The Economization of Life

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Cover art: Raymond Pearl's bottle of *Drosophila*
at different points in time. Pearl, *The Biology of*
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Contents

Acknowledgments

It is difficult to select a starting point when the work making up this book began. Perhaps in graduate school in the early 1990s when I first encountered the writing of Farida Akhter and began to think harder about what reproduction is and might be. Or in 2001 during my first year at the University of Toronto surrounded by colleagues trying to puzzle out what methods transnational feminist studies called for. Or maybe it was at the Technoscience Salon trying out ideas with Natasha Myers and so many other people. It was certainly also in the archive, following manual suction abortion studies out of feminist collectives in the United States and over to Bangladesh, an itinerary that forced me to think harder about the non-innocent transnational entanglements of reproductive technologies. This book was conceived out of all of these itineraries and more, and hence my gratitude and debts to those who have assisted this work are likewise spread in time and space beyond what I can ever do justice to acknowledge. I thank Courtney Berger at Duke University Press for her ongoing backing and intellectual companionship. This work has been funded by grants from the Social Science and Humanities Research Council, and I acknowledge not only their support but also all the labor that has gone into keeping state funding for critical humanities and social science scholarship in Canada alive through difficult times. I also thank the Jackman Humanities Institute at the University of Toronto, as well as the Clayman Institute for Gender Research at Stanford, both of which provided time and space for working on this project. I thank Farida Akhter and Unnayan Bikalper Nitinirdharoni Gobeshona (UBINIG) for their vital contributions to reproductive politics, and for making time to speak with me during my time in Bangladesh. I thank the International Centre for Diarrheal Disease Research, Bangladesh (ICDDR,B) for facilitating my research, and especially thank the library staff and the wonderful head librarian Md. Nazim Uddin for his hospitality, time, and assistance. I

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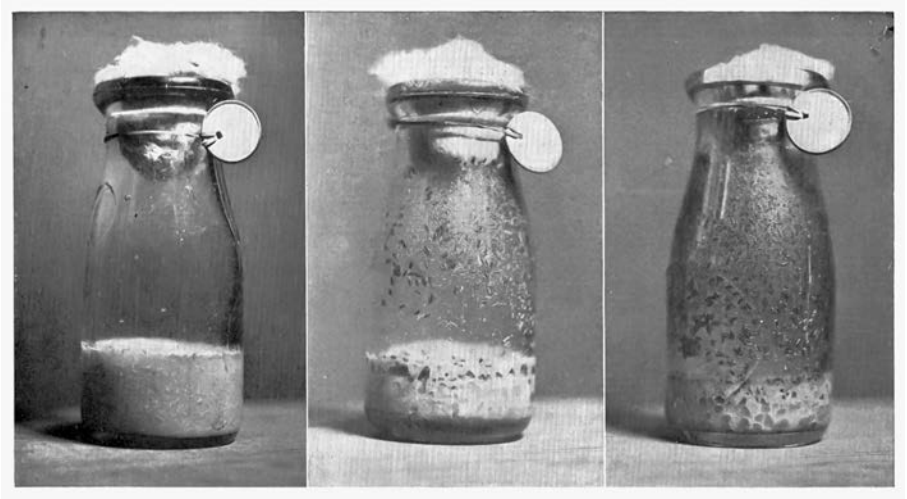


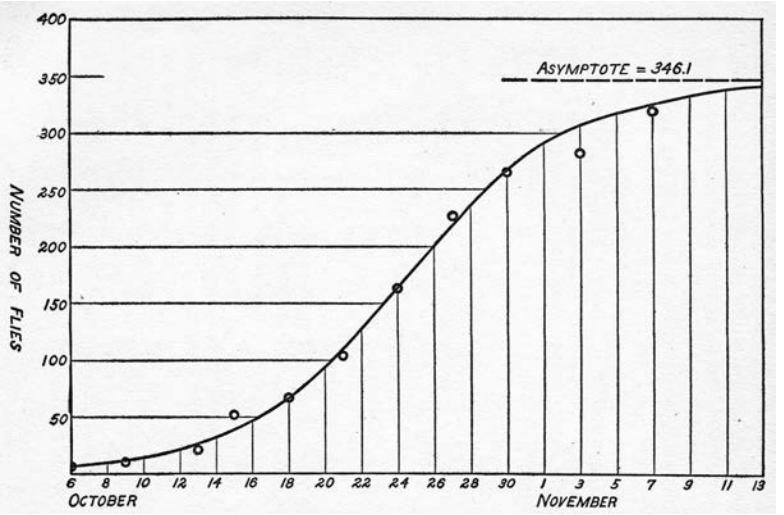
INTRO.1 Raymond Pearl's bottle of *Drosophila* at three points in time. (Pearl, *The Biology of Population Growth*, 1930)

A camera captures a bottle at three points in time. It is filled with *Drosophila*, also known as fruit flies, an organism that is born, reproduces, and dies in a flicker. In the first photo, the sparsely populated bottle, rich in food, finds generations of happy fruit flies reproducing and living long lives. In the second snapshot, the busy fruit flies multiply rapidly, sharply increasing their numbers until, in the third image of the bottle, the fruit flies are so numerous the container can no longer support them, a point in time when death rises, birth declines, and population growth stagnates. The bottle becomes a container of mass death.

Looking at images of this jar today, I want to reach back, pluck open the lid, and release the fruit flies to other fates. Or I could take responsibility for feeding the flies, bred as dependent laboratory creatures by the scientific practices I care so much about. Or better yet I could smash the bottle, breaking the illusion that it is the container that conditions how the flies live or die. I want to imagine other ways of understanding aggregate life that do not demand a contained existence that ends in extermination. What would it take to smash the container?

This book is a history of two aggregate forms of life being modeled in this bottle of fruit flies: population and economy. Together population and economy have rearranged worlds over the twentieth century. New ways of valuing of life have been tied to their fates. Population and economy have been built into the architectures of nation-states where practices of quantification have helped to install economy as our collective environment, as our bottle, as our surround. How does capitalism know and dream its own conditions through numbers and data? I hope that this book will leave readers feeling and thinking differently about population and economy as adequate analytic containers for assembling life toward other futures.

Population became a new kind of experimental concern in the work of Raymond Pearl, the prominent and prolific American biologist who claimed that his 1920s experiments with fruit flies in bottles captured a law



INTRO.2 Pearl's graph plotting the population growth of the fruit flies in the bottle featured in figure I.1. Pearl held that the S-curve of the line was a law of "how things grow" that reached an upper limit, or asymptote, where mass death could then outpace fertility. (Pearl, *The Biology of Population Growth*, 1930)

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of "population" that governed "how things grow," and that could further be graphed as what he called "the logistic curve," today more commonly called the growth curve or the S-curve.[1] Pearl claimed this curve captured a law of life found in any aggregate of living-beings at any scale: bacteria in a petri dish, *Drosophila* in a bottle, and humans too, in a city, nation, class, or planet. The population growth curve, as a line tracing the balance of life and death in a finite container, was abstracted as a universal tendency, repeatable for all life, everywhere.[2]

Pearl promoted his work redefining "population" at the inaugural World Population Conference of 1927 held in Geneva, an event designed to propel a new international focus on problems of population that was distinct from eugenics. Organized behind the scenes by feminist birth control advocate Margaret Sanger under Pearl's supervision, the conference invited a select, mostly male, mostly American and European cohort of biologists and social scientists, along with a smattering of participants from Japan, China,

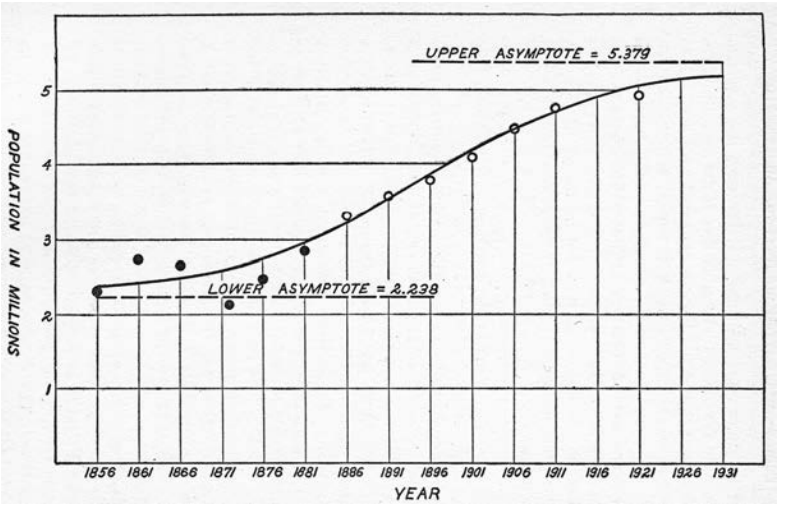
Siam, India, Argentina, Chile, Peru, and Brazil. The event promoted an expert, quantitative, and experimentalist approach to questions of "population" that critically diverged from the era's more popular eugenic orientation. Such eugenics work sought to redirect racialized heredity within evolutionary logics.[3] In the early twentieth century, eugenics had spread across the globe in projects to govern life and death toward breeding better racial futures—more fit, more pure, more evolved, more uplifted races—projects variously embraced by progressives, fascists, socialists, racists and antiracists, feminists, scientists, and political reformers.[4] Eugenics sought to manage evolutionary futures by virtue of encouraging or preventing the heredity of desirable and undesirable traits in a given population. Selective eugenic methods of directing racial futures ranged from voluntary birth control and coerced sterilization, to incarceration and segregation, to pronatalist policies and racial uplift projects, to euthanasia and mass murder. Eugenics plotted bodies, races, classes, and regions of the world on an evolutionary tree in which some bodies were more biologically progressed and forward in time (white bodies, elite bodies, male bodies, thinking bodies, able bodies), while other bodies were more primitive and pathological, and thus threatened to pull future evolution backward (colored bodies, female bodies, colonized bodies, working bodies, disabled bodies). Eugenics rested on racist claims of differential life worth based on biological difference and sought selective methods, often violent, to redirect racial futures.[5] In contrast to eugenics, at stake for Pearl in how fruit flies changed over time were not racial evolutionary futures but *economic futures*—how to balance quantitative population with national production, bringing biology and state planning together through economy.[6]

Pearl's work marks a historic shift in the status of "population" as a problematic. Pearl was trained in biometrics at the Galton Laboratory at University College London, a pivotal crossroads for both statistics and eugenics as disciplines. His work signaled a distancing from questions of racial fitness and Darwinian logics (and hence concerns with the hereditary quality of life) to an embrace of questions of *quantity* and especially the rates of birth and death within populations relative to *economic conditions*. Thus, Pearl was innovating as a biologist within a Malthusian tradition that had long tied population to political economy.[7] Importantly, his work turned "population" into an *experimental object* that could be tested and probed with the

aid of fruit flies, bacteria, or chickens. Laboratory experiments could be done to populations of organisms in controlled settings. Experiments not only charted population dynamics but also sought to find ways of intervening in population's tendencies over time. Moving beyond the lab, Pearl mobilized state-produced data from censuses, as well as then emergent measures of agricultural and manufacturing production, into the project of modeling human population as yet another iteration of experiment.[8] In doing so, Pearl helped to transform "population" into a problem that needed to be both represented and intervened in at the intersection of economics and biology.

In Pearl's translation from *Drosophila* to human, the physical limits of the glass "bottle" stood in for the larger unseeable scale of "national economic production," a measure that was rapidly developing in early twentieth-century state social science. Drawing too on racialized anthropological visions of staged human progress, the purported economic container for human populations was broadly delineated as their national "stage" of economic productivity—primitive, agrarian, or mercantile, with industrial, mass-consumption capitalism as a pinnacle.[9] In contrast, the old eighteenth-century Malthusian model of population had insisted on predetermined rates of food production (the arithmetic increase of 1, 2, 3) and population growth (the geometric increase of 2, 4, 8), such that population growth would inevitably become overpopulation, unrelentingly leading to war, famine, disease, and death. Unlike Malthus, Pearl's model held that production rates were variable and *adjustable* depending on levels of civilization. Population was also adjustable as both death and birth rates could be altered with technologies and state policies. Contrary to the inevitable thrust toward crisis that concluded Malthus's law of population, Pearl's model was rife with possibilities for management.

Pearl's "proof" that the S-curve applied to humans relied on colonial data collection: the so-called natural experiment of colonized Algeria, where French colonial machinery had kept impeccable records that supposedly recorded a full growth curve.[10] According to Pearl, the "civilizing" of Algeria, and the purported improvement to agricultural productivity created by the "white man's burden" of French colonization, sparked a new "swarm" of babies, a rapidly growing aggregate of Algerians.[11] Paralleling aggregate humans with experimental insects, Pearl cited a colonial official to describe



INTRO.3 Pearl's S-curve for colonized Algeria, which he claimed was a rare documented example of a human population completing a growth curve. The example was intended to mirror that of *Drosophila* in a bottle. Pearl's curve set the upper limit of the Algerian population at 5.379 million and predicted that it would stay this way unless a new set of "social, economic or other forces" came into play. (Pearl, *The Biology of Population Growth*, 1930)

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the middle phase of rapid population growth, when "the natives positively pullulate under our rule" and "babies swarm among them like cockchafers under a chestnut tree in the spring."[12] Seeing Algeria as a natural petri dish, Pearl argued that as the population grew it hit a new upper limit resulting in a "process akin to natural selection [in which a] good many natives had to be eliminated before the survivors were reasonably unanimous in their belief that the old days were gone forever."[13] For Pearl, the "business of conquest" in colonized Algeria wrought the S-curve in the births and deaths of Algerians.[14] Here, the effect of the economic and colonial milieu on shaping human futures supplanted other "natural" processes.

This version of population crystallized in the period of the Cold War and decolonization into what I am calling the *economization of life*.[15] The economization of life, I argue, was and is a historically specific regime of valua-

tion hinged to the macrological figure of national "economy." It names the practices that differentially value and govern life in terms of their ability to foster the macroeconomy of the nation-state, such as life's ability to contribute to the gross domestic product (GDP) of the nation. It is distinct from commodifying life or biocapital, or from the broader history of using quantification to monetize practices. It was not a mode that generated surplus value through labor but instead designated and managed surplus aggregate life. In this mode, value could be generated by optimizing aggregate life chances—including the reduction of future life quantity—relative to the horizon of the economy.[16] The economization of life was performed through social science practices that continued the project of racializing life—that is, dividing life into categories of more and less worthy of living, reproducing, and being human—and reinscribed race as the problem of "population" hinged to the fostering of the economy. Thus, the history of the economization of life is part of the history of racism and the technoscientific practices of demarcating human worth and exploiting life chances. Traced in this book through "population control," the economization of life was, and remains, a historically specific regime of valuation created with technoscientific practices (rather than markets) that used quantification and social science methods to calibrate and then exploit the differential worth of human life for the sake of the macrological figure of "economy."[17]

This book sketches the *epistemic infrastructures* that performed the economization of life.[18] These epistemic infrastructures were assemblages of practices of quantification and intervention conducted by multidisciplinary and multisited experts that became consolidated as extensive arrangements of research and governance within state, transnational, and nonprofit organizations. I call them *infrastructural* to underline the ways knowledge-making can install material supports into the world—such as buildings, bureaucracies, standards, forms, technologies, funding flows, affective orientations, and power relations. By attending to epistemic infrastructures, this book tracks how the experimental practices for quantifying and intervening in aggregate life consolidated into the pervasive twentieth-century infrastructures of family planning, development projects, global health, NGOs, and imperialism that were built in the name of monitoring and governing "economy" and "population." Attending to the epistemic, the book charts how "population" became a problem during a historical mo-

ment when neoliberalism was unfolding and the primary purpose of states was increasingly understood to be the fostering of "the economy," itself a historicizable twentieth-century problematic.[19] Attending to the affective, the book queries how imaginaries, feelings, futures, and phantasma are part of the work of quantification. Population and economy became massive material-semiotic-affective-infrastructural presences that can now be hard to imagine the world without.[20] They became a way for capitalism to imagine and organize its own milieu, to conjure its own conditions of possibility.

Harnessed to the enhancement of the national economy, this new era of calculative practices designated both valuable and unvaluable human lives: lives worth living, lives worth not dying, lives worthy of investment, and lives not worth being born. The history of such designations is vital for understanding how the continued racialized and sexed devaluation of life inhabits ubiquitous policies, indices, calculations, and orientations that perform new kinds of racialization even as they reject biological race as such. Moreover, this history puts questions of reproduction at the center of how capitalism summons its world.

Despite the immodesty of some of these claims, this is a short book. It is a provocation, not a proof. I have relied on the astute work of many thinkers to make these claims.[21] The book concentrates on liberal social science practices in the encounter of experts within U.S./South Asian circuits, particularly in Bangladesh. As a short book covering a century, it is dense and at the same time misses much. Compressing a century and focused on experts, calculations, and infrastructures, the book largely leaves out subtle resistances, ecologies, ethnographically rich encounters, people's variegated experiences, competing epistemologies, and local histories. Instead, I have spent years in the archive with studies, reports, and experiments produced by the transnational hegemonic project of family planning and population control. I have read these documents for the dreams and ontologies, the violence and hauntings, the counting and experiments assembled in the name of governing sex for the sake of economy. Attempting to reckon with the history of large aggregate forms (economy and population), the book ends up replicating some of the same erasures of the bird's-eye view science it studies. It tells the story of dominant structures of knowing, and risks entrenching that view. Nonetheless, I think there are virtues in telling this overarching history that come from disarticulating how phenomena that

are taken for granted were installed into the world, thereby making room for other ways of thinking and being. It is a provocation and not a proof because there are many possible ways to trace the extensive history of the economization of life. Concentrating on population, liberalism, capitalism, and transnational itineraries between the United States and Bangladesh, this book traces only one of the potent routes through which the economization of life has become sedimented into the world. I invite readers to propagate the questions posed here into other itineraries, and hope that the economization of life will be further troubled.

This short book contains chapters grouped into three main parts or arcs that add up to a larger chronologically arranged account. These smaller stories are cumulative. They show the piling, propagation, and repurposing of the epistemic infrastructures that created the dense numbers and data about population for the sake of the economy. The infrastructures for experimentalizing population were built up over time, layering on top of one another, thickening the data through which differential life worth became calculable, becoming so embedded that it can it be hard to imagine the world without them.

Attending to this accumulation, this is therefore a book about reproduction in two ways. First, it thinks with and against the problem of population as a politics of reproduction commonly posed as too many births, cracking open the question of what "reproduction" is and how it might be theorized. Second, it offers a cumulative account of epistemic infrastructures reproducing themselves over time. In other words, the book asks, what is reproduced in the name of reproduction?

I came to ask questions about aggregate forms of life through my time spent in the archives of the transnational history of family planning and feminist health practices that were persistently butting against the emerging infrastructures that were governing "economy" and "population" together. While following the history of feminist practices grounded in the United States and in U.S. empire, my research was repeatedly pulled over to social science projects of the 1970s and 1980s happening in Bangladesh.[22] In that moment, Bangladesh was a crucial global node in the exuberant invention of the neoliberal practices that would make up the economization of life. Thus, my research ended up following a particular itinerary that concentrates on the circulation of practices between U.S. and Bangladeshi social

science. More broadly, I argue that the economization of life was generated at this encounter between Cold War and postcolonial social science, at the crux between imperialism and decolonization, and in the tension between experiment and governance.[23]

The argument that there has been an economization of life is a grand claim, impossible to comprehensively capture, and thus this particular history serves as an opening rather than as a compendium. Arc I tells a mid-century story of U.S. Cold War quantitative practices that generated economy and population as objects of governance and intervention, tracking how figures of surplus life, and life not worth being born, became calculable. It asks how "the economy" became an affectively charged sublime, and charts how "reproduction" haunted and then later would become central to the governing of the economy. Arc II looks at the experimental exuberance of the economization of life within family planning practices of the 1960s through 1980s, with a focus on Bangladesh as a crucial site of neoliberal invention. It describes the explosion of techniques for experimental governance that sought to rearrange population through affect and counting for the sake of future economic prosperity. It shows how some (and not other) kinds of infrastructures were densely reproduced in the name of averting life and not dying, creating an era of postcolonial thick data. Arc III takes up the girling of human capital and the rise of "invest in a girl" campaigns in the 1990s that were built out of the data and numbers accumulated in the history described in arc II. It shows how the economization of life has been retwisted through financialization so that new forms of preemptive governance aspire to create real-time data about risks toward securing future supply chain logistics that stretch globally, and thus challenge the givenness of the horizon of national economy in the valuation of differential life worth. Life would explicitly become a form of capital that either increases or diminishes in value based on the riskiness of its milieu. The concluding coda reopens the question of what reproduction is, and how aggregate forms of life might be rethought through a distributed sense of reproduction. In sum, this book aspires to unsettle the world that was built, and not built, for the sake of economy and population.

Thinking with Pearl's population research is helpful for cracking open the founding relations that perpetuate within the longer history of the economization of life. There are four salient interconnected maneuvers crucial to

his initial staging of the problem of population. First, his work sought to deliver a *governable* formula of population as a temporal curve plotted at the crux of aggregate life and staged economic time. As a description of change over time, and not a thing, the curve did not offer a causal explanation about how environmental and biological factors directly altered population growth (these remained open to investigation). Instead, the curve was an idealized *model* of change over time produced by experiment, which then called forth further experimental intervention: what interventions might change the curve? As an experimental instrument, the curve did not mandate any particular type of intervention but rather offered a technique that rendered legible a *target* of intervention: population growth. For example, the curve could be "smoothed" by controlling fertility or used to calculate and then encourage an "optimum population" for a given productivity.[24] Unlike Malthus's law of population, where the calamity of overpopulation in a limited world could not be avoided, with Pearl's curve mass death, famine, and overpopulation were entirely avoidable through management, as long as production "progressed" or populations were "optimized." The curve was not a mere law of nature; it was a call to action.

Second, Pearl's offering of a manipulable curve was relative to the horizon of *economic* prosperity, not improved racial kinds as in conventional eugenics. Building on a then voluminous body of eugenic statistical research on differential fertility (that is, the tendency of the poor to have more children than the rich), Pearl argued that human birth rates shifted relative to economic conditions, such that harsh, crowded, or more dangerous environments created by poverty led to higher birth rates.[25] For Pearl, shifts in birth rate relative to personal wealth "are primarily to be regarded . . . as adaptive regulatory responses—that is biological responses to evolutionary alterations in the environment in which human society lives. In this environment, the economic element is perhaps the most significant biologically."[26] Here, "economics" becomes human life's most important environmental and evolutionary correlate. The economic environment becomes the human's primary ecology. The bottle becomes the economy, rendered as the container for life, surrounding it and setting its conditions of possibility. The economic environment determined how "human units wear out faster in some occupations than others, and therefore need to be replaced faster."[27] Put more baldly, aggregate rates of fertility and death were cal-

culable in new ways as naturalized *economic effects* in need of governing at macroscales.

Pearl's own biography tracks this shift from the qualitative preoccupations of eugenics and heredity to quantitative questions of population and production: while he began his career as a staunch eugenicist and racist, he famously made a public critique of the scientific and statistical legitimacy of much eugenic hereditary logic. Practices of eugenics, he argued, made mathematically and biologically unsubstantiated claims about the kinds of attributes that were inherited. In the early twentieth century, with over fifty years of racist evolutionary thinking to draw upon, and before DNA was agreed on as a biological mechanism of heredity, Pearl argued in the name of academic rigor (rather than antiracism) that projects to govern heredity were mathematically unscientific.[28] Pearl remained a committed racist, and continued to believe in a struggle for existence between races as they came into friction through colonialism or immigration. As an alternative to the focus on the hereditary quality of life, Pearl's work resituated the experimental study of population as a question of *economic futures* in a moment when fascists, feminists, liberals, and socialists all believed in the project of eugenics, and when the deadly force of eugenics had yet to reach its expression in European genocide. After World War II, with the retreat from eugenics, all these divergent political vectors would reattach to the problem of population in its new economic form.

Despite his critique of eugenics, Pearl's replotting of the population curve remained profoundly racist. It offered a new way to move racist accounts of differential human evolution into an economic rather than hereditary biological register. It restaged what Anne McClintock calls the asynchronic space—in which some places and bodies were plotted as more forward in time than others—that racial evolutionary logics produced into the register of economic time.[29] Now, some bodies were more forward or backward on the trajectory of economic development, or more forward or backward along the slope of the S-curve. In Pearl's model, populations with high birth rates were out of time with the forward orientation of white American economic futures.

As the economization of life continued over the twentieth century, social scientists would calculate the differential life worth of racialized bodies in terms of their contribution to future economic productivity, thereby

rendering quantifiable which lives are worth being born, protected, or extended, and which lives might be abandoned or, even better, unborn. In other words, the social science practices that make up the economization of life, and that derive partially from Pearl's work, created newly legitimated quantitative ways of assigning differential life worth after explicit claims to racial biological inferiority became scientifically illegitimate. The economization of life would produce new methods of racial violence that rested on economic potential rather than bodily difference. The problem of population, as a figure of aggregate life, was replete with methods for governing brown, black, poor, and female bodies that recast racial difference in terms of economic futures. Economic futures now depended on designating overpopulation as a kind of surplus life that was better not born. Race did not have to be named in order to enact racist practices.

Third, the *Drosophila* bottles and graphical charts of Pearl's work offered a scopic regime of temporal forecasting in which individual lives are but a flicker and what comes into view are tendencies and relationships only perceivable in aggregation, at the macrodimension, across generations. More specifically, the curve abstracted out relations as *temporal rates* (rates of increase or decrease in people). In this way, the scope of the curve offered a way to *speculate* with bodies now for the sake of the future. It offered a means to make adjustments in time by acting on the future in the present. The crucial time of population was not evolutionary time but economic speculative time.

Fourth and finally, Pearl's application of the logistic curve to humans was a transnational project. It relied on data collected by cities and states, and in the case of Algeria, it relied on the census apparatus of a colonial regime and its racist commitments. Pearl's work on population was produced at the crux of race, sex, nation, colony, and metropole. Yet in the late 1920s (unlike the population control projects following decolonization), Pearl's population curve was primarily directed toward questions of governance in Europe, the United States, and Japan. His shift to an economic logic drew on recently invented measures of "national economy" concurrently forged in the United Kingdom and the United States in the birth pangs of Keynesian macroeconomics, with the corresponding invention of the measure of GDP. The elaboration of this economized rendering of "popula-

tion," moreover, would continue through a transnational traffic of knowledge production and experts later moving within Cold War and postcolonial configurations. The economization of life was crafted at a threshold between a colonial and postcolonial politics of reckoning life.

With these four attributes, Pearl's curve is a harbinger of the practices that crystallized in the Cold War/postcolonial period as the "economization of life," a historically specific and polyvalent mode for knitting living-being to economy. While eugenics—oriented toward nationalist, colonial, and racial evolutionary futures—would dominate to horrific genocidal effect in the 1940s, during the decades that followed it was the epistemic practices that tied together economy and population that would flourish as both a U.S. project of foreign aid and as postcolonial projects of nation-states.[30]

This history of the economization of life complements a surge of recent scholarship, particularly in the field of science and technology studies (STS), concerned with the relations between life, reproduction, and capital. This scholarship has tracked the commodification of life in the twentieth century through patented seeds, genetic sequences, cell lines, biochemical processes, and so on, contributing to an effort to understand an emergent "politics of life."[31] In particular, feminist work has shown how central reproduction as a biological process has been to these developments, from agriculture, cloning, and clinical reproductive technologies to biotechnologies.[32] Work by Sarah Franklin, Catherine Waldby, Charis Thompson, Cori Hayden, Michael Fortun, Stephen Helmreich, Melinda Cooper, Kaushik Sunder Rajan, Kalinda Vora, and Joseph Dumit, among others, charts the rise of new speculative forms of "biowealth," "biovalue," and "biocapital," that is, the transformation of living-being (typically at micrological registers of life such as genes, molecules, viruses, algae, and cells, but also at the level of individuals, as experimental subjects in drug development, and even populations whose health is coupled to information in biobanks) into generative forms of capital through which further commodities and value are created.[33] These manifold technoscientific modes of knitting together living-being and formations of capital in the late twentieth century are accompanied, I argue, with another mode that operated through macro register or scale: the economization of life, composed of techniques for govern-

ing life for the sake of fostering "the economy," and in doing so reassembling sexed living-being at the nation-state scale of "population."

The suggestion that there is a phenomenon called the economization of life is premised on the existence of "the economy." How did "the economy" become the bottle to our fruit flies, the container for reproduction, and the surround for this late twentieth-century politics of life?

Notes

INTRODUCTION

1 Raymond Pearl, "Biology of Population Growth," and *The Biology of Population Growth*. Pearl's curve was indebted to the statistical work of Alfred Lotka (see Sharon Kingsland, *The Evolution of American Ecology*). See also Sabine Höhler, *Spaceship Earth in the Environmental Age*.

2 On the earth as a finite container, see Höhler, *Spaceship Earth*.

3 See Margaret Sanger, *Proceedings of the World Population Conference*. On this conference, see E. Ramsden, "Carving up Population Science." Comments from the participants from Japan, China, Siam, India, Argentine, Chile, Peru, and Brazil were largely absent in the official transcripts of the conference. Exceptions to this silence were a supplementary paper submitted by Rajani Kanta Das, an Indian economist researching at the League of Nations' International Labor Office, and a comment offered in discussion by Kiyo Sue Inui from the Tokyo University of Commerce.

4 On the history of progressivism, feminism, and projects of racial uplift within the spectrum of eugenics, see Childs, *Modernism and Eugenics*; Hustak, "Radical Intimacies"; Kline, *Building a Better Race*; M. Mitchell, *Righteous Propagation*; Paul, *Controlling Human Heredity*; Pernick, *The Black Stork*; Stern, *Eugenic Nation*.

5 On the global history of eugenics, see M. B. Adams, *The Wellborn Science*; Ahluwalia, *Reproductive Restraints*; Campbell, *Race and Empire*; Davie, *Poverty Knowledge in South Africa*; Dubow, *Scientific Racism in Modern South Africa*; Fruhstuck, *Colonizing Sex*; Hodges, "Indian Eugenics in an Age of Reform"; Kevles, *In the Name of Eugenics*; McLaren, *Our Own Master Race*; Park, "Bodies for Empire"; Stepan, "The Hour of Eugenics"; Stern, *Eugenic Nation*.

6 Pearl's relation to eugenics has been debated in the historiography. The portrayal of Pearl as simply anti-eugenics, and thus anti-racist, has been revised to attend to the subtleties of Pearl's critique as existing *within* the scope of eugenics, his continued interest in the scientific management of human breeding, and his racist views (see Allan, "Old Wine in New Bottles"; Barkan, *The Retreat of Scientific Racism*; Mezzano, "The Progressive Origins of Eugenics Critics"). I think, however, the historical account of eugenics in this period needs to be even fur-

ther complicated. The overwhelming focus on the variety of biological racist and antiracist science, while critically necessary, has tended to obscure the rising importance of economic logics coming out of eugenics in the middle of the century. For an alternative account of how biological anti-racism became racialized economic development, see Gil-Riaño, "Historicizing Anti-Racism."

7 As Margaret Schabas (*The Natural Origins of Economics*) has shown, the inauguration of political economy in the eighteenth century by such figures as Carl Linneaus, Adam Smith, and Thomas Malthus initially wove together questions of political economy with those of natural history. It was only later in the nineteenth century that economics and biology became distinct disciplines with divergent practices and domains of inquiry.

8 In fact, Pearl was important to the setting up of the statistical infrastructure at the Department of Agriculture.

9 An example is the theory of stages of social evolution of Lewis Henry Morgan, which influenced the work of Friedrich Engels and Karl Marx (Engels, *The Origin of the Family, Private Property, and the State*). On stages and time in anthropology, see Fabian, *Time and the Other*.

10 On the history of treating Africa as a colonial laboratory, see Tilley, *Africa as a Living Laboratory*.

11 Pearl, *The Biology of Population Growth*, 53, 51.

12 Pearl, *The Biology of Population Growth*, 60.

13 Pearl, *The Biology of Population Growth*, 54.

14 Pearl, *The Biology of Population Growth*, 49.

15 My definition of the term *economization* differs from that offered by Koray Çalışkan and Michel Callon in their well-known essays (Çalışkan and Callon, "Economization, Part 1," and "Economization, Part 2." Çalışkan and Callon use it in a general sense to describe the assembly of actions and devices as "economic," broadly speaking. This stream of sociology of economy draws on actor-network theory to trace how economic phenomena—such as markets—are materialized in technical-human assemblies. Katherine Kenny ("The Biopolitics of Global Health") offers another financialized angle into the economization of life, along the lines of Çalışkan and Callon, in her excellent dissertation work on Disability Adjusted Life Years (DALYs) that resonates with the investment practices described in arc III. In contrast to these uses, this book is defining the term in a narrower way, to specifically historicize practices assigning value for the sake of the macroeconomy. It is thus building on the scholarship of Timothy Mitchell, Susan Bergeron, and others who have historicized the emergence of the macroeconomy in this period (see Bergeron, *Fragments of Development*; Goswami, *Producing India*; Kalpagam, "Colonial Governmentality and the 'Economy'"; T. Mitchell, "Fixing the Economy," and "The Work of Economics"; Suzuki, "The Epistemology of Macroeconomic Reality"). In calling the economization of

life a "regime of value," I am leaning on, and deviating from, Arjun Appadurai's ("Introduction: Commodities and the Politics of Value") discussion of commodities as circulating through multiple regimes of value—in which value here is both economic and cultural. Here, I am concerned with how focusing so intensely on commodities, capital, and labor as the forms through which value is created and contested leaves underinterrogated the work of other historically particular economic formations of value-making. My use here of "regime of value" is also akin to the Foucauldian notion of a "regime of truth" in which the practices and objects by which economy is adjudicated and valued are historically specific. I use the term *regime of value* to mark my interest in historicizing all the components of the economization of life as a mutually constitutive and contingent assemblage.

16 Here I am building on the work of Neferti Tadiar ("Life-Times in Fate Playing"), who describes how valuations of lifetimes and life chances have become a dominant mode within capitalism. Here, this argument, like hers, is interested in examining how value is produced through life beyond the conventional Marxist formulation of the labor theory of value.

17 Drawing on Michel Foucault ("Governmentality"), *governmentality* as a term names practices for directing subjects and objects that develop in states but extend well beyond them. Thus, governmentality is not the equivalent of state governance and instead names the practices that exceed the state and can be found in many other institutions. Foucault's work on biopolitics as a kind of governmentality, and on neoliberal governmentality, are crucial inspirations for this work (Foucault, *History of Sexuality*, Vol. 1, *An Introduction*; *Society Must Be Defended*; *Security, Territory, Population*; *The Birth of Biopolitics*). However, Foucault's own work on neoliberal economics refuses to engage with colonial and postcolonial histories, the elaboration of the racial state, and drops sex as a central analytic. I unfaithfully build on this work in defining economization as a kind of governmentality for the sake of the economy, by which capitalism conjures its own milieu that emerged in racialized and sexualized Cold War and postcolonial itineraries. On theorizing governmentality and its colonial and postcolonial forms, see P. Chatterjee, *The Politics of the Governed*; Kalpagam, "Colonial Governmentality and the 'Economy'"; Scott, "Colonial Governmentality"; Stoler, *Race and the Education of Desire*.

18 In conceptualizing infrastructure here, I am indebted to Anand, "Pressure"; Penny Harvey, *Roads*; Simone, "People as Infrastructure"; Star, "The Ethnography of Infrastructure"; Star and Ruhleder, "Steps towards an Ecology of Infrastructure"; Tousignant, "Insects-as-Infrastructure."

19 For histories of "population" between demographics and ecology, see Bashford, *Global Population*; Höhler, *Spaceship Earth*; Kingsland, *The Evolution of American Ecology*.

20 The potency of "economy" as a phenomenon multiplies the elements found in *material-semiotic actor*, a term widely used in science and technology studies (STS), to include the affective and the infrastructural.

21 In particular, I have built on the rich scholarship of many other scholars who have also taken up the task of historicizing population (Ahluwalia, *Reproductive Restraints*; Bashford, *Global Population*; Connelly, *Fatal Misconception*; Greenhalgh and Winckler, *Governing China's Population*; Hartmann, *Reproductive Rights and Wrongs*; Hodges, *Contraception, Colonialism and Commerce*; Szreter, "The Idea of Demographic Transition"; UBINIG, *Violence of Population Control*) and of grappling with numbers and their enchantments (Day, Lury, and Wakeford, "Number Ecologies"; Desrosières, *The Politics of Large Numbers*; Kalpagam, *Rule by Numbers*; D. M. Nelson, *Who Counts?*).

22 Murphy, *Seizing the Means of Reproduction*.

23 I have used the term *postcolonial* juxtaposed with Cold War in this book to identify the local/transnational interplay of histories of colonization, decolonization, and new imperialisms that characterized so many, but not all, of the places in which U.S.-supported "family planning" programs were created. However, the economization of life, overall, is not necessarily postcolonial, and can just as easily be traced in the history of ongoing settler colonialism in the twentieth century. My emphasis on postcolonial here is largely an artifact of my focus on circuits of expertise between Bangladesh and the United States.

24 The interwar period saw a large literature on optimum population (e.g., East, "Food and Population"; Fairchild, "Optimum Population"), a concept that has recently made a resurgence, such as through the UK organization Optimum Population Trust, and in economics.

25 Pearl, "Differential Fertility."

26 Pearl, *The Biology of Population Growth*, 116.

27 Pearl, *The Biology of Population Growth*, 113.

28 Allan, "Old Wine in New Bottles."

29 McClintock, *Imperial Leather*.

30 My focus here is on the United States, as the largest funder of population control in postcolonial locations. Related histories track the economization of life in communist states, particularly China (Greenhalgh and Winckler, *Governing China's Population*; M. Thompson, "Foucault, Fields of Governability, and the Population").

31 Rose, *The Politics of Life Itself*.

32 Such examples of this feminist work include Briggs, *Reproducing Empire*; Browner and Sargent, *Reproduction, Globalization, and the State*; Casper, *The Making of the Unborn Patient*; Clarke, *Disciplining Reproduction*; A. Y. Davis, *Women, Race and Class*; Davis-Floyd and Dumit, *Cyborg Babies*; Franklin, *Dolly Mixtures*; Franklin and Roberts, *Born and Made*; Ginsburg and Rapp, *Conceiving the New World*

Order; Haraway, *Modest_Witness@Second_Millennium: FemaleMan_Meets_OncoMouse*; Helmreich, *Alien Ocean*; Jordanova, "Interrogating the Concept of Reproduction in the Eighteenth Century"; Landecker, *Culturing Life*; Mamo, *Queering Reproduction*; J. Morgan, *Laboring Women*; Rapp, *Testing Women, Testing the Fetus*; C. Roberts, *Messengers of Sex*; D. Roberts, *Killing the Black Body*; Rudd, "The United Farm Workers Clinic in Delano, Calif."; Strathern, *Reproducing the Future*; C. Thompson, *Making Parents*; Waldby and Cooper, "The Biopolitics of Reproduction"; Waldby and Mitchell, *Tissue Economies*.

33 Cooper, *Life as Surplus*; Dumit, *Drugs for Life*; Fortun, *Promising Genomics*; Franklin, *Dolly Mixtures*; Franklin, "Ethical Biocapital"; Hayden, *When Nature Goes Public*; Helmreich, "Species of Biocapital"; Landecker, *Culturing Life*; Sunder Rajan, *Biocapital*; Thompson, *Making Parents*; Vora, *Life Support*; Waldby and Cooper, "From Reproductive Work to Regenerative Labour"; Waldby and Mitchell, *Tissue Economies*.

CHAPTER 01 | ECONOMY AS ATMOSPHERE

1 Ann Crittenden, "Why Does a 'Healthy' Economy Feel So Bad?" *New York Times*, July 10, 1977; "A Chilled Economy Feels a 'Breath of Spring,'" *New York Times*, March 29, 1970; Landon Thomas, "Suddenly, a Hesitation about Splurging: A Jittery Economy Stirs Second Thoughts about Ostentation," *New York Times*, September 19, 2007; "Sidelights: Mixed Feelings on Economy," *New York Times*, March 13, 1959; Michael C. Jensen, "Home Buyers All over U.S. Feel the Economy's Crunch," *New York Times*, August 25, 1974, 448.

2 Inspirational for this argument is Brian Massumi's ("National Enterprise Emergency" and *The Power at the End of the Economy*) work on the affective fact.

3 My attention to atmospheres and surrounds is in conversation with Peter Sloterdijk's (*Terror from the Air*) provocative argument that the twentieth century was an era of spheres, in which the dominant European technical and epistemological gesture became the explication of atmosphere, whether this be the literal atmosphere of air as in the examples of gas warfare, the explication of environments as engineerable containers, or the sense of culture as a collective atmosphere. Here, I am arguing the national economy became explicated as a container of relationships open to technical intervention, conjuring a collective macroeconomic atmosphere.

4 On the history of the macroeconomy as an epistemic thing, see M. S. Morgan and Knuuttila, "Models and Modelling in Economics," and Suzuki, "The Epistemology of Macroeconomic Reality." On Keynes's use of statistics, see Werle, "More than a Sum of Its Parts."

5 On the history of economic modeling, see M. S. Morgan, *The World in the Model*; M. S. Morgan and Knuuttila, "Models and Modelling in Economics."

6 The analysis that markets are performativity made through the theories of eco-