

of indebtedness, whether structured as monetary debt or as moral calling. In other words, indebtedness is itself a form of valuation of circulatory systems of exchange, again in both senses of the word "value." It is the biopolitics of indebtedness as constituted by global circuits of biocapital that I explore in the next chapter.

2. Life and Debt

Global and Local Political Ecologies of Biocapital

The first sign that one is greeted with in 2004 upon disembarking at Hyderabad airport advertises Genome Valley, which claims to be the "biotech hub of India." It is a six-hundred-square-kilometer area of land in and around Hyderabad city that will, it is hoped, become the hub of academic and corporate innovation in the life sciences. In the last fifteen years, between 1989 and 2004, more than three thousand farmers have allegedly committed suicide in the southern Indian state of Andhra Pradesh, of which Hyderabad is the capital. Three out of four farmers' suicides in the country during this time are estimated to have occurred in this state, which prides itself on being one of the high-tech havens of India. This has included two phases, in 1997–98, and again recently in 2003–4, which have seen a concentrated spate of suicides. The normal reasons attributed to these suicides are drought, crop failure, and mounting debt. However, the most recent spate of suicides has occurred in spite of rising agricultural productivity and normal rainfall in 2003–4, suggesting that debt was the overwhelming factor that precipitated the crisis.¹

The Andhra Pradesh state government during much of this time (1994–2004) was led by N. Chandrababu Naidu. I describe Naidu's vision and governance style and provide greater context about his regime later in the chapter. Suffice it to say at this point that his government stopped paying compensation to families of suicide victims in 1998, on the perverse grounds that compensation for suicides would provide an incentive for farmers to kill themselves. This has made it difficult to ascertain the number of farmers who have in fact killed themselves, since the most reliable way of accounting for such deaths is through an accounting of state compensation.

One of the major policy documents of the Naidu regime is “Vision 2020,” which articulates Naidu’s modernist vision of the state as embedded in a dream of rapid technological progress and material prosperity attained through globalization and an aggressive embrace of the free market.² In the agricultural sector, Vision 2020’s focus is on pesticides and agro-chemicals. Mechanization, modernization, genetic modification, and a reduction of the number of people on the land from 70 percent to 40 percent of the population are central tenets of this policy document. A large part of the investment for these modernizing changes is envisaged by Vision 2020 to come from the private sector.

Grounds, Arguments, and Sites

In this chapter I explore, through the lens of emergent biotechnology initiatives in India, the local political ecologies of indebtedness that are constituted by, and constitutive of, globalization. “Biocapital” in this chapter operates explicitly in two distinct yet simultaneous analytic frames: on the one hand, as the circuits of land, labor, and value (in a classic Marxian sense) that are inhabited by biotechnological innovation and drug development; on the other hand, as the increasingly constitutive fact of biopolitics in processes of global capitalism. In other words, on the one hand, what forms of alienation, expropriation, and divestiture are necessary for a “culture of biotechnology innovation” to take root? On the other hand, how are individual and collective subjectivities and citizenships both shaped and conscripted by these technologies that concern “life itself”?

As I outlined in the introduction, I use “biocapital” as a concept to mean multiple things in relation to “capitalism,” itself a shifting concept with multiple meanings. Specifically, I have argued that biocapital simultaneously manifests as a specific *case study* of systems of capitalism — one situated lens through which we can view the emergence of capitalist logics and systems writ large — and as a *particular form* of capitalism made specific because of emergent technologies and epistemologies of the life sciences. My analysis of biocapital swings between these two relationships to capitalism. Thus at least part of the specificity of my stories in chapter 1 had to do with the emergent possibilities of analyzing the “fundamentals” of life as information that could be commodified and could operate as currency. In this chapter, on the other hand, I analyze

biocapital in terms of how biotech enterprises shed light on emergent (and in some ways continuing) manifestations of capitalism, globalization, and biopolitics.

Biopolitics, to recapitulate, is a notion propounded by Michel Foucault, whereby life becomes the explicit center of political calculation. Foucault’s analysis of the biopolitical was largely situated in the empirical context of the historical transition in Europe from absolute monarchy to the modern state, where *accounting for* and *taking care of* the population becomes central to the rationality of government. This emergent rationality, Foucault shows throughout his work, takes place along with the emergence of *institutions* and *techniques* such as the prison, the census, the clinic, and the asylum, and of *disciplines* that produce the knowledge that underlies these calculations, such as biology, demography, psychology, and political economy.

In other words, Foucault argues that emergent governmental rationality is intimately connected to emergent institutions and techniques of governance, and to emergent forms of knowledge production.³ Also, this is a governmental rationality whose *territorial unit* is the *nation-state*.

It is not surprising, then, that an emergent moment in world history which is marked by globalization should present to us questions of the rationality of global governance. And as we start thinking about governance in more global terms, it is not surprising that biopolitical regulation — the regulation, calculation, accounting for bodies, decisions about who lives and who dies — becomes central to the calculus of this new governmental rationality.

The larger theoretical challenge here becomes one of mapping the articulations of technoscience, capital flows, and global governance, and of asking how these articulations enable us to understand emergent forms of knowledge production and technological innovation, emergent forms of capitalism, and the relationship between various levels — global, regional, national, and sub-national — of governance.

Foucault’s primary concern with biopolitics had to do with an analysis of the state as an agent of political calculation as very much at stake, and this concern was in consonance with the increased role of the state as a defining authoritative institution of modernity. We are in the midst of a historical shift toward increasingly corporate regimes of governance. This is not a shift that

automatically implies a reduced role for the state—indeed, in this chapter, I show very much the opposite—but one that does pose questions about the change in the state's role.

In other words, by the phrase “corporate regimes of governance,” I imply two things. On the one hand, corporations themselves are taking on agential responsibility for dispensing services that, in the liberal ideology of the welfare state, were “state” services.⁴ On the other hand, the state itself is seen adopting corporate strategies or forms of governance, which are often particularly explicit in the Indian context. I have narrated one instance of this in my stories of the Indian state positioning itself as a quasi-market player in order to leverage value from “Indian” genetic material in chapter 1.

In this chapter, I situate the circulatory processes and strategies described earlier in the context of the ways in which governance—which is always already a melding of “state” and “corporate” forms and rationalities—manifests on the ground in India. I address these questions through ethnographic fieldwork conducted in the rural outskirts of Hyderabad city and in the urban center of Mumbai. In the process, I argue that First World–Third World asymmetries in globalization, as opposed to those of industrial colonial expansion, play out through the reconfiguration of the relationship of imperial power to colony into one of vendor to client. I also persist, thereby, with my structural concern with circulation, and the circulatory structures, processes, and regimes that are called into account in these global-local systems and strategies of biocapitalist governance.

Central to these issues is a concern with indebtedness as a governing value system, in both senses of the phrase, of capitalism today. I showed in the previous chapter the ways in which supposedly pure market forms are completely enmeshed in certain forms of gifting (even if those are forms of gifting that are always already open to being co-opted by the market and therefore not quite the gift in the Maussian sense). Also there is the existence of the state as an institution that “gifts” to the public good and thereby calls into account certain forms of indebtedness to the nation. Therefore, at one level, indebtedness operates as moral currency.

But there is also indebtedness in more direct monetary forms of market valuation, at multiple levels, and most certainly in American society. There is,

for instance, the central importance of individual creditworthiness, with the credit card industry as an obligatory node of contemporary American capitalism. Debts are also constitutive at an institutional level, in ways that are difficult to tease out into monetary and moral connotations of the term. Indebtedness is marked, for instance, in interactions between corporations and their investors, whether they be large, public corporations and Wall Street, or entrepreneurs who are forced to relinquish control over their companies by venture capitalists to whom they are indebted, in both senses of the word, for the capital that enables their company in the first place.

Then there is the symbolic capital that is called into account by the biotechnology and pharmaceutical industries in particular, as I emphasized in the previous chapter, by virtue of their being in the business of “food, health, and hope”—suggesting how consumers should be indebted to these companies for undertaking high-risk, decade-long drug development ventures to produce therapies for otherwise untreatable diseases. This is an indebtedness that rationalizes not just symbolic capital for the industry but also some of the most expensive drug prices in the world.

Indebtedness operates at multiple levels or registers, as one structural facet of a contemporary historical moment marked by particular arrangements of capital flows, as a symptom of a free market system that is always already a value system in all its multiple senses, and, more specifically for an analysis of biocapital, the ways in which indebtedness becomes biopolitical and bio-social.⁵ It is not incidental, of course, that the American nation-state is itself the largest debtor nation-state in the world.

Such multiple registers of indebtedness are at play in India as well. The immediate impetus for India's embarking on its rapid program of economic liberalization and globalization in 1991 was a huge balance-of-payments crisis. At the time, India's foreign exchange reserves had fallen to \$585 million, which was sufficient for financing just one week of exports. As a consequence, imports had to be curtailed, and there was a high rate of inflation, which led to an increase in domestic prices that further made the export environment unfavorable.⁶ Additional structural factors were brought into play because of the first Gulf War, which led to an increase in oil prices and a reduction in remittances from Indian expatriates in the Gulf.⁷ Ironically, a major reason for India's

indebtedness at the time was a more tentative, but nonetheless very real, push toward liberalization initiated in the late 1980s under Rajiv Gandhi, marked by what Partha Chatterjee calls a “mindless spending spree” (Chatterjee 1997 [1989], 201).

In spite of all these structural factors that evidently pointed to crisis, crisis was itself evident only in its own production by “market logic.” Jayati Ghosh, in her analysis of the initiation of liberalization programs, shows that at this time both agricultural and industrial output were normal, and inflation not particularly high (Ghosh 1998). What was key, however, was that India’s balance-of-payment crisis was not inspiring confidence on the *speculative* marketplace. Once again, one sees the dissonance between “commodity” and “commercial” capitalism.⁸ Just as a successful industry in terms of product manufacturing and revenue generation like the Indian pharmaceutical industry was deemed to be a failure from the perspective of a growth-based model and was made under WTO-imposed constraints to retool its business models, so one sees an entire nation’s economic strategy similarly retooled because of a perceptible “failure” in the eyes of a speculative market rationality that does not necessarily seem like such a failure when seen in terms of a manufacturing and production rationality.

In response to the 1991 crisis, the immediate solution adopted by the Indian government was to take out a loan from the International Monetary Fund (IMF), putting India into a further state of indebtedness. Once again, both monetary and moral registers of indebtedness were called into account, because the conditions of the IMF loan necessitated embarking on structural adjustment policies in order to be more “fiscally responsible.” The explicit juxtaposition by the World Bank/IMF of the fiscal responsibility or irresponsibility of its (Third World) debtor countries with the “rewards” or “punishments” as the case may be (which imply the extent of further creditworthiness) is strikingly direct and paternalistic. Therefore, simultaneous to invoking a system of monetary payback came, immediately, a call for moral reform—a reform that demanded that India shed an “irresponsibility” that was *not* profligacy but prudence, an *absence* of the profligacy, exuberance, and risk of embracing the free market.

I wish here to explore the Third World Other that is India, not in relativist,

or even explicitly comparative, terms to the “center” of much of the technoscientific innovation in my stories, the United States, but rather *as a constituent* of the American imaginaries that India currently inhabits in incongruent ways. The relationship of India to the United States as I am trying to configure it, therefore, is *not* the relationship of an outside to an inside (a binary or relativist framing from which no project of strictly symmetrical comparison can completely escape) but the story of the outside that is always already within the hegemonic inside—but within it in ways that make the inside uncomfortable, distend it, but never turn it “inside out.”

In this chapter, I continue the sensibility introduced in chapter 1, inspired by what Rosemary Coombe calls an “ethics of contingency” (1998, 5). I simultaneously insist on locating India as a constituent of a hegemonic terrain that is *not* of its own making, while refusing to acknowledge for it a Third World status that is known in advance. In the process, many of the tactical and strategic articulations of the Indian state tend not to be “resistance” to global orders of technoscientific capitalism, even while they might rescript hegemonic imaginaries in ways not imagined.

With this context, this chapter narrates ethnographic fieldwork at two sites that I consider exemplary for studying the relationships between global capital flows and local forms of indebtedness, and for showing the ways in which biocapital “touches down” in different contexts in India.⁹ The sites that I choose in this chapter are once again institutional assemblages, each of which is located in a distinct political ecology. I do not use the phrase “political ecology” in the sense that environmental studies scholars do,¹⁰ but rather employ it as shorthand for a “local” that is particular not just because of its spatial circumscription but also because of a political economic environment already conditioned by local and global histories and presents.

The first site is the IICCI Knowledge Park, known simply as “the Park,” a biotechnology park started by the Indian financial services company IICCI and the government of the state of Andhra Pradesh, with help from nonresident Indian (NRI) entrepreneurs based in Silicon Valley. The Park is located about forty kilometers outside Hyderabad, which, as mentioned earlier, is the capital of Andhra Pradesh and one of the fastest-growing “technoscience cities” in India. The second site is Wellspring Hospital, a hospital started by the Indian

pharmaceutical company Nicholas Piramal India Limited (NPIL) in Parel, in the heart of downtown Mumbai. The hospital houses Genomed, a genome start-up seeded jointly by NPIL and the Centre for Biochemical Technology (CBT), India's flagship public-sector genome lab.

These sites are significant to my stories of biocapital at the level of the institutions they represent and the political ecologies within which they are situated. Both the Park and Genomed/Wellspring are start-ups in a country that has very few start-up entities of the kind seen in the United States, most markedly in Silicon Valley. The attempt to imitate a U.S. "start-up culture" in both these experiments is quite explicit. The Park reflects start-ups at multiple levels—it is itself a start-up venture with considerable investment in capital and expertise put in by the investing parties, and its function is to enable the incubation of biotech start-ups on its premises.

Yet both of these start-ups require significant, and explicit, state involvement. The Park is enabled, as I will show, in large measure by the Andhra Pradesh state government, while CBT, a publicly funded lab of India's Council for Scientific and Industrial Research (CSIR), is an equity holder in Genomed.¹¹ Hence both are examples of hybrid state-corporate assemblages set up *in order that* India (the nation-state) become a "global player" (in the global marketplace) through corporate entities whose very conditions of possibility are provided, in large measure, by the state. In other words, both are institutional reflections of the active, resource-intensive interest taken by the Indian state in fostering biotechnology innovation, which largely does not exist in India at this point and is configured, from its initiation, as a global market venture.

However, the two sites inhabit completely different political ecologies. Needless to say, India's size implies a huge heterogeneity in what constitutes "the nation-state" on the ground. Mumbai and Hyderabad, in many ways, represent two epochs of India as an industrializing country, with Mumbai exemplifying the phase of industrial growth through manufacturing, and Hyderabad (along with Bangalore) exemplifying a "postindustrial," high-tech capitalism.

Saskia Sassen makes the argument that cities are constituent nodes in the capital flows of contemporary globalization, in ways that simultaneously question the centrality of the nation-state while instantiating its importance (see,

for instance, Sassen 2000). Cities trouble the centrality of the nation-state to the extent that their nodal positions in global capital flows are not simply a consequence of their being a component of a nation-state, as was the case in the era of industrial colonial expansion. While cities are very much constituents of nation-states, they are also, in direct and emergent ways, constituent nodes and passage points in flows of transnational capital. Equally importantly, Sassen calls for an attentiveness to locality, not as an oppositional category to "the global" but as a constituent of the global. In other words, *place matters*, and Sassen refuses to completely evacuate the role that particularity plays in shaping the ways in which globalization manifests or "touches down." This is very much in line with my argument in making "comparisons" between the United States and India, in my attempts to trace the radically incongruent manifestations in India of processes whose ideologies purport to be a seamless homogenizing force. But it also shows up starkly in my comparison in this chapter of political ecologies within India, which have consequences for understanding the questions of governance with which I opened this section. It becomes clear, especially in my accounts of the role of the Andhra Pradesh government in fostering the Park and a culture of biotech innovation writ large, that "governmentality" is not just complicated in contemporary capitalism by the melding of state and corporate forms of governance, but the "state" in question, while never ridding itself of the specter of the nation, cannot automatically be assumed as the *nation-state* in its strict modernist understandings.¹²

Both the sites that I write about in this chapter, of course, are also related to questions of governmentality not just in the sense of instruments and strategies of governance but as explicitly *biopolitical instruments and strategies*. The incorporation (quite literally) of cultures of innovation as governing ideologies of state-corporate formations invested in enabling and facilitating global capital flows has consequences for the ways in which the lives of subjects of the state are reconfigured. These reconfigurations have everything to do with historical and emergent relations of production, and with fundamental Marxian concerns such as access to land and the encroachment of rural space by urban expansion (in this case, in the explicit cause of technoscientific development), urban proletarianization and deproletarianization, alienation, divestiture and expropriation, and, as a governing framework, indebtedness.

This chapter does not offer a subjective narrative from the perspective of those displaced by, or recruited into, these start-up attempts at biotech innovation. Rather, it is an attempt to map a structural terrain marked by a transition from one era of industrial capitalism (emblemized by agriculture, and by, in Mumbai's case specifically, textile manufacturing) to another, high-tech capitalism.

The ICICI Knowledge Park

I start my story of life and debt in rural Andhra Pradesh by talking about Chandrababu Naidu, who was chief minister of the state from 1994 to 2004, and the political party that he heads, the Telugu Desam. This is among the younger, and yet more powerful, of what are known as "regional parties," parties that draw their political affiliation from a particular region (usually a single state) in India. On the one hand, these are parties whose ideologies and identities are intensely shaped by a sense of locality, in opposition to the centralizing tendencies of the Indian state that are most acutely upheld by the Congress party, which has ruled India for forty-four of its fifty-seven years of independence. On the other hand, these parties have become increasingly central to national governance as the erosion of the Congress's pan-national hegemony has seen the emergence of coalition governments at the center, likely to persist as the norm rather than the exception in the coming years of India's parliamentary democracy.

What is interesting for me here is how in many ways a regional party such as the Telugu Desam is increasingly enrolling itself as a *transnational* facilitator of capital flows into India, as the upholder of the "Telugu nation" turns out to be the most aggressive and sophisticated political player in the game of globalization. At one level, of course, it is not such a surprise that a political party that depends on an ideology that is opposed to the centralizing tendency of the state should find natural allies in entrepreneurs who are themselves opposed to such centralization. Political decentralization and market decentralization seem to find common cause in movements such as Naidu's Telugu Desam.¹³

Speed, information, and selling were the key modes of governmentality for Naidu: "An Indian chief minister in today's global economy has to be a salesman. If he rests on his pride nothing will be achieved. He also has to be like a

chief executive who makes things happen. Speed is of the essence" (Naidu 2000, 9). And further: "The only course at that point was to go out and market the state. That is what I set out to do. By going to every investors' forum, domestic or foreign, making Power Point presentations on what Andhra Pradesh has to offer" (134). Naidu learned much from management pedagogy, as any good chief executive would. He says: "Politicians must be acquainted with the managerial wisdom of Peter Drucker and Jack Welch" (21). His attempt has been to turn governance into an *expert regime* that is founded, further, on imitating the United States.

This is governmentality, however, not of the *nation-state* but of the *state-state*: the entity that Naidu was seeking to manage was, quite explicitly, Andhra Pradesh, which after all *is* the region that the Telugu Desam in its very inception claimed most directly to represent. Further, Naidu constantly emphasizes the competition *between* states for rapid economic growth and attraction of foreign investment, as if each state were a corporate entity.

But even the notion of Andhra Pradesh as a single state is a problematic one. There is an increasingly strong movement for statehood in the region of Telengana, which comprises the mostly interior parts of Andhra Pradesh. This is a movement that has existed since India's independence, with Andhra Pradesh, as a state, being the legislative conglomeration of three regions, coastal Andhra, Rayalaseema, and Telengana. It is a movement that has gained force recently because of the continued deprivation of Telengana, and also because statehood has been given to three other regions in India that have fought for autonomy for many years. Telengana provides most of the minerals and raw materials that go into sustaining Hyderabad, and the relationship between the center and the periphery of this state has very much been one of relatively straightforward expropriation, with little development being channeled back to Telengana. Indeed, Telengana has been the site of many of the farmer suicides over the last decade.

Naidu, as mentioned earlier, effected a number of reversals of the founding Telugu Desam ideology. While it received its *discursive* identity from the notion of a federally strong Telugu statehood opposed to the Congress party's tendency to concentrate power in Delhi, Telugu Desam received its popularity from the populist measures of its founder and former chief minister N. T.

Rama Rao. Central to Rama Rao's policy was providing cheap rice and huge agricultural subsidies, and imposing prohibition, which had been the demand of many women in urban and rural Andhra Pradesh. Naidu brutally reversed all of these at the altar of fiscal management, structural adjustment, and pragmatism. And yet, central to his art of politics was his ability to project these brutal reversals, first as policies that were not imposed by an antipopulist state, and second as policies that represented the continuation of Rama Rao's legacy while they reversed it.

Vision, then, was fundamental to Naidu's mode of governance: it allowed him to project attractive futures to investors and his electorate alike, to set milestones for himself and his government to achieve, and was precisely the mechanism that allowed a silent reversal of Rama Rao's legacy, because it implied, rhetorically, a legacy in itself, which Naidu artfully took credit for, but always as an inheritor of a mantle, in a state where Rama Rao's populism makes his legacy an extremely useful one for electoral purposes.¹⁴ Naidu posits vision in explicit opposition to planning, which has always been undertaken by the Indian state on Soviet lines, in terms of five-year plans. "For a vision," says Naidu, "a reasonable time-span is 20 years" (Naidu 2000, 12). In other words, in the terms of Antonio Gramsci,¹⁵ vision, for Naidu, is strategic, whereas speed is tactical: vision is the distant promissory horizon to set for oneself, whereas speed is the means by which to narrow that distance as energetically as possible.¹⁶

There are direct links—of ideology, capital, and locality—between Naidu and the nonresident Indian entrepreneurial community in Silicon Valley. One of the more perverse mimetic borrowings has been that of the ideology of venture capital. Naidu saw that venture capital was the engine that has fueled entrepreneurialism in Silicon Valley. He therefore believed that Andhra Pradesh should have lots of venture capitalism. The state, therefore, has itself decided to provide venture capital, by setting up a fund to which the contributors are the Andhra Pradesh Industrial Development Corporation Ltd., the Small Industries Development Bank of India, and the AP Industrial and Infrastructure Corporation Ltd. (see Naidu 2000, 139). In other words, Naidu set up a system of public investment as "venture capital" funds, a completely oxymoronic conception of venture capital, which by its American definition comes out of huge private investment funds that expect an extremely high re-

turn on investment. Naidu's "venture capitalism" is, effectively, a euphemism for government subsidy for high-tech industry.¹⁷ The fostering of an "entrepreneurial culture" in this way ultimately involves the removal of subsidies from one sector, agriculture,¹⁸ and the concomitant provision of subsidies to another, high-tech—but primarily high-tech *services* rather than high-tech *innovation*—where the services themselves are often performed for Western corporations and exported.

Naidu's ideology might be called an "intervention of no intervention," premised as it has been on the ideology of *minimal* state intervention, an ideology that, in order to be upheld, requires *massive* state intervention.¹⁹ One of the critical points to be made regarding such governance is that things like information technology, biotechnology (together referred to in India quite commonly as HIPAA-BT), and tourism, which were all central to Naidu's strategy for attracting foreign investment into Andhra Pradesh, have all tended to be emphasized at the expense of rural development.²⁰ Let me explore this further by talking about one such state initiative to enable biotech innovation in the Hyderabad area.

This is the ICICI Knowledge Park, which consists of a set of infrastructure facilities developed by the state government in collaboration with the private venture capital and financial services company ICICI. It consists of a set of laboratories that can be leased out to companies who want to set up research facilities. The rationale for this, according to Naidu, is that "a lot of multi-nationals are interested in doing research in India because of the availability of high quality scientific manpower" (Naidu 2000, 147). This is a rationale, again, that is at complete odds with a rationale of doing *innovative* technology and *basic* research by local scientists. In other words, the structure of something like the ICICI Knowledge Park is best suited, from the perspective of the state's own investment in it, not necessarily to encourage basic, cutting-edge science locally but to encourage the setting up of facilities to do research at a fraction of the cost that it would take to do similar research in the West. This is, of course, research that will use state-subsidized infrastructure but will quite possibly translate into scientific and commercial advances that get re-exported back to Western markets, even though the stated rationale for such ventures is that some of the value generated will remain in India.²¹

The Park is conceived as an idyllic research environment. All the labs are

extremely open, and a lot of the space has been given to terraces that look out over fields, fountains, and ponds, with a number of ducks thrown in for good measure. Indeed, this is an aesthetic that ICICI is consciously trying to cultivate, as was evident from constant and anxious questions asked to me by the CEO of the Park throughout my visit as to whether everything looked scenic enough. It certainly did.

ICICI's job here is to act as an estate manager and provide the enabling conditions for companies to get together and do work in a workspace where a number of labs are in close proximity to one another, thereby presumably encouraging collaboration. While the job of ensuring smooth execution is ICICI's, the land has been made available by the Andhra Pradesh government (this area is part of a tract of land designated by Naidu's government as "Genome Valley"). The Park has its own substation providing the labs with electricity, and it has created its own tank to hold rainwater, thereby taking care of the two big worries that plague any wet-lab researcher in India. Also, the Park is not meant for companies with manufacturing facilities, as manufacturing would lead to pollution. The state government has declared a twenty-five-kilometer zone around the Park as a no-pollution zone.

The built-up area when I visited in summer 2001 had space for ten labs, and there were plans to erect more buildings in the future. One of the central features of the Park is a customs shed. A major problem that Indian researchers face is the absence of a standardized import policy for research materials, which means that quite often valuable and perishable materials languish in customs sheds without ever reaching their intended recipient. ICICI, however, has ensured that any research materials coming to the companies housed in the Park would be delivered straight to the Park, where the customs officials would come the next day and clear the material. (This, of course, is yet another enabling feature that is "provided" by ICICI but actually enabled by the government.)

Parks like these raise a number of questions, and in India the immediate one is whether such ventures are huge steps toward becoming a "developed country" or a "global player," or whether they are simply white elephants. The answer may well depend on who rents the lab space in the Park. While in the three years of its operation, a number of start-up ventures have leased space in the Park, Indian industry has never been geared to take risks, as it has grown

up in a largely protectionist environment. The brief high-tech boom and the desire of NRI entrepreneurs based in Silicon Valley (who see in Naidu a great supporter of their own wishes to transport a "culture of innovation" into India) notwithstanding, India is a long way off from having what might be called a start-up culture, certainly in biotech. ICICI believes that providing the enabling infrastructure for starting up companies will change this, but an adequate material environment alone does little for entrepreneurship unless it articulates in creative ways with both long-term capital sources and a certain sort of ideology of risk taking that is necessary for an entrepreneurial culture to take root.²² Another problem that industry has to tackle is the question of how to leverage academe as an incubator. It is particularly ironic that a "start-up space" is being envisaged forty kilometers outside Hyderabad, when the city itself has some of the top academic life science research institutions in the country, such as the Centre for Cell and Molecular Biology (CCMB).²³

The biggest question, however, comes back to the role of the state government. The tragedy of water reservoirs being created and used for high-tech "global" research in what is not a water-rich region, and the gifting of land by the government for the Park in a state that has seen a spate of farmers' suicides over the past decade as a consequence of unbearable debt, are structural manifestations of global capitalism that have to be taken especially seriously in Andhra Pradesh, a state with revolutionary peasant movements completely inscribed in its history and present.

The land in itself is easily made available by the state government because 10 percent of the land around Hyderabad belonged to its precolonial ruler, the Nizam, and is known as *sarf-e-khas* (literally implying crown land, or land of the king). The government still has control over these lands to dispose of as it pleases. Real estate has boomed in Hyderabad over the last decade, in large measure because the government has encouraged the growth of high-tech so assiduously. Thus the land in areas like Shamirpet, where the Park is housed, has become extremely valuable, but this area itself was not significantly agricultural land. Therefore the government has not had to appropriate land for ventures like the Park. To this extent, the Park does not represent a dispossession of agricultural land for high-tech development. What it does represent is an index of the priorities of the Naidu government, especially a vision of development that has involved leapfrogging the agrarian sector.²⁴

What makes it so easy to conceive of such land as somehow “ideal” for setting up high-tech enterprises is a conception of these areas as simply the extension of Hyderabad city. The Park is itself located close to Turkapalli village, which is officially a part of Rangareddy district. It is, however, roughly halfway between Hyderabad and Medak, the district headquarters of Medak district. A few figures from the 1991 Andhra Pradesh census indicate what a stark difference exists between urban Hyderabad and the surrounding rural districts that are being made into an extension of urban Hyderabad.

Hyderabad has a literacy rate of 71 percent, compared to 49 percent for Rangareddy district and 32 percent for Medak district. In a 217-square-kilometer area, Hyderabad has 177 hospitals and 1,062 high schools. In a nearly 7,500-square-kilometer area, Rangareddy district has only 45 hospitals and 1,032 high schools. In a nearly 10,000-square-kilometer area, Medak district has 49 hospitals and 1,363 high schools.²⁵ Twenty-one percent of the population of Rangareddy district is involved in cultivation and agricultural labor, as is 35 percent of the population of Medak district (compared to 1.4 percent of the population of Hyderabad). In other words, stark differences exist in the levels of development between the city and the countryside, which are presumably to be bridged by some inchoate notion of wealth trickling down.

It could be argued that the networks between Hyderabad and Silicon Valley are in many ways stronger than those between Hyderabad and Medak. Even the relationship between Hyderabad and Silicon Valley emphasizes various histories and trajectories of indebtedness. The very opening up of the Indian economy to global capital flows that has enabled the easy repatriation of capital and expertise from Silicon Valley back to India stemmed, as I have mentioned, from a situation of state indebtedness. The interest taken by the Silicon Valley entrepreneurs, as I will show in greater detail in chapter 5, comes from a feeling of indebtedness toward India, as many of these entrepreneurs received a highly state-subsidized higher education in India before leaving to settle down in the United States. The solution to India’s balance-of-payments crisis led to the implementation of IMF/World Bank structural adjustment policies that exacerbated the indebtedness of local farmers, a situation that is part of Andhra Pradesh’s political economy to the extent that it is not in any other part of India. The regional political complexities arising from Naidu’s government being subjected to the constraints of representative de-

mocracy (an indebtedness to the people of the state for being in power in the first place), and of a state that has a history of both peasant revolutionary movements and movements from autonomous statehood for Telengana, further serve to accentuate the particularities within which biotechnology transfer, a supposedly seamless homogenization of India’s market culture with that of Silicon Valley, and a form of “technology transfer” that is completely about global capital flows, actually manifests on the ground.

Wellspring Hospital

Michael Fischer, adapting an imaginary from Gilles Deleuze, proposes the term “ethical plateaus” as a means of thinking about the intersections and interactions of different technologies and ethical-political emergences in ways that are always already stratified (Fischer 2001). One lens through which the tactical emergence of ethical-political terrains can be viewed is clinical trials, which are techniques within which values, in all senses of the term, get incorporated. I wish here to talk about clinical trials in an Indian context by drawing on some of my fieldwork at the Centre for Biochemical Technology (CBT) and its associated start-up, Genomed.

As mentioned in chapter 1, Genomed is a start-up that has been seeded by CBT in partnership with the Indian pharmaceutical company Nicholas Piramal India Limited (NPIL). There were two physical lab spaces in which Genomed is housed, very different from each other. There is one Genomed on the premises of CBT in Delhi, and another in a private hospital owned by NPIL, Wellspring Hospital, in Mumbai.²⁶

The two Genomed sites quite literally represent different worlds and different forms of life and indicate vividly how place matters in understanding technoscientific production in situated and complex ways. On the one hand, there is the evidently different environment in which the two branches of the company are located: one drawing directly on all the academic researchers, facilities, and work happening in CBT, the other not, for instance. But there is also a difference in the types of work being performed at the two. In addition to doing population genomic research on schizophrenia (which parallels similar projects being done on asthma and type 2 diabetes in Delhi), Genomed Mumbai also studies pharmacogenomic drug response in clinical trials.²⁷

Wellspring Hospital is primarily an experimental site rather than a therapeu-

tic one. It is, indeed, a “five-star” hospital in appearance: glittering marble floors, comfortable sofas littering the hallways, and hospital beds with bright yellow bedcovers all make Wellspring seem more like a hotel than a hospital, and very different from, say, the All Indian Institute of Medical Sciences, India’s premier referral hospital in Delhi, with which CBT Delhi has collaborative projects under way. What makes Wellspring even more unlike anything resembling “normal” Indian hospitals is the striking and almost complete absence of patients.

This absence is because the major interventions that take place at Wellspring are clinical trials. A stated purpose for ventures like the Human Genome Project, or studies of genetic variability such as the SNP analysis that I described in chapter 1, is that they make the process toward developing a therapeutic molecule more rational. However, the path from DNA sequence information to the development of a drug is extremely tortuous, for both scientific and business reasons. Scientifically, this is because the genetic etiology of disease is extremely complex and multifactorial. In terms of business rationalities, it is because an increase in the number of targets for the development of a therapeutic molecule, which is what genomics provides, does not necessarily decrease the high capital risk associated with drug development for biotech and pharmaceutical companies. There is a tendency among the latter, in any case, to make drugs for existing indications (the so-called “me too” drugs) because, in a certain market calculus, that is less risky than searching for drugs for new indications. They also have very little guarantee of success.²⁸ The risk for drug development companies here operates at two levels — the three phases of clinical trials, especially phase 3 trials that need to be performed on a few hundred to a few thousand volunteers, are extremely capital intensive. Also, even a small percentage of adverse responders could lead to the drug not getting FDA approval for marketing in the United States.²⁹

While the genetic etiology of disease is complex, that of drug response is relatively simple and is associated with the Cytochrome P450 group of drug-metabolizing enzymes. Therefore it is expected that the safety profile of a drug correlates strongly with the patient’s Cytochrome P450 genetic profile.

Pharmacogenomics is the correlation of genetic profile with response to drugs. Because the genetics of drug response is so much less complex than the

genetics of disease, pharmacogenomics is much more easily realizable than developing therapy based on DNA sequence information. Meanwhile, if patients can be stratified based on their likelihood of developing an adverse response to a drug, then it might be possible to market a drug only to that segment of the patient population who are *not* adverse responders. This could save millions of dollars for pharmaceutical companies, who might otherwise see drugs like Pfizer’s Trovan fail to come to, or stay on, the market altogether because of an adverse response of a small percentage of people taking the drug. Thus pharmaceutical companies are extremely interested in pharmacogenomics. The key here is how the epistemic reconfigurations promised by genomics — such as allowing correlations between genetic profiles and response to drugs — implode completely with economic considerations. The emergence of particular rationalities of clinical trials is completely a coproduction of economic or market considerations and possibilities with epistemic possibilities, each providing the conditions of possibility for the other.³⁰

In addition to the money that could be saved for pharmaceutical companies by incorporating pharmacogenomics into their clinical trials regimes is the money that could be saved by taking the trials to the so-called Third World, where trials are significantly cheaper to perform. While Wellspring/Genomed does research on the genetics of schizophrenia and type 2 diabetes, a third major project, and potentially its most lucrative one, concerns pharmacogenomics.

The pharmacogenomics work is explicitly conceived of as research that can be of interest to Western biotech and pharmaceutical companies that might wish to contract clinical trials out to Wellspring/Genomed. But the resource in question that would make this attractive is not just the emergent pharmacogenomic capabilities in India as a result of state investment in biotechnology, but the *population*. As the director of CBT and board member of Genomed S. K. Brahmachari admits, India’s cross section of populations covers the spectrum of the world’s populations. “If they want Caucasians, we’ll give them Caucasians; if they want Negroids, we’ll give them Negroids; if they want Mongoloids, we’ll give them Mongoloids.”³¹ Thus India becomes the melting pot of clinical trials.

The idea that a local pharmaceutical company would invest in building a

state-of-the-art hospital almost solely as an experimental site in itself makes Wellspring an interesting institutional component of a genomic assemblage. What makes it even more interesting, and pertinent in terms of my arguments for situating ethical understandings in political economic contexts, is the larger urban ecology within which Wellspring is situated.

Wellspring is located in Parel, in the heart of downtown Mumbai, but also in the heart of the part of Mumbai that houses the textile industry. Mumbai's economy grew largely on the strength of a textile industry that rapidly disintegrated through the 1980s and 1990s, leaving visible from the windows of Wellspring the empty shells of once prosperous mills.³² Parel, therefore, is teeming with unemployed millworkers, who have gone through periodic cycles of unionization over the last decade, but whose struggles to reoccupy and reopen the failing mills have probably, once and for all, ended in defeat. Hospitals like Wellspring now abut both the poverty of recent deindustrialization (a very different space of poverty from that of, for instance, Daravi, widely regarded as Asia's largest slum) and the new wealth that is displayed through other monstrously glamorous erections, such as a nearby shopping mall that sells a range of foreign brand-name consumables that can be afforded only by the rapidly ascendant middle-class consumer population. Such shopping malls are clearly, at least partly, built in anticipation of the mills finally being torn down and replaced by high-rise apartment blocks, since Parel represents prime real estate in a city with some of the most expensive real estate prices in the world.

In other words, Wellspring's location in Parel is almost certainly not accidental, as there lies available to the researchers a huge unemployed local population that ends up being easily recruited into clinical trials, which do, after all, compensate their volunteers. Even if the correlation between the hospital's locality and the nature of the work performed is not direct or premeditated (something I have been unable to ascertain), there is at the least an incongruent breaking of a pattern that is otherwise prevalent in Mumbai. Normally, private hospitals tend to be located in elite areas, whereas Wellspring is an unusual example of a private hospital located in a mill area.³³

The ethics of such clinical trials can only be understood and evaluated if situated within the local ecologies of their conduct, ecologies that trouble the

very notion of a trial "volunteer" in ways that are not relativist but situated and historically, materially produced. Just as Marx describes the forced proletarianization of the working class during the Industrial Revolution in volume 1 of *Capital* (Marx 1976 [1867], 873–942), so one can see how forced deproletarianization as a consequence of the crippling contradictions of capitalism leading to the virtual death of an entire industry in Mumbai leads in Parel to the creation of a new population of subjects who are created as sites of experimental therapeutic intervention.³⁴ What is at stake here is not simply a judgment of the dubiousness or other character of clinical trials recruitment strategies on their own terms, but rather the question of how regulatory and ethical regimes of pharmaceutical governance happen on the ground. Specifically, what is at stake is an understanding of the relationship between national-global enterprises of clinical trials and local forms of indebtedness.³⁵ In this process, biosociality itself gets configured as a relationship between vendors and clients, just as globalization is.

Conclusion

In this chapter, I have looked at the co-constitution of biopolitics with global capital flows, which are themselves constituted by relations of indebtedness, leading to localized, particular manifestations of global technoscientific capitalism, and raising questions, simultaneously, of exchange (a Marxian concern) and governmentality (a Foucauldian concern).

My comparisons highlight the particularities of place. But once again, the comparisons between Wellspring and the ICICI Knowledge Park are not meant to be symmetrical. Rather, they are situated juxtapositions that highlight forms of incongruent manifestations of the apparently homogenizing process of installing a "start-up" culture. Of course, these particularities have everything to do with local histories, such as that of Mumbai's textile industry or the history of rural development in Andhra Pradesh, which are themselves conditioned by historical, global relations of production.

The history of the Mumbai mill districts is too long and rich to do justice to in this chapter. Briefly, I have hinted at Mumbai's transformation away from being a center of the textile industry toward being almost exclusively a business center—a transformation from commodity to commercial capitalism,

leading to massive retrenchment among Mumbai's textile workers, most of whom live in the mill districts of the city, Parel and Byculla. Most of these retrenched millworkers now make their living either as sidewalk hawkers or as security guards in newly built shopping malls.

There is considerable union activity in Parel. Through much of the 1980s and 1990s, the unions focused on reopening mills, but they now focus primarily on documenting retrenched workers and their qualifications and ensuring both tenancy rights and employment for them in new real estate and businesses that come up in the mill districts.

The trope that union leaders use to describe the changes taking place in Mumbai in terms of the lives of the workers there is *sacrifice*. For instance, Datta Isswalkar, the founder of a community organization demanding the right of retrenched workers to work, describes the consequences of Mumbai's rapidly changing landscape (both built and market) in the following terms:

Har waqt gareeb ka hi bali kyon dete ho? Hum to development ke khilaaf hain hi nahin. Lekin iske jo sufferer hai, uske liye kya suvidha aapne banaaya? Woh kyon har waqt wohin piche rahen? Mera kehna hai ki poore duniya ke saamne globalization ke jaap karte ho, vikas ki baat karte ho, lekin har time vikas aur globalization mein jo bali jaata hai woh gareeb jaata hai. . . . Investor yehi dekhte hain na, ki security hai ki nahin usko? Lekin mazdoor apni suraksha nahin dekhta? Usko adhikaar nahin chahiye? Yeh kaunsa satya hai? Iska matlab, vittha, capital ko aap zyada mahatva de rahe hain insaan se? To yeh kaunsa vikas hai bhai? Yeh kaunsi globalization hai?³⁶

[Why do you always sacrifice the poor person? We are not against development. But the sufferer of this, what help have you created for him? Why should he always lag behind? What I'm saying is that you go on about globalization to the whole world, you talk about development, but every time the person who gets sacrificed by development or globalization is the poor person. . . . After all, don't investors look to see whether they have security for their investments? So shouldn't the worker also look for his security? Does he not want rights? What sort of truth is this? This means that you are giving capital more importance than people? What sort of development is this, brother? What sort of globalization is this?]

The story of Parel, then, can be situated along two theoretical frames. The first is the Marxian frame of proletarianization and deproletarianization, hav-

ing to do with shifting modes of production, the collapse of textile manufacturing, and the experimental recruitment of retrenched workers.

The second is a biopolitical frame. Michel Foucault's notion of biopolitics is an account of the ways in which, through techniques of normalization, standardization, visualization, and enumeration, populations get included, and thereby *accounted for*, within "state rationality" in its broadest sense. In an elegant inversion of this logic of *inclusion* of populations into a biopolitical calculus, João Biehl shows how biopolitical techniques of governance, in the case of the management of AIDS by the Brazilian state, create an *excluded* population—an exclusion by systems of enumeration of afflicted, treatable, and treated patients that, as integral to the rationality of such enumeration, *fails* to count those who, as a consequence, are left to die (see Biehl 2001; Biehl et al. 2001).³⁷

Both in Biehl's case and in Isswalkar's description of the situation in Mumbai, the excluded population in question is a *sacrificial* population. When this excluded population gets incorporated into logics and circuits of global capitalism (such as into clinical trials regimes), however, this population shifts away from being sacrificed to being *consumed*. The worker's body becomes available to systems of capital, and also to systems of science, as a source of value generation, and as a source of knowledge production.

Scholars such as Biehl and Susan Greenhalgh (2003) in her work on China show how *acts* of state enumeration have as integral to their logic and method *inactions*; "seeing like a state," to use James Scott's phrase (see Scott 1999), leads to certain forms of blindness *as a part of the rationality of a certain mode of seeing and accounting for the population*.

Similar Marxian and biopolitical frames of reference present themselves in the Andhra Pradesh story, though the particularities and historical specificities are different. The stories of the Andhra Pradesh government creating a culture of technoscience in and around Hyderabad by embracing ideologies of innovation and technology transfer necessarily involves configuring state priorities, and state subjects, in certain ways that lead to exclusions, primarily an excluded population of indebted farmers, whose interests do not get accounted for in circuits of global capital flow.³⁸

The thick historical and institutional contexts within which such biopolitical emergences take place, of course, are hardly so simple; even exclusion is not

seamless. The biggest contradiction that faced Naidu in his attempts to create a culture of innovation in the Hyderabad area has to do with the fact that he himself was subject to the vicissitudes of representative democracy. In other words, it is the excluded population of local peasants who vote politicians like Naidu into or out of power, not the Silicon Valley entrepreneurs or IMF/World Bank experts. This is a contradiction realized both by Naidu and by Western free market ideologues.

Therefore, on the one hand, part of the art of Naidu's governance is his ability to give audience, and a certain form of voice (albeit not necessarily equal voice) to both sets of interested parties, free market capitalists and indebted electorate. For instance, it was possible for me (no doubt aided by the symbolic capital of being a graduate student at MIT) to get an appointment with Naidu simply by e-mailing him out of the blue. On the other hand, the complaints of NRI capitalists and the Indian middle class regarding India's poor competitive position in global markets with respect to, especially, China represent a thinly disguised dismay at the constraints imposed on an unbridled exercise of the free market by representative democratic mechanisms. This is evident, for instance, in a special issue of the *Economist* published in 2001 that surveyed the first decade of India's economic reforms. The last section of the *Economist* survey calls itself "A Management Guide: How to Run India Inc." It starts by saying that "if India were listed on the stock market, it would be a juicy takeover target. A corporate raider would see an enterprise that has raised its game in the past ten years but remains constrained by caution. Surely India's assets could deliver higher returns under new management" (Unger 2001, 19). It becomes evident that only certain prescriptions can flow from a framing of "India Inc." as a "takeover target" for a "corporate raider," India simply needing "correction" so that it can achieve its "full potential." What needs "correcting," not surprisingly, are things like "wages and salaries," which need, of course, to be corrected with that wonderful attribute of the Wall Street trader, "draconian pragmatism" (ibid.).

In Parel, a different regime of biopolitical inclusion and exclusion is at work. This is the enrollment of a certain population that has become excluded from mainstream economic activity because of the radical collapse of the city's major industry, getting recruited then as subjects in clinical trials, thereby becoming,

quite literally, both source for genetic material that enters extremely contested circuits of exchange, and also *experimental subjects*.³⁹

Thus the stories about the Park are about the types of policy prioritization and consequent neglect and alienation of certain sectors required for a culture of innovation in biotechnology to take root in India. While the story of Parel is also one of global capitalism, it also concerns the effects of the *epistemic* changes being brought about by genomics and biotechnology.

In chapter 1, I talked about the indignation of Indian public scientists at what they perceived to be the expropriation of Indian genetic material by Western researchers or companies. I pointed to the irony that the mechanisms of preempting such acts by the Indian state were market mechanisms, implying that the state acted as if corporate; but here the irony is doubled as, *at the same time* that the state acts as a quasi-market agent to protect "Indian" interests against Western corporate interests, it acts (through the company it seeds) as a full-blown market agent in making Indian populations available to Western corporate interests as experimental subjects. Of course, in such situations, Wellspring/Genomed becomes a contracting agent, so at one level, this is simply a consistent enforcement of the desire on the part of the Indian state that the same market principles that get applied by Western companies contracting with other Western corporate entities also get applied when these companies do business with "Indian" genetic material.

The incongruence arises because, in relationship to the state, populations such as the unemployed millworkers of Parel are configured as a particular type of subject, *citizen*.⁴⁰ Indeed, it is precisely the *citizenship*—a modernist category of representative democracy—of peasants in Andhra Pradesh that allows them, by virtue of their ability to vote, to bring friction into the seamless imaginary of technology transfer that Naidu would otherwise have bought into. The biopolitical incongruence of the Parel population resides in the way in which they become, simultaneously, *experimental subjects* and obligatory nodes in systems of global exchange consequent to their citizenship. It is, after all, a consequence of citizenship that the people from whom Rep-X collects samples get represented by the Indian state, which enters into contractual relationships to act on behalf of, or in the name of, the sample donors. It must be remembered that the populations from which Rep-X collects samples and

the population of Parel are not necessarily, or at all, overlapping; however, they do share the subject position of citizenship and thereby get interpellated into particular relationships to the state, market, and state-market formations.

Adriana Petryna proposes the term “biological citizenship” in her analysis of Chernobyl survivors in Ukraine (Petryna 2002). In her formulation, these survivors, who are also citizens of the new nation-state of Ukraine (which is itself built on the debris of both Chernobyl and the former Soviet Union), *configure* and *perform* their citizenship by virtue of their status as victims of radioactive fallout. Reparations for Chernobyl victims are integral to — indeed, are defining of — Ukraine’s legitimacy as a nation-state distinct from the Soviet Union. However, these reparations can only be constituted by systems of enumeration such as acceptable radioactive exposure that qualifies for reparation and designates victims as quantified (and therefore qualified) in certain ways for remuneration. These systems of enumeration exist in specific relationship to an emergent idea and institution of a nation-state that has been constituted in the shadow of radioactive catastrophe. In other words, Petryna argues, the very conditions of constitution of citizenship in Ukraine are biological.

In India, an older nation-state than Ukraine, citizenship preexists such (in the case of Ukraine, catastrophic) moments that instantiate the *biological* as underlying a citizenship order.⁴¹ This is evident in the Andhra Pradesh stories, which show citizenship to be quite similar to what liberal political theory tells us it is — a right to exercise electoral franchise. In Parel, however, citizenship gets reconfigured.

More generally, this reconfiguration occurs alongside the *epistemic* changes that genomics, always already overdetermined as market science, makes possible or brings about. What one sees here is the ability of information to describe “life itself,” and to accrue value through insertion into transnational circuits of exchange. This reconfigures subjectivity in ways that turn populations into source (in intellectual property considerations), experimental subjects (in clinical trials regimes), and obligatory passage points without which the global exchange networks that get constituted could not thus be constituted. Since it is the Indian *state* that happens to be the most entrepreneurial agent in Indian biotech today, the relationship of this emergent subjectivity to citizenship comes to be at stake. This is especially so when the state enters into

market contracts that involve populations that it claims to represent by virtue of its statehood. Even if the citizenship in question does not exactly parallel the biological citizenship Petryna speaks of, there is no question that a component of citizenship at stake in these emergent, global, postgenomic transactions is undeniably “biological,” and equally configured by relations of indebtedness at multiple levels.

The first part of the book, then, has been concerned with circulation. This is a circulation, as I have argued, that can be described and discerned in two distinct narrative registers or ethnographic perspectives — that of circulatory systems, with the vital importance of the obligatory passage points of those systems; and that of particular locales, with the vital importance of the fact that these locales are positioned within global circulatory systems.

I do not wish here to preordain the consequences, for whomever and in whatever form, of the circulatory processes I am studying. At the same time, I do not resist this preordination to fetishize, instead, the empirical, local, or agential, in a fashion that *reduces* outcomes of processes that are undeniably constrained by the structural edifices within which they are contained (or fail to be adequately contained) to mere contingency.

The first two chapters have dealt with the conditions of possibility of exchange, and the tendential ways in which these processes of exchange, which always already relate to value in both senses of the word, manifest on the ground in different globalizing locales. The second part of the book concerns the ways in which globalizing regimes of exchange (both technological and market) articulate. Chapter 3 investigates the promissory grammatical structure of biocapital that structures the operations not just of corporate statements (public relations) but also of scientific statements (facts). Chapter 4 maps the forms of individual and social subjectivities that get configured through such grammars of promissory articulation that concern “facts” about “life itself.” Chapter 5 outlines the underlying belief systems, such as nation and religion, that form the grounds or conditions of possibility or the terrains of enablement for such forms and practices of articulation. And chapter 6 provides a case study of some of my arguments throughout the book in an ethnographic account of a San Francisco-based start-up company.

their becoming commodities. In the process, a business model whose value depended on the creativity of graphic designers shifted to become one where the designers became alienable, dispensable, replaceable units of an assembly-line manufacturing process, while software programmers became the integral creative center of the company, mere “plumbers” no longer.

This coexistence of the alienated with the cultic is an essential dimension to labor issues in capitalism writ large and allows an analysis of capitalism as a *hegemonic*, rather than a merely coercive, formation — and thereby a formation that has enduring social power in spite of its multiple contradictions. Indeed, I mentioned in my story of Genentech in chapter 5 my informant’s surprise at the cultlike feeling of invincibility of Genentech employees despite the fact that most of them had “pretty crummy jobs.” It is the multiple ways in which magic imbricates not just the objects and discourses, but also the *sites*, of capitalism that animate the fetishes of capitalism and provide it its performative force and social power.³⁹

I have used GeneEd, in concluding this book, as an emblematic site through which to explore and illustrate some of my larger arguments relating to biocapital. These arguments have related to the performative conjuration of techno-corporate futures, the continued alienation of labor in high-tech capitalism (as Marx diagnosed for industrial capitalism), and the cultlike fetishes that animate techno-corporate activity, especially in the United States.

Coda

Surplus and Symptom

In conclusion, I return to this book’s originating claim: that biotechnology represents a new face, and a new phase, of capitalism. This might seem to be a difficult statement to sustain, because the coproduction of life and capitalism is in itself not new. It is, historically, especially seen in the green revolutions of the 1960s, leading to new methods and institutional arrangements of agricultural production, new discourses and strategies around the management of risk, and new safety and lifestyle concerns as articulated by an emergent environmental movement. Both states and corporations were involved in such reorganizations.

Biocapital thus does not represent a new phase of capitalism in a temporal sense. Instead, as I argued in the introduction, my sense of the relationship of biocapital to systems of capitalism writ large is similar to Jean-François Lyotard’s sense of the relationship of postmodernism to modernity — a constitutive component of a larger set of institutions, regimes, and practices that are themselves defined and exceeded by their incongruent components.

At the same time, there is an uncanny sense that something new is happening here. Part of this sensibility of novelty is due to the very discourse that sustains biocapital — for instance, the hype that is such an integral part of the biotech industry (and this hype itself, of course, is not necessarily such a new thing but can be located within the very discursive ethos of American nation building and nationalist consciousness). Another part of this sensibility is due to the fact that there are new institutional and technological assemblages that are being presented to us, new events that herald novelty. These include, to name some of

them I have talked about in this book, DNA patents; the SNP Consortium; the ability to make sensible information out of biological material at speeds and resolutions that were earlier inconceivable; global benefit sharing agreements; biotech start-ups in India; knowledge parks; venture capitalism in high tech; new arrangements for technology transfer between academe and industry; the generation of the working draft sequence of the human genome; the dot.com boom and bust; automated sequencing machines; DNA chips; personalized medicine; genomic-based diagnostic tests; pharmacogenomics; globally standardized clinical trials regimes; World Trade Organization–mandated trade and intellectual property practices; nonresident Indian entrepreneurial communities in the United States; patient advocacy groups; consumer genomics, population genomics; and direct-to-consumer advertising. At the same time, some very old patterns of resource extraction and global inequities persist, even if they articulate or are resisted in new ways.

But a good part of the sensibility of novelty that we might experience is also conceptual, as the humanities and social sciences attempt to keep pace with events and emergences that are undoubtedly *rapid*, regardless of their novelty or familiarity. Michael Fischer poses the challenge to, and potential of, anthropological research in keeping pace with and making sense of what he calls “emergent forms of life,” where, he says, “life is outrunning the pedagogies in which we were trained” (Fischer 2003, 37). The theoretical challenge, then, is not to abandon these pedagogies, the conceptual inheritances with which we formulate our explanations and descriptions, but to *recalibrate* them. In other words, the question is, What work does old vocabulary do in the face of new events and articulations, and when and with what sorts of new vocabularies do we need to come to terms with them?

Michel Foucault, as I have mentioned at a number of points in this book, argues for the constitution of the modern subject at the intersections of life, labor, and language (Foucault 1973). All three have been distinct themes throughout this book—life, especially, as the recalibration of life as a credible future that can be invested in, life as a business plan (chapter 4); labor, especially, as the labor of consumption, of consuming as a sovereign consumer or of being consumed as an experimental subject (chapters 1, 2, 5, and 6); and language, as in the discourse of hype and hope, salvation and messianism

(especially chapters 3 and 5). But the question for Foucault remained one of how these intersections rearticulate at different moments in history to *constitute* modernity as some kind of temporally intelligible (if not temporally seamless) concept.

Paul Rabinow argues that Foucault, during the course of his writing, transformed his initial understanding of modernity as an epoch into an understanding that is based on “a new philosophic relationship to the present” (Rabinow 2003, 14). This relationship, according to Rabinow, is

one in which modernity was taken up not through the analytic frame of the epoch but instead through a practice of inquiry grounded in an ethos of being oriented toward the present, of contingency, of form-giving. Perhaps today one, but only one, significant challenge of forging a modern ethos lies in thinking about how to relate to the issue of anthropos. . . . What if we took up recent changes in the logoi of life, labor, and language not as indicating an epochal shift with a totalizing coherence but rather as fragmented and sectorial changes that pose problems, both in and of themselves and for attempts to make sense of what form(s) anthropos is currently being given?¹

The analytic problem of articulating biocapital as a novel form of capitalism is similar to the problem of depicting modernity as an epoch that Rabinow outlines here. A solution, as he indicates, is to resist an attempt at a totalizing formulation of a contemporary structure and instead to proliferate accounts of the fragments that constitute (and, indeed, exceed and surprise) such structures.

Rabinow, then, proposes a way to account for *epochs*, for those concepts of structure that structure our own understandings of the presents we live in, in terms of *contingency*. But there is a related analytic problem that is still at stake and unresolved. This is the parallel problem Fischer poses, of understanding *emergence* in terms of *structure*. In other words, if contingent, fragmented, multiple reality constantly exceeds our structural boundaries, then at the same time rapid, incongruent, emergent reality constantly calls for some kind of conceptual grounding, however provisional, in a kind of structural framework. Biocapital as a concept attempts, on the one hand, to point to the *insufficiency* of capitalism as an explanatory structure for rapid emergences in

the life sciences and biotechnologies but, on the other hand, tries to provide, through the vehicle of received theoretical inheritances, familiar words and concepts through which to ground these emergences that otherwise threaten to overtake our pedagogical limits.

Biocapital, then, is always already all too new and all too familiar; all too specific to new emergences in the life sciences and all too general a symptom of a rapidly mutating political economic structure that we call "capitalism." I wish to point to two themes that I believe need emphasis in order to go beyond the argument that the emergence of a global commercial genomics has had structural effects driven by particular, sometimes new, forms of value creation and exchange networks. The first is that new epistemic and technological assemblages such as genomics can only be understood through an analysis of the market frameworks within which they are emergent. The second is the argument that an understanding of globalization needs an accounting of its biopolitical dimensions, but that equally, an understanding of biopolitics needs an accounting of its global dimensions.

Subject to Surplus, or Symptomatic Speculations on Biocapital

Let me begin this section by referring to the story of Wellspring Hospital in Parel, Mumbai, which was the subject of analysis in chapter 2. This is the story of a hospital located in Mumbai's mill districts that houses a genome start-up, Genomed, which is seeded partly by a public institution, the Centre for Biochemical Technology (CBT), and partly by a local pharmaceutical company, Nicholas Piramal India Limited (NPIL). This is one of a number of attempts in India that I have mentioned in this book that seeks to imitate an American "start-up culture." A major research focus at Wellspring/Genomed is pharmacogenomic drug response in clinical trials, and major proposed clients for these clinical trials experiments are Western biotech and pharmaceutical companies. The subjects on whom these experiments will be performed are, according to scientists I spoke to at Wellspring, most often unemployed millworkers in Parel, an area that has, over the last twenty years, seen the dramatic disintegration of the textile industry that formed the basis of the local economy for much of the twentieth century.

I argue that the experimental subjects in Parel are *subject to speculation*, where speculation means, simultaneously, two different things. On the one hand,

they are subject to the speculative enterprises of capitalism, both those of Western companies seeking to outsource clinical trials and those of the Indian state attempting to leverage global market terrains. In that sense, the story I have told of Wellspring reflects an old story, of colonial expropriation of Third World resources, where the resources in question are the genetic information and medical records of the experimental subjects of Parel. What makes this different from a mere resource-mining exercise, however, is that these are *experimental* subjects. As Hans-Jörg Rheinberger (1997) has beautifully illustrated, experiment is a speculative exercise of a very different register, a practice of inquiry that is constantly open-ended. The experimental subjects of Parel get incorporated, quite literally, into the implosion of these two forms of speculative enterprise, having to do with the *market*, on the one hand, and with the *life sciences*, on the other. It is a flavor of this implosion that I hope to provide with the term "biocapital."

The logics seen in Parel point to *one logic* of biocapital, leading to certain particular forms of subject constitution consequent to certain enterprises of speculation. Let me now shift frames to another story I have narrated in this book (in chapter 5), that of the Bay Area consumer genomics company Genomic Health. The vision of consumer genomics as articulated by Randy Scott, CEO of Genomic Health, sees the intertwining of diagnostic technologies that will enable the generation of personalized, high-throughput biological information at the genomic level with communications technologies such as the Internet, leading to the emergence of networked biosocial communities. Consumer genomics is a highly individualized practice, and the key here is that *every* individual, because of his or her genomic risk profile, is a potential target for therapeutic intervention. In this calculus, every individual is a patient-in-waiting and, simultaneously, a consumer-in-waiting.

Here again, the subjects of consumer genomics are subject to speculation. On the one hand, they (we) speculate about their (our) genetic "days of reckoning," the illnesses coming at them (us) in the future, and act in ways relevant to that. Such action could, for instance, involve lifestyle changes, or preventive or prophylactic therapeutic intervention. On the other hand, these subjects are again part of a speculative market enterprise, constituting a potential market for companies like Genomic Health. The difference, however, is that while the subjects of speculation in the Parel case are marked by their class

position as a consequence of being *workers*, and therefore subject to the class logic of industrial capitalism, the subjects of speculation in Genomic Health's case are *all of us*, marked in this case as *consumers*, also consequent to class logic, this time of late or postindustrial or neoliberal capitalism.

We are faced with a complication while talking about biocapitalist subject configurations using the tools of Marxian political economy. This is that the relationship we are faced with in contemporary biocapital is not that of the *capitalist* to the patient-consumer but that of the *corporation* to the patient-consumer, and where market value implies value for the corporation, which depends on potential of the patient-consumer-in-waiting for therapeutic consumption over and above that which is necessary owing to illness.²

The corporation, conceptually, is a complicated beast. It is in itself a “capitalist” entity, but it is also answerable to “real” capitalists—who might be venture capitalists if the company is private, or might be Wall Street investors and stockholders if the company is public. If we are to extrapolate and use Marx for our contemporary purposes, we are faced squarely with the ontological question of what constitutes the corporation.

This is where reading volume 3 of *Capital* becomes interesting. It is at this late stage of his work that Marx first deals with the place of speculative capitalism, and with the emergence of the corporate form as a constitutive institutional *form* of capitalism. In fact, and most interestingly, Marx finds it very hard to do so, and his writing about the corporate form treats this form as somehow morally abhorrent. This is significant because throughout his writing Marx is arguing for a structural rather than moralistic analysis of capital (and hence, for instance, his famous tirade against the Young Hegelians in *The German Ideology*). I believe that this inability to deal with the corporate form can be explained by the likelihood that Marx, by the time he wrote volume 3 of *Capital*, was able to anticipate the (still emergent) corporate form in a manner similar to that in which, more than a century later, Slavoj Žižek would read capitalism. Žižek says:

The “normal” state of capitalism is the permanent revolutionizing of its own conditions of existence: from the very beginning capitalism “putrefies,” it is branded by a crippling contradiction, discord, by an immanent want of balance: this is exactly why it changes, develops incessantly—incessant development is the only

way for it to resolve again and again, come to terms with, its own fundamental, constitutive imbalance, “contradiction.”³

Žižek regards the mutations of capitalism as the means of its adaptation and evolution to a higher form. Marx too realized toward the end of his writings that this “higher” form was not necessarily the higher form of communism; it could also be the higher form of the corporation. In other words, Marx was to realize by volume 3 that the corporate or speculative form of capitalism could in fact present an alternative, *capitalist* realization of the contradictions of mid-nineteenth-century capitalism—and about this he could only feel discomfort in moral rather than structural terms.

The specificity of biocapital as a *biopolitical* form of capitalism lies in the fact that the symptom shifts away from disease manifestation and toward disease potential. This happens through exactly the same logics whether we are considering emergent life science epistemologies such as genomics or emergent pharmaceutical company tactics such as direct-to-consumer advertising.⁴ This indicates the implosion of the economic and epistemic that makes biocapital, in my opinion, something more than just the encroachment of capital on a new domain of the life sciences. Rather, the very grammars of the life sciences and of capital are co-constituted; life becomes a business plan. And the symptom is at the heart of this configuration.

My arguments here might appear to set up an incongruence, and it is one that is of some relevance to the narrative form that this book has taken. This is that the epistemology in question, which has indeed, I have argued, given “biocapital” its specific flavor, is that of the life sciences, especially as reflected in emergent techno-epistemic assemblages such as genomics. Obviously these are epistemologies that are inherently and in a direct way biopolitical. They draw their authority from the fact that they are scientific and therefore, by definition, universal. And yet, while the facts of genomics might indeed be universal, the biopolitical manifestations of genomics, as I have shown, are completely incongruent, manifesting in much “older” ways in India than they do in the United States.

Indeed, we are faced with a peculiar conundrum if we analyze epistemologies such as genomics, within the institutional and political economic frameworks that they both operate within and condition. While these epistemol-

ogies are placeless and universal by virtue of being scientific, the tactics of involved scientific-corporate actors are situated, conditioned by particular market regimes and legal, institutional, and policy frameworks. The task of tracing the former grammar, which happens to be a biopolitical grammar, is generally considered the domain of theory. The task of tracing the latter grammar, the grammar of cultural particularities, is similarly considered the domain of ethnography. The implosion of biocapital marks the implosion of a theoretical diagnosis regarding new configurations of subjectivity by the life sciences with an ethnographic diagnosis regarding new configurations of value generation by the American free market whose ideologies are increasingly globally hegemonic, but whose manifestations, as I have tried to show throughout this book, are hardly seamless in settings such as India.

Marx constantly argues for the importance of structural attentiveness in spite of the constant reality of tendential, incongruous, agential reality. In other words, incongruent manifestations of systems of exchange in India as compared to the United States are *not* merely contingent “exceptions” to a structural norm consolidated in the West. Rather, the exceptions are a *consequence* of these structural norms, their very evidence. The ways in which global systems of biocapitalist exchange—the explicitly Marxian concerns with value—manifest in India also *have to be analyzed in terms of structural logics*, even if (indeed, especially because) they are multiple, tendential, and contradictory.

A similar challenge faces theorizations of biopolitics: How does one account for incongruent manifestations of biopolitical emergences, such as modes of subject formation by emergent epistemological and institutional assemblages, without reducing these incongruent emergences, simply, to attributions of contingency? In other words, how can one theorize biopolitics “elsewhere,” in places that are *not* advanced liberal societies, but that desire to be like them? The relationship of the sovereign American consumer described in chapter 4 to the Indian experimental subject described in chapter 2, for instance, is most reductively attributable to differences in economic standing. The difference that I wish to mark here from such a direct structural argument is that the Indian subject position is not just a consequence of *subjugation* to hegemonic logics and dominant relations of production but exists because of

the *desire*, on the part of the Indian state, to buy into, and appropriate, these hegemonic imaginaries for itself, and for its selves.

In other words, there are two sets of relations to stay attentive to between, for instance, “India” and the “United States,” as two sites structuring this analysis of “global” capital. The first, undeniably, are structural relations of production. It matters to the ways in which biocapital manifests in tendential fashion in the two locales that one of them is richer, stronger, and more powerful than the other. Indeed, similar structural logics operate within the United States, which is why the subjectivity of sovereign consumer does not automatically accrue from genomics to racially marked subjects, for instance.

But the second, again, has to do with *symptomatic* relations, with the fetish, this time of an American value system. This is a particular conception of the free market that is enforced not just through ideological mechanisms but through actual material structures, such as, for instance, World Trade Organization–mandated intellectual property regimes, which are considered across the board within India as regimes instituted to further American global economic interests (even by those who argue that India should be a willing and active participant in such regimes). And yet the ideal of the American free market becomes the value system that Indian actors, whether they are entrepreneurs based in Silicon Valley or state actors based in Delhi, desire to buy into. Indeed, power differentials between the United States and India can no longer be reductively attributed to differences in “facilities,” the standard reason given by Indian scientists a decade ago for the relative impoverishment of scientific output compared to that in the United States. Indian public biology labs today have, or have access to, many of the state-of-the-art technologies that compare to those of top American labs (just as American biotech companies occasionally have leaky ceilings). The real power differential between the two locales lies in the ways that global imaginaries get structured, where doing science, and structuring the market *in the image of America* becomes the driving motivation for Indian techno-capitalist actors, the inverse never being the case. Indeed, it would be hard to suggest what a countervailing Indian vision or imaginary for the conduct of either technoscience or political economy would be.

I do not wish to attribute this desire to be “as if American” to a Marxian false

consciousness. Indeed, as I argued in chapter 1, such Indian responses demand instead what Rosemary Coombe calls an ethics of contingency, a willingness to defer judgment on actions constrained by global inequities, but also enabled by global desires, to a future that is yet to come. But I do wish to diagnose a site of American global techno-capitalist hegemony, which resides in the realm of the construction and sustenance of imaginaries that the rest of the world, quite literally, buys into, even if in incongruent ways. It is because the *imaginaries of the American free market* become such global objects of desire—become *symptomatic*, indeed, of global power relations—that it is possible to talk of a culturally particular practice of free-market value generation with the same degree of theoretical fluidity as a universal practice of scientific knowledge production. The American free market is a peculiar beast, indeed a unique beast, probably never replicated in exact fashion anywhere else in the world. And yet, in spite of its absolute particularity, it exists everywhere; the world is built in its image. Ethnographic particularity becomes the object on which social theory gets built for our times, just as other parts of the world remain ethnographic locales.⁵

Methodological Speculations

These concluding reflections, and this book, beg the question of theorizing emergent political economic structures using ethnography. Specifically, they ask questions of whose “postgenomic lives” are being constituted by biocapital, and who “we” are who are studying these emergences. George Marcus and Michael Fischer’s call for anthropology as a form of cultural critique takes seriously the ways in which a discipline formed to study “the Other,” “elsewhere,” in fact holds much potential for having its insights repatriated in order to study “our” cultures (Marcus and Fischer 1986), especially as sites of ethnographic knowledge production proliferate globally in ways that cannot easily be reduced to the old colonial binary of an Occidental center and an Oriental periphery.

Fischer’s problematic as posed in *Emergent Forms of Life and the Anthropological Voice* is that received theories and concepts often prove insufficient to contain and make sense of our rapidly emergent lifeworlds. Both technoscience and capital are particularly lively sites of such rapid emergence. At the

same time, as Fischer would no doubt be the first to acknowledge, there is a value to reading theory, and to experimenting with reading theory in the context of new empirical emergence.

This is precisely what this book has attempted. I have tried to present a series of situations, some in India and others in the United States, that on their own lend themselves easily to particular reductive readings. Therefore it is easy to talk about, for instance, Genomic Health, and argue consequently for the *novelty* of our emergent techno-capitalist lifeworlds. It is equally easy to talk about Parel, for instance, and consequently of the *persistence* of very old forms and logics of subjection, alienation, and expropriation. One is a picture of the complete novelty of biocapital, coexisting with another that is a picture of its complete familiarity. Yet these two stories, and the others I have narrated, inhabit the same worlds of biocapital, and indeed the sites that I describe are linked by all manner of global techno-capital flows.

What I have attempted in conclusion, provisionally and in all too much of a hurry, is to question a certain relationship of ethnography to theory. We live in an intellectual milieu in which theory provides us with diagrams for understanding worlds present, past, and future, with advanced liberal societies invariably forming the templates on which these diagrams are formed; and in which ethnography is postulated as “the corrective” to these universalizing, homogenizing, and hegemonic theoretical tendencies, by claiming to force attention on those sites that constitute the margins or peripheries of theory. And yet this essential troubling of center and periphery is, necessarily, at least at this time, impossible, because if ethnography’s function is to trouble taken-for-granted assumptions about center and periphery, it is also, at the same time, to *describe* those assumptions, to represent the reality of globally hegemonic alignments as faithfully as possible. If my own subjective desire as ethnographer and theorist is to be able to write an ethnographically attentive social theory of emergent globalizing structures where a site such as India was the crucible of theoretical formation, and the United States was the strange ethnographic particularity, then such a desire is, in its sensibility, not that distinct from the desire of the Indian state to be a global player. But like that of the Indian state, it is a desire that is deferred to the future in the manner in which Derrida speaks of it—*l’avenir*, the future that is to come, rather than

that which will be, the promissory future without whose conjuration there will be “neither history, nor event, nor promise of justice” (Derrida 1994, 170). An unpredictable and tendential future, which in provisional, partial, fragmentary, and uncertain fashion, subjects such as the life sciences and social theory, value systems such as those of global capitalism and bioethics, and institutions such as corporations, nation-states, and patient advocacy groups, and indeed all of us who are interested in writing or reading books such as this, are working toward.

NOTES

Introduction

1. The book that Boguski was referring to was Paul Rabinow's *Making PCR*. See Rabinow 1997.
2. Base pairs are the chemical bases that join complementary strands of a DNA molecule via hydrogen bonds.
3. For an insider account of the many things that happened, see Shreeve 2004.
4. For the most famous articulation of this point of view at the time of the fall of communism, see Fukuyama 1992.
5. For an elaboration of the notion of coproduction, see Jasanoff 1995, 1996, 2004; Raddon 2001, 2004.
6. The four criteria for patentability in the United States are novelty, inventiveness, utility, and nonobviousness. In other words, for something to qualify as patentable, it must be new, actually invented (and not simply discovered), useful, and not obvious to others with prior experience in the field.
7. “Technoscience” is a terminology used by scholars in science and technology studies to argue for the impossibility of considering “science” and “technology” as easy binary counterparts to each other. I use “technoscience” through this book to refer interchangeably to the life sciences and to biotechnology, each of which influences and structures the development of the other.
8. According to Cynthia Robbins-Roth (2000), 11 percent of all federal research and development money was allocated to basic biomedical research, and the National Cancer Institute alone was spending nearly a billion dollars annually on basic research by 1981.
9. Indeed, Buck-Morss (2002) notes that Marx always referred to capital, rather than capitalism, as the phenomenon he was trying to make sense of.
10. For the notion of situated perspective, see Haraway 1991.
11. There are some significant differences between biotech and pharmaceutical companies, which I elaborate on later in the introduction.
12. Marx 1974 (1894), 298.
13. This also echoes Gayatri Spivak's 1999 argument with Fredric Jameson that postmodernism is repetition rather than rupture.

14. Political economy itself was structured by emergent social formations, since political economy was, in Marx's opinion, a fundamentally bourgeois science. Once again, one sees a coproduction between the "scientific" and the "social" as a diagnostic outcome of Marx's own critical method.
15. See Landecker 1999 for the way in which "biological" has increasingly come to function as a noun and not just as adjective.
16. For definitive explanations and critiques of Foucault's work, see Dreyfus and Rabinow 1983; Rabinow 1984.
17. For a key diagnostic analysis of late capitalism, see Jameson 2003 (1991).
18. It was only after completing this manuscript that I read Jason Read's excellent recent book, *The Micro-Politics of Capital*. While philosophical rather than ethnographic, and not concerned with technoscience, Read's method of reading Marx against Foucault has close resonances with what I am attempting here. Read 2003.
19. Marx and Engels 1963 (1845), 19.
20. See Doyle 1997, 2003; Jacob 1993 (1973); Kay 2000; Keller 1995, 2002.
21. See *Grundrisse* (Marx 1973 [1858]) and *Capital, Volume 1* (Marx 1976 [1867]) for Marx's labor theory of value.
22. Donna Haraway (2004) refers to this uncanny value of all exchange as "encounter value."
23. For the vexed relationship between notions of ideology and fetishism in Marx, which he diagnoses as a fundamental tension that grounds Marxian analysis of capital, see Etienne Balibar's essay "The Vacillation of Ideology in Marx" (Balibar 1994). For an argument that Marx's account of commodity fetishism inaugurates a *symptomatic* argument that prefigures a Freudian or psychoanalytic notion of symptom, see Žižek's essay "How Did Marx Invent the Symptom?" (Žižek 1994). My use of the word "uncanny" here is therefore not accidental but is a purposeful use of the Freudian concept. See also Maurer 2003 for an analysis of the ways in which systems of monetary and financial exchange are uncanny.
24. Many thanks to Nick King for making this evident through a workshop he organized on exchange networks in biomedicine called "The Moment of Conversion," which put this particular form of abstraction of this materialist process front and center in its analysis. The conversations in that workshop were particularly invaluable in developing my arguments in chapter 1.
25. See Deshpande 2003 for an articulation of the ways in which economics can be a nationalist discipline.
26. This, I believe, is the simplification that actor-network theory, an otherwise extremely provocative analysis of the mechanics of how technoscience functions, falls prey to. See, for instance, Callon 1999 (1986); Latour 1987, 1988.
27. See Haraway 1997 for her description of the "omion of technoscientific practice."
28. For a useful, if somewhat glorified, account of the biotech industry, see Robbins-Roth 2000. For accounts of the pharmaceutical industry, see Mahoney 1957; Mann 1999.
29. This becomes particularly pertinent in the wake of the recent bioterrorism scares in the United States, including the incidences of letters coated with anthrax spores in September and October 2001. At a venture capital conference that I attended in Boston at the end of October 2001, there was unmitigated excitement among the venture capitalists I

- met, who saw anthrax as a pure and simple business opportunity because it would focus the attention of the Department of Defense on the biotech industry. See also Hoyt (2002), who analyzes the role of the military-industrial complex in post-World War II America in the innovation of vaccine development.
30. The most successful early biotech companies that have produced biopharmaceutical products are Amgen (which has developed granulocyte colony stimulating factor [G-CSF] and erythropoietin) and Genentech (which has produced recombinant insulin, tissue plasminogen activator [tPA], human growth hormone, and α -interferon products) (see Walsh 1998, 1–36, for a good summary, from which I have drawn for this account).
31. I discuss this IPO and analyze this fundamental driving temporal structure of the biotech industry in chapter 3.
32. There is a similar terrain in Europe, though the regulatory structure surrounding clinical trials and drug marketing is significantly different. These are consequential differences for understanding the terrain of drug development in the two contexts, but this is not an issue that I explore in this book.
33. This has predictably been labeled piracy by those with close ties to the U.S. pharmaceutical industry. However, it is hopefully evident from the formulation here that one could just as well see this as allowing free market competition in therapeutic molecules similar to that allowed, even in the United States, in many commodities central to daily consumption.
34. The difference of Reddy's and DRF from many U.S. biotech companies is that the former are organizations run by some of the most experienced members of the Indian pharmaceutical industry, many of whom have been in the business for the last twenty or thirty years, and therefore come much closer to the ideal type of the "gray-haired big pharmaceutical manager," the perceived managerial caricature of American big pharmaceutical companies. Indian pharmaceutical companies have not abandoned their generic manufacturing business models, WTO compliance just means that they need to restrict their generic business to molecules that have gone off product patent. However, Indian companies are slowly beginning to leverage their generic expertise to become competitive in the generic markets of the West. While generic markets are far less profitable than markets for drugs protected by patents, the ability to infiltrate Western generic markets is potentially very lucrative for Indian companies hoping to get a global toehold. Indeed, a few Indian companies, including Reddy's, have established R & D divisions in the United States. The emergent politics of generic drugs around the world is a particularly interesting terrain that requires close study, and Cori Hayden (2004) has embarked on such a study in Mexico.
35. For the notion of assemblage as it pertains to the analysis of technoscience, see Rabinow 1999.
36. The HGP used DNA from about fifty donors, created libraries from them, and chose eight libraries for subsequent sequencing. Celera used DNA from twenty-one donors and chose five libraries for subsequent sequencing. All eight libraries used in the HGP were from male donors, while three of the five Celera libraries were from female donors. See Gibson and Muse 2002, 20, for a diagrammatic representation of this.
37. The best account of the early days of the HGP is Cook-Deegan's (1994). For definitive

historical accounts of Cold War Soviet science, see, for instance, Graham 1990, 1993; Gerovitch 2002.

38. Some of the early model organisms to be sequenced were yeast (*Saccharomyces cerevisiae*), roundworm (*Caenorhabditis elegans*), and fruit fly (*Drosophila melanogaster*).
39. For a nice tabular summary of the stages of the HGP, see Gibson and Muse 2002, 14. See also Collins et al. 1998 for a summary of milestones and further challenges for the HGP as they existed at a time that could be considered the start of their race with Celera to sequence the genome.
40. For which see also Geertz 1983, 68.
41. See also Marcus 1998 for an elaboration of the methodological strategies of multisited ethnography.
42. The best way to proliferate analyses of various sites and forms of biocapital, I believe, is through collaborative inquiry. To that end, I organized a workshop called "Lively Capital: Biotechnologies, Ethics, and Governance in Global Markets," which brought together leading analysts of the life sciences and capitalism from a range of disciplines (primarily anthropologists, but also historians and literary theorists). The papers in this workshop trace forms and practices of biocapital in a range of national locales, including the United States, Mexico, Iceland, the United Kingdom, Germany, Nigeria, South Africa, India, China, Taiwan, and Singapore. Even this, evidently, is a fairly limited list of sites of analysis. The papers in this workshop are currently being gathered together for an edited volume.
43. The majority of the stories in this book trace events occurring between 1999 and early 2002, when the bulk of the field research was done. I performed follow-up research at various sites between 2002 and 2004 to trace the continuing changes occurring at a number of sites that I had studied. Given the rapid nature of some of these changes, it could be argued that this book is already something of a contemporary historical analysis, a succession of snapshots of dramatic and emblematic but by no means static moments in the history of technoscientific capitalism in two national locales.
44. This draws on Donna Haraway's notion of gene fetishism. See Haraway 1997.

1. Exchange and Value

1. This does not pretend to be an exhaustive account of the DeCode controversy, which has been well researched and debated not just among American bioethicists but also among American anthropologists. For contrasting positions on the controversy, see Palsson and Rabinow 1999 and M. Fortun 2000. Michael Fortun's book on the subject is forthcoming. An extensive archive of the literature surrounding the DeCode controversy is available on the Web site of the leading organization in opposition to DeCode, Mannvernd (www.mannvernd.org). Many thanks to Mike Fortun for conversations that have taught me much about the DeCode controversy, and also to Skuli Sigurdsson, whose indefatigable efforts have been instrumental in the creation of this archive.
2. As Stuart Hall points out (see Morley and Chen 1996), articulation too (like value) is a double-jointed word, implying simultaneously the ability to enunciate and make oneself heard, and the process of linking together.
3. The idea of "qualitatively compressed time" might seem anachronistic but in fact reflects the actual difference in modes of production—to the extent that new ways of doing

science emerge—from an increase in speed. This is reflected in the rapidly emerging high-throughput industries, which require battalions of advanced automated instrumentation that itself gives rise to new instrumentation industries. A particularly striking example of the qualitative effects of time compression can be seen in the business model and R & D activity of a San Diego-based company called Syrrx. Syrrx is a high-throughput proteomics company that seeks to automate all the steps of protein documentation and analysis. In the process, it claims it has robots that can actually crystallize proteins. Protein crystallization has always been one of the hardest things to do in biological research and is often considered more of an art than a precise science. That Syrrx believes it can automate such an intricate and unpredictable process is a testament to how drastically high-throughput technoscience (or its desire) can change the nature of scientific practice as much as it is to the rhetorical powers of a company capable of dynamically selling itself to investors.

4. For the essay that "fathered" information theory, see Shannon 1948.
5. This is still occasionally the case, though many genome companies have increasingly shifted their business models away from database generation toward functional genomics, drug discovery, and biopharmaceutical development. See the introduction for an explanation of these terms and business models.
6. One might think, however, that the state, were it so willing, might have the muscle to bring drugs to market. Historically, however, the state, and not just in the United States, has been good at initial capital outlay that enables the development of private industry, but has been bad at successful long-term execution on capital-intensive projects. Therefore, while the idea of a "public-sector" pharmaceutical company might be tempting to those who believe that the state should invest heavily in the development of accessible therapeutics, this is likely to remain out of even the spectrum of options that states generally explore. Further, in the United States, there exists an extremely strong pharmaceutical company lobby in Congress. Therefore the American state has close relationships with the pharmaceutical industry.
7. I am grateful to Alexander Brown for conversations that have helped me think through these parallels.
8. A "SNP" is a single nucleotide polymorphism. See the introduction for a definition of these DNA sequence markers.
9. A site at which this agitation, and dislike of Venter, was apparent was the 1999 Cold Spring Harbor genome meetings. The phrases quoted were mentioned in talks given by public researchers at these meetings. The reference to the worm genome was because the public researchers were just coming out with the sequence of the roundworm *Caenorhabditis elegans*, which was a major milestone at the time.
10. See also M. Fortun 1999 for an analysis of speed in genomics.
11. As Cook-Deegan (1994) points out, there was serious debate even within the NIH Office of Technology Transfer regarding the patentability of these sequences. A major reason why the NIH felt that it was necessary to patent the sequences was defensive: they felt that they would be in a vulnerable position if someone else patented the sequences instead and thereby prevented their release into the public domain.
12. Venter himself was not at the NHGRI but was working at the National Institute for Neurological Disorders and Strokes (NINDS).

50. Of course, neither of these is obvious or intuitive outside the constantly expanding rationality of population genetics as a discipline and enterprise that discursively constructs populations as units that “naturally” exist to be genetically studied.
51. This section is based on conversations with Indian scientists and policymakers. Instead of directly quoting specific conversations, I have summarized their general content and will keep specific informants anonymous.
52. India is often referred to as “India Inc.” in the Indian business press.
53. The question of what constitutes “source” and what “invention” is, of course, a central one in IP debates writ large and is not just confined to biotech. The question of what, if anything, is distinct in the blurring of source and invention in biotech—other than the obviously different and dramatic political contexts that some of these biotech controversies operate within—is of central importance, and something I am very much grappling with.
54. I make these claims, again, based on conversations with Indian scientists and policymakers that I feel delicate about attributing directly to specific people. I do, however, wish to acknowledge one person by name, who has helped me greatly both as an informant and in helping me think through some of the conceptual issues at stake here. Manjari Mahajan is a student of science policy, who was briefly employed by S. K. Brahmachari at CBT to help him think through some of the science policy issues that emerged from genomics as a global practice, particularly as they pertained to IP issues. Mahajan has been particularly keen that the Indian state assert claims for intellectual property rights, rather than simply request benefit-sharing agreements with Western companies (which is the model adopted by most Latin American countries, and a model that Brahmachari, regardless of his personal feelings on the matter, feels might be the more strategic model to pursue because it might antagonize foreign investors less), because regardless of the possibly paradoxical framings of state-as-corporate-entity that this might lead to, intellectual property rights are precisely that: they confer proactive rights to exclude others from using “Indian” genetic material as they please, and they protect against Western companies obtaining precisely such rights. Benefit-sharing agreements, on the other hand, engage a terrain of (usually Western) corporate philanthropy rather than of rights. I thank Mahajan for these insights.
55. See, for instance, Victoria Bernal (2004), who traces the formation of an Eritrean nationalist consciousness as a consequence of global networks that are constituted simultaneously by members of the Eritrean diaspora and by communications technologies such as the Internet.
56. I narrate stories of Genomed in chapter 2.
57. For Derrida’s notion of deconstruction that this draws on, see Derrida 1976.
58. I think Coombe’s notion of a “cultural life” rather than a “social life” is of utmost importance, because understanding the lives of commodities cannot simply be an attempt to understand the circuits they travel as they are produced, circulated, and consumed. Commodities, by definition, are mystical things, and it is impossible to divorce their social life from an analysis of the imaginaries that they create, sustain, and traverse. Hence the salience of the notion of “cultural life.” Coombe, indeed, is intimately concerned with the imaginaries associated with intellectual property.
59. For an example of which, see my story of pxE International in chapter 5.

60. Another American biotech company, AgriDyne, also received two U.S. patents for the bioprocessing of neem, and W. R. Grace was issued patents for neem-based biopesticides.

2. Life and Debt

1. See, for instance, “Suicides by Andhra Pradesh Farmers Continue,” *The Hindu*, June 10, 2004.
2. See unpan1.un.org/intradoc/groups/public/documents/APCHIPAAY/UNPANO13207.pdf.
3. This is a theme that encompasses Foucault’s work. For his exposition specifically on governmental rationality, or what he calls “governmentality,” see Burchell et al. 1990.
4. This is not only reflected in the governing ideologies of free market ideologues such as Margaret Thatcher, Ronald Reagan, and George W. Bush but also has very much been the mantra of “experts” of market globalization, as suggested by IMF/World Bank structural adjustment policies, or by publications such as the *Economist* or the *Wall Street Journal*.
5. For the notion of biosociality, see Rabinow 1992.
6. For background on the 1991 crisis, see National Council of Applied Economic Research 2001.
7. See Corbridge and Harriss 2003 (2000), 120. While part of the reason for India’s move toward liberalization at the start of the 1990s was structural, part was very much ideological. A detailed account of the factors leading to a change in the economic rationality of the Indian state is beyond the scope of this narrative. Nonetheless it is useful to point out that some of the changes occurring in India at the start of the decade were a consequence of what Sudipta Kaviraj (1997) calls an “elite revolt,” not just to four decades of state socialism inspired by the vision of Jawaharlal Nehru, but also to increased social mobilization among “backward” castes that was pronounced in the late 1980s. (The term “backward caste” is officially one of state classification. This includes Scheduled Castes [known politically as Dalits, these are groups of people deemed untouchable in the Hindu caste hierarchy] and Other Backward Castes, groups who are not Dalits but still deemed socially and economically backward by the state.)
8. For a discussion of Marx’s distinction between commodity and commercial capitalism in *Capital, Volume 3*, and its relevance to this analysis, see my introduction.
9. I am inspired here by Saskia Sassen’s consideration of how globalization “touches down” in different localities (see, for instance, Sassen 2000).
10. See, for instance, Bell 1998; Kassiola 2003.
11. Unlike in the United States, public institutions in India are not allowed to be monetary stakeholders in private enterprises. Instead, CBT holds equity in Genomed in the form of intellectual property, where CBT will get a fixed share of any intellectual property Genomed develops. This in itself is imaginatively different from the U.S. model for equity holding in start-ups. The advantage of this model, according to the director of CBT, S. K. Brahmachari, is that CBT’s intellectual property stake cannot be diluted even if Genomed gets bought up by, or receives investment from, another entity, in the way monetary equity would have been.
12. For an analysis of the decoupling of the nation-state in global food politics, see Gupta 1998.

13. An important question is whether the relationship between regional parties and the transnational facilitation of capital flows is applicable to other regional parties beyond the Telugu Desam. A particularly instructive case is that of neighboring Tamil Nadu, which has been influenced since the mid-1960s by the Dravida Munnetra Kazhagam (DMK) and its offshoot and rival, the All India Anna Dravida Munnetra Kazhagam (AIADMK). These parties, as the Telugu Desam has for the Telugus, have based their ideology on Tamil regional identity while becoming important coalition players on the national political scene.
14. While Naidu's vision remains extremely attractive to investment communities based both in India and in the United States, it did not to the Andhra Pradesh electorate, who resoundingly voted him out of power in May 2004.
15. See, for instance, Hoare and Smith 1971.
16. The irony here is that Naidu himself could only be elected as chief minister for five-year terms and, as just mentioned, has been voted out of power before his vision could be successfully implemented.
17. This is not to say that there isn't a growing venture capital industry in India. The amount of venture capital investment in India increased from \$3 million in 1995 to \$342 million in 2000 (United Nations Development Program 2001, 38).
18. This has been the central mantra of World Bank/IMF structural adjustment policies all over the world.
19. This phrase is a play on Sharon Traweck's phrase "culture of no culture" to describe the culture of high-energy physicists. See Traweck 1988.
20. According to the 1991 census data, the rural population of Andhra Pradesh makes up 73 percent of the state's total population; there are 195.16 lakh (1 lakh = 100,000) agricultural workers as opposed to 104.48 lakh nonagricultural workers (a ratio of nearly 2:1, with the latter category including marginal workers).
21. I wish to be careful of making such predictions, especially since there has been innovative biotech research coming out of Hyderabad in recent years. Most well known has been the creation of a recombinant hepatitis B vaccine by the local biotech company Shanta Biotechniques. Shanta is currently located in the Biotech Park, adjacent to the ICICI Knowledge Park and conceived on similar principles. However, the research on the development of the hepatitis B vaccine occurred while Shanta was being incubated on the premises of an academic institution, the Centre for Cellular and Molecular Biology (CCMB). Rather than make pronouncements on the likely or unlikely futures of ventures like the Park, I wish here merely to emphasize Naidu's rationale for such ventures. Naidu's vision has not been the sole defining vision for the development of biotech in Hyderabad, but it has undoubtedly been a vital and enabling vision, one that has fashioned the priority and direction of biotech initiatives there to a significant extent.
22. The role of pedagogy, of course, is central here, which is why initiatives of Naidu's such as setting up the Indian Business School, modeled on the lines of American schools such as Wharton, become an integral component of such emergent stratified assemblages.
23. Indeed, as just mentioned, Shanta Biotech's development of its indigenous hepatitis B vaccine occurred while it incubated at CCMB.
24. See Srinivasulu 2004. Srinivasulu claims that the recent electoral failure of the Telugu Desam results from its failure to see the consequences of the changes it was bringing

- about for the rural population of the state, coupled with a marginalization of the agrarian sector. I wish to thank Venkat Rao for conversations on the history and politics of Andhra Pradesh and its high-tech initiatives. Rao's insights have been invaluable in constructing this narrative.
25. All these figures are obtained from the 1991 Andhra Pradesh census, available at www.andhrapradesh.com, and also from Andhra Pradesh Government 1997. If these figures are adjusted for the relative population densities of Hyderabad city and the adjoining rural districts, the disparities are not quite as stark and amount to a hospital ratio, for instance, of roughly 4:1 between the city and the rural districts. Two things, however, trouble such an easy calculation. The first is that the utility of hospitals relates not simply to the number of people that they serve but also to their ease of access. It is not sufficient to say that hospitals serving a less dense population area can thereby be concomitantly fewer in number than one serving a denser population area, because in the former case the question of how sick patients in parts of the rural countryside far from hospital access then becomes a central question for development. Further, there is the question of the qualitative difference in hospitals and medical facilities in Hyderabad compared to its surrounding districts, vital comparative parameters that census figures cannot indicate. Indeed, hospitals in Hyderabad were seen by Naidu as an integral component of the state's *tourism* strategy, as he hoped to set up a number of "five-star" hospitals in the city that could cater to rich patients from various parts of the country (and perhaps also from other countries). He explicitly refers to the setting up of hospitals as a form of "health tourism" (Naidu 2000).
 26. Genomed Mumbai has now (as of 2004) moved to a larger industrial facility in New Mumbai. However, Wellspring Hospital remains in Parel, a part of Mumbai whose political history I outline hereafter in the text. The story that I narrate, therefore, traces the particular situation of Genomed at the time I performed my fieldwork, 2001–2. Although my account is already dated because of the rapidly changing nature of the processes I am studying, I believe that it nonetheless allows me to highlight the structural logics and empirical specificities of biocapital "touching down" in India.
 27. As briefly mentioned in the introduction, pharmacogenomics is the correlation of genetics to drug response.
 28. It is estimated that of every five drugs that enter clinical trials in the United States, only one makes it to market.
 29. Paradoxically, the more successful a drug is on the market, the greater the danger of recall due to adverse events, because a statistically small *percentage* of adverse responses would then get magnified to a numerically large *number* of people who experience negative side effects. The most dramatic example of a postmarketing recall because of the magnified effects of adverse responses in a statistically small percentage of people is the case of Pfizer's antibiotic Trovan, which was considered to be the best fluoroquinolone in its class until the small percentage, but increasingly large number, of patients showing liver failure as a side effect forced Pfizer to withdraw the drug from market.
 30. Adriana Petryna is currently engaged in an ethnographic project that studies clinical trials; see Petryna 2005. The best historical work on clinical trials is H. Marks 1997.
 31. S. K. Brahmachari, interview with the author, January 7, 2002. The difficulty of classifying populations for population genetics is constitutive to its epistemology; see chapter 4

for an elaboration of this fact. See also Reardon 2001 for an account of the difficulties encountered by the Human Genome Diversity Project as a consequence of this.

32. Sudha and Lalit Deshpande (2003) show that the decline of the textile industry in Mumbai actually started in the 1970s, before liberalization. They indicate that the last five years of the 1970s saw the loss of 34,000 textile jobs, while the first eight years of the 1980s saw the loss of 88,000 textile jobs.
33. Neha Madhiwalla (2003) shows how the distribution of private hospitals mirrors the distribution of elite residential areas. While Mumbai has among the best health coverage in India, the distribution of this health coverage is expectedly very uneven and skewed based on class.
34. My suspicion that what I describe is far from unique to Parel, even though Parel's political ecology might be unique, is suggested from conversations with Joao Biehl, who has for a number of years ethnographically studied an HIV testing center in the Brazilian province of Bahia. This is a center set up by the Brazilian state and is part of the widely hailed Brazilian state intervention in the diagnosis and treatment of AIDS, which has often been referred to as a model for other states to follow. On a recent visit to the center, Biehl found that adjoining the center was a huge five-star hospital, set up by a major multinational pharmaceutical company, that served primarily as an experimental site for clinical trials. In this case, it was the people getting tested for HIV who served as the population that could potentially be recruited into the trials in this hospital. Thanks to Biehl for conversations about this.
35. The relationship of bodies as sites of medical intervention to local forms of indebtedness is strikingly illustrated in Lawrence Cohen's 1999 account of organ transplantation in South India.
36. Datta Isswalkar, interview with the author, July 29, 2004.
37. In a similar vein, see also Susan Greenhaigh (2003) on China's "unimaginable populations."
38. One way they could conceivably be "included" in such circuits is if their genetic material and information was collected for population genetics experiments of the type being done by CBT/Genomed.
39. This is in contrast to the configuration of unmarked advanced liberal subjects of genomics, who are, as I argue in chapter 4, configured as *sovereign consumers*.
40. See Balibar 1995 for a theoretical exploration of the relationship between subjectivity and citizenship. See also Mamdani 1996.
41. Of course, the Indian (and Pakistani) nation-states were themselves formed along with the catastrophic events of the partition of the Indian subcontinent into two nations. It was, however, religion rather than biology that undergirded this citizenship order.

3. Vision and Hype

1. Balasubramanian 2002.
2. This account of Doubletwest's rather sorry but extremely entertaining history is reconstructed from conversations with former employees, who are both kept anonymous and not directly quoted.
3. Quote given by Williamson on Incyte TV, a closed-circuit TV channel that was covering the 1999 TIGR conference and airing it to the rooms of its participants.

4. I keep the firm anonymous, since I believe that the contours of this story, and the role venture capital has played in the lives of dot.com start-ups, can be conveyed without specifically naming the firm involved.
5. Bellenson and Smith, meanwhile, started another company in 1999 called DigiScents, which managed to get featured on the cover of the November issue of *Wired* magazine that year. This was a company that had nothing to do with biotech, and the products intended included the "iSmell" (a computer peripheral that would emit fragrances to enhance a user's multimedia experience), "ScentStream" software to drive iSmell, and the "Scent Registry," a licensable digital database of thousands of scents to sell to developers of Web sites, games, movies, advertisements, and music. In April 2001, DigiScents laid off all seventy of its employees and closed up shop after failing to attract enough venture capital funding to go beyond developing a prototype.
6. See the introduction for Marx's distinction between the two.
7. This is not to say that the stock market does not play a role in the lives of Indian companies. It is just that the metric by which Indian companies tend to be judged, even on the Indian stock market, is based less on speculation than on tangible material indicators.
8. See Comaroff and Comaroff 2001 for a collection of essays dealing with what they call millennial capitalism.
9. Dumit, unpublished essay.
10. For Merton's account of the normative structure of science, based on the four norms of universality, disinterestedness, communism, and organized skepticism, see Merton 1973 (1942).
11. This is consistent with Weber's famous argument that the role of the Protestant ethic in the small churches and denominations of North Carolina textile towns was business credit made by moral creditworthiness—the very function of sect organization was to enforce a moral creditworthiness. Also, the bidding among Jains in India for the honor of sponsoring ritual acts is a different but similar way of asserting business creditworthiness, often way beyond their actual means. The moral economy called into account in such situations of credibility/incredibility resembles that of the Balinese cockfight (Geertz 1973). Thanks to Michael Fischer for discussions about Weber's analysis of creditworthiness, and for pointing out the analogy to Jains.
12. Merton 1973 (1942). Of course, the corporatization of technoscience puts some of these norms more at stake than others. Clearly, the norm of communism is often violated when science gets increasingly commodified. Also, the norm of scientific disinterestedness is clearly at odds with that of corporate interest in maximizing market value from a technoscientific enterprise.
13. Among the most controversial of these arrangements is Novartis's funding of the College of Natural Resources at the University of California, Berkeley.
14. I have had one brief, perfunctory conversation with him that he himself is unlikely to remember.
15. Scott was also invited to present at a session on the ethical, legal, and social implications (ELSI) of DNA patenting in the Cold Spring Harbor Genome meetings of 1999 that I attended. These meetings have constituted the "official" annual gathering of the public HGP, and 1999 was the year when the public researchers' animosity toward Craig Venter

38. Sunil Maulik, correspondence with the author, November 20, 2001.
39. Of course, the fetishistic or cultlike dimensions of capitalism hardly manifest in uniform ways, or even in ways that necessarily lead to an enthusiastic buying in to the capitalist cause. At the end of the day, however “crummy” a job at Genentech might be, it is still a highly privileged site of labor in global capitalism. The fetish or cult of capitalism, especially in more marginal or subaltern sites, could often operate in ways that are still powerful but construct an aura of fear or hysteria rather than desire. For instance, see E. P. Thompson’s account of the making of the English working class (Thompson 1966 [1963]), a process that he shows involved millenarian, religious, cultic, and fetishistic performance in ways that provoked a submission through the creation not of desire but of a “chiliasm of despair.” Michael Taussig similarly shows how the making of South American working classes through forced proletarianization was accompanied by the fetishism of capitalism as the devil, as the cult to be submitted to rather than bought into (Taussig 1980).

Coda

1. Rabinow 2003, 14.
2. This relates to Joseph Dumit’s notion of “surplus health” (Dumit 2004).
3. Žižek 1994, 330.
4. For the latter, see Dumit 2004.
5. These arguments are hardly specific to the American free market but are relevant to a range of theoretical questions that inform our times. For instance, I am constantly amazed that democratic political “theory,” in political science departments around the world, gets synthesized through an understanding of American interest-group politics (and occasionally, increasingly, by European grassroots politics), while the democratic political mobilizations (both representative and grassroots) of the world’s largest democracy, India, get relegated to area studies.

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