the creative reuse of existing, and increasingly accessible, mapping technologies. The increasing proliferation of these technologies in the public sphere has powerful implications for perpetuating and revealing the agency of the cartographer. Kurgan utilizes these systems to illuminate patterns of inequality in the urban experience and the ways in which conventional mapping practices serve to perpetuate, as opposed to remediate, these structures. Throughout the chapter the main questions that are addressed center on what Kurgan and the SIDL are doing with this work, and explore if and how it actually differentiates from the so-called conventional cartography that is highly contested. Moving through a visual and theoretical analysis of the project itself, in this chapter we will also examine what implications these maps have for a reconfiguration and re-evaluation of social, political, and economic urban structures. In effect, what is it that the Million-Dollar Blocks project contributes to new understandings of urban space? What can this project achieve beyond the confines of influence in the academic and arts spheres (e.g. effect policy change, mobilize marginalized communities)? How do these maps function as stand alone artifacts?

II. Crime Mapping

While serving to highlight a problem, we have seen how redlining maps also acted as ringing alarms coming from an institutionally authoritative standpoint. The FHA and HOLC, acting as authoritarian truth-claimers, presented redlining maps as immutable mobiles that allowed the human mind to see a supposedly complete idea of the geography

at hand and thus, wield a presumably informed domination over that geography.[96] Immutable mobiles, defined by French philosopher and anthropologist Bruno Latour, are understood as vectors that allow for the easy and rapid mobilization of resources to aid the domination of territory, information, or knowledge. They are packages of information that are designed by institutions – namely governments – for easy transportation and transplantation without alteration. These immutable mobiles get their power, that is, their accepted authority, from the strength of inscription as uncontestable knowledge. This strength is enabled through the tendency of society to trust in and preference that which is written. Further: "No matter how beautiful, rich, precise, or realistic the inscriptions may be, no one would believe what they showed if they could be contradicted by other evidence of local, sensory origin or pronouncements of the local authorities."[97] It is in this way that, for example, redlining maps were able to act authoritatively upon urban America. Maps constitute a concrete, written form of conveying information, thus falling under this category of uncontestable knowledge – standing as immutable mobiles.

Acting similarly upon urban space are crime maps, which are created by the government for a variety of reasons, such as determining where to apply heavier police patrol, general public knowledge, and factoring into real estate appraisals. These crime "hot spot" maps began as a crime-tracking project in New York City in 1994 that was spearheaded by then police commissioner William Bratton and supported by then New York mayor Rudolph Giuliani. Giuliani's reputation is largely occupied by the lasting impact of his quality of life campaign, and his strategy of rapid response crime "hotspot" targeting. Instead of delving into the institutional patterns and systematic issues in

[96] Plantin, *Participatory Mapping: New Data*, 7-10.
[97] Bruno Latour, *Visualisation and Cognition: Drawing Things Together*, report no. 21 (n.p.: Bruno Latour, 1985), 24.

affected neighborhoods or among certain populations, Giuliani sought to quickly target the surface locales of where crimes occurred. What this method of action did was further displace the problem, creating the illusion of improvement, while doing nothing to address these underlying issues. The maps concisely gathered and presented data, but did nothing to deal with the structural inequality that lies at the heart of the issue. In effect, the maps served as more of a beautification project than a comprehensive analysis. A root issue here is the belief in the power of aesthetics, in this case aesthetically pleasing data visualization, to improve the urban fabric. Something more is needed, on the part of real action, comprehensive analysis, and truly digging into the systemic and historical issues, than simply conveying data in an appealing, easily apprehended manner.

The crime maps were made using a COMPSTAT (computerized statistics) program and GIS software that tracked the locations and times of crimes throughout New York City. A simple red dot or polygon is then placed at the location of each crime. Thus, if a certain area attracts a lot of crime, the map would sport a distinct cluster of red dots. When crime maps are presented in digital form, the viewer often has the additional ability to zoom in on specific red polygons to get the exact location, or know the specific number of crimes and sometimes even the type of crime that occurred there. This sort of policy development based on data represents a severe abuse, misuse, and misrepresentation of information because it leads to policies founded on a surface image created by the data, without truly analyzing that data in depth. No one is asking the glaring question of: What causes those numbers to be so? One surface view is not comprehensive and is certainly not conclusive, even if it is packaged in a neat and visually appealing manner.

Again, the practice of crime mapping operates through what is termed geo-profiling. This concept denotes a practice of uncovering "the typical spatial patterns of an individual with the goal of predicting that person's behavior or targeting them for surveillance".[98] This strategy is utilized in crime mapping to isolate those behaviors that are not in keeping with societal norms, thus calling attention to them, with the end goal being heavier policing and increased surveillance. This practice of geo-profiling, it seems, is really yet another doorway to racial profiling. Because it is anticipatory in method, the government and police force base their crime maps on categorizing by "high-risk" groupings, as opposed to dealing with individual qualities. There is, then, a shift here from reactionary to anticipatory crime analysis and tracking with the advent of these crime maps.[99] Yet again, the map foregrounds the spatial experience, as opposed to experiences of space having sway in the map. Similarly to the process of redlining mapping dealt with in the first chapter, crime mapping constitutes a risk-based approach, which, we have already seen, is problematic because of its roots in profiling.

Different versions of these popular maps have since been created for cities throughout the country, and are available, widely accessible, and highly influential in a number of sectors, both governmental and personal. Crime maps have become a lens for popular interpretation of cities.[100] An example of their commonality of is the use of these maps on real estate websites (Fig. 20). It is common when looking at real estate listings to see somewhere on the page an accompanying crime tracking map for the given area, thus forming for the client a prescribed understanding of the space, without requiring any on-the-ground experience or comprehensive knowledge of the actual area. Thus, perhaps it is

[98] Crampton, *Mapping: A Critical Introduction*, 120.
[99] Ibid., 120-1.
[100] Kurgan, *Close Up at a Distance*, 188.

not only these maps as artifacts that pose a problem, but the way in which they are modeled after and taken up as complete truths as well. This occurrence is indicative of the way in which maps are implemented beyond the realm and objective within which they were created, causing potentially unintended, but still very real results. A fundamentally problematic function of maps is evident here, and that is the agency that is applied to maps and their immutability, meaning they are taken as reliable vectors of knowledge and transcribed throughout the atmosphere. Instead of being utilized solely for their original intended function, crime maps are appropriated and copied for an array of applications, many of which have detrimental effects on the social environment. A generalized opinion is formed in an instant by these crime maps. Not only do these maps enable detached assumption making, they also neglect to address the underlying patterns shaping the phenomenon identified. Again, these maps act as authoritarian vehicles of alarm, pointing fingers upon an urban societal ill while not conveying the root actors and issues, and sometimes even concealing these bigger patterns.

III. Laura Kurgan & The Spatial Information Design Lab (SIDL)

As an architect, geographer, and designer Laura Kurgan states her primary goal as seeking out ways in which the existing systems and technologies of mapping can be both used and turned on their heads by imbuing them with a greater depth of exploration. In Kurgan's case, she identifies this increased comprehensiveness as maps that address not just a surface image, but explore the underlying factors shaping that image and what future implications it holds. She conducts her research and cartographic projects with the twofold goal of exposing the fundamental prejudices within the very practice itself and

newly identifying existing systemic patterns, pertaining specifically to the urban population and incarceration in the United States. While her current work is largely focused in the sphere of data visualization, her background is in architecture. Kurgan earned her B.A. in Architecture from the University of California, Berkeley in 1985 and her M.A. in Architecture from Columbia University's GSAPP in 1988.

The SIDL was founded in 2004 as a sub-unit within the graduate school devoted to interdisciplinary research. The research conducted by the Lab covers a broad spectrum of academic interests, but is always grounded in questions of geography and space. The most notable aspect about the SIDL is the use of advance visualization technologies to convey data in accessible, self-aware, and artistic ways. In the opening statement on the SIDL website, the members state that: "We see our task as converting information that is otherwise dormant invisible, or simply incomprehensible into images and arguments that provide grounds for research, discovery, and action."[101] The members of the group typically work in concert with outside researchers and advocates trained in relevant disciplines and coming from a number of different institutions. The current core group of SIDL workers is made up of Laura Kurgan herself; data visualization specialist, architectural designer, and urban planner Juan Francisco Saldarriaga; Jochen Hartmann, a designer and software developer; Amelie Berner, who specializes in interactive data presentation; current graduate student in architecture at Columbia and GIS student coordinator at GSAPP Jonathan Izen; and former Columbia Masters of Architecture student Madeeha Merchant.[102]

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[101] "Spatial Information Design Lab," Spatial Information Design Lab, last modified 2015, accessed February 13, 2015, http://www.spatialinformationdesignlab.org/.
[102] Ibid.

IV. Million-Dollar Blocks: The Project

The Million-Dollar Blocks project was initiated by the SIDL as one facet of a two-year research and development project centered on the topic of graphic innovation in justice mapping. The JEHT Foundation and Open Society Institute funded the project, which introduced a partnership between the Justice Mapping Center (JMC), the JFA Institute (JFA), and the GSAPP think-tank, SIDL.[103] JMC is primarily composed of director Eric Cadora and associate director Charles Schwartz, but works in conjunction with experts throughout the country. The center cites a long list of partner organizations, ranging in location across the country and in type from non-profit to governmental to think-tanks. These organizations come up with projects through a collaborative process of bouncing commissions and ideas back and forth. The center uses GIS to help other partner organizations analyze issues of criminal justice, social welfare, and economic development in the context of the geographic stratification of these issues. The objective of visualizing this information is to affect policy change.[104] The JFA Institute is a non-profit group focused on similar issues of criminal justice policy reform. This organization deals more with the research side of the operation, working in conjunction with federal, state, and local government agencies to conduct their research and facilitate policy change.[105] In addition, input from leaders on the state and local level was continually received and circulated throughout the MDB project. In terms of individuals, the core team conducting the research on Million-Dollar Blocks consisted of project directors

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[103] Ibid.
[104] "Justice Mapping Center," Justice Mapping Center, last modified 2015, accessed February 13, 2015, http://www.justicemapping.org/.
[105] "JFA Institute," JFA Institute, last modified 2012, accessed February 13, 2015, http://www.jfa-associates.com/.

Laura Kurgan and Eric Cadora, research associates David Reinfurt and Sarah Williams, and research assistant Leah Meisterlin. All members of the core board were involved with GSAPP, aside from Eric Cadora. Focusing on the cities of New York, New Orleans, Phoenix, and Wichita, visualization techniques were refined by SIDL based on the research undertaken by JMC. Using this data visualization, the SIDL board produced the series of maps that make up the Million-Dollar Blocks project (Figs. 21-25), and then connected these results to direct policy initiatives by the JFA Institute.[106]

Kurgan and the SIDL utilize the functional aspects of new mapping technology while pushing to draw attention to the risks posed by these very systems, such as misrepresentation or the oversimplification of information. The data employed in this project comes from within the criminal justice system and is not publicly accessible. So, these academics and social justice workers do bring forward otherwise unavailable data to a larger public. The MDB project represents this data using theoretically contested mapping technology to exploit and expose the manifest shortcomings in cartographic practices. In this project in particular, governmental “crime maps” are juxtaposed with the more comprehensive prison pattern maps made by SIDL. These extensive maps expose the patterns of incarceration in the United States and the raw facts that: a. most prisoners come from a small number of neighborhoods in cities across America, b. the amount of money spent on these prisoners amounts to millions of dollars for just very small segments, even mere blocks, within the city, and c. a startling number of these prisoners coming from a few very small, specific areas, will be re-incarcerated within only a few years of their initial release.[107] By communicating these research findings,

[106] "Spatial Information Design Lab," Spatial Information Design Lab.
[107] Kurgan, *Close Up at a Distance*, 188-9.

Kurgan's team hopes to redirect public policy, using the maps as a platform for collaborative engagement.

Kurgan and the Lab employ an aesthetic of contrast to bring power to their statement. Crime "hotspot" maps present a one-dimensional picture, whereas the MDB maps weave a multi-layered fabric. The reason the MDB maps are touted as more comprehensive than the original crime tracking maps is because they direct attention to the multiple factors playing into mass incarceration in the United States as opposed to simply ringing alarms around specific areas where a high rate of crime occurs. The basic patterns of crime hotspots do not, in fact, have much to do with actual patterns of crime, incarceration, and re-incarceration, nor do those patterns concern the evolving culture of incarceration in America's cities. Thus, Kurgan's work visualizes a link between the class/race construction and incarceration, and also identifies this phenomenon as a uniquely urban problem in America. With this project Kurgan reveals the overly simplified picture popularly projected by crime maps, an image that is used to streamline police operations and call public attention to the areas where crimes occur. Instead, the Million-Dollar Blocks project creates both a zoomed out and zoomed in, top down and bottom up, image of the underlying patterns and patent issues with incarceration across the board in urban America.[108]

In the introduction to her book *Close up at a Distance*, Kurgan discusses the issues of spatial representation that underlie most of her work, introducing the fundamental problem that the technologies of spatial representation have a greater effect on the space they concern beyond mere representation. As opposed to straightforwardly depicting geographical information, cartography, in fact, is used by institutions to re-

[108] Ibid., 188, 204.

create space, imbuing it with a whole host of implications, ideas, and subjectivities. The images created by these technologies are, in fact, very active artifacts in cultural production, and an image only really becomes meaningful because it is so embedded in our cultural understanding and acceptance of it as "a window onto a self-evident, empirical world."[109] Maps are not benign artifacts, but active players in shaping our environment. Kurgan explains that she uses these technologies to create work that rejects the historic cartographic ideology of a critical distance, and instead emphasizes the inherent subjectivity, and even potential motives behind mapmaking.[110]

As a facet of the Million-Dollar Blocks project, this book is a part of the critical discussion of the project itself. Furthermore, *Close Up at a Distance* is not only a way in which information on the project was communicated, but it is one piece of the many integral supplementary material that go along with the maps. The maps resulting from the project, while visually intriguing and artistically complex, do not necessarily hold as stand alone objects, meaning they require supplementary reading and material in order to successfully convey their message. Thus, the intended audience is the informed audience, not the average layperson.

The separations between reality and representation, knowledge and information, inclusion and exclusion, are continually losing distinction. Digitized representations of space flatten reality and, therefore, separate spatial experience from the agency and interpretation of the mapmaker. These two separate facets of space are melded into one, thus the line between lived, cultural, personal, and communal experience of a space and the singular view projected by the cartographer on the map are no longer distinguished. It

[109] Dear et al., *GeoHumanities: Art, History, Text*, 179.
[110] Kurgan, *Close Up at a Distance*, 13-4.

has become nearly impossible to see the agency behind the image. One troubling aspect of the shift to digital reliance is that satellite images and digitally constructed maps can be artfully interpreted to support any number of arguments. It isn't that the images are false or forged, but that they are imbued with meaning by the agenda of whoever is selecting the images. No matter how objective that individual may purport to be, even the most innocent, yet integral, choices, such as what images to include or exclude and what to emphasize and de-emphasize, are being made regardless.[111]

In the face of this theoretical discourse on critical and counter cartographies, a discussion that plays very much into the contemporary cartographic conversation, Kurgan's goal is to make room for a public dialogue and open up the floor for the interpretation and questioning of data, maps, and images. This dialogue is enabled through an understanding of the biases and re-representation of maps, in addition to the basic knowledge to engage with and question these artifacts. By channeling the technologies themselves to create images that say something a little different, Kurgan raises questions across the board.[112] Kurgan is using these new technologies to call attention to the limits of the images they themselves produce. Ultimately, neither a view of a whole scene nor an examination of the details truly brings to light subjective experience.[113] Yet, in the images Kurgan creates with the Million-Dollar Blocks project she illuminates the shortcomings of pre-existing crime maps, and uses the same technologies to show the more significant patterns that create the story.

Conversely to these aforementioned alarmist and surface urban maps, the Million-Dollar Blocks project produced maps that identify an urban problem for the very sake of

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[111] Kurgan, *Close Up at a Distance*, 24-6.
[112] Ibid., 34-36.
[113] Dear et al., *GeoHumanities: Art, History, Text*, 180.

introducing a discourse on the underlying problems at hand. These maps are rooted in a trans-disciplinary methodology. Kurgan explains that the project itself grew out of research initiated by New York state prisoners themselves while incarcerated. This group of prisoners conducted a study that led to the conclusion that more than 85% of New York State prisoners are black or Latino, and, further, 75% of the prison population in the state comes from a mere seven neighborhoods in New York City.[114] Eric Cadora, then working at the Center for Alternative Sentencing and Employment Services, was intrigued by the prisoners' research. Cadora took up the reigns of the project in order to examine and call more productive and policy-oriented attention to a very interesting emerging pattern, using what he termed "justice mapping". Cadora and JMC partner Charles Swartz created their maps with the intention of encouraging discussion on both the root issues and potential solutions. This series of research and maps expanded on the initial discovery of the prison admissions locational phenomenon to add in another layer of consideration: the amount of money spent per each spatial concentration. Thus came the discovery of what would later be identified and defined as "million-dollar blocks".

Kurgan picked up where Cadora left off with the initial objective of rendering visible a difficult to decipher, but distinctly spatial phenomenon. What this spatial issue constitutes is the immense geographical stratification and concentration of contemporary ills that plague urban populations, namely poor services and stark rates of incarceration. In *Close Up at a Distance*, Kurgan makes the claim that the reason this spatial issue remains below the surface of common apprehension is largely a result of its nature as a simultaneously micro and macro attribute of the contemporary urban fabric.[115] This entire

[114] Kurgan, *Close Up at a Distance*, 187.
[115] Ibid., 188.

phenomenon operates within the nexus of a bigger picture, that of the civic infrastructure, criminal justice, and social services of the American city. It is this bigger picture, it would seem, that the MDB project is attempting to bring to light.

Kurgan channels this infrastructural understanding, and at the same time "borrows and inverts the language of crime "hot spot" maps to create the Million-Dollar Blocks mapping project.[116] Thus, the project is situated within the intention of subversion. The MDB maps serve to subvert by inverting the very core idea and stylistic rendering of crime maps. The SIDL synthesizes all of this pre-existing, early stage information with other more comprehensive and less widely available data on incarceration. First, Kurgan tracked the home addresses of prisoners, as opposed to the locations of crimes. Then, she compared this data with the amount of time in prison (thus, the amount of money spent) and the return rate of the prisoner. This analysis, through the visualization of the maps, lead to the discovery that significant portion of the prison population across the United States is coming from a very few impoverished and resource-isolated city blocks. The MDB maps construct the argument that incarceration is a distinctly spatial phenomenon with links to systemic patterns concerning civil service investment, allocation of government money, and incarceration and probation policy. The maps evidence this pattern by visualizing an urban landscape of stark stratification across class levels and incarceration rate.

Instead of leaving it there, however, Kurgan next "zooms in to the micro geographies of those communities"[117] to examine what is really going on there. Zooming in to allow for closer inspection of any underlying patterns reveals more information,

[116] Ibid., 188.
[117] Ibid., 188.

allowing for a further examination of what past crime maps fail to dig into. There seems to be a certain spatiotemporal component in this mapping project, which a unique feature. The maps work in concert to simultaneously track various phenomena playing into this scenario, tracing the relation between single occurrences and trends over time. These million-dollar blocks are places where the state is spending millions of dollars per year to incarcerate individuals from a few specific, small, and similarly underprivileged locales within inner cities throughout the United States. Additionally, around 40% of these people return to prison within three years of release. A comparison of the data and the overall picture presented by these maps suggest that the criminal justice system has developed as the predominant institution in these underserviced areas, and, therefore, the money flowing into this one system detracts from investment in other public infrastructure such as education, housing, and healthcare. The money allotted to these areas is spent to imprison these individuals instead of on the creation and improvement of institutions that would channel efforts into the improvement of the areas, and, eventually, rectify the patterns that have created this culture of imprisonment across the urban U.S. What is visualized in these maps is the geography of incarceration, meaning incarceration as an unproductive, non-reformative, and default institution. With the incarceration rate climbing rapidly and consistently upward since the 1970s, reaching around two million in 2000, what these maps make clear is not only the default of the prison system as a way of dealing with impoverished, under serviced, and otherwise underprivileged urban populations, but also the extent to which the patterns of incarceration are geographically concentrated, much more so than the patterns of the actual locations of crimes.[118]

[118] Ibid., 189-196.

V. What Constitutes Participatory Mapping?

While this project may be expansive and trans-disciplinary, it is challenging to pinpoint whether the maps epitomize a truly bottom-up experience. Kurgan states in her book that: "The map is not a top-down view. And neither is it a bottom-up account. It is both".[119] In the frame of questioning what these maps, as counter-cartographic objects, actually achieve in the realm of policy and social change, it is imperative to look at the participatory aspect of the Million-Dollar Blocks project. In other words, within the confines of academic cartography, what is it that constitutes participation. Whose voice is included in these maps? Further, who are these maps for?

As part of the greater Million-Dollar Blocks project, the SIDL conducted a scenario-planning workshop. Scenario planning is a collaborative process centered on coming up with an array of possible solutions, ideas, and potential outcomes to address a very uncertain or open-ended issue. The MDB scenario-planning workshop took place in the exhibition space at the Architectural League of New York and was facilitated by Andrew Blau of the Global Business Network, a consulting firm from San Francisco that deals with scenario planning for a number of different groups. The workshop included members of the SIDL and MDB team, local government agency leaders, technical assistance specialists, community developers, architects, and urban planners.[120] The group was, essentially, composed of an array of public intellectuals and social justice advocates. While this certainly constitutes an interdisciplinary and collaborative practice, the question that remains is if this arrangement constitutes a participatory practice. In

[119] Ibid., 204.
[120] Laura Kurgan et al., "Spatial Information Design Lab: Scenario Planning Workshop," Spatial Information Design Lab, last modified 2008, accessed February 13, 2015, http://www.spatialinformationdesignlab.org/sites/default/files/publication_pdfs/ScenarioPlanning.pdf.

other words, what are the expectations of a participatory mapping practice? There is merit and advantage to consulting experts, but a cartographic endeavor cannot truly be termed participatory without the input of local, non-expert residents. This lack of input from those actually living the spatial experience is the very root issue at hand in the critical discourse on cartography.

For example, one of the ideas drawn from the scenario-planning workshop was a concept of service and institution "hybrids". These hybrids consisted of a combination of necessary corrective or assistive service with a more everyday service. The document on the workshop cites a few examples:

> workforce training with economic development; domestic violence shelter with a liquor store; political representation with public housing; markets with legal aid defenders; children and family services with education and counseling; child care with work release programs; high school with medical and child care services; small business development with bail bonds.[121]

The Lab presents the main goal of these hybrids as a sort of de-stigmatizing of these services:

> Rather than approaching these services as aberrations in the community, and hence associating service delivery with punishment, the hybrids encourage residents to use social services by associating them with their day-to-day lives and ordinary social interactions.[122]

Yet, without resident input, it seems that it would be difficult to know what sort of stigmatization or social issue reliance on these services has created in the community. These maps, then, are coming from the academic and institutional viewpoint of the city and are directed towards the policy- and information-rich population.

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[121] Ibid.
[122] Ibid.

In terms of participation, comparing the MDB idea of scenario planning with, for example, the Cambridge-based Institute for Infinitely Small Thing's project, called "The City Formerly Known as Cambridge" (Fig. 26), some differences emerge. "The City Formerly Known as Cambridge" is an interactive and performative map that was created by the Institute for Infinitely Small Things over a short period of time based on input from local residents. They set up "renaming booths" at various local events – community fundraisers, small sporting events, etc. – and anyone who felt compelled to could walk up and rename any given street, building, landmark, etc. with whatever name they personally felt fitting. Every point of reference in the city was renamed by various residents, creating a completely new image of Cambridge based on the lived social and cultural experience of its local residents.[123] While this map may in the end be totally useless in a practical sense, it not only serves as a point of pride and community building, but also makes a powerful point about localized perceptions of space and how those views differ from the image often projected onto space by conventional maps. In relation to the MDB project, "The City Formerly Known as Cambridge" displays participatory mapping at its most scrupulous. The project was almost completely participatory and non-discriminatory in that participation. The only organization and input that came from a centralized source was the compiling of the local input into the map.

VI. The Academic Map: Whose Maps Matter?

This comparison still begs the question of whose maps matter. Du Bois utilized a similarly inclusive, inquisitive, and participatory methodology in the construction of his maps in *The Philadelphia Negro* study, yet his project was neither immediately

[123] Dear et al., *GeoHumanities: Art, History, Text*, 46-8.

appreciated or circulated at the time of its publication in 1896. While it has today developed into an indispensible historical artifact, Du Bois' map went largely unnoticed in its time. It isn't that his project was completely ignored. The U.S. Department of Labor and Atlanta University did both commission and fund numerous studies by Du Bois modeled after *The Philadelphia Negro* between 1896 and 1904. However, as a whole, the academic field of sociology amongst major universities never really appreciated Du Bois' methods. For example, he was never offered an official title at the University of Pennsylvania, nor did the institution commission anything further from him. Sociologists largely ignored his research, and, in fact, the pre-1940s Chicago School, which dominated sociological thought during the first half of the 20th century, continued to argue the opposite of Du Bois' findings, despite his extensive and in-depth studies.[124]

If anything, Du Bois' plight speaks to the restrictions placed on personal voice for black and other minority-based scholars. Since his methods and viewpoints were not in keeping with the white supremacist morality that prevailed at the turn of the century, and, specifically because of his rejection of biological arguments in explanation for black poverty, Du Bois was running gratingly against the grain.[125]

On the other hand, Kurgan's maps, also coming from an academic realm, have been widely circulated, utilized, and acknowledge as a significant contribution to an emerging discourse. In fact, a number of her maps are on display in a permanent collection at the Museum of Modern Art in New York City and are considered a highly reputable source. It is hard to say what lasting effect the Million-Dollar Blocks project will have since it is so recent and ongoing. While the Million-Dollar Blocks project has

[124] Tukufu Zuberi, "W. E. B. Du Bois's Sociology: The Philadelphia Negro and Social Science," *Annals of the American Academy of Political and Social Science*595 (September 2004): 148-150.
[125] Ibid., 152-3.

garnered appreciation within the academic and art world, whether or not the influence has extended beyond these spheres is less clear. In an interview with NPR in 2012 Cadora discussed what he sees as the contribution of the project, in addition to the effects it has had since its introduction. The groups coming together under the SIDL with this project were the first people to collect, organize, and visualize background information about prisoners (e.g. home address, age, employment status). Cadora comments that, to someone well versed in issues of incarceration in the United States, what patterns emerged from the maps aren't necessarily brand new concepts, but the visualization and aggregation of these numerous factors in a single series proves powerful in terms of raising awareness and bringing these issues to the visually apprehensible forefront. He goes on to describe how the images mapped at the start of the project, almost a decade ago, compared to the image that emerges today reveals a real difference. This change is attributed to investment on the part of city and state legislators and officials, especially the Department of Probation, that has significantly increased since the advent of this mapping project. The investment Cadora refers to has largely taken the form of amplified efforts to engage with the community and local organizations.[126]

Beyond the accounts provided by Kurgan, Cadora, and the Lab itself, gauging the policy-oriented and lived experience impact that the MDB project has, or hasn't, had is difficult given the relatively recent advent of the project and the slow speed with which policy change occurs. It is questionable that almost all accounts of the project and detailed information on the practice come from the source itself, be it Kurgan's book, the SIDL website, and accompanying SIDL documents on the project. There is, for example,

[126] Eric Cadora, "'Million-Dollar Blocks' Map Incarceration's Cost," interview by Diane Orson, *All Things Considered*, NPR, October 12, 2012.

a significant lack of presence in the news about the group and this project. This lack of accessibility suggests an academic insulation and isolation of the project, and raises the concern of whether this project and its message really extended beyond academia. Additionally, it is somewhat indicative of the dubious relationship that exists between academia and the government. Further, the main venues for presenting these maps – MoMA, the Architecture League, Columbia University – are all confined to the academic sphere as well.

While limiting the prescribed audience and reach of the project to academic and institutional operators may place some constraints on its reception as groundbreaking or radical, there are also some benefits to an academia-laden project. For example, within academia one can increasingly develop a perspective that is separate form the market and relatively free of restrictions on freedom of speech. Thus, in the face of such grand freedom and very few threats, the cartographer-researcher does not need to worry about repercussions and is, thus, able to create and explore with few restrictions. This freedom can enable much more honest, involved, and comprehensive accounts than would be established in the face of strict confines on speech and presentation. If the goal of the project is only to spur policy debate and eventual change, then this reach may be enough, but if the project is simultaneously making claim to a greater reorientation and questioning of cartographic practice via participatory and counter-cartographic methodologies then it would follow that a greater level of inclusion is necessitated.

VII. Conclusions

As mapmaking technology proliferates in the public sphere, the line between physical space and digital space progressively blurs. This difference increasingly loses its distinction because, through geographic technologies, it becomes possible to wield power and feign understanding over physical space without actually being present in that space. Moreover, domination over physical space is now possible without even being physically present in that space, a phenomenon that finds its weight in such controversial activities, Kurgan points out, as digitally directed missiles and drone warfare.[127]

So, in the face of this debate on the SIDL and its MDB project, the question remains of what it is that this project actually does. Does the MDB project introduce information in a new, interesting, and accessible way? Yes. Would it seem that the project has a useful place in the discussion on incarceration policy change? Yes. Is the cartographic aspect of the project introducing something new and different on the discussion in critical cartography, or presenting maps that break free from the historical constraints of cartography? Maybe not.

While MDB is no different in producing subjective artifacts with a specific social agenda, it does so with a level of self-awareness and political purpose. The implications that this geographic spatiality has in the context of mass incarceration of the urban U.S. population are far-reaching and, when visualized and contrasted with layers of data and facts on incarceration patterns across the country, reveal deeply ingrained patterns within these issues. By bringing these connections and structures to the visual forefront, the project could lead to better-informed and more productive criminal justice reform.

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[127] Kurgan, *Close Up at a Distance*, 17-18.

Conclusion

We have seen the ways in which cartography is utilized as a tool of distortion and suppression, subjectively selecting how geographic information is conveyed, and whose spatial account is privileged over others'. Maps, at their most root definition, are tools to relay geographic information. While the politics surrounding these visual artifacts are, in fact, much more complex, even the most politically un-motivated map still possesses an inherent motivation. Maps speak to a public that is removed from the context of map production, and is additionally unconnected to the depicted topography itself. Thus, not only does the use of maps necessitate a level of trust in their production, it also precludes an artificial understanding of space to begin with. In response, professionals and non-experts alike seek a new mapping practice that strives not only to further illuminate the existing power structures that cartography is laden with, but to include a wider range of voices in the production of the map as well.

However, the question still remains: How can one depart from these existing structures that cartography is so tied up in, to emerge with a more inclusive, experiential, duplicitous, and participatory mapping? A fundamental concern with the new technologies of mapping is its basis in white, male-dominated realms of academia and governmental institutions, largely restricted region-wise to North America and Europe. This concern is the foundation to which participatory attempts are responding.

In November 1993 a "GIS and Society" workshop was held in Friday Harbor, Washington. These meetings, which included GIS experts, analysts, and critics, came to be known as the Friday Harbor meetings and mark an entry point to the discussion on participatory GIS. These experts opened up the platform for discussing tactics to include

within the professional sphere of cartography more local knowledge, experiences, and personal narratives. The main points that the conference brought forth, which stand as the core issues of critical GIS today were: recognizing a theory of GIS that establishes the technology as a distinct set of institutions and practices that are active in shaping society; revealing how these effects of GIS operate within society; pushing the limits of GIS as it persists with these inherent side effects; and discussing new possibilities for GIS and exploring how, if at all, it can be used differently.[128] Essentially, participatory GIS arose as an attempt to actively respond to the top-down control exercised by maps, with a bottom-up methodological alternative.

A primary problematic that developed in geographic and cartographic thought in these decades of technological growth was that, with the increase in GIS use came a rise in the privileging of facts and data over knowledge. Thus, empiricism and positivism came to dominate the field. An important question, then, is how community participation in GIS can be implemented and actualized without merely serving to legitimize top-down objectives. The discussion is still centered in the privileged realm of government and academia, with the tools also being produced by multi-national corporations. Consequently, two of the major concerns that persist in existing participatory mapping attempts are its ability to simultaneously empower and marginalize, in addition to the same reoccurring issues of access to computers, technology, knowledge, and facts.[129]

The strength of participatory GIS, however, becomes evident in the goal on the part of its innovators to be participatory in every stage of the cartographic process. Simultaneous with critical deconstructions of the perceived objectivity and neutrality of

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[128] Crampton, *Mapping: A Critical Introduction*, 101.
[129] William J. Craig, Trevor M. Harris, and Daniel Weiner, eds., *Community Participation and Geographic Information Systems* (London; New York: Taylor & Francis, 2002), 7-9.

maps, GIS was also being touted by professionals as perfectly mimicking space to a degree only possible with computer processing. As critical geographers continued arguing the many subjective points of decision making inherent in mapmaking, emphasizing that, in fact, these subjectivities were multiplied within the GIS platform, interested parties began exploring participatory and alternative GIS options.[130] There are a handful of terms used when discussing participatory applications of a mapping and GIS practice – participatory GIS (PGIS), public participation GIS (PPGIS), community-integrated GIS, and participatory mapping – each with a unique definition, but all pertaining to the same objectives of inclusivity, bottom-up structuring, and empowerment. While each term has its own nuance, they all constitute a practice that is "context- and issue- driven rather than technology-led and seek to emphasize community involvement in the production and/or use of geographical information."[131] Essentially, instead of favoring the technology first and context second, the context becomes central to both the process and product.

Also alongside the multi-faceted explorations in alternative uses of GIS is the introduction of web mapping operations, which pose another option for non-professional interjection into the cartographic guild.[132] Web maps began to appear on the cartographic-technologic scene as early as the nineties, but with interfaces such as GoogleEarth and OpenStreetMap, and the advent of public availability of GPS and Web 2.0 technologies, web maps started becoming much more user-friendly. OpenStreetMap in particular poses an opportunity for interaction within the interface on a much more

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[130] Plantin, *Participatory Mapping: New Data*, 28-9.
[131] Christine E. Dunn, "Participatory GIS - a people's GIS?," *Progress in Human Geography* 31, no. 5 (2007): 616.
[132] Plantin, *Participatory Mapping: New Data*, 28-34.

collaborative, participatory level, with varying degrees of creation and innovation depending on the user's skill level. Since it is open license, all of the data can be used and edited by anyone, establishing an ad hoc, participatory system.[133]

In keeping with the rising web mapping trend, in June 2000, ESRI announced the launch of the ESRI Geography Network. Using ArcIMS technology, the Geography Network would deliver "GIS content and capabilities to users anywhere in the world, via the Internet."[134] Again, aided by the general trend of improving Internet speeds and access, this mapping interface was extolled as the answer to all issues of accessibility, reach, and privilege in regard to geographic information. As Dangermond applauds:

> Perhaps the most interesting and important implication of the Geography Network is that citizens from around the world will be able to share in the rich treasures of information currently maintained and accessed by only a few. The result will be that over time, everyone will learn and have a better understanding of how the world works. This will lead to better personal decisions and facilitate more participation and collaboration in the decisions that effect how the world evolves. Ultimately, people will become more conscious of how closely related and interconnected they are to the earth – like a bee to a flower.[135]

The creators of this interface present the mapping technology as something entirely new, which will open up access, widen the scope of usership, and convey diverse opinions. Dangermond then goes on to insist that the average user will be able to assert new and improved claim to decision making processes within society. New web developments creating a more inclusive mapping practice seem to achieve a necessary "scaling up" of mapping operations, meaning increased access to these exclusive operations:

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[133] Ibid., 45-8.
[134] Craig, Harris, and Weiner, *Community Participation and Geographic*, 306.
[135] Ibid., 307.

> Scaling up in terms of access to Participatory GIS through the Internet releases the potential for online public participation and discussion, contribution to decision-making processes through online decision support systems, and citizen feedback from system improvement and enhanced communication and political action.[136]

It is unclear, however, in what way this "new" mapping interface changes any of the pre-existing cartographic constraints. The base mapping operations are still coming from a powerful, corporate source. Use of the program is still limited to those who have computer and Internet access, not to mention the education level required to maneuver such advance applications. Further, while the basic program is free to use (beyond the purchase price of a computer and Internet connection), it is still a private web site, and some of the GIS data have fees attached.[137]

Up to this point, participatory GIS efforts have attempted to garner more inclusive efforts, dealing with integrating local knowledge with expert data, including "the public" in gathering information to be used in the GIS, and incorporating these variegated views in the spatial analysis and decision-making processes that follow as well.[138] Yet, while some people may increasingly have access to mapping technologies via the Internet, these individuals, and even more so those who are still not even reached by the technology, continue to lack any political, monetary, or technical control.[139] Additionally, beyond questions of literal access to the Internet, there are also accessibility issues that arise when considering usability and technological literacy. Even once these substantial issues with a participatory practice are overcome, a whole host of other concerns arise. At the forefront of these considerations are those that pertain to quality control. While

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[136] Dunn, "Participatory GIS - a people's," 625.
[137] Zhong-Ren Peng and Ming-Hsiang Tsou, *Internet GIS: Distributed Geographic Information Services for the Internet and Wireless Network* (Hoboken, NJ: Wiley, 2003), 551.
[138] Dunn, "Participatory GIS - a people's," 619.
[139] Ibid., 620.

widening the scope of who gets to map and who gets to collect and contribute data is appealing on many levels, this range of information will, undoubtedly, be extremely varied in terms of quality, reliability, and cohesiveness. It seems that the only way to guard against inaccurate or otherwise unusable data would be to have someone in charge of regulation and editing, and, thus, detracting from the empowering function of the tool. This practice, then, is a double-edged sword, because a process meant to empower has now become subject to regulation out of necessity, but, nonetheless, establishing an authority over the practice and minimizing its bottom-up goals.

Michael J. Shiffer, Associate Professor in the Urban Planning & Policy Program and Director of the Digital Cities Lab at the University of Illinois at Chicago, discusses GIS in terms of "spatial multimedia". Shiffer explains that these alternative multimedia forms of spatial representation can operate alongside GIS technology and offer some answers to persisting concerns over the lack of accessibility and the inability of the system to display and give meaning to "informal mental models, such as personal anecdotes and observations."[140] What "spatial multimedia" actually consists of are representational aids that can act as supplementary means for disadvantaged groups to convey ideas and breach participation blockades. These representational aids include solutions to the issue of individuals simply not being able to get to the meeting, conference, proceeding, etc., such as cable television, video conferencing, and the world wide web; media that bridges the gap between professional or specialist knowledge and public understandings, including visual aids, simple spreadsheet calculations, animations; and addressing the question of whose voices are heard with annotation tools that enable

[140] Craig, Harris, and Weiner, *Community Participation and Geographic*, 309.

collaborative marking and augmentation of a visual map or chart, reminiscent of Kevin Lynch's method, and allowing everyone to contribute.[141]

Finding ways to implement a variety of voices, and, especially, bringing to the forefront those narratives that are rarely heard, is invaluable to an inclusive mapping practice because there exist different truths for different people based on their experiences. In the conclusion to William Craig et al.'s work on participation in GIS, the editors insist that: "PPGIS is purposefully value-laden and redefines the meaning of "accuracy"."[142] Meaning, participatory mapping is a response to highly contested and debated theoretical critiques, and it comes at a critical point in the divergence of technological cartography and mapping theory. While this "new" cartographic practice is expanding and opening up the historically disciplined realm of mapping privilege, and while it is important to convey these duplicitous pieces of knowledge, it should also be understood and used in different ways. In a sense, the mere existence of alternative mappings – counter-maps, art maps, and mental maps – is a powerful statement in and of itself, regardless of any claims to accuracy. Here we have a juxtaposition of technical knowledge and "deep knowledge".[143]

The primary goal of these various participatory platforms, web mapping operations, and spatial media tools is to bridge the gap between expert analysis and community experience. These alternative forms of mapping are not meant to replace more formal and professional GIS practices, but could, rather, supplement and complement top-down operations with a bottom-up perspective.[144] The essential function

[141] Ibid., 309-19.
[142] Ibid., 368.
[143] Dunn, "Participatory GIS - a people's," 623.
[144] Ibid., 627.

of alternative mappings is adding another layer of data and meaning to an already multi-layered and multi-faceted, but consistently problematic, structure. As power-laden objects tied up in historical conflict, political structures, and topographical ownership, maps as visual aids and knowledge-bearers hold a lofty amount of responsibility. Mapmakers and map users, thus, are responsible for conveying information in a productive, inclusive, and honest manner. Subjectivity will never be eliminated from the map, nor is that necessary, but transparency is imperative for a continued utilization of the map as a tool or a work of art. Participatory mappings hold the potential to incorporate this demanded transparency. There still remains, however, a considerable breadth of questions regarding participatory practices. There is a need to more clearly articulate who "the public" is and what exactly constitutes "participation". There is a question of whether GIS can even be re-appropriated in these ways, or if the technology is too irreparably tied in with colonialist thinking and the cartographic anxiety. It is likely that these questions will need to be dealt with before a new system of participatory mapping and spatial analysis can truly be implemented on a widespread and viable scale. Yet, for now, mapping practice has reached an exciting point in history, where interest is high, and alternative mappings are prolific, reaching all spheres of learning and activity, and stretching across the disciplines. While concrete solutions still beg further hashing out and detailing, the breadth of cartographic material and definitions of what even constitutes a map hold promise for incorporating a multitude of narratives within the cartographic "non-discipline".

Images

Chapter One:

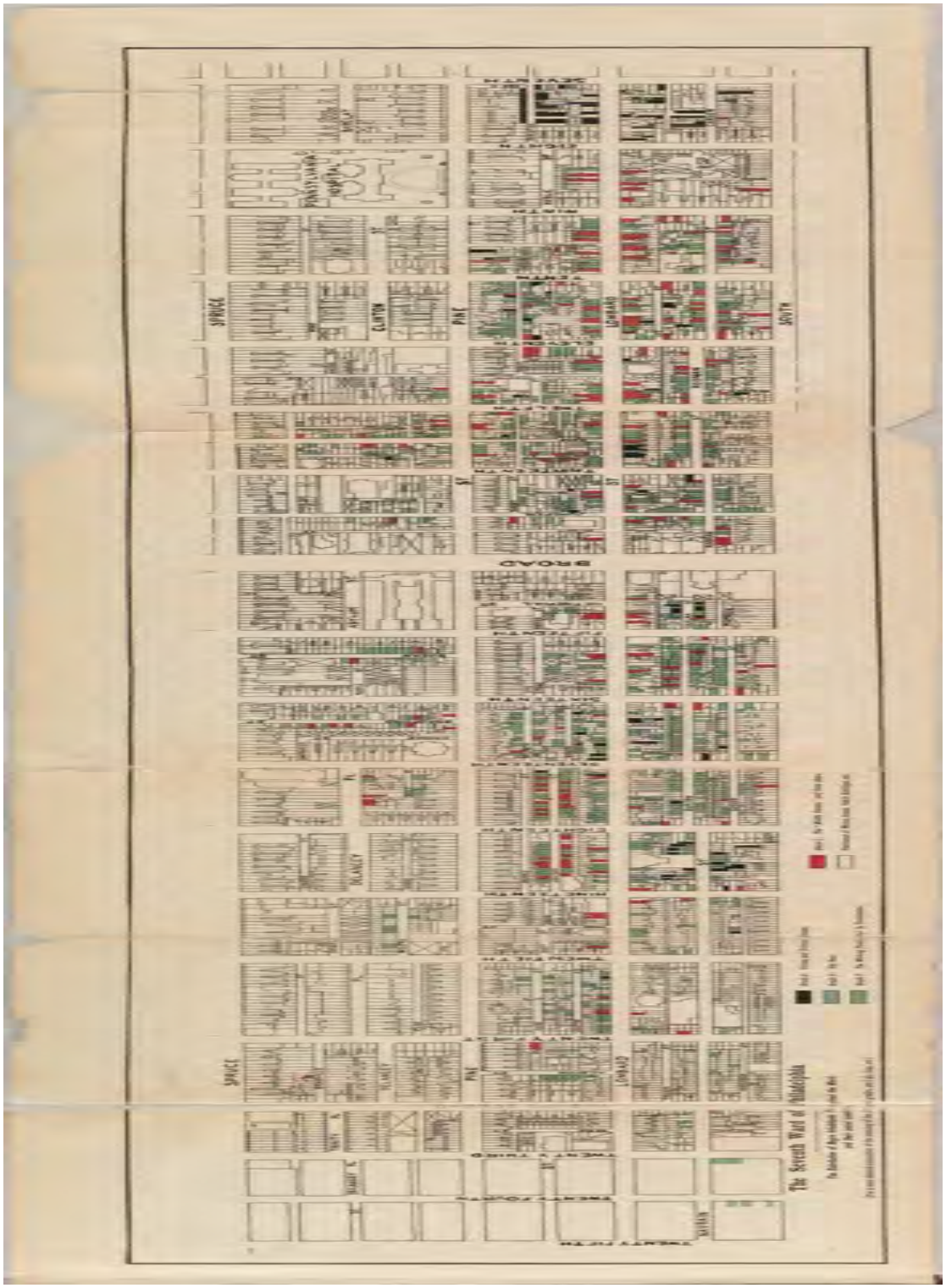


Fig. 1 Original Du Bois map of the Seventh Ward from *The Philadelphia Negro.*

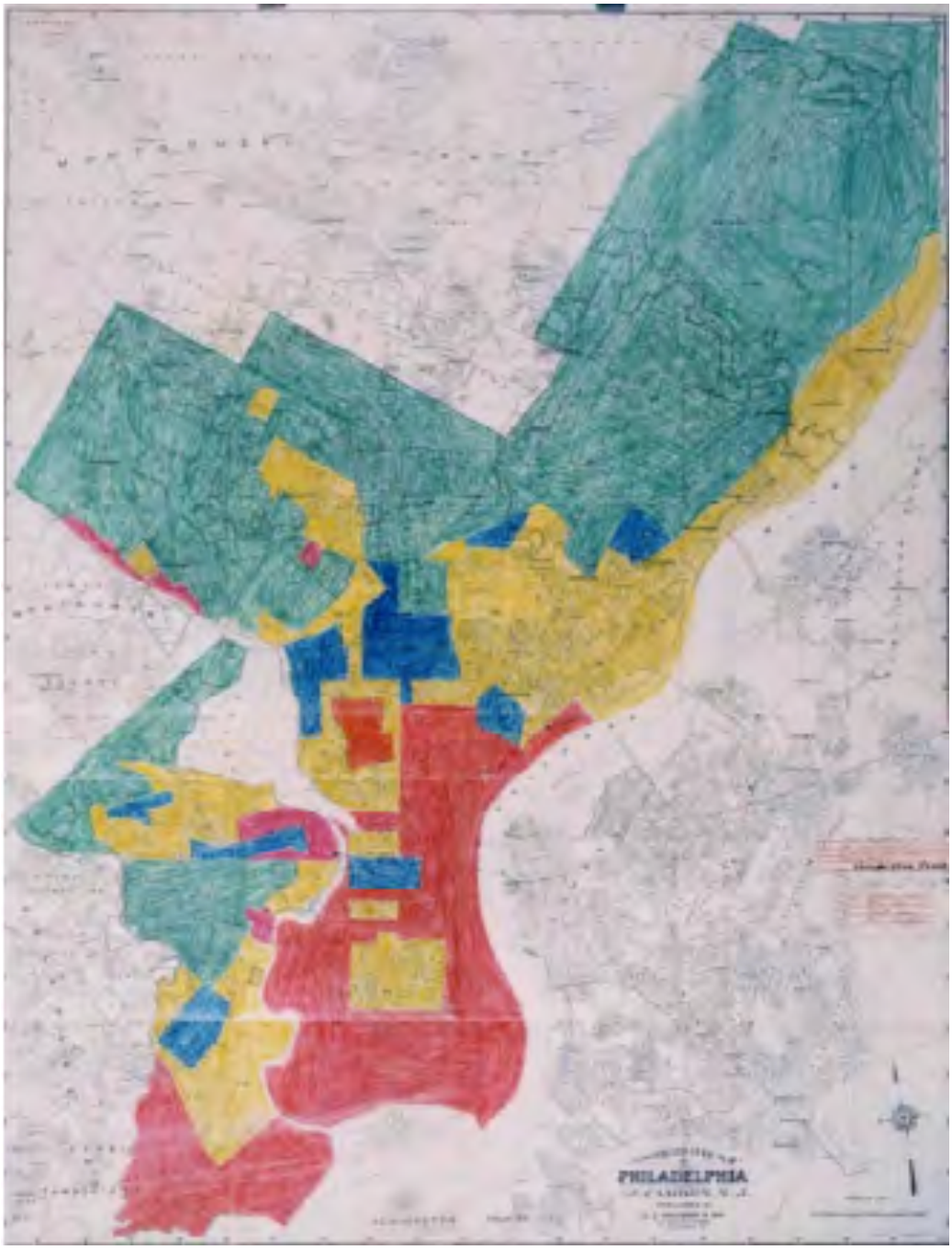


Fig. 2 HOLC map of Philadelphia, 1935.

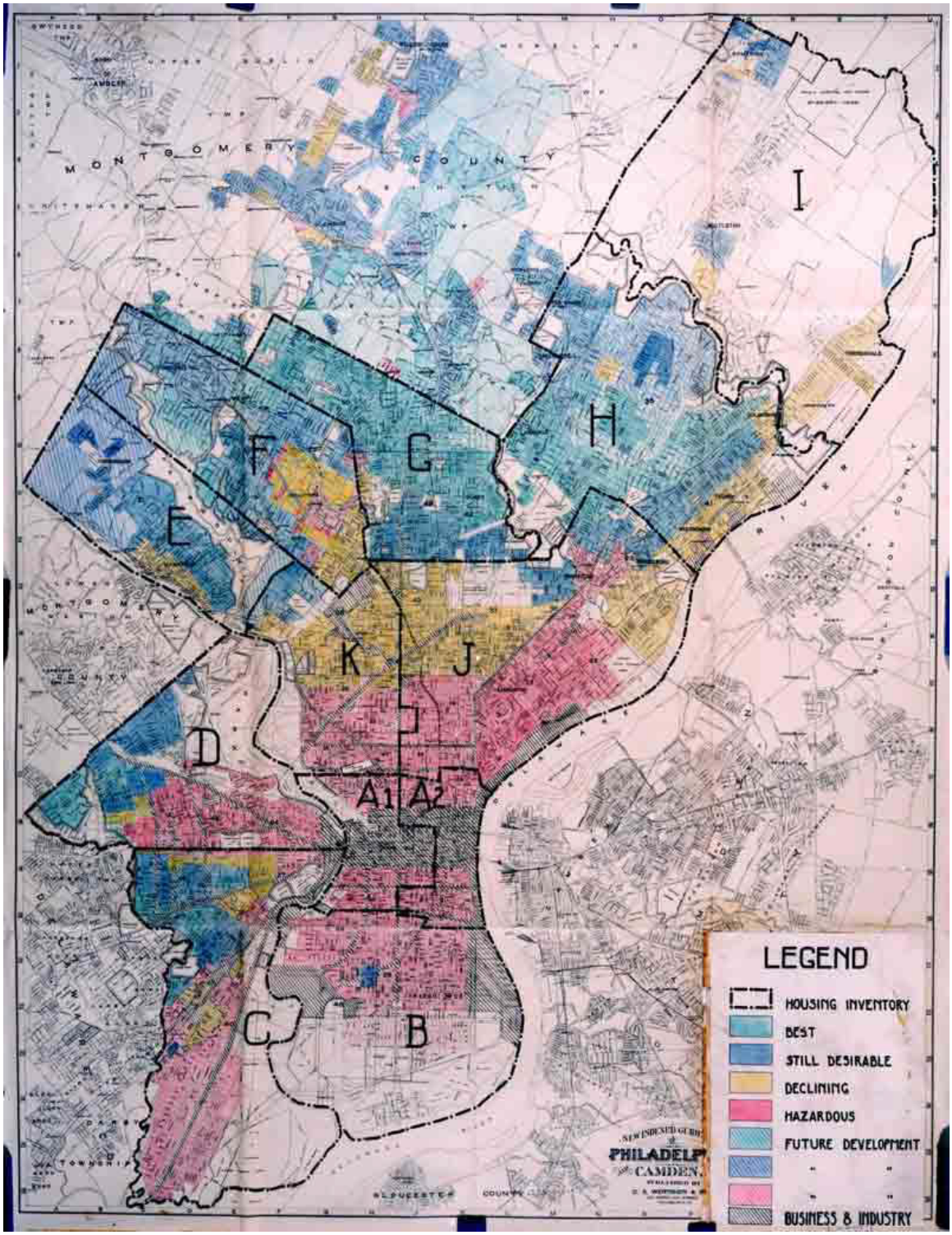


Fig. 3 HOLC map of Philadelphia, 1936.

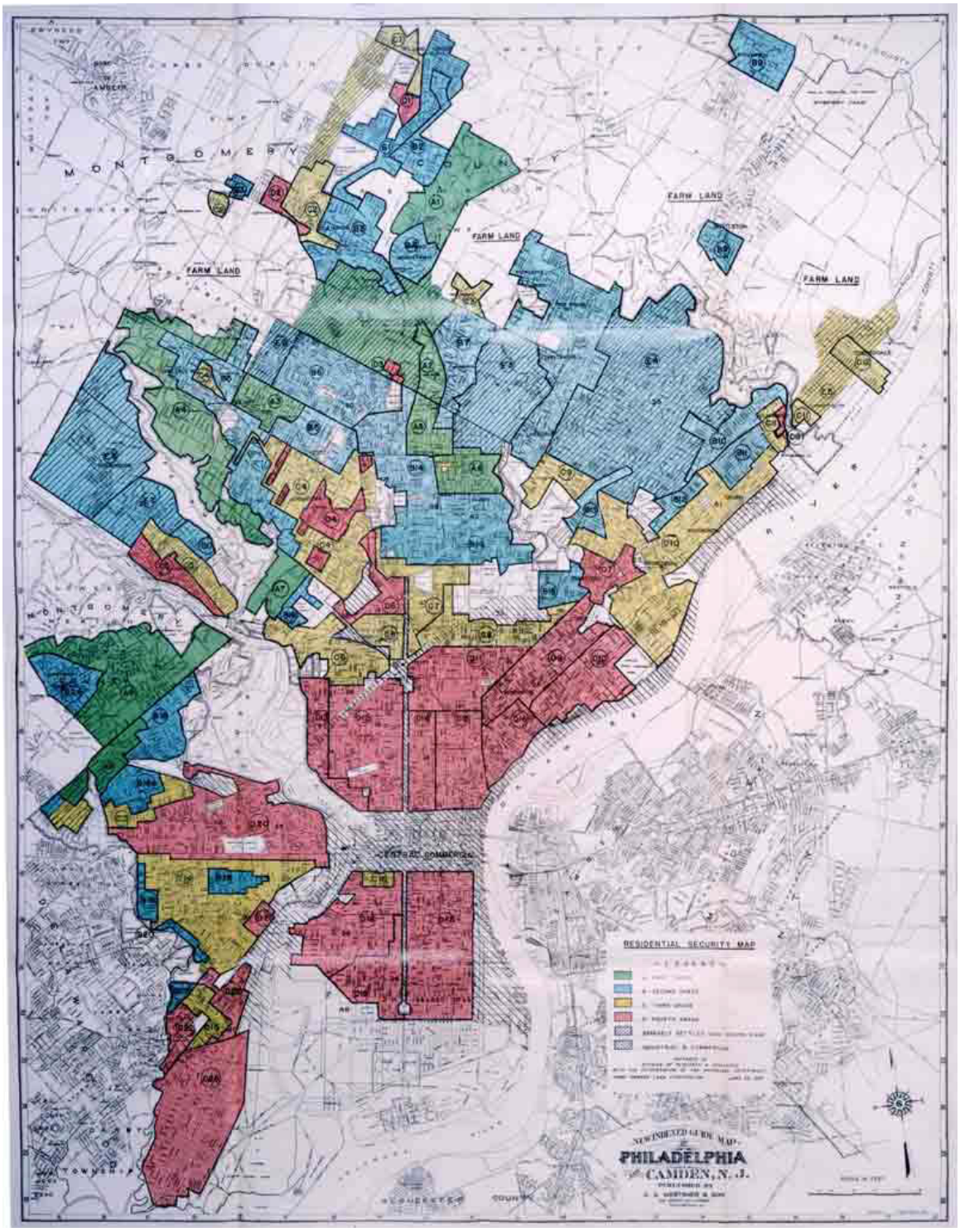


Fig. 4 HOLC map of Philadelphia, 1937.

EXPLANATION

Philadelphia, Pennsylvania

The purpose of the Residential Security Map is to graphically reflect the trend of desirability in neighborhoods from a residential view-point. Four classifications are used as indicated by the legend, namely: First, Second, Third and Fourth grades. The code letters and colors are A, B, C and D, and Green, Blue, Yellow and Red respectively. In establishing the grade of an area, such factors as these are considered: intensity of the sale and rental demand; percentage of home ownership; age and type of building; economic stability of area; social status of the population; sufficiency of public utilities, accessibility of schools, churches, and business centers; transportation methods; topography of the area; and the restrictions set up to protect the neighborhood. The price level of the homes is not the guiding factor.

The First Grade or A areas are "hot spots"; they are not yet fully built up. In nearly all instances they are the new well planned sections of the city, and almost synonymous with the areas where good mortgage lenders with available funds are willing to make their maximum loans to be amortized over a 10-15-year period -- perhaps up to 75-80% of the appraisal. They are homogeneous; in demand as residential locations in "good times" or "bad"; hence on the up grade. The Second grade or B areas, as a rule, are completely developed. They are like a 1935 automobile -- still good, but not what the people are buying today who can afford a new one. They are the neighborhoods where good mortgage lenders will have a tendency to hold loan commitments 10-15% under the limit. The Third grade or C areas are characterized by age, obsolescence, and change of style; expiring restrictions or lack of them; infiltration of a lower grade population; the presence of influences which increase sales resistence such as inadequate transportation, insufficient utilities, perhaps heavy tax burdens, poor maintenance of homes, etc. "Jerry" built areas are included, as well as neighborhoods lacking homogeneity. Generally, these areas have reached the transition period. Good mortgage lenders are more conservative in the Third grade or C areas and hold loan commitments under the lending ratio for the A and B areas. The Fourth grade or D areas represent those neighborhoods in which the things that are now taking place in the C neighborhoods, have already happened. They are characterized by detrimental influences in a pronounced degree, undesirable population or an infiltration of it. Low percentage of home ownership, very poor maintenance

Fig. 5.1 HOLC explanation of map categories.

Fig. 5.2 HOLC explanation of map categories, continued.

Explanation
Philadelphia, Pennsylvania
Page Two -

and often vandalism prevail. Unstable incomes of the people and difficult collections are usually prevalent. The areas are broader than the so-called slum districts. Some mortgage lenders may refuse to make loans in these neighborhoods and others will lend only on a conservative basis.

These maps and descriptions have been carefully checked with competent local real estate brokers and mortgage lenders, and we believe they represent a fair and composite opinion of the best qualified local people. In using them we do not mean to imply that good mortgages do not exist or cannot be made in the Third and Fourth grade areas, but we do think they should be made and serviced on a different basis than in the First and Second grade areas.

A street index will be found enclosed in an envelope attached to the right side of the docket.

The following local persons collaborated with the field agent in the preparation of this map and the area descriptions: James F. McManus, Regional Appraiser, HOLC, Mr. Diggery, State Appraiser, HOLC, James Hoffman, Assistant State Appraiser, HOLC, Robert J. Nash, Realtor in entire Philadelphia Area, James Cairns, Realtor in Ardmore, A. J. Fronefield, Realtor in Wayne, H. B. Wilson, Realtor No. Broad St. Section, Francis E. McGill, Realtor in Manayunk Section, Rowland & Banister, HOLC appraisers and brokers, David C. Snyder, HOLC broker, B. B. Lister - Doherty, HOLC broker, Allen and Barnes, HOLC broker, Jas. H. Livesly, HOLC broker, Adolph Caspard, HOLC Broker, W. R. Stinson, HOLC broker, Harry J. Hurley, Holc appraiser and broker, Sloan & Lynch, HOLC broker, Mr. Charlton, State Property Manager, Mr. Seaton, Philadelphia Property Mgr.

NOTE: a street index etc

NS FORM-8
2-3-37

AREA DESCRIPTION
(For Instructions see Reverse Side)

1. NAME OF CITY Philadelphia, Pa. SECURITY GRADE D AREA NO. 12
2. DESCRIPTION OF TERRAIN. Level
3. FAVORABLE INFLUENCES. Close to business - good transportation - subway, busses, trolley.
4. DETRIMENTAL INFLUENCES. Negro concentration - heavy absolescence.
5. INHABITANTS:
   a. Type Laborers - Mechanics. ; b. Estimated annual family income $900 - 1,800
   c. Foreign-born nominal (Nationality); ___ %; d. Negro yes (Yes or No); 80 %;
   e. Infiltration of negro ; f. Relief families very heavy ;
   g. Population is increasing ; decreasing ; static.
6. BUILDINGS:
   a. Type or types 3 story row ; b. Type of construction brick ;
   c. Average age 20 - 65 ; d. Repair poor
7. HISTORY:

YEAR	SALE VALUES RANGE	SALE VALUES PREDOMINATING	SALE VALUES %	RENTAL VALUES RANGE	RENTAL VALUES PREDOMINATING	RENTAL VALUES %
1929 level	$2,000 - $7,000	$5,500	100%	28 - 65	50	100%
1934-36 low	800 - 2,800	2,000	35	12 - 30	20	40
June 1937 current	1,000 - 3,200	2,500	45	15 - 35	25	50

   Peak sale values occurred in ____ and were ____ % of the 1929 level.
   Peak rental values occurred in ____ and were ____ % of the 1929 level.
8. OCCUPANCY: a. Land 100 %; b. Dwelling units 98 %; c. Home owners nominal to 10 %
9. SALES DEMAND: a. fair ; b. row - 20 ea. ; c. Activity is poor
10. RENTAL DEMAND: a. good ; b. 22 - 25 ; c. Activity is good
11. NEW CONSTRUCTION: a. Types no ; b. Amount last year on Corinthian Ave. section
12. AVAILABILITY OF MORTGAGE FUNDS: a. Home purchase None except b. Home building
13. TREND OF DESIRABILITY NEXT 10-15 YEARS down
14. CLARIFYING REMARKS:

The section between Corinthian Avenue and 22nd Street from Poplar to Brown was built 15 yrs. ago - values range up to $4,000. rents around $35 - 45. Considerable business scattered through this section on main Streets. Broad Street is all business.

15. Information for this form was obtained from W. R. Hutzel

Date ____ 193__

(Over)

Fig. 6.1 HOLC Grading Criteria sheet, Example I.

NS FORM-8
2-3-37

AREA DESCRIPTION
(For Instructions see Reverse Side)

1. NAME OF CITY South Philadelphia SECURITY GRADE D AREA NO. 18

2. DESCRIPTION OF TERRAIN. Level

3. FAVORABLE INFLUENCES. Good transportation - close to commercial and industrial area.

4. DETRIMENTAL INFLUENCES. Negro encroachment - heavy obsolescence.

5. INHABITANTS:
   a. Type Laborers - common ; b. Estimated annual family income $ 750
   c. Foreign-born Italian (Nationality); 25 %; d. Negro yes (Yes or No); 70 %;
   e. Infiltration of Italian ; f. Relief families heavy ;
   g. Population is increasing ; decreasing ; static.

6. BUILDINGS:
   a. Type or types 2 - 3 story row ; b. Type of construction brick ;
   c. Average age 50 - 75 ; d. Repair poor

7. HISTORY:

YEAR	SALE VALUES RANGE	SALE VALUES PREDOMINATING	SALE VALUES %	RENTAL VALUES RANGE	RENTAL VALUES PREDOMINATING	RENTAL VALUES %
1929 level	$1,500 - $8,500	$5,000	100%	20 - 75	40	100%
1934-36 low	800 - 3,500	2,000	40	10 - 35	20	50
June 1937 current	1,000 - 5,000	3,000	60	12 - 40	22	55

   Peak sale values occurred in ____ and were ____ % of the 1929 level.
   Peak rental values occurred in ____ and were ____ % of the 1929 level.

8. OCCUPANCY: a. Land 100 %; b. Dwelling units 98 %; c. Home owners 10 %

9. SALES DEMAND: a. poor ; b. 3 story rows $2,200 - $3,000 ; c. Activity is poor

10. RENTAL DEMAND: a. fair ; b. 3 story rows 25-35 ; c. Activity is fair

11. NEW CONSTRUCTION: a. Types no ; b. Amount last year

12. AVAILABILITY OF MORTGAGE FUNDS: a. Home purchase none ; b. Home building -

13. TREND OF DESIRABILITY NEXT 10-15 YEARS downward

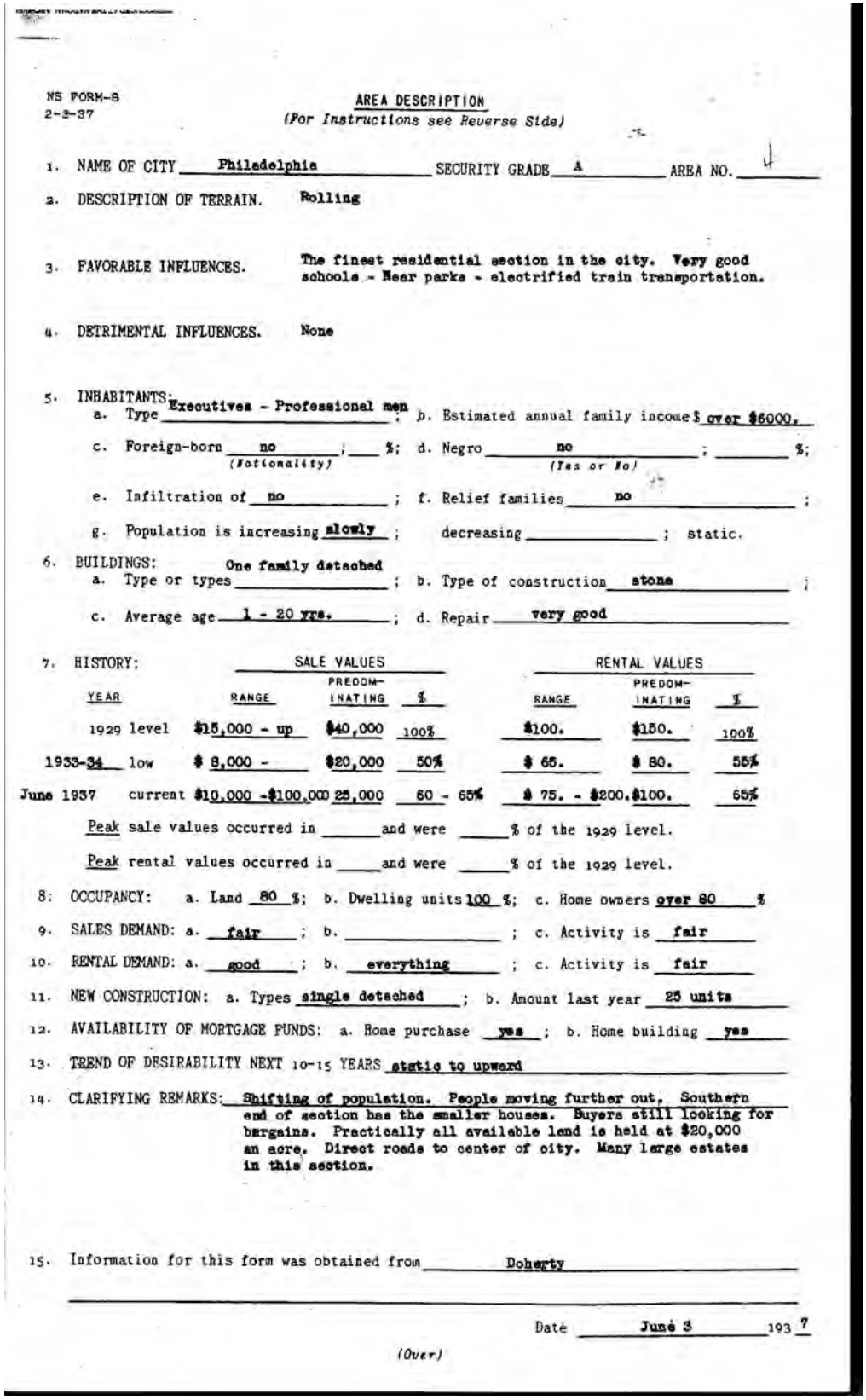
14. CLARIFYING REMARKS: No great demand for property in this section at any time. Many negro families doubled up. Section has been slowly deteriorating for years. Italians are slowly driving negroes out. Small streets are principally 2 story rows. Considerable industry and small business in the section.

15. Information for this form was obtained from Jas. H. Livezly

Date June 8 1937

(Over)

Fig. 6.2 HOLC grading criteria sheet, Example II.



NS FORM-8
2-3-37

AREA DESCRIPTION
(For Instructions see Reverse Side)

1. NAME OF CITY Philadelphia SECURITY GRADE A AREA NO. 4

2. DESCRIPTION OF TERRAIN. Rolling

3. FAVORABLE INFLUENCES. The finest residential section in the city. Very good schools - Near parks - electrified train transportation.

4. DETRIMENTAL INFLUENCES. None

5. INHABITANTS:
   a. Type Executives - Professional men ; b. Estimated annual family income $ over $6000.
   c. Foreign-born no (Nationality) ; % ; d. Negro no (Yes or No) ; % ;
   e. Infiltration of no ; f. Relief families no ;
   g. Population is increasing slowly ; decreasing ; static.

6. BUILDINGS:
   a. Type or types One family detached ; b. Type of construction stone ;
   c. Average age 1 - 20 yrs. ; d. Repair very good

7. HISTORY:

	SALE VALUES			RENTAL VALUES		
YEAR	RANGE	PREDOMINATING	%	RANGE	PREDOMINATING	%
1929 level	$15,000 - up	$40,000	100%	$100.	$150.	100%
1933-34 low	$ 8,000 -	$20,000	50%	$ 65.	$ 80.	55%
June 1937 current	$10,000 - $100,000	25,000	60 - 65%	$ 75. - $200.	$100.	65%

Peak sale values occurred in ____ and were ____ % of the 1929 level.

Peak rental values occurred in ____ and were ____ % of the 1929 level.

8. OCCUPANCY: a. Land 80 %; b. Dwelling units 100 %; c. Home owners over 80 %

9. SALES DEMAND: a. fair ; b. ____ ; c. Activity is fair

10. RENTAL DEMAND: a. good ; b. everything ; c. Activity is fair

11. NEW CONSTRUCTION: a. Types single detached ; b. Amount last year 25 units

12. AVAILABILITY OF MORTGAGE FUNDS: a. Home purchase yes ; b. Home building yes

13. TREND OF DESIRABILITY NEXT 10-15 YEARS static to upward

14. CLARIFYING REMARKS: Shifting of population. People moving further out. Southern end of section has the smaller houses. Buyers still looking for bargains. Practically all available land is held at $20,000 an acre. Direct roads to center of city. Many large estates in this section.

15. Information for this form was obtained from Doherty

Date June 3 193 7

(Over)

Fig. 6.3 HOLC grading criteria sheet, Example III.

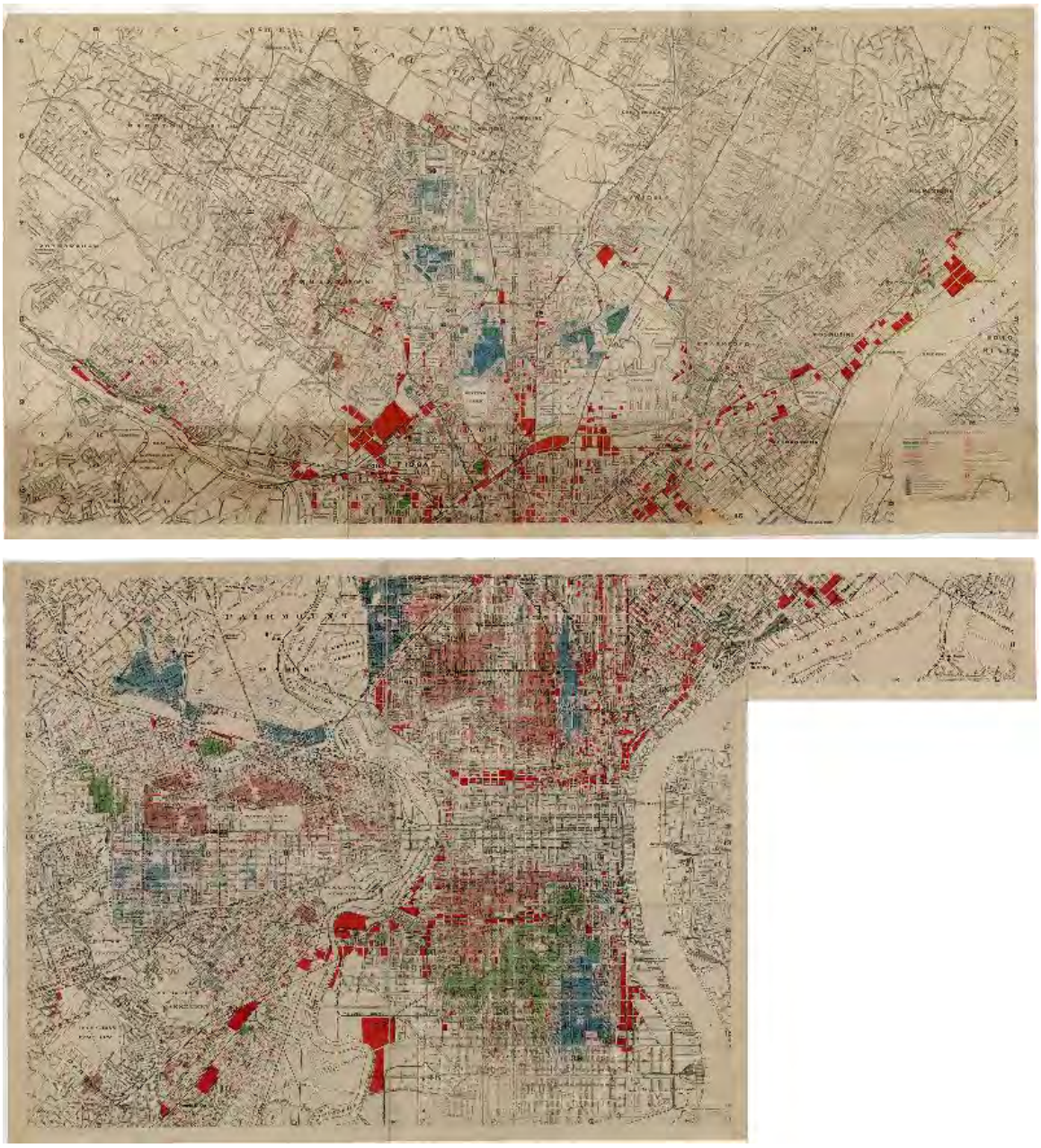


Fig. 7.1-7.2 J.M. Brewer's map of Philadelphia north section (top) and south section (bottom) from 1934.

Chapter Two:

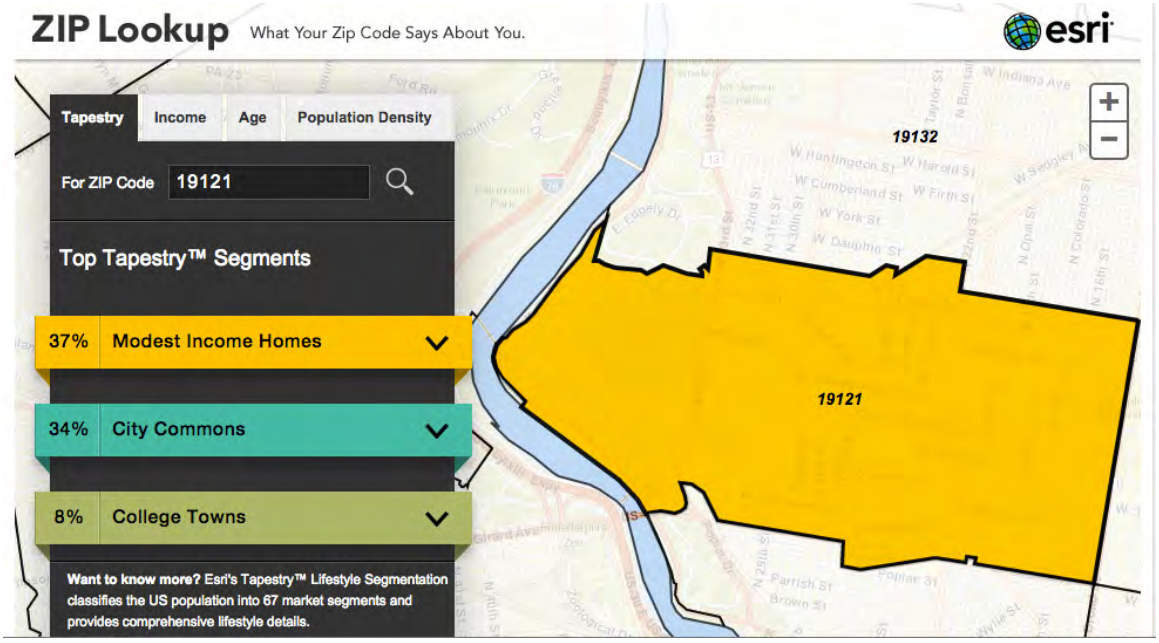


Fig. 8 Screenshot from ESRI interactive ZIP Lookup map showing "Tapestries" category for the zip code 19121.

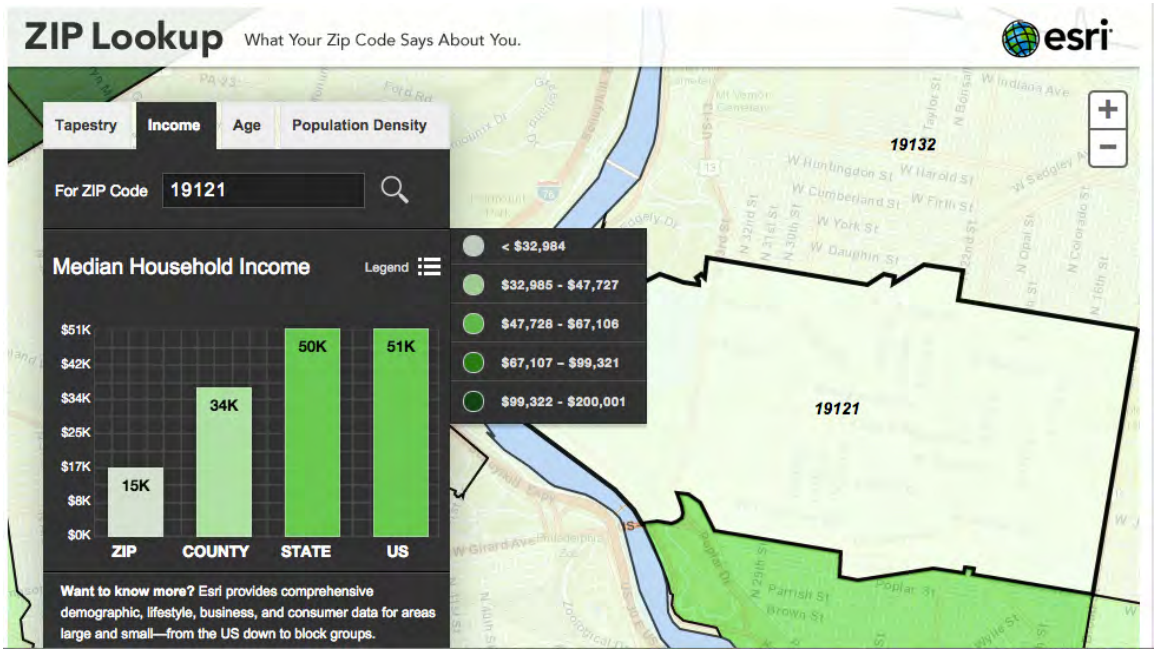


Fig. 9 Screen shot from ESRI interactive ZIP Lookup map showing "Income" category for the zip code 19121.

Fig. 10 *City Plan of Tokyo, October 1944* – OSS Map no. 5279.

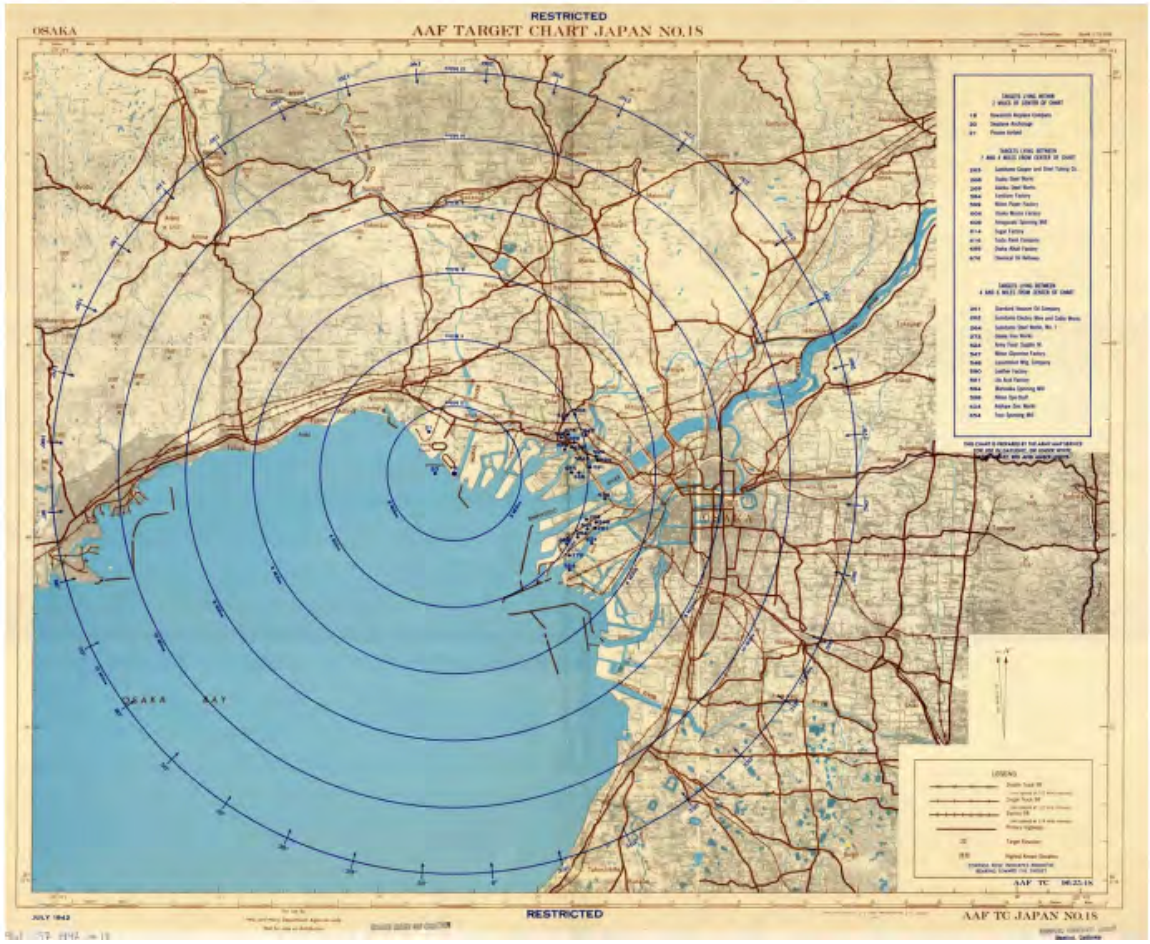


Fig. 11 *AAF Target Japan No. 18 – Osaka, July 1942*.

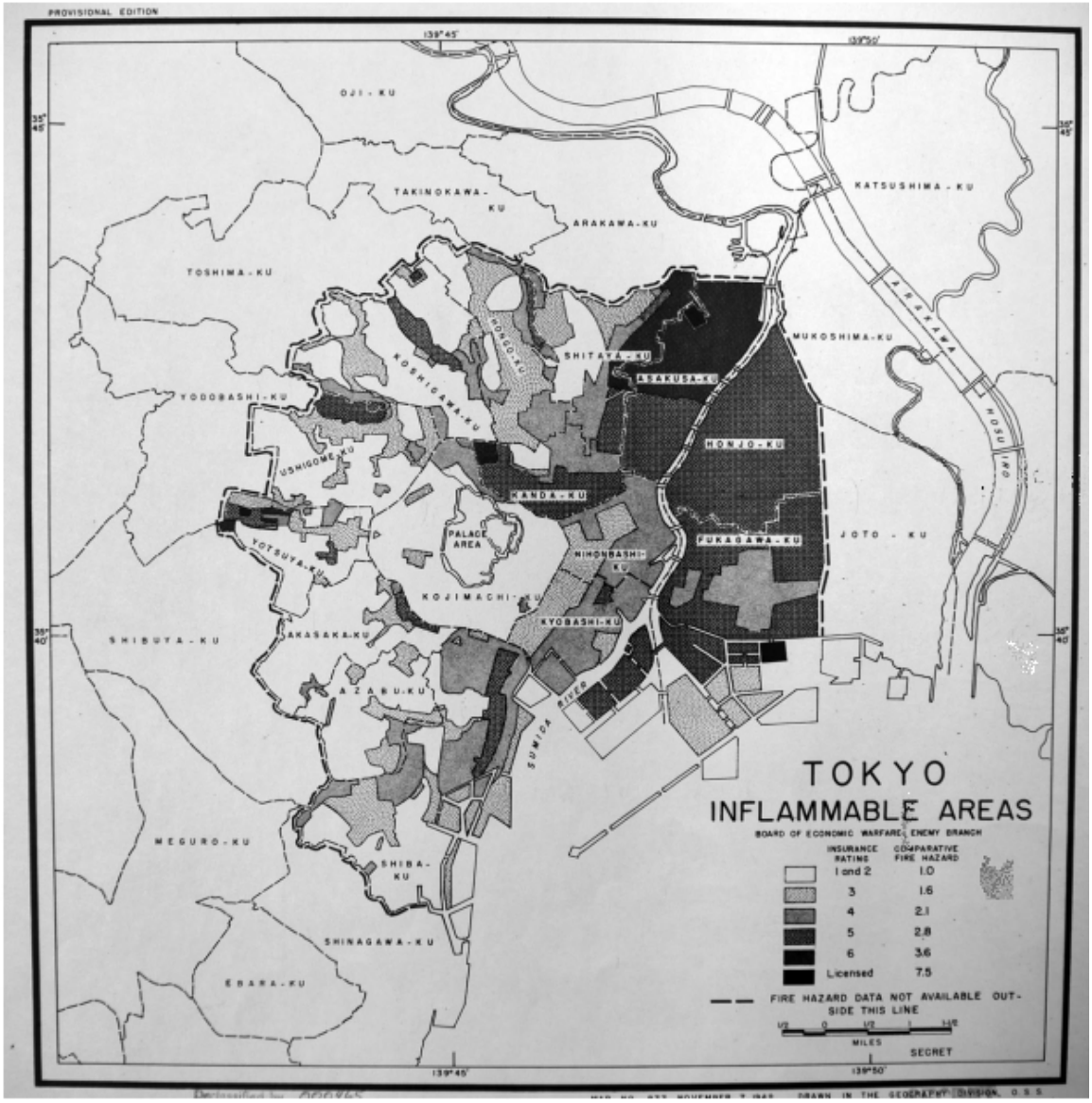


Fig. 12 OSS Map no. 877, *Tokyo – Inflammable Areas,* November 1942.

Fig. 13 *Tokyo Area – Target 90.17 Urban*.

Fig. 14 *Tokyo No. 7 Mosaic Map* showing damage to center of the city after multiple fire bombings up to early July 1945.

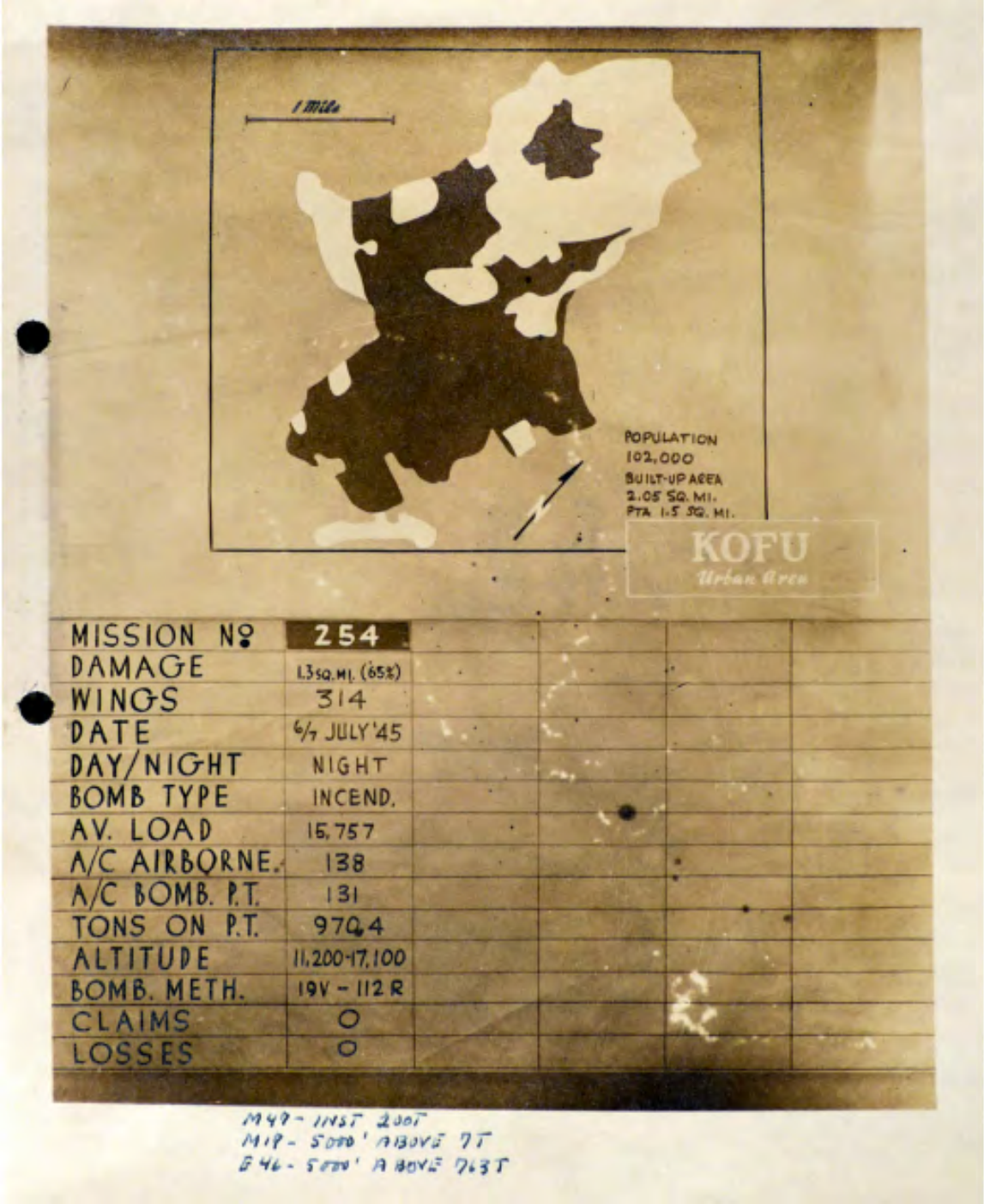


Fig. 15 *Damage Report Map of Kofu City, July 1945,* XXI Bomber Command.

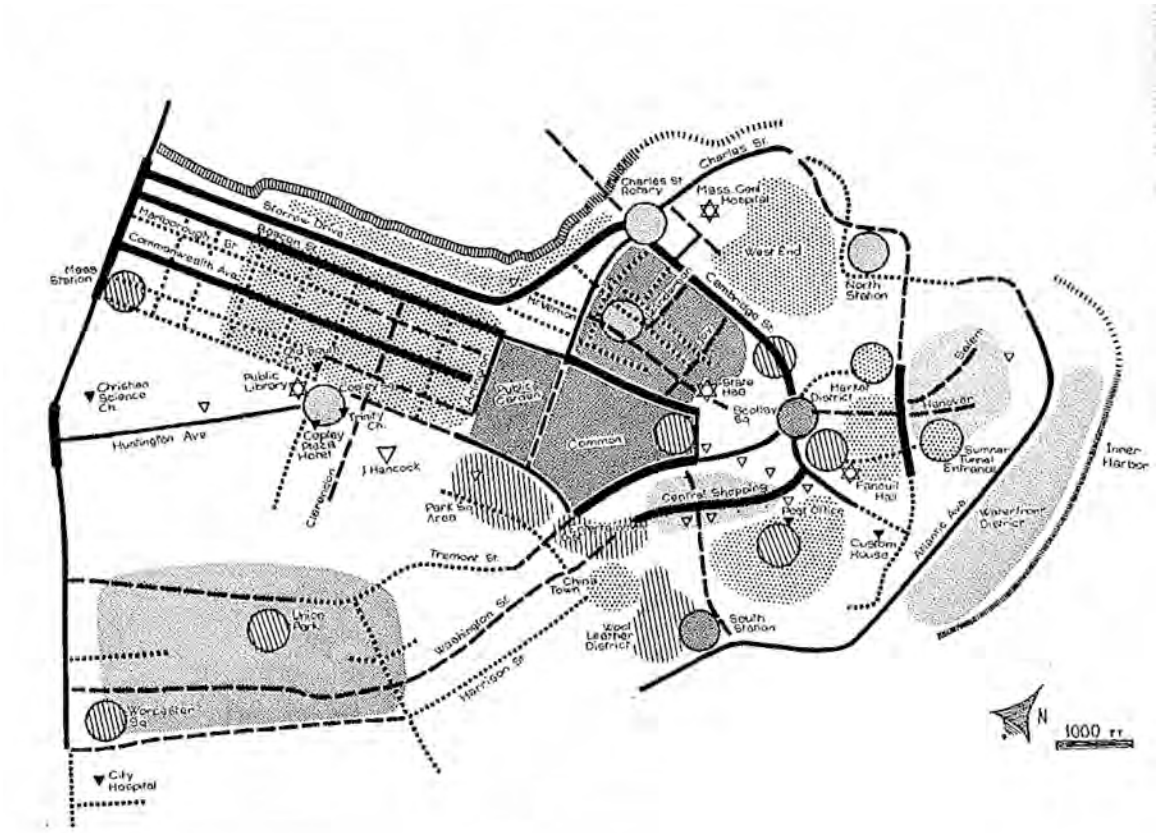


Fig. 16 Kevin Lynch, The Boston image as derived from verbal interviews.

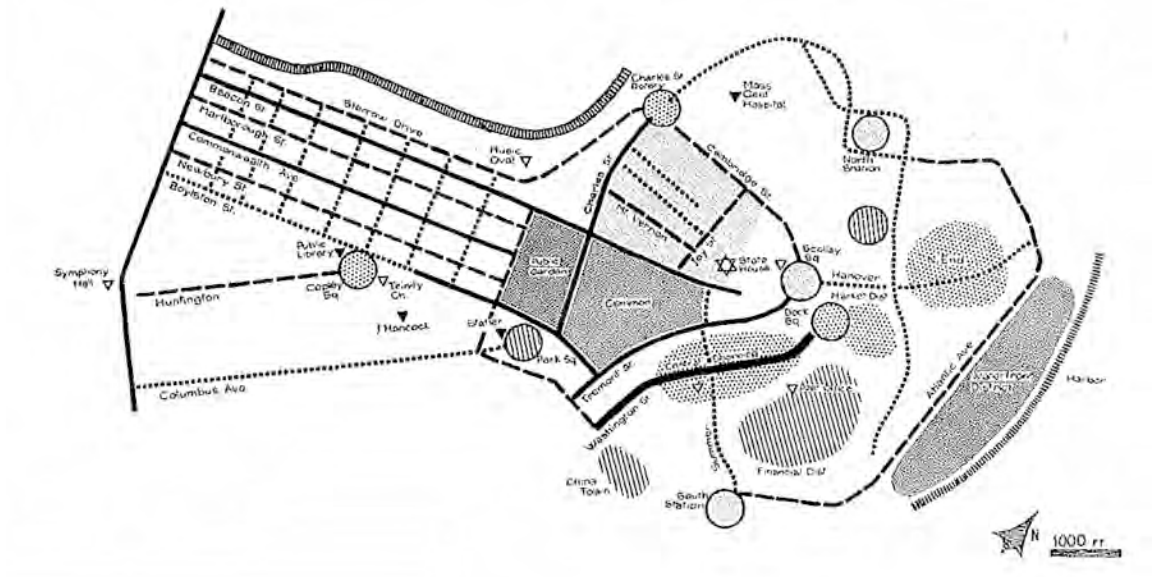


Fig. 17 Kevin Lynch, The Boston image as derived from sketch maps.

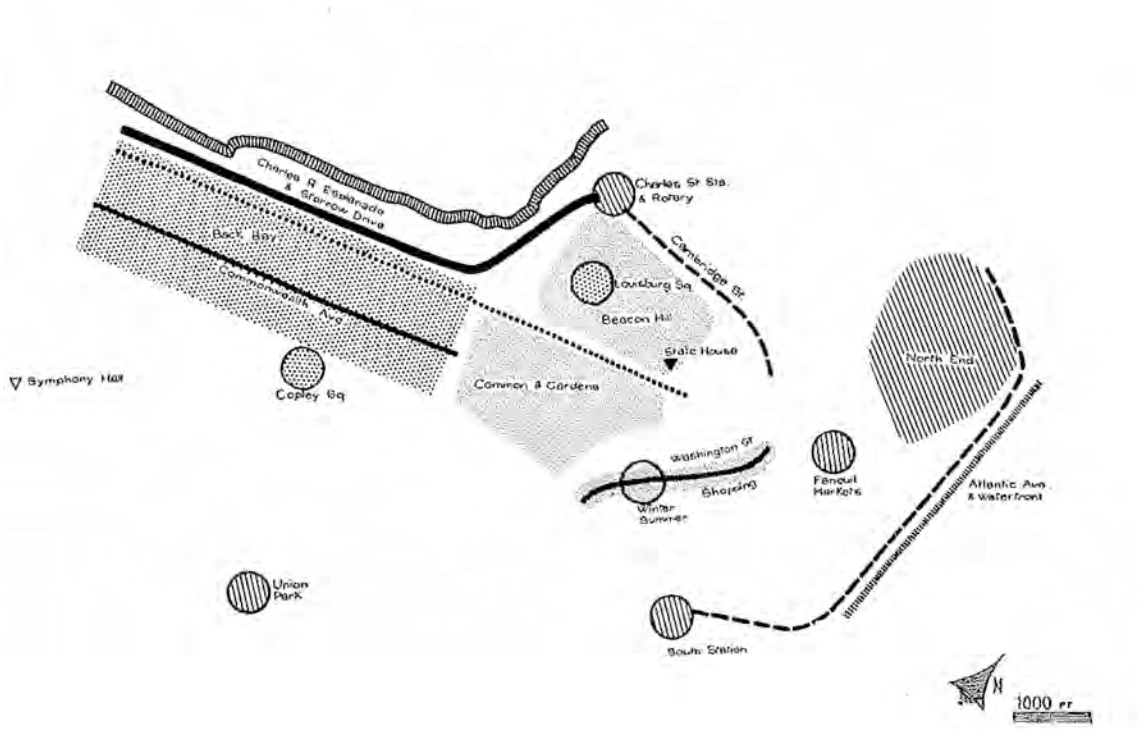


Fig. 18 Kevin Lynch, The distinctive elements of Boston.

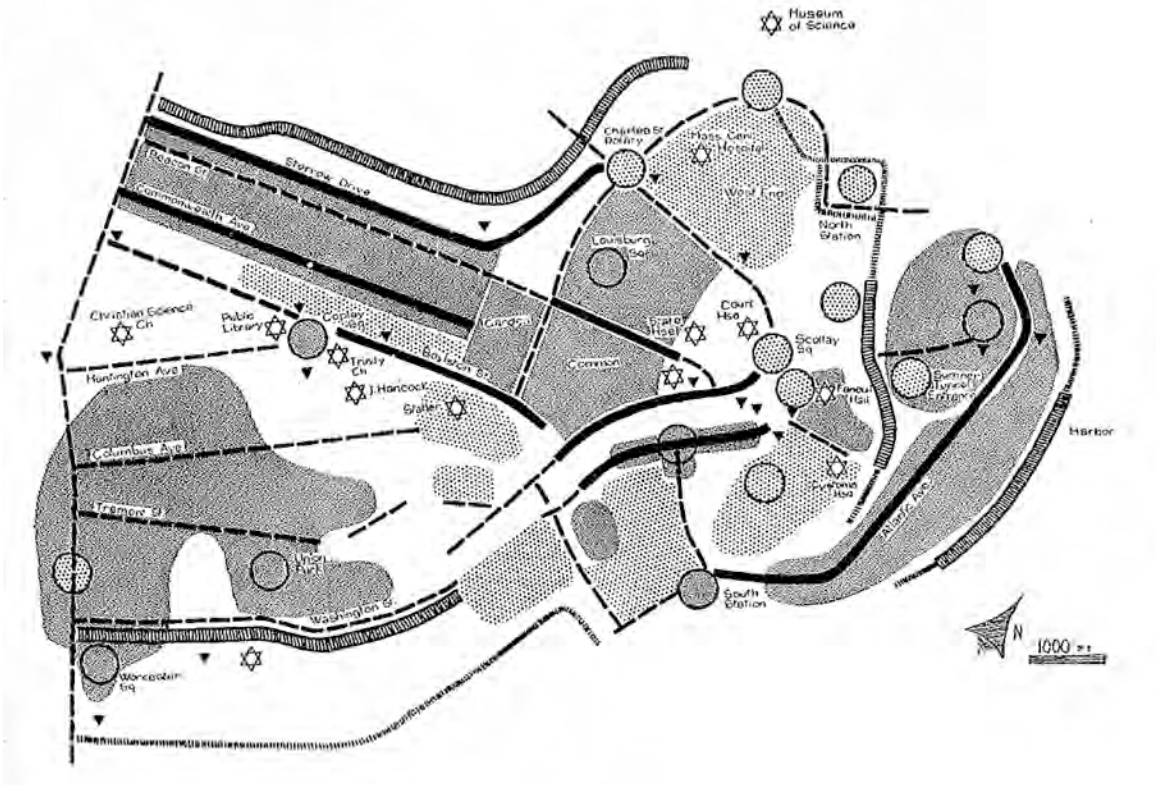


Fig. 19 Kevin Lynch, The visual form of Boston as seen from the field.

Chapter Three:

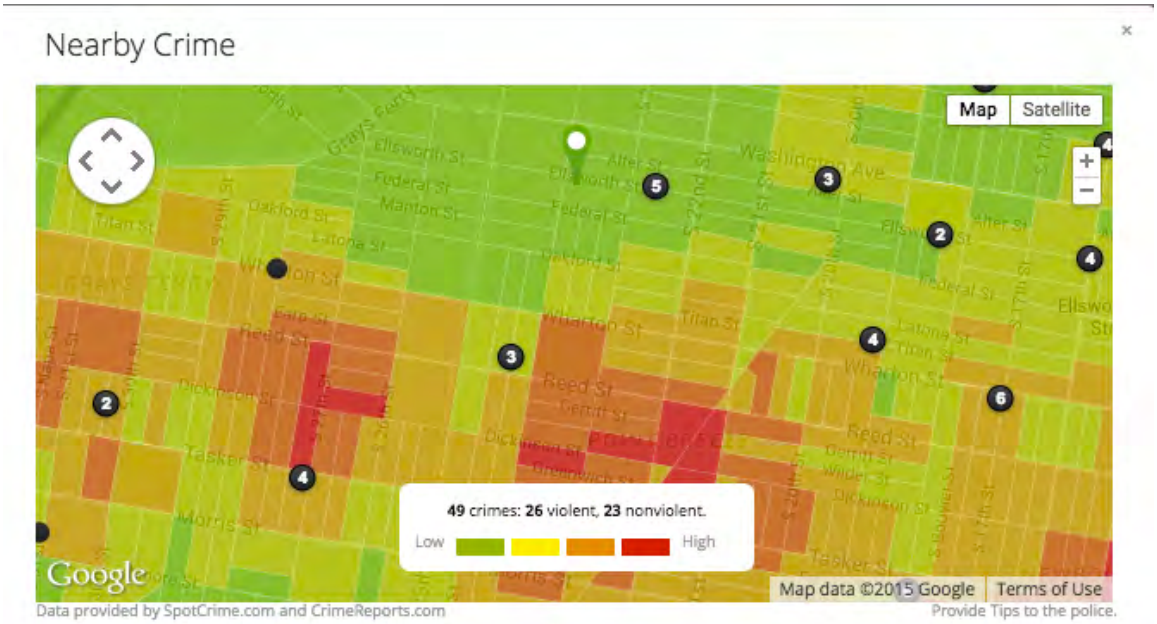
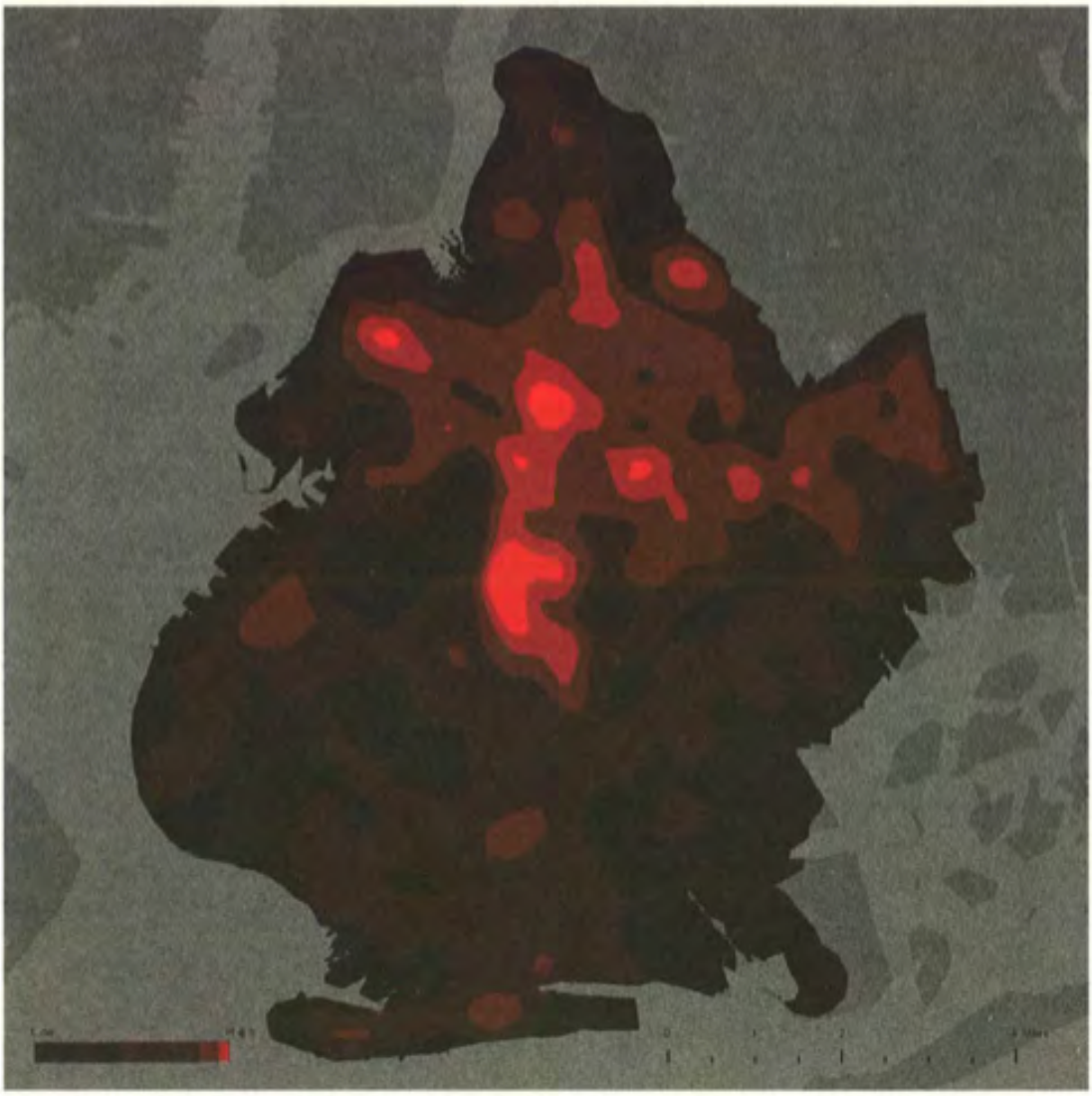
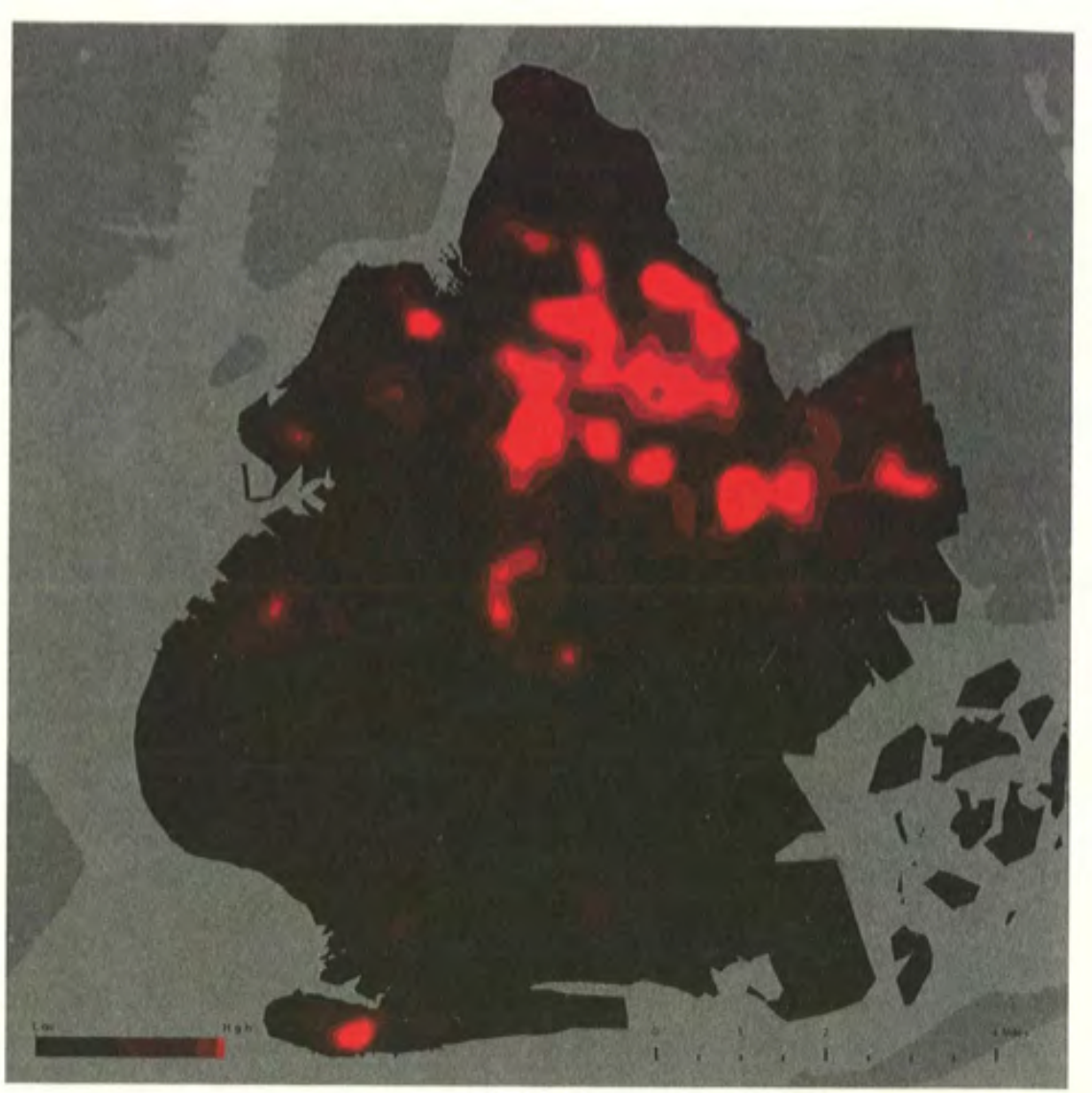


Fig. 20 Sample of a crime map from real estate website ‘Trulia’.



Crime density map, Brooklyn, New York, 1998.

Fig. 21 Million-Dollar Blocks crime density map, Brooklyn, NY, 1998.

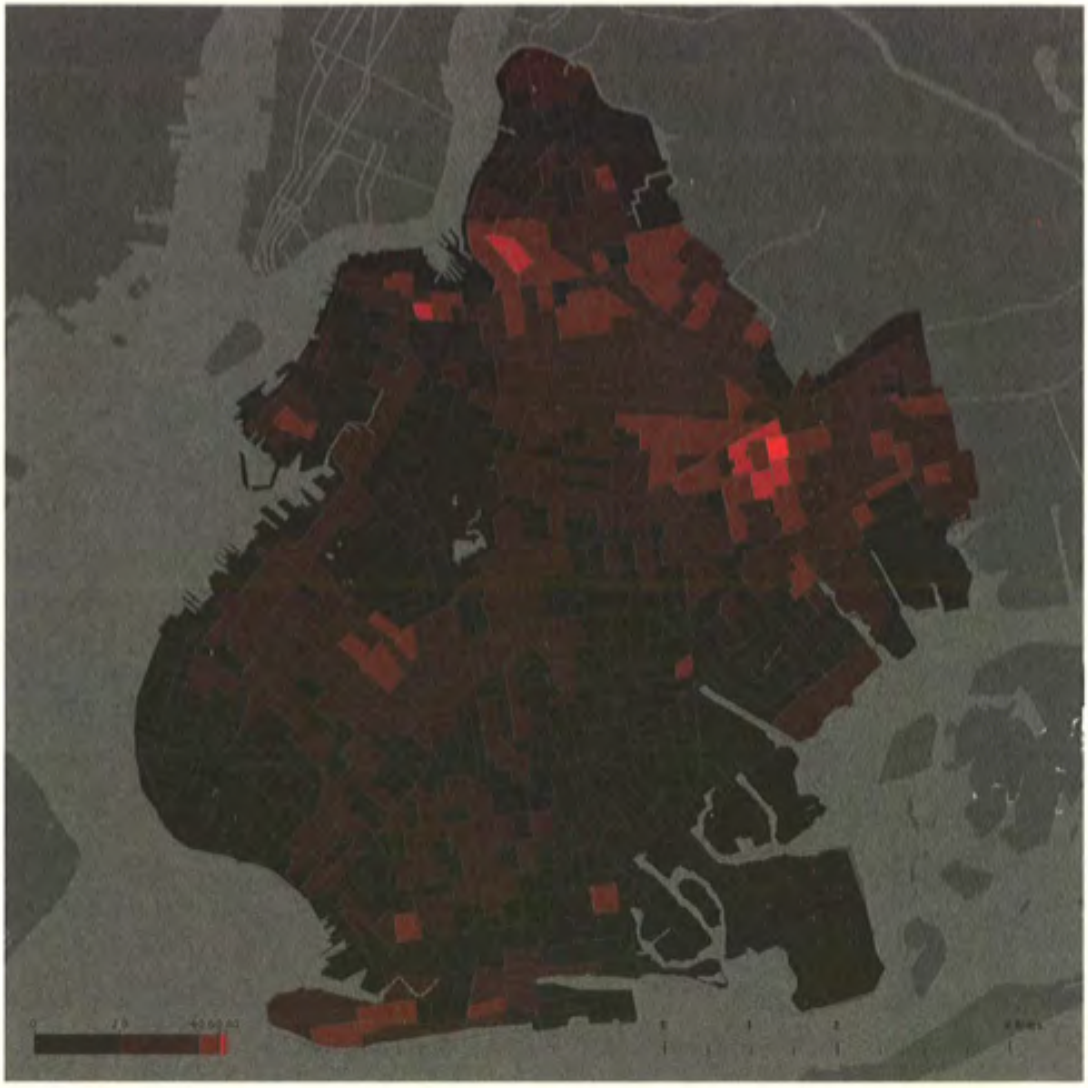


Prison admissions density map, Brooklyn, New York, 2003.

Fig. 22 Million-Dollar Blocks prison admissions density map, Brooklyn, New York, 2003.

Prison admissions by census tract, Brooklyn, New York, 2003.

Fig. 23 Million-Dollar Blocks prison admissions by census tract, Brooklyn, New York, 2003.



Population living in poverty by census tract, Brooklyn, New York, 2000.

Fig. 24 Million-Dollar Blocks population living in poverty by census tract, Brooklyn, NY, 2000.

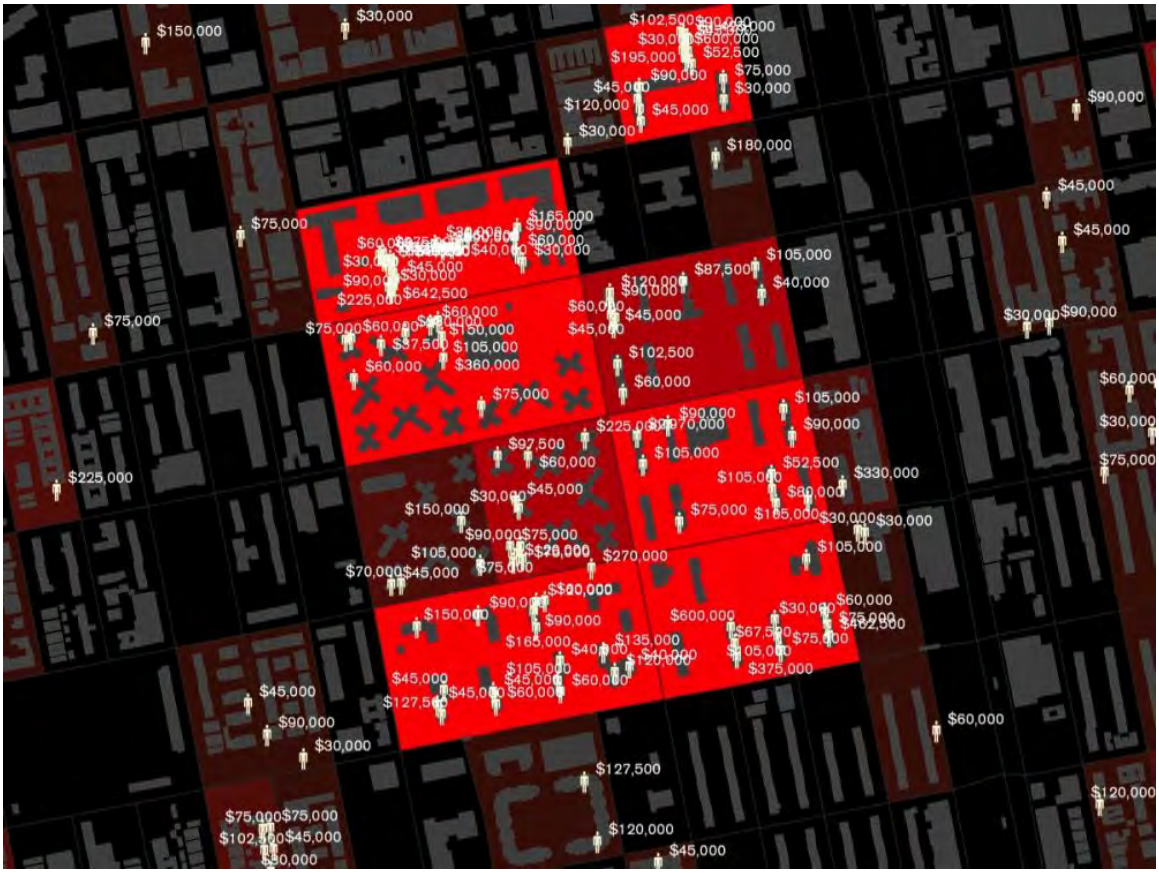


Fig. 25 Million Dollar Blocks image of money spent to incarcerate 109 people from just 17 blocks in Brownsville, Brooklyn, NY, 2003.

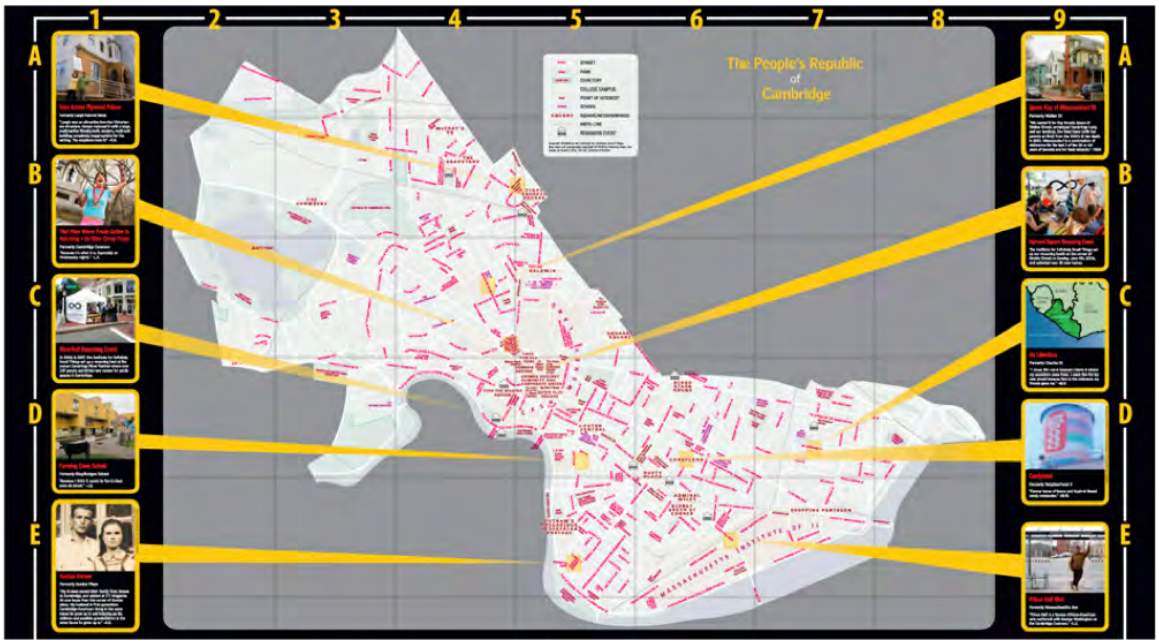


Fig. 26 The City Formerly Known as Cambridge by the Institute for Infinitely Small Things, 2008.

Appendix.

"Modest Income Homes": Even though our families may be non-traditional, our religious faith and family values guide our lives. We are singles, single parents, or multigenerational families. Many of us are primary caregivers for our elderly relatives. Jobs are often hard to come by, so Social Security, public assistance, and Medicaid really help us to scrape by. Many of us are living below the poverty level. We don't use credit cards and prefer to pay our bills in person. Most are renting old single-family houses in urban areas. To get around, we may own an older vehicle or take public transportation. We play basketball, watch a lot of TV, and will buy products endorsed by celebrities. Radios are tuned to gospel and R&B stations.

"City Commons": Most of us are young singles or single parents who rent apartments in large cities. Employment is a challenge considering that nearly a third of us didn't graduate from high school. Those of us who work earn wages; income for others is supplemented by Social Security and public assistance payments. Even though our circumstances are limited, we try to provide the best we can for our kids and ourselves. Most of us have medical insurance; Federal programs such as Medicaid also provide healthcare options. We keep up with the latest fashions, and buy baby and children's food and clothes at discount stores or warehouse clubs. We listen to urban radio, and subscribe to cable so we can watch game shows, home shopping channels, and children's programs.

"College Towns": We are either college students or work for a college or its supporting services. As students we are busy with our studies, but make time for part-time jobs, sports, and socializing. Managing our own money is new to us, so we tend to splurge on impulse purchases such as the latest fashions. We can be influenced by celebrity endorsements and trends we see in magazines. Computers and cell phones are major in our lives; we go online for everything: schoolwork, shopping, news, social media, and entertainment. We're excited to be on our own for the first time, experiencing life's variety and adventures.[145]

[145] Esri et al., "ZIP Lookup: What Your Zip Code Says About You," map, ESRI, accessed November 11, 2014, http://www.esri.com/data/esri_data/ziptapestry.

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Images

Fig. i.

Holiday, Henry. "Illustration of 'The Bellman's Speech.'" Map. In *The Hunting of the Snark: An Agony in Eight Fits*, by Lewis Carroll. London: MacMillan, 1876.

Fig. 1

W. E. B. DuBois. *The Seventh Ward of Philadelphia: The Distribution of Negro Inhabitants throughout the Ward, and Their Social Condition*. Map. New York: Oxford University Press, 2007.

Figs. 2-6.3 are all held in the National Archives, Records of the Federal Home Loan Bank Board [FHLBB], Group 195.3.

Fig. 7.1

BrewerJ, J. M. *J. M. Brewer's Map of Philadelphia, North Section*. Map. Philadelphia: n.p., 1934. MJMBAA00001. Free Library of Philadelphia Map Collection. Free Library of Philadelphia, Philadelphia.

Fig. 7.2

———. *J. M. Brewer's Map of Philadelphia, South Section*. Map. Philadelphia: n.p., 1934. MJMBAA00002. Free Library of Philadelphia Map Collection. Free Library of Philadelphia, Philadelphia.

Fig. 8-9

Esri. "Esri ZIP Lookup." Map. Esri. 2014. Accessed April 18, 2015. http://www.esri.com/landing-pages/tapestry.

Fig. 10

City Plan of Tokyo, October 1944 - OSS Map no. 5279. Map. Washington, D.C.: Office of Strategic Services, 1944. 226: 330/20/8. U.S. National Archives. Cartographic and Architectural Section, Washington, D.C.

Fig. 11

AAF Target Japan No. 18 - Osaka, July 1942. Map. Washington, D.C.: Office of Strategic Services, 1942. Branner Library. Stanford University, Stanford, CA.

Fig. 12

OSS Map No. 877, Tokyo - Inflammable Areas. Map. Washington, D.C.: Office of Strategic Services, 1942. 226: 330/20/8. U.S. National Archives. Cartographic and Architectural Section, Washington, D.C.

Fig. 13

Tokyo Area - Target 90.17 Urban. Map. Washington, D.C.: Office of Strategic Services, n.d. 243: 59/6. U.S. National Archives. Washington, D.C.

Fig. 14

Tokyo No. 7 Mosaic Map. Map. Washington, D.C.: Office of Strategic Services, 1945. 243: 59/6. U.S. National Archives. Washington, D.C.
Fig. 15
Damage Report Map of Kofu City, July 1945. Map. Washington, D.C.: XXI Bomber Command, 1945. 243: 59/5. U.S. National Archives. Washington, D.C.
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