

---

*Streamlining's Laboratories*MONITORING CULTURE AND EUGENIC DESIGN  
IN THE FUTURE CITY

WELL BEFORE SMART CITY TECHNOLOGIES BEGAN to be prototyped across global twenty-first-century cityscapes and urban laboratories, a sprawling “future city” emerged in the center of New York City, a luminous jewel of the 1939 World’s Fair. Commissioned by General Motors, the Futurama showcased a proximate utopia featuring an orderly, predictable flow of automated highways, driverless cars, and planned suburban societies. The thirty-five-thousand-square-foot installation brought to life the smooth, frictionless principles of the streamline design movement that made the new, aerodynamically remade forms of bullet trains and mass-produced vehicles iconic representations of the modernist era. Celebrated as the “smash hit” of the 1939 World’s Fair, the Futurama incorporated all the seductive conveniences of streamlining’s design principles of uninterrupted flow into a single, immersively engineered futurescape. Drawing in an unprecedented audience of some forty-four million visitors, the largest of any World’s Fair until then, it unveiled a model of trafficless, remotely managed, fourteen-lane highways that seamlessly connected the nation’s vast terrains. And as its architect, the famed streamline designer Norman Bel Geddes, put it in his book, *Magic Motorways* (1940), predictably, it “never deviat[ed] from a direct course.”

A 1939 *Life Magazine* article on the Futurama embellished on the order and promise achieved with streamlining’s efficiency-oriented designs. It highlighted the remote controls of an engineer monitoring the city from a distance, removing all the chaos and noise from users’ unpredictable decision-making. Across the fourteen-lane highways of future America, it marveled, “Cars change from lane to lane at specified intervals, on signal from spaced control towers which can stop and start all traffic by radio. Being out of its driver’s control, each car is safe against accident. . . . [While o]ff the highway,



FIGURE 2. Spectators given a god's eye view of the Futurama's streamlined world. (General Motors, New York World's Fair/Manuscript and Archives Division, the New York Public Library)

the driver dawdles again at his own speed and risk" (1939). This, the article affirmed, is what streamlining's "sober, courageous planning can do" with "inventors and engineers" who, audiences were assured, had "cracked almost every frontier of progress" (1939).

However, it was the eugenic ideals baked into the Futurama's model city that conditioned its sublime effect on visitors and the press. This was translated through a showcasing of social achievements that were projected to have emerged from perfected high technological design. It wasn't just how this city of the future functioned, in other words, it was also about the society for whom the city was designed. As the 1939 *Life Magazine* article opened, it reveled in the unabashedly fit, tanned, heteronormative, family-based ableist masculinity standardized at the center of the streamlined future projected through the Futurama. It stated, "America in 1960 . . . is really greener than it was in 1939 . . . full of tanned and vigorous people who in 20 years have learned how to have fun. They camp in the forests and hike with their handsome wives and children . . . its members alive and very fit. . . [And] when they drive off, they get to the great parklands on giant highways" (1939,



FIGURE 3. The Futurama's crossing fourteen-lane highways. From *LIFE* magazine, June 5, 1939. (Alfred Eisenstaedt/the LIFE Picture Collection/Shutterstock)

81). This was a future utopia, readers were told, where the fruits of intelligent planning, science, and technology had eradicated problems of excess, uncertainty, and wasteful heterogeneity—and where the dedicated work of streamlining standards, and ridding the world of disorderly, bad designs, ensured evolutionary progress in social and technological products alike.

Generations later, streamlining is remembered for popularizing and creating new market appetites for cleansed, decluttered forms and smooth, elongated surfaces in industrial products, represented by the now iconic aerodynamic profiles of 1930s bullet trains and airplanes (Bush 1974; Cogdell 2004; Kulik 2003). Far from innocent, however, the Futurama reminds us

too of how much streamlining's aesthetics and its use to mediate the spirit of unhindered progress relied on eugenic methods around a racially purified, planned society and its commitment to the necessary removal of dysgenic forces to advance a future utopia. The so-called elements of "parasite drag" (Bel Geddes 1934) that streamlining designers, including Bel Geddes and Raymond Loewy, both members of the 1939 World's Fair planning committee (Kargon et al. 2015), worked obsessively to diminish, were decried for not simply introducing unsightly, devolved elements into products and design. For streamliners, such elements worked as explicitly regressive forces that, even if imperceptible to untrained eyes, measurably impeded social and material operations, truncated market flow and economic profits, and obstructed the advancement of technological and biological machines.

Streamliners thus blended perfectly into the World's Fair international expositions that were architected to celebrate Western progress and technological advancements. London's 1851 Great Exposition was the first such event; its profitability and popularity helped spur an international movement in exposition making. This fed into the elaboration of extravagant visual architectures intended to celebrate the global market-based innovations of host nations and to affirm the interests of the political, financial, corporate, and intellectual elites behind their making. Under the pretense of creating a space for global comparison, world's fairs welcomed spectacles of racialized global difference. Colonial villages and living ethnological displays of native and other non-White peoples were infamously used to confidently channel an equation of White supremacy with Western technological progress and to contrast spectacles of primitive humanity with the "blueprints for future perfection" (Rydell 1984, 19) offered by elite Western designers. Channeling an unequivocal endorsement of Western nations' global dominance, world's fairs framed imperialist expansions into Asia, Africa, and Latin America as parts of a rightful world order that they assured audiences would remain unchallenged. Such assurances aimed to allay what historians have noted was a "widespread anxiety" (Rydell 1984, 19) among White consuming classes in the West over the rapid economic changes underway in the nineteenth century, spanning rising class struggles, colonial independence movements, economic depressions, and new patterns of global migration.

Eugenics' perfected future was thus contingent. Streamliners promoted the idea that it all relied on a continuous monitoring to contain contaminating elements and to segregate or excise unfit, dysgenic forces from well-bred populations. The Futurama's twenty-minute-long travel experience not only

simulated the ease of autonomously managed long-distance transport, but it assured passengers that the unpolluted world they passed through had been scrupulously crafted by dedicated, ever-attentive, and watchful professionals who ensured the security of well-born travelers. Replicating the observational powers granted from the elevated vantage of a suspended conveyor belt one-third of a mile long, the Futurama floated passengers, seated side by side, through a simulated aerial pathway as they looked over the meticulously sculpted “world of tomorrow.” Intentionally data-rich in its planning and design, with over 408 topographical photographs of different regions of the nation used in its development, the one-acre-size expanse of miniaturized urban and natural landscapes was filled with over five hundred thousand model buildings, fifty thousand cars, and one million trees as a means to deliver a veritable god’s eye view of the future to spectators (Morshed 2004). As visitors stepped off the Futurama, too, they were immediately provided a pin that read “I have seen the future” to certify the experience (Kargon et al. 2015).

It was no secret either that the exacting order and perfection achieved in the Futurama’s streamlined society had been fundamentally shaped through investments in eugenic methods and design. Historians noted that in the early twentieth century, the burgeoning field of industrial design leveraged a visible marketplace of goods to create the explicitly consumer-facing sites of international expos (Cogdell 2010; Rydell 2010). By the 1890s, such expos were called “world’s universities” and showcased the future benefits of eugenic thinking and planning to broad consumer audiences. Smart city prototypes and their universe of perfected streamlined products thus projected the possibilities of eugenic advancement through a visible world that aimed to convince publics of the real, tangible results that could materialize by removing regressive elements—defined by their “dysgenic, parasite drag”—from society and showcase industrialization as the apex of civilization (Bender 2009).

Streamlining in this sense might be described as a post-pluralistic aesthetic—self-consciously drawing attention to the perfection achieved only when overly populated, crowded, and noisy elements were identified and removed. Design historian Christina Cogdell wrote about how streamline design channeled the material embodiment of eugenic ideology in the early twentieth century by approaching products the same way that eugenicists approached human populations. Both, Cogdell wrote, “considered themselves to be agents of reform, tackling problems of mass (re)production, eliminating ‘defectiveness’ and ‘parasite drag’ that were thought to be slowing

evolutionary progress. Both were obsessed with increasing efficiency and hygiene and the realization of the ‘ideal type’ through such amputations and as the means to achieve an imminent ‘civilized’ utopia” (2010, 4). In addition, both worked assiduously to assure publics that they could rely on new knowledge professions, especially those related to industry and evolutionary biology, “two of the most powerful social and scientific systems of the late 19th Century,” Cogdell wrote, “who offered their professional skills as a means to gain control over rapid changes and anxieties over new disorders infiltrating modern life” (Cogdell 2010, 82).

In this chapter, I point to the 1939 Futurama exhibit and its celebrated success as a future model for smart cities and design in consumer society to directly address the history of eugenics and what a growing number of historians point to as its enduring persistence in Western societies (Black 2003; Cogdell 2010; Rydell 2010; Stern 2005; Wolff 2009). Conventional explanations espouse the disappearance and retreat of eugenics in the United States following World War II, marking its decline following a peak of political influence in the 1910s and 1920s. It was during this period when proponents in the United States successfully led the passage of the National Origins Act and the nation’s institutionalization of broadly applied immigration quotas, as well as laws legalizing forced sterilization of the unfit in over thirty states. However, I underscore that the broad popularity of the Futurama marked another important transition.

Rather than marking a dissolution of eugenics influence in the United States, the Futurama, I argue, evidenced continued public appetites for eugenics thinking. It marked an important turn for the movement when the capitalist marketplace, rather than the policies of modern states, came to be the key platform for scaling eugenic ideals to broad publics. If the world of law and policy had previously been regarded as the essential social vehicle to target for eugenic reforms around the measurement and removal of dysgenic classes, the 1930s marked the rise of a new strategy that centered the marketplace, with its vibrantly visible ecology of production sites and manufactured goods, as the key stage to utilize for reforms. Broadly engaging for consumers and producers alike, the economy could be an expedient alternative to politics for public outreach and education on eugenic ideals and how to monitor supposedly subordinate populations to reduce polluting forces.<sup>1</sup>

This chapter thus builds on chapter 1’s exploration of eugenic researchers’ development of a nineteenth-century information market. While conventional histories of eugenics in the United States have focused on the

nationally scoped policy gains of its promoters and eugenics' contributions to data-centered research methods, largely overlooked has been how eugenicists came to identify the economy too as an opportunity for extending and popularizing its radically segregationist worldview to a growing class of information consumers. Eugenics' discovery of the economy as a relevant stage yielded early market-based experiments with the publishing industry and collaborations with filmmakers, cultural sectors, and educational institutions eager to distribute eugenics to an audience beyond the narrow research networks and knowledge professionals who made up its early base. And as this chapter explores, by the twentieth century, such a strategy expanded to include an emerging network of industrial designers, producers, and architects who recognized the visual politics of the capitalist marketplace as a uniquely rich space from which to extend eugenic ideals. Moreover, it could be space that offered the consumption of visual difference as evidence for and a predictor of the superiority of consuming classes themselves.

The Futurama's smart city thus made explicit how flexibly eugenicists could shift from the world of politics to a world of commerce as a new site and stage for reforms. More than just a strategy that provided eugenics with a new existential justification and target for salvation (one that their projection of overly permissive, degradation-accelerating democratic politics once supplied), the growing marketplace of capitalist goods could provide a scalable theater to extend eugenics' utopic prophecies in modes more visually seductive and persuasive than any state policy could provide. Through the marketplace, eugenics promoters could project a future of perfected goods, material bodies, and standardized production, efficiently and profitably reproduced and responsive to the needs and concerns of fit, well-born, and future-worthy populations. In such a world, metrics around the social and economic benefits of removing parasitic elements from products and the growing popularity and sale of streamlined goods provided empirical validation to eugenicists' obsessive (and often failed) methods. If their attempts to "dataify" human difference had failed to produce a science of racial degeneration and improvement, the economy could provide an alternative evidence-bearing mechanism to empirically validate eugenic ideals. That is, it provided ready methods that allowed the brutality of modern marketplaces' exclusions, exploits, and violences to be selectively represented and cleanly rationalized (or forgotten), where what mattered most was a luminous world of consumer products and rising sales. And importantly, it provided eugenics a place to hide in plain sight.

The politics of monitoring and streamlined design channeled through global smart cities today remind us of eugenics' enduring market-based shift. This chapter reviews this transition, looking first at eugenicists' growing recognition in the 1930s of the capitalist marketplace and production of consumer goods as a viable and even advantageous alternative to politics as the primary stage in which to project its salvatory reforms. Exploring the work of leading designers and the famed "godfather" of American industrial design, Raymond Loewy, I unpack how streamlining was used to draw young design professionals into the burgeoning practice during the interwar period. I close by reviewing the persistence of streamlining ideals in smart city ecologies, exploring how streamlined approaches to salvatory transformation translates into contemporary start-up enterprises in Latin America. There, datafication infrastructures promise to perfect flawed designs in gendered labor by compelling self-monitoring habits among young female tech workers, whose productive capacities could be streamlined for optimal profitability and correctively transformed into value-generating accessories for smart living.

#### MONITORING MARKETS, EUGENICIZING DESIGN

Generations following the *Futurama's* debut, the ideal of the smart city still looms large as a model of perfected urban space. Like the mixed-sector collaborations between industry, state, design, and urban development actors that once coordinated world's fairs' global visibility, parallel partnerships over a century later now find new purpose in global smart city architectures. Anchored around the product innovations of corporate giants such as Cisco, IBM, Intel, Microsoft, Siemens, and Google Alphabet, the public-private investments behind smart cities today promote them as evolved global spaces where the complexities, uncertainties, and potential dangers of urban life are managed through ubiquitous forms of urban "sensing," expansive data collection, and predictive analysis. Channeling what technology studies scholars Orit Halpern and Robert Mitchell called the "smartness mandate" (2023), smart cities' temporal logics "colonize space through time" (14) and turn on the future-oriented, anticipatory practices of constant evaluation to secure economic evolution and ensure technical devolution remains foreclosed. Smartness thus organizes a form of technical rationality, "the primary goal of which is . . . perpetual evaluation

through a continuous mode of self-referential data collection; and for the construction of forms of financial instrumentation and accounting that no longer engage, or even need to engage, with what capital extracts from history, geology, or life” (24).

Yet, well before data-driven ecologies automated contemporary forms of ubiquitous digital surveillance in smart city architectures, parallel forms of offline population monitoring were being promoted in the name of eugenically designed societies. Streamline designers’ role in exciting public appetites around the Futurama and prototyping future cities nearly a century ago reminds us how the cultivation of hypervigilant monitoring techniques was not to merely cleanse the market of dysgenic design but to work for the emergence of a consumer capitalism optimized through eugenic principles. While the popularity of streamlining in the early twentieth century is credited today to the appeal of its symbolic value and aestheticization of speed and efficiency (Bush 1974), its leading designers actively promoted their uptake of eugenic-derived techniques of continuous assessment, economized production, and excision of parasitic drag as driving their practice (Cogdell 2010). It emerged, then, as the defining aesthetic of modernity in US industrial design circles in the years following World War I. As the United States entered into World War II, streamliners could frame their practice as a “salvatory” force for a market facing a new period of crisis—one where the untold demands of the wartime economy needed to be met with an evolved form of market capitalism.

This required first cultivating new techniques of observation to repeatedly examine and monitor for the expression of parasitic drag—often imperceptible in normal conditions—to diminish regressive forces. Futurama designer Norman Bel Geddes thus stressed streamlining’s “empirical method,” applied to meticulously examine and alter designs toward streamlined ideals. As he wrote describing the painstaking process of model testing while a wind was driven around them, “[C]ertain models register less resistance—or *parasite drag*—than others . . . [which are] altered and more data secured. Slowly, from a good many thousand such experiments . . . desirable forms [are] established” (1934). Pronouncing the iterative process should seed a “science of streamlining,” Bel Geddes predicted that monitoring to reduce parasitic anomalies could yield a revolution in knowledge making. As he stated, “Science has been awaiting the great physicist, who, like Galileo or Newton, should bring order out of chaos in aerodynamics, and reduce its many anomalies to harmonious law” (1934).

Historians today credit industrial design – and streamlining in particular – with innovations that revived consumer markets following the economic slump of 1927 and the Great Depression of 1929 (Kulik 2003). It was arguably less through a platform of science and more through leveraging the visual theater of a new consumer society, however, that streamliners succeeded in promoting hyper-monitoring to rid design of what they saw as its many anomalies and inefficiencies. Streamliners Bel Geddes and Raymond Loewy, in particular, rose to heightened levels of public fame following the end of World War I. Their introduction of new streamlined aesthetics helped boost sales and profits of mass-produced artifacts during the economic slump of the interwar period. Celebrated in the media for years after World War II, they would be lauded as turn-of-the-century futurists (Harry Ransom Center 2013), modernist heroes (Goldberger 2013), and revolution-making visionaries (Albrecht 2012). Loewy, whom *Time* magazine placed on its front cover in 1949, was crowned “the most important” industrial designer in twentieth-century America (Kulik 2003). Their insistence on approaching production as a system that could be obsessively assessed to identify unwanted, noisy elements was credited for saving a “sluggish” postwar market and “simplifying fabrication” processes with “sometimes spectacular” sales results (Bush 1974, 311).<sup>2</sup> Typically, however, there was little attempt to explain or even mention how deeply eugenics fundamentally shaped the methods and techniques of streamlining (Cogdell 2010; Morshed 2004).

Streamliners, though, were acutely aware of the power of publicity. Before they became known as industrial designers, Bel Geddes worked as a Hollywood and Broadway set designer, and Loewy worked as a fashion illustrator for *Vogue* and *Harper's Bazaar* and as a window designer for major US department stores, including Macy's and Saks Fifth Avenue. Both recognized opportunities to excite market appetites by cultivating public personas. Both drew amply from eugenics to dramatize the importance of their work and to promote the adoption of purifying practices among fellow designers, particularly when it came to what Loewy referred to as protecting “prosperous” consumers (Loewy 1942) from the contaminating excesses of the postwar market. In various magazine articles and interviews from the 1930s to 1950s, in publications such as *The Atlantic*, *Ladies Home Journal*, *Life*, and *Time*, as well as the 1939 World's Fair, broadcast platforms were used to showcase streamliners' public role as “[t]he Industrial Designer [who] dedicated himself to educating public taste . . . [for] an increasingly high standard of design and engineering perfection” (Loewy 1942, 95).

Within their profession, too, streamliners promoted a duty to vigilantly monitor against an overpopulated, polluted marketplace—one where the exercise of an examiner’s eye determined the necessary application of what Loewy called “design abortions” (1942, 98). Loewy stressed the dire absence of such monitoring work evident during the origin years of the profession. Addressing the British Royal Society of the Arts in 1942, describing the period following WWI, when industrial design emerged, he stated, “[P]eak production for war turned overnight into peak production for peace . . . and the demand was immediate for every sort of manufactured item, no matter what its form” (1942, 93). He was more strident about what he saw as a world of putrid excess in the United States after decades of uncontrolled growth. He spoke retrospectively about his career as an honoree in 1981 before the British Society of Royal Designers for Industry, stating, “[Following WWI], the entire American scene was in need of . . . a design transfusion. Products were gross, clumsy, noisy, vibrating, smelly and quite ugly” (1981, 203). Further leveraging eugenic metaphors as he referred to the heroic work – and “industrial blood transfusion” (1981, 203) – that industrial design provided to US consumer markets in the Great Depression’s late 1920s, Loewy credited himself with “convinc[ing] Washington of the role industry should assume” in leading national policy. Successful products and their consumption, Loewy insisted after all, was the central driver of the nation’s future that grew everything from employment bases to more demand for raw materials, shipping, insurance, and advertising.

Streamliners like Loewy thus openly dramatized their work as a salvation for national markets and the future of civilized culture (Loewy 1942, 93). They projected the rise of industrial design as responding to the existential threat posed by the uncontrolled growth of devolved products that were allowed to flood markets irresponsibly. More than merely innovative, Loewy saw industrial design as a corrective to the “painful monstrosities” (Loewy 1942, 93) that threatened to taint future generations, and emphasized how streamlining worked to “cleanse” manufacturing and “abort” (1942, 98) polluting designs. As he professed to his Royal Academy audience in 1941, streamlining would at last rescue the “civilized taste of the increasingly prosperous customer” (1942, 93) from the “unbelievable ugliness” and “the most flagrant bad taste” in the majority of manufactured items.” (1942, 93).

Just a few years later, Loewy’s advocacy for removing design monstrosities via streamlining earned him the October 1949 cover of *Time*. Featuring

an image of Loewy's face knowingly staring back at readers, framed by his famed streamlined product designs, the cover included a caption that cemented Loewy's reputation as not just a streamlining evangelist, but a savior of capitalist profit making. It read simply, "Designer Raymond Loewy: He streamlines the sales curve."

#### STREAMLINING CAPITALISM, REMAKING THE SELF FOR CRISIS TIME

Just two decades earlier, parallel arguments made by eugenic researchers and political leaders on the need to truncate uncontrolled population growth among the unfit – including people living in poverty, people with disabilities, and minority and immigrant classes – led to the passage of the landmark US Immigration Act of 1924. Projecting a future of blood-based, genetic contamination and racial suicide that permissive border policies would inflict upon well-born, White elites, eugenicists successfully legalized the heightened monitoring, surveillance, and datafication of minoritized classes as a means to control, contain, and predict devolutionary impacts. The racialized immigration quotas, monitoring instruments, and restrictions eugenic researchers put in place (and that remain the model for nationally based immigration quotas maintained to this day) were designed to exclude unwanted classes from non-Anglo and non-Scandinavian countries of origin. They also expanded the national bans established by the Chinese exclusion acts (that began in the 1860s) and the 1917 immigration law of earlier decades. Such eugenic policies' impacts were compounded by state-based sterilization laws (over thirty-two states by 1937) (Stern 2020) targeting the unfit and heightened restrictions on movement, marriage, and coupling of unwanted populations already within the nation.

Projecting the social abominations and degenerated national future at stake that had been allowed to advance from overly permissive political ideals around equality, freedom, and autonomy, eugenicists targeted democratic policies and norms as their initial site of reform. Well before eugenicists' discovery of design worlds and the market economy, eugenicists focused on the world of politics. At least until the end of the 1930s, politics were the key public stage for expediting their reforms and for successfully advancing a eugenic society.

The official start of World War II, however, changed public receptivity and prompted the need for a new strategy. While leading US eugenics policy and research institutes, such as the Eugenics Research Organization (ERO) in New York, continued to promote the adoption of sterilization laws, the 1930s saw the final state among thirty-two (Georgia) become the last to legalize eugenic sterilization. The period just before the official start of the war saw the ERO turn the final streams of its once ample funding toward the publication of “pro-Nazi agitation”<sup>3</sup> and resources (Black 2003, 1105). Many local organizations were finally forced to close their doors, too, as financial and political backers were no longer willing to finance eugenics (Allen 2011; Bird and Allen 1981) after the Nazi escalations and invasion of Poland in late 1939 allowed news of atrocities in Europe to circulate broadly.

By the beginning of the 1940s, as global war spread across Europe, US streamliners found a new public platform for eugenics’ evangelism in the world of commerce and marketplace of designed goods. In speaking as a US-based streamliner before the British Royal Academy audience toward the end of 1941, Loewy projected the war’s economic and political instabilities as disruptive but ultimately evolving forces for streamliners that would rightfully press producers toward necessary “design abortions” for excessive, deficient, or defective product plans that an earlier period had irresponsibly allowed. Instead, as he put it, “The number of models in any given line of products [could be reduced]” to a “single, perfect unit. . . . Many design abortions will be automatically disposed of in this action” (1942, 98).

Beyond perfecting product output, such crisis events from Loewy’s vantage also prompted designers’ internal evolution of mind and cultivated skills by pressing “the designer [to become] an economist” (1942, 97) and a flexible forecaster in planning for all the potential stages and timelines for production. Urging them to reorient their temporal registers and cognitive capacities toward an acutely heightened, future-tensed work of anticipation and prediction, he stated, “Emergency has upset . . . the tempo [of] normal activity. . . . There is no constant flow of business. . . . [T]he designer must condense into three weeks what work would ordinarily have been distributed over three months” (1942, 97).

Advocating readiness for a “state of unlimited emergency” (Loewy 1942, 98)—or what feminist Maria Puig de la Bellacasa called the “permanent precariousness” that conditions “innovation time’s” restless, insatiable value-seeking activity (2015)—Loewy assured his audience that “ultimately, design will benefit from the present emergency,” as designers would be

pressed to streamline and “conserv[e] materials” (1942, 98). They would be compelled to cultivate a new internal discipline and temporal disposition necessary to “produce the most beautiful accessories to living ever available to any civilization” (1942, 98). Such intensified internal tempos, by Loewy’s projection, would enable the designer to “operat[e] with a split personality, in a dual role. He is coordinating the various fields . . . working quickly, efficiently, to produce in a state of unlimited emergency, while at the same time he is preparing a ten-year schedule for good design when all materials are plentiful” (1942, 98). It was not merely that designers’ temporal registers and attentive capacities should be remade to optimize for constant productivity, but that to achieve such an ideal the designer now needed to perfect an acutely heightened practice of monitoring directed both inward to the self and outward to external factors.

Beyond ridding a visual marketplace of the degrading influence of bad products, streamliners came to see their designs as complementary to the demands of a newly competitive economy that the crisis period of world wars and their aftermath brought. Such conditions demanded greater innovative capacity and predictive anticipation as designers worked in a shifting marketplace, where the flow of supplies to manufacturing and the needs of consumers were rife with contingencies. If a eugenic-derived design could help create a more efficient and innovative capitalist market, streamliners’ capitalism could also help forge a more resilient form of industrial design and predictive designer. And it would be those evolved professionals who could later help ensure that eugenic influences sustained a currency in modern markets well after eugenicists’ early twentieth-century policy gains in the United States began to wane.

#### SELF-MONITORING IN THE LATIN AMERICAN SMART CITY

Generations later, streamliners’ mission to prevent market abominations and promote new temporal dispositions among working professions channels through global smart city design. In such experimental sites, expansive sensing networks now routinize surveillance and ubiquitous forms of examination to be undertaken throughout systems. What once appeared as streamliners’ obsessive call for continuous monitoring to remove parasitic elements is now automated through distributed sensors, remotely run cameras, and

grids of closed-circuit televisions. Showcasing the promise of expanded urban monitoring applied to minimize uncertainty and disorder, smart cities allow diverse urban sites to be legible as enhanced digital infrastructures (Kurgan and Brawley 2019), distinguished for a “logistical superiority” that streamlines urban life and outperforms other, allegedly regressed spaces (Halegoua 2020, 10).

“Smartness” as an extension of streamlining indeed manifests in the vast product network of sensors and monitoring hardware operating to evolve the performance of urban systems. However, smartness itself as a governing disposition—or what Halpern and Mitchell called a form of technical rationality (2023)—also permeates life and work across living complexes. Like streamlined designs, smart architectures promote the virtue and profitability of perpetual evaluation, sustained through both automated technical networks and the everyday participation of actors conditioned to accept and even valorize an ecology of constant surveillance and datafication of human-system interaction. Smartness as an attribute thus turns on the intersecting operations of digital monitoring, sustained human-system engagement, and occupants’ willingness to live and work under constant data collection and assessment.

Part of this entails a redefinition of practices of the self through smartness, where new tolerances for perpetual monitoring are cultivated to manage growing uncertainty and disorder across both urban space and within the self. Personal conduct as a target of streamlining promises to better evidence, know, and predict the value—or expense—generated by an individual through enhanced forms of datafication. This final section thus explores how such techniques of self-monitoring are cultivated through the streamlined self as they extend within a contemporary smart enterprise in one recent fieldwork site for me—the data-driven start-up and code academy in Lima, Peru, called *Laboratoria*. Particularly within global tech and development sectors, *Laboratoria* has been celebrated for accelerating education models and rapidly retraining women in Latin American cities to be employment-ready coders in just six months. Doing this, however, has entailed developing monitoring systems—and cultivating self-monitoring habits—for the working class students to evidence and predict their future worth as women and gendered minorities in tech.

Indeed, well beyond Peru, code academies such as *Laboratoria* rapidly grew for disrupting conventional educational markets to respond to the reported global crisis of a shortage of coders. Central to this was demonstrating

the profit-making viability of ventures that could teach programming in a fraction of the time universities or technical institutes required. Education remade under smartness regimes extends rationales for continuous evaluation by promoting self-monitoring and modulation as necessary operations to measure transformation and to navigate and endure the pervasive uncertainty, competition, and crisis conditions of innovation ecologies (Chun 2011). Halpern and Mitchell thus underscored how smartness logics apply as much to the governing of urban space as to individual self-governing. As they put it, “[If] smartness is predicated on an imaginary of crisis that is to be managed through a massive increase in sensing devices, [its spread enables] self-organization and constant self-modulating and self-updating . . . [so systems] can . . . adapt by analyzing data about themselves” (2023).

Speaking to me in 2017, just three years after launching Laboratoria, its founders described the origins of their social enterprise as an experiment to accelerate the training of coders to fulfill high, unmet demands in the market. They added that the unique business advantage they developed was to not only outpace conventional education systems, but to direct the potentials of technological empowerment to the social transformation of women. Through this, Mariana Costa Checa, Laboratoria’s founder, stressed an ambitious vision: to become the main global source of female tech talent from Latin America. Distinct from many parallel ventures, Laboratoria touts its ability to empirically identify, filter, and track among thousands of applicants—over two thousand for placement in its Lima-based classroom in 2017—talent that really *can* be transformed into employment-ready coders. As Costa Checa underscored, “We realized we had to have a selection process that was more robust, training that was much more complete, and a clearer strategy to place them in the market” (personal interview, June 25, 2017).

In working toward this, Laboratoria credits what it refers to as the start-up’s “rigorous data driven Selection Program” that collects over six hundred data points from applicants to help them identify “real potential for technology.” An extensive series of online and on-site exams, preadmission tests, psycho-social evaluations (for measuring traits, from perseverance to persistence), logic and comprehension tests (with exams on reading comprehension with technical themes), an additional prework assignment, and, finally, a rigorous “simulation week” are designed to ultimately reject over 95 percent of applicants and to select only those (just seventy admits in Lima in 2017) with “real potential.” As Chief Operating Officer Ana Maria Martinez elaborated, “We are superobsessed with data . . . with predicting who has potential to

learn programming. . . . So we are constantly measuring [the students]—not only when they are admitted, but at graduation, and after they work” (personal interview, June 9, 2017). Laboratoria credits this approach to obsessive tracking to creating a placement rate where some 75 percent of graduates are placed in coding jobs that average a threefold increase in income after completing the boot camp. They note that such measures provide evidence that they provide real “Skills—Not Just Diplomas.”

Indeed, at the graduation ceremony in Lima for Laboratoria’s summer 2017 cohort, the motto of the company on the power of code to transform was palpably channeled throughout. The event, hosted in a packed auditorium in the manicured, tourist district of Miraflores, opened with the familiar, triumphant soundtrack from *Star Wars*, with text scrolling over the screen of how “in a galaxy far, far away” the students of Laboratoria were called upon. It was followed by a virtualized three-minute data visualization video animating a morphing network graph. It was created using the data drawn from students’ monitored activity in the class’s shared Git Hub repository, which included an active code-based archive of all the students’ lesson work and coded commits over the course of the boot camp. The morphing graph’s aestheticized mutations and steady, mesmerizing whirls provided a smooth veneer to a streamlined version of students’ experience over the previous six months. Whatever hardships, discomfort, and struggles there were could now be reduced into a glossed-over version of luminously represented code commits, an idealized distillation of evolved human productivity at the technological interface.

As the primary means for the audience, made up largely of students’ families hailing from distant cities, to view a narrative of the past six months of a loved ones’ life in aggregate with Laboratoria, it spoke in the language of smartness with its reliance on data monitoring and managed data pools to project its tracking of an optimization of life, performance, and productivity. In the final seconds, the animation suddenly burst into an explosion of rapid whirls that represented the intensity of two Hackathon events organized by Laboratoria with regional corporate representatives to oversee and prototype work with students in a thirty-six-hour period confined to Laboratoria’s office site. The back-to-back, all-nighter events for students were in the company of and under the constant observation of corporate reps and sponsors, who remained visibly on site during the intensified competition to emphasize to participants the potential for earning employment following the events. Those events memorably came to life for students in the flurry of data streams stretching out before them.

Alongside larger industry actors, data-driven start-ups such as Laboratoria have worked to prototype the presumed proximate future of industry-oriented tempos and hyperevaluative environments with the added tools of data analytics that can work to optimize results in the artificially intensified and temporally compressed space of the start-up boot camp. While Laboratoria's work turns on reputed capacities for managing thousands of user profiles to weed out most applicants per cohort and mine information pools for key signals that best identify viable talent, it has also touted itself for being a start-up that works to know applicants differently from other tech companies or traditional education institutions.

Since its founding in Peru nearly a decade ago, all students have hailed from economically challenged sectors. In Lima, the first city where the company set up offices, students are typically first-generation degree earners, hailing from peripheral districts and new urban settlement zones where families migrating from the Andes and dispersed Indigenous communities that adopt Spanish as a second language often begin to settle. For such learners, two-hour-long commutes to Laboratoria's class site (in a single direction), in paths that weave across Lima's varied traffic and vast zones of cultural and economic divide, are routine.

"All of it is truly horrible," one twenty-five-year-old Laboratoria graduate flatly stated, recalling what her daily commute of nearly four hours entailed. Such complexities are only one among many layered risks students manage on a daily basis in order to invest in and train for their futures. While often taken for granted, navigating the city for marginalized working populations requires developing a savviness in managing space and time for both speed and safety. As one part-time instructor described it: "[Otherwise] Lima devours you, just being in traffic and the general conditions of work." For students living outside Lima, too, it's not unusual for their own temporal investments to begin well before formal admission into Laboratoria's program. One alum recalled how she bought her first bus ticket—one for travel to Lima from Trujillo, a city some ten hours away—after deciding to apply to Laboratoria. "I had never stepped a foot in Lima before. . . . I arrived alone without any family here, and went straight on to take the exam," she explained, adding that she would repeat the same trip alone three more times before being accepted into the program.

The work of predicting worthy and unworthy potentials for future company success, however, has made Laboratoria a darling in the world of social

enterprise. Since its founding, Laboratoria has won multiple international awards, including the 2014 Kunan Prize for Social Entrepreneurship, the 2016 Google Rise Award, and multimillion-dollar backing from Google, Telefónica, and the Inter-American Development Bank. They also gained prominent global visibility as one of only three awardees distinguished at the 2016 Global Entrepreneurship Summit hosted by the White House and moderated that year by Facebook's Mark Zuckerberg with then US president Barack Obama (King 2016). And by 2022, it had won added multimillion-dollar awards from Mackenzie Scott, Blackrock, and the Peery Foundation.

All this has further accelerated the tempo for expanding Laboratoria's start-up sites and graduation rate. Having begun in Lima with a first cohort of just fourteen students in 2014 as a project among four friends—half of them graduates from the same elite masters program in international affairs at a US ivy league university—the company opened sites in Mexico City; Santiago, Chile; and Arequipa, Peru, shortly after its launch, graduating some four hundred students just three years later. That year, the enterprise proudly announced aims to exponentially expand operations to see to an incredible ten thousand graduates per year across the network within the next four years, adding that it would soon open two new sites in San Paolo, Brazil, and Guadalajara, Mexico, with added sites being scoped in Colombia and Ecuador. That same summer of 2017, in Laboratoria's Lima-based classroom, a converted floor of a high-rise office building in Miraflores, I listened as Herman Marin, one of the charismatic cofounders of Laboratoria, spoke to a cohort of fifty students without any hint of concern of the changes already taking place due to the new demands of rapid scaling and growth in the company. Even if he no longer knew any of the students by name, he channeled his own early experiences in tech, sermonizing to the class the imminent conversions that would soon open up to them: "There are thousands of things that are going to happen . . . from meeting supercool people . . . to being able to travel. . . . And being able to have control . . . to define your future."

That kind of message blends a tech-imbued salvatory conviction with a pitched, almost missionary-like faith in what the power of opting into technological training and increased market opportunity can rapidly effect. But the emphasis on individual "transformation" also seeps into Laboratoria's aim to provide more than just tech skills—and to stress the value of "personal conduct" and "soft skills" in tech sector and office environments. Among the classes students take throughout the program are ones not just focused

on web development, user-experience design, and coding skills, but also on developing skills in personal conduct, streamlining personal aesthetics (with clean, uncomplicated, and pulled back hairstyles stressed), and managing personal desk space as visual markers that make themselves available for routine evaluation in office cultures. These practices, too, are opportunities to evidence individual value and worthiness to company authorities.

Coaching on the importance of self-conduct and preparing students for the kind of mindset monitoring he anticipates, Marin told the class, “Today, all jobs of the future are very focused on trying . . . not just to connect with people who can do the technical work . . . but also focused on understanding how to achieve the right *cultural fit* . . . how to find *people* who can really ground themselves in the organizational structure of a company that has a distinct mindset . . . and how to develop within new employees the kind of perspective that [those companies have] created.”

Marin, however, also underscored the importance of individuals making the right choices for themselves in managing space and time in the context of data-driven monitoring and assessment techniques. Data-driven conduct channels new possibilities of self-monitoring—of a micro-attention to constant feedback loops of information and an experience of self as now embedded within fluid interactive, information-generating spaces. As Marin said, “It’s a fact . . . that a person takes about twenty-six minutes to recover when there is an interruption in work. That is a huge problem because . . . if you’re interrupted three or four times . . . we are talking about an hour or two hours of work lost . . . productivity that you fail to develop. And employers lose an opportunity to continue creating value . . . and obviously, there are ways to limit that.”

His comments orient the class to consider how one’s consciousness of time can get parsed to the tempo of microdecisions, local data points, and moments of potentially impactful action, so that even a minute won’t be at risk of being used badly. As Marin advised, self-organization should start “before starting your workday . . . or maybe even the night before, when you have the opportunity to quickly check emails . . . or to try to coordinate in advance with the people you want to try to connect with the next day . . . [since] there are already people and things that are happening without you . . . and [you don’t want them to have to] depend on your being there.”

But it was his next tip on the utility of commute time that I found most unexpected. Channeling smart city ideals of streamlined urban transportation, he advised students, “Another important strategy is to use commute

time . . . and go from home to work in a more productive way . . . [and] there are a lot of things that can be done . . . like trying to use that space [for] meetings . . . [since] today a lot of jobs work remotely . . . [so] you can have meetings on the phone. . . . For many of us, commute times are long, right? More than an hour . . . [so] that time can be used to accomplish things at work, and not wait until you get there . . . it's [just] a matter of organizing."

For all Laboratoria's celebrated data management and for all of Marin's own micro-attention to time and space, down to the optimal use of each minute, Marin seemed to have entirely lost sight of the limits of a smart city's infrastructural projections that, far from having attained general ubiquity, are inoperable outside the designated confines of strictly zoned, future-ready urban living. He missed, then, what even the most novice of first-time visitors to Lima might notice. He missed that the informal system of micro- and public buses that the city is infamous for, and which are the most common forms of transportation used by the vast majority of Limenans, would be almost inconceivable for the kind of workplace activity he prescribed. When Laboratoria's students reference their typical commute of two hours from the city's peripheral zones to Laboratoria's offices in the manicured business district of Miraflores, they describe two hours of standing with one hand gripping a handrail for balance and the other gripping a bag of possessions. Most commutes require an exchange between multiple bus routes, so there's never an uninterrupted stretch of time. Even if a free seat was available, a background of rush-hour traffic, horns, motors, and the calls of combi drivers would drown out most conversation.

As importantly, he missed crediting students for how much self-organization and time management are already exercised in their day-to-day navigation of the city, both well before and after being accepted into Laboratoria's boot camp. Marin's own commute to work consists of a fifteen-minute walk through Miraflores's picturesque neighborhoods to Laboratoria's office. I can't help but wonder, for as much personal coaching and data collection on students as Laboratoria dedicates to know its coders better, if the blindness to even the basic complexities of life for Laboratoria's students isn't something that is itself predesigned. Could it be that the company's message on the potentials of identifying viable, investment-worthy talent—enabled by access to personal data and monitoring of choices around technology—can only be sustained so long as dispositions are streamlined exclusively toward market demands; so long as it can keep attentions focused on the promise of monitored conduct, optimized value generation, and production, and away from

the real and varied local complexities that shape the actual lives and daily work experiences of students, that can now be treated as excess noise. And so long as the principles of streamlining, turned onto the lives of Laboratoria's students as products of smart ecologies' futurized labs, can continue to be credited with perfecting designs and purifying human production for the elite White, governing classes it always projected as its ideal consumer.

## CONCLUSION

This chapter opened by exploring eugenics' influence on the work of founding figures in industrial and smart city design, reviewing how principles of hyper-monitored design and production were used to identify market optimizing and value "dragging" elements in products during the interwar period. Over half a century later, the persistence of streamlining ideals in smart city ecologies continue to channel through messages of the salvatory, transformative potentials of technological markets and the hypermonitoring practiced under contemporary start-up enterprises in Latin America. There, datafication infrastructures promise to perfect "flawed designs" in labor by compelling self-monitoring habits among young tech workers, whose productive capacities can be newly streamlined for optimal profitability and correctively transformed into value-generating accessories for "smart living."

This chapter underscored how powerfully an unsullied narrative of "transformation through code" and data-driven evaluation can operate and how much such mantras can be used to speak in the interest of the futures of individual workers and knowledge institutions. As a parallel symptom of the affective bonds between global Western liberal and financial logics, popular "invest in a girl" (or, really "invest in a global girl") campaigns and their related epistemic infrastructures that feminist technology studies scholar Michelle Murphy described are resonant here, too. Such campaigns, their dependence on data and anticipation, and their melding of Western liberal NGO and global corporate excitements—whether from Nike, Intel, or Goldman Sachs—could grow and gather enthusiasm, Murphy noted, precisely because the numbers and data did designate "the girl" as a good investment (2017, 121). Investing-in-a-girl campaigns, Murphy wrote, "exemplif[y] the way finance capitalism creates value out of life, rendering life as something that either accrues or diminishes in value . . . like other growth/risk opportunities for capital" (131). However, she asked, "What if the math

had not added up, and in fact another object or life form was calculated as the best investment? . . . The popularity of the girl raises the questions, What work does this phantasmagram do for capitalism? What is the girl an alibi for?" (121).

Particularly considering eugenicists' interest in remaking markets and economic production in the image of streamlining, the question is apt. For at least as much as the work done to make the heroic potentials of dysgenic monitoring and data capture around unwanted parasitic elements on markets known has been the work done to discount and diminish other forms and terms of knowing, to deliberately create "un-knowns" and omit awareness of key aspects of human experience that inevitably exceed the narrow terms of industry-optimizing valuation and market-driven demands. And in so doing, this work allows "the (global) girl" to stand in not for the radically excluding, dispossessive contradictions of a streamlined, data-driven capitalism's contemporary regime, but to be reframed as a "recoverable" version of what less deserving, unworthy counterparts could never be before the evaluative assessments of Western techno-elite monitors. What, indeed, is "the Global Girl" an alibi for?