

Postcolonial Biotech: Taiwanese Conundrums and Subimperial Desires

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Abstract Where most accounts of biotech in Taiwan—indeed, globally—focus on its economic potential and its potential to heal various ills, a postcolonial and subimperial framing insists on attention to often underexamined aspects, for example, how biotech practices reflect specific nationalist desires and rely on forms of exploitation. A postcolonial and subimperial framing insists on the inclusion of other stories. Drawing Taiwan’s *nanxiang* (southward) policies and Indigenous rights into a biotech frame, I suggest that such policies and desires create potential contradictions that are not easily resolved. For example, hard-won policies preventing the collection of Indigenous genetic samples may foreclose studies that might address pronounced health disparities. And the scope of a national biobank project aimed toward a global Chinese ethnic community is limited by competing claims of Taiwanese genetic uniqueness. One possible resolution envisions Taiwan biotech as a site for imagining possible futures outside enduring colonial influences and subimperial desires.

Keywords biotech · Taiwan · postcolonial · subimperial · Indigenous genetics

From the perspective of the aboriginal people, one would assume, the colonization of Taiwan would come to an end only when they are once again masters of the island. Likewise for people in the working class, homosexuals, and

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women, only when they acquire enough power to be the masters of their own fates can decolonization be said to have been achieved.

Kuan-Hsing Chen, *Asia as Method*

Freedom is an important theme in contemporary Taiwanese discourse. During my ethnographic fieldwork on emergent biotech and bioethics in Taiwan, I routinely heard versions of the phrase “we are very free” or “Taiwan is a very free country.” This was enacted in the many demonstrations and protests that I witnessed in Taipei, including, for instance, a 2006 protest held in front of the president’s mansion calling for his resignation and a protest outside of National Taiwan University’s prestigious hospital in which marchers held signs in both English and Chinese calling for a free Tibet. Freedom’s audiences are multilingual. Exercises of freedom continue, as the 2014 Sunflower movement indicates. Sometimes, those telling me about Taiwan’s freedom follow up, more quietly, with something like “perhaps too free.” Like freedom itself, this qualification may hold many meanings.

The [Freedom House \(2015\)](#) reports that “Taiwan’s media environment is one of the freest in Asia,” and in its 2017 “Freedom in the World” rankings, Taiwan surpassed the United States. The [Heritage Foundation’s 2015](#) Index of Economic Freedom lists Taiwan’s economy as the “14th freest,” with an overall score “well above the world average.” Full electoral democracy was established in 1996, and this distinguishes Taiwan’s present from its legacy as having endured one of the longest periods of continuous martial law in world history (1948–87), even as the United States, in a Cold War context, referred to the island as “Free China.” This freedom also distinguishes Taiwan from the perceived authoritarianism of the mainland Chinese government, which continues to claim Taiwan as its province.

Even as international indices and local sentiment celebrate Taiwan’s relative freedom, Kuan-Hsing Chen and other scholars working on the concept of subimperialism in Taiwan remind us of freedom’s multivalence and its exclusions. Chen argues that Taiwan remains not yet decolonized, deimperialized, nor what he calls “de–cold warred”; many in Taiwan remain not yet free. Thus, as the epigraph above suggests, Taiwanese freedom for some comes at the expense of many others. An analytic of subimperialism challenges facile narratives of freedom, asking who can be the masters of their own fates and criticizing the “unchecked freedom” of global capitalism ([Chen 2010: 4](#)). It reminds us to ask what freedom means: freedom from what, freedom to do what to whom—perhaps too free?

Subempire refers to empire at a lower level. It is often positioned as a way to establish oneself within global hierarchies by doing to “lesser” others that which has been—or continues to be—done to the doer. It operates squarely within existing geopolitical and global capitalist orders. Subimperialism is thus the lower-level reproduction and practice (including affective desires) of imperial ideologies ([Chen 2010](#)).¹ As the articles in this issue show, however, this does not imply that subimperialism

¹ Chen states ([2000: 16](#)), “This stratified construction of global capitalism is neocolonial imperialism.” This is the ground upon which subimperialism is exercised. Even if formal colonialism is over, neocolonial imperialism continues, differentiated in part by the fact that it relies upon political and economic dominance rather than military force. In this schema, Taiwan remains subordinate to the United States and Japan (see [Chen 2000: 15–16](#)).

overlays neatly onto imperial categories and practices; it may appear in varied forms and within often subtle interactions. It may appear, for instance, within newer enactments and perhaps invisible modes of colonialism, as Michael Shiyung Liu suggests of US medical interventions in Taiwan in a Cold War context in his article in this issue. Discontinuities and tensions are also present, as John P. DiMoia shows in this issue regarding Indiana University's nursing collaboration with South Korea that focused on strengthening American-style nursing education to supplant the German style previously imported by the Japanese. Subimperialism in a Taiwanese context, while acknowledging radical contextual shifts, nonetheless signals the continuing potency of imperialist ideologies in structuring current policies and desires. It points specifically to the formation of imperial relations and practices at a lower level in the global capital imperial hierarchy. Subimperial desires are reflected in practices that serve as mechanisms for healing the insults suffered by the formerly colonized by repositioning them as the new colonizer with control over "lesser" others.

Where most accounts of biotech in Taiwan—indeed, globally—focus on it as an economic engine and on its potential to heal various ills, a subimperial framing sheds light on blind spots in dominant narratives of biotech development and insists on attention to underexamined aspects, such as how biotech practices reflect specific nationalist desires and rely upon various forms of exploitation. A subimperial framing insists on the inclusion of other stories. Here I discuss the relationship between subimperial approaches and postcolonial STS. Next, I show how Taiwan biotech sits uncomfortably as an expansionist government policy and its related cultural productions overflow into a genetic register. Then I discuss how biotech development refashions Indigenous peoples in Taiwan as specific subimperial subjects, even as they resist. In a more theoretical register, and drawing on insights from postcolonial STS, these stories show how even as a subimperial approach could lend itself straightforwardly to an analytic of hybridity, assemblage is a more appropriate analytic frame for thinking about biotech in Taiwan. Finally, I conclude by asking whether Taiwan biotech might find its uniqueness not in a genetic or genomic register but, rather, in the innovation of successor sciences (Harding 1986).

1 Postcolonial Technoscience

A subimperial perspective adds an important component to postcolonial studies of technoscience. While conventional historiographies of science have posited the successes of science to its correspondence with truth, STS scholars have shown that science is situated and social and that its claims to universal validity are themselves products of specific social and cultural work. Against diffusionist models that posit science as emerging in the West and then traveling elsewhere, scholars of postcolonial STS insist on the central role played by the colonies in scientific knowledge production. The postcolonial does not refer here to an end to colonialism—it is not epochal. It does not presuppose that decolonization has occurred (Anderson 2002), nor does it apply only to sites outside the West—it is not geographically delimited. Such approaches do not seek a "transcendent postcolonial theory" but, rather, attend to interactions and contact zones marked by unequal and contingent relations (Anderson and Adams 2008: 183). The postcolonial here is a framework and an attitude. It shapes

a perspective that takes little for granted and examines, instead, relational and situated interactions. Similarly, a subimperial perspective attends to such contingent and variable interactions, transactions and translations, and insists on attention to histories, hierarchies, and relationships. It defies standard developmental models that suggest homogeneous effects on populations and insists, rather, on attention to those who are either ignored or harmed by such efforts.

Even as literature on postcolonial STS has grown, it remains secondary to studies that seek to understand science in relation to globalization, a perspective that seems to obscure colonialisms (Anderson 2009). Mainstream approaches to both postcolonialism and globalization have significant blind spots (Chen 2010: 2). Much of the postcolonial literature remains overly centered on the West (Chen 2010), ignoring other kinds of imperial conquest and relationships formed therein. And, globalization is not a neutral circuitry of interaction and exchange but, rather, the extension of relationships whose contours are riven in prior colonial hierarchies and relationships; globalization is the current stage on which imperialisms are enacted. Insisting that the “unchecked freedom” (Chen 2010: 4) of capital has led to the intensification of inequality, Chen equates forms of imperialism and globalization when he states that “globalization without deimperialization is simply a disguised reproduction of imperialist conquest” (2).

Postcolonial STS and an attention to subimperial formations together foreground hierarchical relationships and their specific and multiple relational histories. Such approaches destabilize neutral depictions of globalization and insist that, in fact, the world is not flat; it is everywhere contoured by the mutual shapings—the friction (Tsing 2004)—of prior relationships.

2 Taiwan Biotech

Biotech is exemplary of contemporary globalizing forms. It attends to and enacts, on the one hand, transformative interventions that may have the potential to transform our biologies at individual and species levels, while on the other hand, it attends to local specificities, including regional distinctions (Thompson 2010; Ong and Chen 2010) and local biologies (Lock and Nguyen 2010). Here, I use the term *biotech* in the more limited sense of biomedical science and technology.

Postcolonial STS shows that histories of sciences in the colonies are inextricable from histories of medicine (Anderson and Pols 2012). Michael Shiyung Liu (2009) and Ming-Cheng M. Lo (2002) write on the rise of biomedicine in colonial Taiwan and demonstrate the strength of the linkages between colonial science and medicine there.² Prominent analyses of contemporary biotech in Taiwan often focus on its potential as an economic driver and its relationship to a (post)developmental state

² Lo 2002 shows the complicated and changing interrelations between colonizer and colonized in medical practice and training and the ways in which notions of profession, identity, progress, nation, modernity, and government were articulated through colonial medical science. These configurations shifted within different periods of Japanese colonial rule. Liu (2009) shows how German-style biomedicine was introduced in Taiwan by Japanese colonialists but that its uptake in colonial Taiwan was neither smooth nor incontrovertibly beneficial.

(Wong 2011). While these are centrally important aspects, I emphasize that, like colonial medicine, Taiwan's current biotech is shaped by multiple considerations and within varied assemblages. The notion of assemblage enables the consideration of varied forms within the same frame of reference.

By *assemblage*, I refer to the concept introduced principally by Gilles Deleuze and Felix Guattari (1987) as a way to rethink the social as an always emergent and contingent coming together of disparate things: people, things, ideas, artifacts, signs, and so forth. In Manuel DeLanda's (2006) elaboration, assemblage becomes a way to recuperate a reconstructed realism within studies of the social. The assemblage becomes the unit of social analysis, characterized by the relationality that it comprises. The analytical primacy often given to the individual subject is subjugated to the gathering of disparate things. Further, components of the assemblage are defined not by internal essential characteristics but by their interactions within assemblages, of which they move in and out. The notion of the assemblage thus captures the heterogeneity of its parts, the shifting temporalities of the relations, the contingencies of interactions, and the convergences and divergences (or territorializations and deterritorializations) of contemporary circulations. As Cameron Duff clarifies, even as subjects and contexts are not ontologically given, they nonetheless come together; they are "*made in experience* in and through the emergent coming together of heterogeneous materials, forces, spaces, signs and bodies" (2016: 17, emphasis in original). Stephen Collier and Aihwa Ong (2005) move beyond structural or totalizing assessments of globalization in their use of "global assemblages" to examine how global circulations work in actual configurations.

Below, I argue that assemblage is an important analytic approach that can account for subimperial formations and biotech circulations. Here, however, I emphasize some of the contingent local elements that comprise Taiwanese biotech assemblages. For instance, an ethno-regional concern frames biotech as a way to study regionally relevant diseases that are often perceived as receiving inadequate attention in Western labs and clinics. This was acutely felt during the post-SARS years, in which Taiwanese-led research suggested that Asians were especially susceptible to SARS because of a genetic predisposition (Lin et al. 2003). Taiwanese stem cell researchers also substantiated the existence of pulmonary stem cells and demonstrated that these were the sites of SARS attacks, thus partially explaining its lethality (Yu 2006, 2008). Thus, perceived ethnic and regional medical vulnerabilities established Taiwan biotech as a way to care for a national population, as well as broader regional groups, based on shared ethnic and geographic proximity.

In addition to local health concerns, economic factors underpinning biotech development in Taiwan cannot be overstated. Biotech in Taiwan has been seen as a way to "catch up" in global fields of science, and medical fields in particular were seen as holding rich potential in this regard. Even though it was widely perceived that Western countries, and especially the United States, were more developed in biotech, their lead was not seen as too substantial to overcome. During the George W. Bush presidency in the United States (2001–8), which was widely perceived to be antiscience, and in which federal funding for human embryonic stem cell research was strictly limited, it seemed that these emergent biotech fields held much promise for both biological and economic health. These dual and intertwined goals are perhaps best stated on the website of the Hsinchu Biomedical Science Park (2013), which presents biotech as

the ultimate growth industry: “Because life and living are priceless, the needs for biomedical products and health care products can never be met, and the market scale will continuously increase.”

Indeed, this is the logic that underpins much government support for biotech. Newly democratic Taiwan, with a young National Health Service and a burgeoning presence in the global knowledge economy, seemed well positioned to both contribute to and benefit from biotech development. Already by the 1980s government support for biotech development in Taiwan was under way when it was listed as one of the target industries for development (Rei 2010; Tsai 2010). Biotech development remained a state priority over the next decades and was reiterated in the 2005 government Biomedtech Island project that aimed to develop Taiwan as an Asian hub for biotech and therapeutics.³ The idea of developing Taiwan as a medical hub is nothing new; it was conceptualized as a subimperial center for modern medicine during the Japanese colonial period (Liu 2009).⁴

While some characterize globalization in terms of the decline or the decentering of the role of the state, such sustained government support points to the continued importance of the state. Indeed, as Ong (2010) suggests, in relation to East Asian sciences, the state retains a central importance in how people constitute themselves as ethical citizens, as well as in driving industrial science. Government programs such as those bolstering Taiwanese biotech are indicative of what Kuan-Hsing Chen (2010: 20) calls the “state-capital alliance,” which he identifies as “the engine for the formation of Taiwanese subimperialism.” This alliance is readily visible in Taiwan biotech.

Biotech development in Taiwan is thus shaped by many factors; an economic incentive and a desire to strengthen Taiwan’s presence in the global knowledge economy hang together with medical, ethnic, geopolitical, historical, and other factors. And biotech sensibilities are shaped, for example, by exclusion from international arenas. Beijing’s One-China policy limits Taiwan’s access to recognition and inclusion in many international organizations, including the World Health Organization. Such exclusionary considerations coexist alongside a broader regional perception that local medical vulnerabilities require enhanced attention. Indeed, biotech in Taiwan is seen as a way to participate meaningfully on the stage of global science while simultaneously caring for both a population and an economy. Biotech in Taiwan thus assembles heterogeneous global and local elements in unique and specifically meaningful ways (Liu 2012b).

Productive approaches in postcolonial STS call for sustained attention to various contact zones and “unequal and messy translations and transactions” (Anderson and

³ In 1998 the National Science Council recommended that the Advanced Research in Genetic Medicine and Sanitation Plan, a special program on genetic medicine, be elevated to a national program, and four years later the National Research Program for Genomic Medicine was inaugurated (Tsai 2010). Also in 2002 the government enacted the Two Trillion Twin Stars Policy that sought to establish Taiwan’s biotech alongside its established global success in information technology. In July 2003 Taiwan’s president, Chen Shui-bian, reiterated biotech development as a national priority at the BioTaiwan Exhibition 2003.

⁴ For a full discussion, see Liu 2009: 147–54, which describes how the conjunction of laboratory and clinical medicine, and its associated public health impacts, “made Taiwan a model of Japanese colonial medicine when the empire was extended to Coastal China and Southeast Asia in the late 1930s” (147). Eventually, this medicine was renamed as southern medicine (*nanhô igaku*), foregrounding its influence in the southern regions of the imperial Greater East Asia Co-Prosperty Sphere (153).

Adams 2008: 184). An analytic approach of subimperialism insists on attending to the multiple incarnations and durable effects of relations of power. Together, postcolonial STS and subimperialism provide powerfully innovative ways for thinking critically about the varied stakes within Taiwan biotech that are ignored in most mainstream studies that focus on biotech principally within the realm of economic development.

Below, I engage with Kuan-Hsing Chen's subimperialist critique of Taiwan's 1990s southward policy (*nanxiang zhengce*). Chen discusses the cultural productivity and identity reformulation, through geographic realignment, that this policy generated. I suggest that this policy also created the cultural space for the articulation of a nanxiang identity in a genetic register.

3 Nanxiang Genetics

Chen locates the origins of Taiwan's subimperial practice in the 1980s with state capital expansion both westward and southward. The southward movement aligns Taiwan with Southeast Asia, and the westward movement aligns Taiwan with mainland China. These dual moves position both Southeast Asia and China as simultaneously sources of cheap labor and significant potential markets. Subempire, Chen (2010: 18) reminds us, refers to "a lower-level empire that depends on the larger structure of imperialism." That is, Taiwan's expansionism reproduces, at a lower tier, that of other imperial forces, including especially flows of capital investment. President Lee Teng-hui's 1994 Southeast Asia trip was closely linked with the official policy of *nanxiang zhengce* (Go South, or southward, policy). Chen tracks the origins of Taiwanese subimperialism to nanxiang practices of labor exploitation and Taiwanese state protectionism.⁵ The nanxiang policy positioned Southeast Asian countries as sources of labor, potential markets, and special regional development and industrial zones that represent the expansion of the Taiwanese state, "a territorial colonialism" (Chen 2000: 16) that is an expression of "an inchoate ideological desire for a Taiwanese subempire" (Chen 2010: 18).

Subimperialism, however, is not limited to capital investment; it articulates in affective registers as desire, as ideology, as consciousness formation. Indeed, alongside the official nanxiang policy, other social and cultural strands supported a Southeast Asian alliance, especially for those supportive of Taiwanese nationalism and a distinct ethnic Taiwanese identity. For example, alongside President Lee's nanxiang project, in an academic register, Nobel Prize winner and president of Academia Sinica Yuan-tse Lee sought to create Taiwan as an academic center of Southeast Asian studies (Chen 2010: 27–29). And the 1994 special issue of *China Times* (*Zhongguo Shibao*) titled "Human Space" (Renjian) that Kuan-Hsing Chen (2000) critiques builds a case for a cultural and historical linkage. For example, therein Changzhen Yang (1994) positions Taiwan as geologically part of the "black tide cultural sphere" oriented around the Black Tide ocean current that flows around the Southeast Asian

⁵ Taiwanese state involvement in Southeast Asia included support of labor abuses and negotiations with Thailand, Indonesia, and Vietnam to limit the number of laborers from those countries allowed to work in Taiwan. It also included negotiations with Indonesia to suppress protests of workers in Taiwanese businesses there (Chen 2010).

Indo-Chinese Peninsula. Together, this set of articles creates an argument for a cultural, historical, geographic, and affective repositioning of Taiwan as part of Southeast Asia (Chen 2010: 27–30).

A decade later, when I began my fieldwork on Taiwan biotech, I found that a scientific nanxiang argument was being made in a genetic register. In a 2006 interview in Taipei, a scientist familiarized me with the nanxiang sentiment. He introduced me to archeological evidence suggesting that Taiwan Indigenous peoples are not of Chinese origin but, rather, Malay Austronesian. He complained about the destruction of Shih-san-hang, Taiwan's largest archeological site. This site has been used to support an argument that Indigenous peoples in Taiwan are originally from mainland China or, alternately, to suggest a longer Indigenous presence on the island that, in turn, is used to distance Indigenous groups in Taiwan from mainland China. This scientist viewed the destruction of the site as the intentional destruction of both Taiwan's cultural heritage and evidence that might threaten the Chinese nationalist narrative of mainland Indigenous origins, "because the KMT [Kuomintang] wants to claim that Taiwan is part of China." He also showed me an artist's map, from 2003, angled and oriented such that Taiwan was shown in a line with Southeast Asian islands, clearly making a cartographic argument that Taiwan is part of Southeast Asia rather than China. "Here is China, Japan, and Korea," he said. "And here is Taiwan, Vietnam, here is Philippines, and Indonesia. If you look at it, this is one chain, and Taiwan is in a very important position" (2006 interview). In retrospect, the artist's map may well have been inspired by Micha Wu's contribution to the 1994 "Human Space" special issue of *China Times*, in which he reproduced a 1944 Japanese *Asahi Shimbun* newspaper map showing Taiwan as the center of imperial Japan's Greater East Asia Co-Prosperity Sphere (Chen 2010). This scientist suggested that a reorientation of one's framework—"if you want to change your image of Taiwan, all you have to do is change the angle," he said—could be used to formulate a different geographic alignment and thus a different narrative.

We also discussed genetic studies that scientifically position Taiwanese as Southeast Asian. Thus, alongside explicitly expansionist state policies expressed in nanxiang zhengce, and subjective and affective nanxiang desires such as those articulated in the "Human Space" special issue, there is also a genetic argument that both draws upon and substantiates a nanxiang Taiwanese-ness. The genetic argument used to buttress ethnic Taiwanese nationalism relies on studies that delink Taiwanese from Han Chinese. This is accomplished by aligning Taiwanese with ethnic Chinese along a southern geographic continuum. Specifically, Marie Lin of Mackay Memorial Hospital in Taipei County and her colleagues have conducted human leukocyte antigen (HLA) analyses that suggest that Taiwanese (defined in their study as Minnan/Hoklo and Hakka) are descendants of an ancient Yueh people who were indigenous to southeastern coastal mainland China. They suggest that the Yueh are also ancestors to "Singapore Chinese" and "Thai-Chinese" (Lin et al. 2001). In this way, they represent Taiwanese as genetically distinct from northern Han Chinese and closer to their contemporary southeastern Asian neighbors.⁶ This study is used, as I suggest elsewhere, to align Taiwanese with Southeast Asian Chinese populations (Liu 2010). This move

⁶ A more detailed discussion of this argument can be found in Liu 2010 and J.-S. Chen 2009.

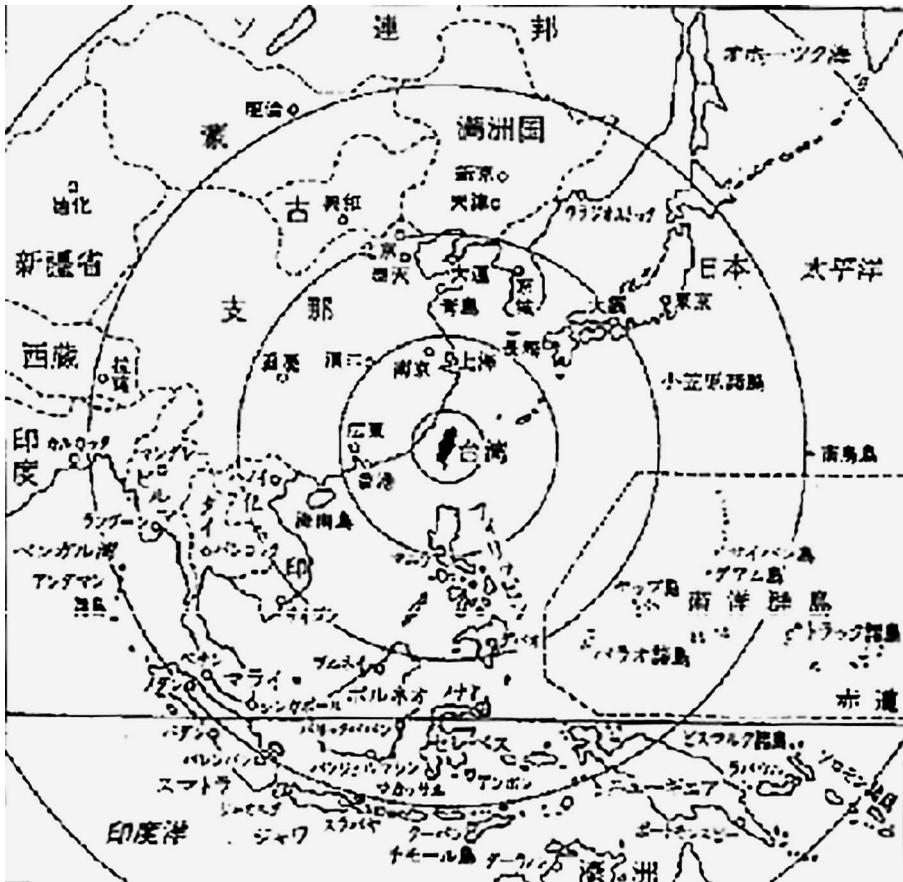


Fig. 1 Taiwan as the center of the Greater East Asia Co-Prosperity Sphere

simultaneously denies a specific northern Han Chinese-ness that is used to characterize a mainland population, even as mainland scientists frame genetic Chinese-ness in more inclusive and diverse terms (Sung 2010).

Lin and colleagues’ population genetics studies buttress the cultural and historical accounts of the “Human Space” special issue and provide a foundational—because scientific and material—connection with Southeast Asian populations. This genetic kinship narrative is used to simultaneously disarticulate Taiwanese from a northern Han Chinese identity and to naturalize through science the nanxiang policies in political and affective orders.

4 Indigenous Genetics

Like the nanxiang economic policies, studies that position Taiwanese as genetically closer to southeast Asian populations work in what Fred Y. L. Chiu (2000) calls an “exvolutionary” mode of subimperialism. Taiwanese genetics and biotech are also

engaged in an “involutionary” mode of subimperialism and identity making that relies on the DNA of Indigenous peoples in Taiwan. In this section, I discuss how Indigenous genetic materials and information are seen as valuable resources for identity projects and scientific knowledge production. The collection of Indigenous blood and saliva has led to accusations of biopiracy and biocolonialism for an expansionist biotech.⁷

Chiu (2000: 106) suggests that Taiwan Aborigines “are the subjugated people par excellence.” Above, I discuss the genetic linkage used to suggest that Taiwanese are Southeast Asian. Here, I discuss an involutionary mode of genetic identity making that draws on an Indigenous genetic contribution to claim a unique, and implicitly non-Chinese, identity. A set of studies suggests that most Taiwanese (understood to mean Hakka and Hoklo/Minnan) have some Indigenous genetic markers (Liu 2012a). One of these, also led by Marie Lin, suggests that 13 percent of the Taiwanese HLA-A, -B, and -C three-locus haplotypes appear to be of Aboriginal origin and thus are presumed to result from several hundred years of “intermarriage” between Taiwanese and Aborigines (Lin et al. 2000). Archaeological evidence suggests that Indigenous peoples have been in Taiwan for at least six thousand years, and they are thought to be the originary Austronesians. Since Indigenous groups in Taiwan are among the most genetically homogeneous in the world (Lin et al. 2000), their specific contribution could have happened only in Taiwan, thereby making this Taiwanese genome exceptionally unique because of these specific Aboriginal contributions (Liu 2012a). These Indigenous genetic linkages are used in both political and personal projects of identity making. For some, they seem to substantiate their own deeply felt antipathy to an authoritarian Chinese state (represented by both the KMT and the Chinese Communist Party), as well as their deep affective attachment to a threatened Taiwanese homeland.

These studies also buttressed a new instantiation of the nanxiang policy under presidents Lee Teng-hui and Chen Shui-bian in which they sought to develop a regional zone of Taiwanese influence—as central not to a Japanese imperial Co-Prosperity Sphere but to a new realm of uniquely Taiwanese Austronesian originality.⁸ This project was assisted by genetic studies, along with linguistic evidence, that led to the Austronesian dispersal hypothesis, which posits Indigenous groups in Taiwan as the originary Austronesians (Bellwood 2009, [2000]). Thus, an ancient linkage was used to establish present-day linkages between Taiwan and others in the Austronesian zone, with Taiwan centered as the source. Austronesian affiliations include Indigenous peoples in New Zealand, the Philippines, Hawaii, the Solomon Islands, Indonesia, and Madagascar. These ancient links were used to enact political alliances in the present when, for example, under President Chen they were used to support diplomatic

⁷ In Taiwan, it is common in English to refer to Taiwan Indigenous peoples collectively as Aborigines. Here, I use both terms interchangeably.

⁸ I thank an anonymous reviewer for highlighting how the Austronesian homeland argument was used as part of presidents Lee Deng-hui’s and Chen Shui-bian’s respective reenvisioning of the Go South policy. Also, more recently, in the first year of Tsai’s presidency, the government announced a “New Southward Policy” (*xin nanxiang zhengce*, 新南向政策) (Executive Yuan 2016). This policy is framed primarily in terms of economic and trade cooperation but includes science and technology as a specific mode of cooperation under a section on the use of soft power. The new nanxiang policy also operates in a kinship frame, suggesting, for example, that children of international marriages (e.g., Vietnamese-Taiwanese) will be cultivated as promoters of the new nanxiang alliances (Zheng 2016).

ties with Pacific island nations (e.g., the Solomon Islands in 2007) and a formal memorandum of understanding with New Zealand in 2004. Indigenous genetics were thus used to transform claims of ancient kinship into current political alliances to support a Taiwan-centered zone of influence.

In biotech more broadly, and outside of the identity debates, Indigenous DNA holds particular value in the new bioeconomy. In part because of the relative genetic homogeneity of Indigenous groups in Taiwan, and their specific uniqueness, their DNA has been increasingly viewed as an important scientific resource. Indigenous activism, however, has increasingly restricted scientific access to such DNA. The national Taiwan Biobank project, for instance, faced significant opposition, and the pilot study was delayed several times, in part because of concerns about the collection and use of Indigenous samples. Ultimately, the pilot study did not include Indigenous peoples. Full-scale collection for the larger project began in 2012 and does not include Indigenous peoples at all, since although the 2010 Human Biobank Act requires only individual informed consent, the 2005 Indigenous Peoples Basic Law requires group consent.⁹

4.1 Indigenous Conscriptations

Some scientists I interviewed justified their use of Indigenous samples in ethnological and even kinship terms. One told me, “I’m Taiwanese, so I should do this research” (2006 interview). Another described colleagues who had accumulated a substantial collection of Indigenous samples and praised their generosity in sharing them. The sharing of research samples as part of a moral economy of science has a long history, and these colleagues’ actions were depicted as good for science, for Taiwan, and for Indigenous peoples. Mark Munsterhjelm (2014: 117) tracks the circulation of Taiwan Indigenous genetic materials as they moved among Taiwanese institutions and to Stanford, Fudan, and Yale.¹⁰ By now, however, many Indigenous communities are skeptical of projects using their biological materials. As reports of illicit sample collecting accumulate, resistance grows, and in several cases Indigenous groups demanded that samples of blood, saliva, and derived data be returned to them (S.-J. Chen 2009; Munsterhjelm 2014).

Indigenous biosampling has become increasingly difficult for scientists and has become an important focus of bioethical and human rights related attention. Discussing concerns of informed consent in relation to the biobank project, a professor empha-

⁹ See Ho 2012 for a discussion of the difficulties encountered around the question of how to define a group in relation to the Taiwan Biobank.

¹⁰ These include the Taiwan-Stanford-Fudan connection, starting in the mid-1990s, in which Mu-tsu Hsu provided one hundred indigenous samples to Stanford University researchers, which provided part of the research basis for two subsequent US patents assigned to Stanford. A Stanford researcher, Jin Li, apparently then took some of these samples to Fudan University in China when he moved there in 1997. Several of these (and other) samples became part of the Yale-Stanford Collection of human cell lines. Ru-band Lu reportedly collected samples from forty-two Atayal males and forty Ami males for his research on alcoholism in 1993–94 and subsequently collaborated with researchers Kenneth Kidd and Judith Kidd at Yale University. (In 1993–94 Sediq and Truku peoples were classified by the government as Atayal. They have subsequently gained independent recognition. Munsterhjelm 2014 suggests that Lu’s samples were taken from Sediq men, while others have suggested to me that they were, in fact, Truku.) Ten each of these Atayal and Ami cell lines were shared with the Coriell Institute, where they have been available for purchase since 1995.

sized the social and historical roots of resistance: “For instance, with collecting blood from Aborigines, this is very controversial. The Aborigines think that they are cheated and that they are deprived by the Han Chinese or by parliament. It’s a historical debt. And this is a debt that has exerted much influence on the national biobank project” (2007 interview). The fact that Indigenous peoples were specifically targeted as sample populations for the Taiwan Biobank enhanced concern from Indigenous groups, human rights activists, and multidisciplinary scholars. Terence Hua Tai and Chiou Wen-Tsong (2008) elaborate reasons why Indigenous peoples might resist their conscription as biological subjects. They call improvements in the Department of Health’s regulations for research on human subjects “overdue progress” and succinctly characterize problems with Indigenous blood collection:

The indigenes, in particular, have been persistent victims of a long history of exploitation in which researchers often went to tribal villages to covertly collect blood samples under the guise of “free health checks.” A news report even quoted a villager as saying that in just one year he gave blood “eight” times—meaning, perhaps, “several” times in his native tongue—for “free health checks.” Moreover, the Bureau of Health Promotion has been offering indigenous elderly two physical examinations per year for free, but, lacking a sound monitoring procedure, this well intentioned health policy has unfortunately made the examinees vulnerable to surreptitious, unconsented extraction of more blood from them than is necessary for the proclaimed purpose. (108–9)

Under the guise of helping via the provision of medical checks, Indigenous DNA has been made available to biotech researchers. While some samples have been shared in informal exchange networks, the implications of such collecting are amplified in light of a global biotech environment of commercialization. For example, DNA and cell cultures derived from Taiwan Indigenous Ami and Atayal peoples (50 mg) are available for US\$55 and US\$85, respectively, from the Coriell Institute for Medical Research in New Jersey.¹¹

A well-publicized case in Taiwan involved Ying-chin Ko (葛應欽), a preeminent researcher in Taiwan with a long record of conducting health-related genetic research among Indigenous peoples there. He became a central figure in biotech controversies as new bioethical and bioeconomic regimes developed. Ko had been collecting samples from Indigenous peoples for years. Between 2004 and 2007, for example, Ko’s team collected samples from over fifteen hundred Atayal participants. During the first decade of the new millennium, Ko and collaborators submitted a series of four US patent applications and three corresponding Taiwan patent applications. Ultimately, none of these patents were granted, for various reasons, and the final US application was withdrawn after being challenged especially for the use of genetic materials from Solomon Islanders. Controversy also arose in Taiwan, where Ko was accused of violations of informed consent protocols. For example, the original informed consent agreements suggested that participants could withdraw their consent at any time; however, such withdrawal becomes impossible once a patent is granted (NIPS

¹¹ These appear to have come from Taiwanese researcher Ru-band Lu. See n. 13.

2011). In addition, Article 21 of the 2005 Indigenous Peoples Basic Law requires group consent, which was not expressly obtained by Ko.¹²

The uses of Indigenous peoples, their biological materials and their identities, in projects of science and politics remind us both of the histories of colonial medicine and science and of prior conscriptions. Such projects can be seen as constituting a form of subimperialism. As Japanese colonial subjects, Indigenous peoples were enlisted to supply labor for resource extraction and were conscripted into Japanese military projects. Some were made to take Japanese names, and many “became” Japanese during the *kominka* period.¹³ They occupied, as Leo Ching (2001: 13) recounts, “the lowest realm in the colonial hierarchy.” They also became objects and subjects of scientific scrutiny and related practices of counting and classification (Liu 2012a; J.-S. Chen 2009; S.-J. Chen 2009; Suenari 2006). These colonial studies provided a foundation for continued and enhanced scientific study of Indigenous peoples in Taiwan. In this sense, current scientific projects conducted on Indigenous samples can be seen as a continuation of scientific colonialism that commenced during the Japanese occupation. This continuity appears especially significant in light of the prominence of medical education in the Japanese regime and the fact that so much of Indigenous sampling is premised on claims of medical therapeutics and research.

One could thus sustain an argument that this biosampling is a subimperial formation that emerges from the Japanese colonial period. However, I suggest it is also inextricably linked to economic changes in science. The new bioeconomy is shaped largely by new possibilities of capitalizing life that came out of US congressional and legal cases in the 1980s and created new patent and intellectual property rights regimes that enable the privatization of forms of life.¹⁴ These shifts, along with enhanced pharmaceutical markets, have significantly changed the economic potential of biotech. It is in this realm that the national biobank and Indigenous collecting especially are shaped, even as they are also shaped by longer histories of scientific collecting and knowledge production.

4.2 Inclusions (Aborigines as Taiwanese, Taiwanese as Aborigines)

The uniqueness of Indigenous DNA is emphasized for its value in nationalist projects both of biotech and of ethno-political identity making. In both, Indigenous peoples are emphasized as being part of a larger body politic, one that signals Indigenous inclusion in Taiwanese genetics and politics (Liu 2012a). Indigenous poet Monanen Malialiaives recounts a Taiwanese man at a protest telling him that Aborigines are brave and also

¹² For a detailed discussion of the Ko controversies, see Munsterhjelm 2014: chap. 6.

¹³ *Kominka* refers to the official Japanese policy of imperialization beginning in 1937 and continuing until the end of the Japanese empire in 1945. Leo Ching (2001: 94–97) writes that *kominka* represented a shift in imperial governance toward an emphasis on “interiorization” by the colonial subject of being or becoming—self-identifying as—Japanese. Being a good Japanese entailed a corresponding shift from living as Japanese to being willing to die “as Japanese in the name of the Emperor.”

¹⁴ The Bayh-Dole Act (1980) granted intellectual property rights resulting from federally funded research to universities and other agencies, encouraging the privatization and commercialization of such research outputs. The US Supreme Court case *Diamond v. Chakrabarty* (1980) resulted in the determination that a living human-made organism was patentable, thus creating a new class of property especially relevant to biotech development.

Taiwanese: “A Southern Fukienese praised me, thumbs up, saying in Fukienese, ‘You *shandi* (or mountain) guys are brave! *Shandi* guys are also Taiwanese!’ *Is that praise?*” (Malialiaves 2000: 186, emphasis added).¹⁵ The man whom Malialiaves identifies as Southern Fukienese would surely call himself Taiwanese, and in this utterance he is including Indigenous peoples in this category of national kinship and selfhood. His inclusion fits neatly alongside the (contested) claim that most Taiwanese have some Indigenous genetic contribution. Historical data point to immigration patterns and policies in the seventeenth through the nineteenth centuries that supported men, but not women, coming over from China, and the well-known idiom, “We have *tangshan* [Chinese/Han] grandfathers but no *tangshan* grandmothers,” supports the claim that many Taiwanese have some Indigenous ancestry.

The genetic contribution has been used to make political claims, such as that of Premier Frank Hsieh (then presidential candidate): “Now you shouldn’t say: ‘you are Aboriginal, I am not.’ Everyone is Aboriginal” (quoted in Rickards 2005). As I discuss elsewhere, even as a fractional Aboriginality is used in configuring a Taiwanese identity, and in political speech, rarely do such claims result in the repayment of historical debts or the political adjudication of present suffering (Liu 2012a). An Indigenous Sediq woman puts this succinctly when, speaking of politicians, she states, “Why should I support them so that only those people can get power and money? My life won’t change either way” (quoted in Simon and Mona 2009: 17).

Sometimes, Indigenous peoples are included as Taiwanese, as in “*Shandi* guys are also Taiwanese.” At other times, Taiwanese remake themselves as Indigenous, as in “everyone is Aboriginal.” Is that praise?

4.3 Disappearances

The Human Genome Diversity Project, despite its designers’ conceptualization as a progressive and antiracist corrective to the limited scope—the exclusivity—of the Human Genome Project, failed to gain the support of Indigenous peoples around the world. This is, in part, due to the representation of Indigenous peoples as disappearing, their naming as “isolates of *historical* interest” (Reardon 2005: 68, emphasis added), and the lack of any perceived value in the project for the people themselves. We already know, they said, our origins, our kin, and who speaks like us (Reardon 2005). And, many were offended at the project’s depiction of Indigenous peoples as threatened or disappearing resources for science and history rather than as living communities in need of justice (Reardon and TallBear 2012).

In this context, and against some scientific claims that Taiwan’s Pingpu (平埔) peoples, so-called Plains Aborigines, have disappeared or are disappearing, they are demanding recognition.¹⁶ Cheng-hsiung Wan (萬正雄), head of the Tainan County Siraya Cultural Association, has been part of an ongoing campaign to gain official recognition for Pingpu peoples as an Indigenous group in Taiwan, thereby conferring

¹⁵ *Shandiren* translates as mountain person or people and was a common appellation for Indigenous peoples in Taiwan. Now it is considered to be a derogatory term.

¹⁶ For example, “We found that 13% of ‘Taiwanese’ HLA-A, -B and -C three-locus haplotypes most likely originated from these mountain tribes and also from the Pazeh, who are a disappearing plains tribe” (Lin et al. 2001: 192).

some rights and protections under the Taiwan constitution.¹⁷ Wan says, “The government has refused our pleas, citing such reasons as the Pingpu tribes did not register as Aborigines within the given timeframe,” and that Pingpu have been “too assimilated by the Han” (quoted in [Lee and Chung 2012: 5](#)). Anthropologist Shu-juo Chen tells the story of scientist Marie Lin’s reports that most Pingpu groups were extinct, and her subsequent apology: “I express regret for my previous statement that the pure Plains Indigenes are extinct. I want to affirm that pure Plains Indigenes are still alive in eastern Taiwan” (quoted in [S.-J. Chen 2009: 79](#)). Chen further notes that in 2007 Kavalan peoples insisted that Lin return all of their biosamples and stop publishing about their genetic data. In addition, they filed a grievance about unethical sample collecting. Scientific and government representatives may claim that Pingpu have been assimilated, genetically or culturally, but Pingpu claim their own identities and existence, and Indigenous peoples more generally insist on autonomy over the uses of their biological materials and their votes.

In a report to the UN Committee of Indigenous Peoples, I Chiang and Lava Kau wrote: “The basic policy of the KMT government toward the indigenous peoples is one of artificial assimilation, aiming at the complete effacement of the indigenous peoples’ consciousness of their own history, culture and language” (quoted in [Taiwan Communiqué 1991: 20](#)). This comment predates the genetic and political claims to Indigeneity that I discuss above, but Indigenous peoples in Taiwan are no strangers to various forms of assimilation. As Chiang and Kau suggest, such assimilations are artificial in that they represent strategic inclusion rather than meaningful and substantive inclusion. After Japan’s defeat in 1945, Taiwan was turned over to the Republic of China government (KMT). As [Chiu \(2000: 117\)](#) notes, this handover did not entail any real decolonization but was, rather, “a classic case of recolonization.” Japanization was replaced by sinicization, which included mandates to learn Mandarin and take Han surnames and customs.

Now, in a period of democratization, government policies have improved formal recognition for Indigenous communities. However, Chiang and Kau remind us that democracy is no guarantee of Indigenous representation: “In the parliament, where the majority rules, the rights and welfare of the indigenous peoples are completely at the mercy of the Han majority, a fact which renders our quotas little more than political ornament” (quoted in [Taiwan Communiqué 1991: 20](#)). [Sandra Harding \(2008\)](#) notes that celebratory accounts of democratization often ignore the harm suffered in such movements, especially by women and minorities. Since Indigenous peoples in Taiwan represent only about 2 percent of the population, a democracy based on numerical representation does little to protect their interests. It is important to note, however, that since 1991 when Chiang and Kau wrote the report quoted above, there has been progress in the formal representation of Indigenous peoples’ interests, including revisions in the Taiwan Constitution.¹⁸

¹⁷ Kavalan (a Pingpu group) are recognized as an official Indigenous group; however, other Pingpu groups are excluded. [Malialiaives \(2000\)](#) reminds us that *Pingpu* is itself a name that originated from the Japanese colonial period classifications.

¹⁸ “In 1996, the Council of Indigenous Peoples was established within the Executive Yuan. In 2008, six seats of 113, or 5.3%, were designated specifically for Aboriginal representatives in the Legislative Yuan. The magistrates of 30 mountain townships are reserved for Indigenous politicians. . . . In 2009, Taiwan’s

Just as Indigenous peoples in Taiwan were made Japanese for imperial projects and then later Chinese in a Cold War context, in the above stories they are now Taiwanese for specific political and biotech projects. Even as they are included in politicians' speeches and in kinship stories made in a genetic frame, Malialiaves (2000) reminds us that they are simultaneously excluded even within revised historiographies and textbooks that celebrate Taiwan as a nation of immigrants. It may not be specific inclusion, however, that Indigenous peoples in Taiwan seek, as Malialiaves suggests when he asks above, "Is that praise?" Rather, it may be recognition on their own terms.¹⁹ In an interview, Malialiaves discusses the sinicization of Aboriginal peoples in Taiwan who, after hundreds of years, no longer recognize themselves as Indigenous. He predicts the disappearance of Indigenous identities when he suggests that, with the dominance of Han culture in Taiwan and its prevalence in the media, it should take only twenty to thirty years for Indigenous peoples to become completely sinicized (Maziere 2011). Disappeared in textbooks, in genetic research, and in his future vision via cultural assimilation—for Malialiaves there has been no decolonization, no end to imperialism; he does not seem to envision the possibility of a time when Indigenous groups "are once again masters of the island" (Chen 2010: 53). He sees one in which they are, rather, disappeared or "artificially assimilated."

5 Biotech Conundrums

Subimperial desires are expressed anew in a genetic register. They draw on nanxiang and Indigeneity narratives to reconstruct Taiwanese identity in both exvolutionary and involuntary modes. Biotech techniques both enable and buttress genetic identity narratives; these are claims made through the practices and the language of science. Biotech is also an expansionist endeavor, as illustrated in its promotion by the Taiwan government as a strategic growth industry. And populations are viewed as both resources for, and potential beneficiaries of, biotech interventions. They are also important potential markets for biotech products. Here, a Taiwanese genetic specificity butts up against biotech as an industry. An analytic of subimperialism reveals certain blind spots in mainstream thinking about Taiwan biotech. It calls for serious consideration of geopolitical and domestic relationships, and it insists upon an attention to how historical formulations shape relationships and desires in the present. These biotech stories, however, also illustrate the limits of subimperial desires.

A qualified or non-Chinese genetic identity has biotech implications. The national Taiwan Biobank was conceptualized as a central component of Biomedtech Island, a tripartite government plan to build Taiwan as a regional hub for biomedical research

government ratified two human rights conventions, the International Covenant on Civil and Political Rights and the International Covenant on Economic, Social, and Cultural Rights. Along with the already accepted Universal Declaration of Human Rights, these three accords represent the most important international agreements on human rights, and include measures to protect traditional languages, religions, and cultures. . . . In addition, Taiwan's constitution was amended for the sixth time in 2000, a revision that included two paragraphs specifically addressing Aboriginal rights" (Liu 2012a: 338).

¹⁹ Or perhaps an insurrectionary abandonment (Cohen 1994).

and therapeutics.²⁰ It also proved centrally controversial, and was significantly delayed by critical interventions especially from ELSI scholars and Indigenous groups.²¹ Two of the biobank's key designers at Academia Sinica, [Chia-Hao Ou and Chen-Yang Shen \(2007\)](#), wrote that the biobank will help identify health risks and will become a substantial resource for biomedical research. They continued: "The ethnicity of Taiwan is unique and the Taiwan Biobank can be expected to develop into the supply centre for a Chinese ethnicity database." The expansionist goal of the biobank is clear.

The biobank can be read as a subimperialist project, but it is one that complicates linear movements of either identity or medicine. In an expansionist mode, it expresses a desire to center Taiwan biomedically as a resource for a global Chinese community. Taiwan's population becomes both resource for and beneficiary of biotech progress. But claims to a unique ethnicity, and especially to a non-Han one, complicate the biobank's usefulness to global Chinese in a biomedical frame. Thus, while Ou and Shen seem to signal a westward (toward mainland China) and multidirectional global movement, this complicates the nanxiang genetic narrative. I asked the scientist who showed me the map locating Taiwan as central to Southeast Asia how one can suggest that Taiwanese genomes are unique and yet also frame the Taiwan Biobank as a resource for a global Chinese ethnic community. He replied by constructing a more specific Chineseness: "I don't know how global, because it has to be a Southeast Asian type of Chinese, because of the genetic makeup. People from Canton or Fujian may be very similar, but if you talk about the Yangtze River in the north, Beijing, that's very different" (2007 interview). Lin's genetic studies that frame Taiwanese as genetically Southeast Asian can be read as part of a nanxiang project conjoining science, politics, and identity. In an expansionist bioeconomic frame, however, Taiwanese genomes must be situated both as unique—thereby having something special to offer—and as broadly useful to global communities of ethnic Chinese.

As I mentioned earlier, the Taiwan Biobank met with resistance in part because of the enhanced complications that arose from the collection of Indigenous biological materials. Currently, Indigenous samples are not being collected for the biobank. This gives rise to a second conundrum. While the collection of Indigenous biologicals can surely be viewed as a form of extractive subimperialism, such a view may risk impeding health justice. By now there has been substantial work in building ethical research infrastructures, including policies and multilevel institutional review boards, as well as additional regulatory requirements for the collection of Indigenous materials (including the Indigenous Peoples Basic Law). A scientist and I discussed some of the progress that had been made in the regulatory structures and the kinds of research

²⁰ The national Taiwan Biobank is the oldest biobank in Taiwan. The Ministry of Health and Welfare has approved twenty-five biobanks in Taiwan, most of which are collections of disease-related samples and affiliated with medical institutes and hospitals. Taiwan Biobank is a cohort-based population bank and was subject to substantial scrutiny for several years. Taiwan passed the Human Biobank Management Act in 2010; the Taiwan Biobank was established officially in 2012 and aims to collect 300,000 samples ([Fan, Hung, and Yeh 2015](#)).

²¹ I use ELSI here as a recognized shorthand for ethical, legal, and social implications; however, I recognize it as problematic acronym since it excludes much broader considerations, such as the cultural, economic, political, and theological.

that requires institutional review board approval. An excerpt from my 2012 field notes follows:

Dr. X says that there is still a very big controversy about use of Aboriginal samples. Gaining access to Indigenous samples is “a difficult process and therefore these restrictions prevent scientists from studying this. You must have group consent. . . .” Dr. X approves of the regulations and appreciates the concerns that social scientists and others have raised. But, he wonders if these protections preclude some medical attention. “Is this kind of regulation bad for Aboriginal groups themselves?” Might all this regulation about Aboriginal samples preclude work that might actually provide medical benefit to Aborigines—that might begin to address the health disparities problems?

The health of Indigenous peoples in Taiwan is generally much worse than that of other groups. Indeed, Indigenous lives are characterized statistically by poor health measures, and these health disparities symbolize broader Indigenous injustice and suffering. Thus, this scientist worries that strict regulations, designed to protect Indigenous groups, may also preclude studies that might improve both health and social justice.

A similar dilemma arises in relation to a private company that banks umbilical cord blood (UCB).²² This company uses some of the proceeds from its private clients to underwrite the collection and storage of Indigenous UCB. The charitable arm of the company, I was told by a researcher there in 2006, is concerned with including Indigenous peoples who are often too poor to pay for UCB collection and storage. This company is committed to including Indigenous peoples in UCB’s therapeutic promise. The money, this scientist tells me, can always come later, but they have only one chance to collect a newborn’s UCB. This scientist suggests, as does the long and durable relationship between the project’s main physician and the Indigenous groups he works with, that these are acts of benevolent helping; it is about the inclusion of Aborigines in the ongoing promise of potentially transformative therapies that social inequalities have rendered them unable to afford. As we know, however, from colonial histories, from multiple reports of genetic extraction disguised as health checks, and from analyses of bioethical instruments like benefit sharing (Hayden 2007), benevolence is not necessarily innocent; it is often intertwined with multiple interests. Neither exclusion nor inclusion provides ready answers.

6 Beyond Hybridity: Biotech Assemblages

Inclusion and exclusion are not the only possibilities. Biotech in Taiwan is practiced on a complex field of multiple and often competing interests. Global biotech narratives foretell previously unimaginable futures: of therapeutic hope, on the one hand, and nightmarish destruction, on the other. In Taiwan, individual scientific careers are

²² UCB banking is very popular in Taiwan and differs significantly from public biobanking projects. Private UCB banking is viewed largely as a form of biomedical insurance and underpins a thriving industry. Wenmay Rei (2010) reports that, while public UCB banks remain relatively underdeveloped, private family banks thrive. Rei emphasizes that private UCB banking is framed principally as a consumer transaction and is therefore governed by contractual rather than medical law.

shaped by the draws and duties of kinship, nation, and home. These are elaborated in narratives of family, service to country, and desires to help, which are sometimes conjoined with alluring promises of prestige and research support. Neither Taiwan nor biotech lends itself to facile binary characterizations.

William W. Keller and Richard J. Samuels (2003) have suggested Taiwan to be exemplary of a technohybrid approach to technoscientific development. In their schema, the technohybrid sits between a technonationalist approach exemplified by South Korea and a technoglobalist approach exemplified by Singapore. I have argued that contemporary technoscientific formations exceed such categorical schemas and that Taiwan's technohybridity is a characteristic of the inherent hybridity of the assemblages within which global science constitutes itself (Liu 2012b).

Given its history of varied occupations, it is hardly surprising that Taiwan might be characterized in terms of hybridity. And an analytic of hybridity enables a movement away from colonial categories that relied on binary constructions of difference and incommensurability. Franz Fanon provides insights into the hybrid subjectivities produced in the colonial subject. He emphasizes the underlying, yet never quite realizable, desire to be recognized by the colonizer; this is, I suggest, foundational to the subimperial impulse. Fanon attends, as well, to the resultant embodied aspects. Thus, Fanon (1967: 111) insists that "the black man suffers in his body quite differently from the white man," because of the interiorization of the gaze from "the white man who had woven me out of a thousand details, anecdotes, stories." The colonized is made and experienced not as oneself but, rather, by the imaginings and representations made by the colonizer. Homi Bhabha (1984: 126) has thus foregrounded the hybrid subjectivities, and ambivalence, made in relation to colonial mimicry "as a subject of difference that is almost the same, but not quite." And Suman Seth (2009) emphasizes that such mimicry is always incomplete; it relies on a foundational and inescapable division between colonizer and colonized. These are the conditions of the production of subimperial desires.

Taiwan, however, complicates this kind of binary division. When I told a *Waishengren* scientist in 2014 that I was working a paper on subimperialism in relation to Taiwan biotech, she immediately protested that this orientation overly privileged the importance of only fifty years of Japanese rule.²³ She wanted to insist on the importance of other relationships, other influences. Indeed, she is correct. China, the United States, and many others, including internal others, figure prominently. And subimperialism refers to an attitude, a mode of subjectification, and not just to formal colonialisms.

²³ *Waishengren* translates to "outside the province person or people" or "foreigner" and refers here to those Chinese who immigrated to Taiwan after the Communist Revolution—the post-1945 migration. This scientist's reaction nonetheless signals an important and ongoing conflict in Taiwan about how to think about the Japanese colonial period. For some, a recourse to Japan is a way to move away from an unwelcome Chineseness. It represents a nostalgia and a rescripting of the past as a better time, or a developmental boost, as Taipei's mayor, Wen-je Ko, suggested in 2015: "For the [world's] four Chinese-speaking regions—Taiwan, Singapore, Hong Kong, and Mainland China—the longer the colonization, the more advanced a place is" (Tsoi 2015). For others, especially those who remember the Japanese bombings on a Chinese homeland, such a move is antithetical to a meaningful identity and present. This is, of course, complicated by Japan's own changes—its positioning as a top world economy, cultural appeal in realms as diverse as global pop culture and food, and a post-Hiroshima and -Nagasaki antimilitary ethos.

In Taiwan, there is no single colonizer. There is not a clear “racial” distinction that underpins so much in postcolonial literatures. Thus, we see that the binary distinctions that frame much of postcolonial scholarly analyses must also be made rather than merely observed. Kang Chao and Marshall Johnson (2000) for instance, show implicitly how binary distinctions privilege certain categorical possibilities in their account of how inattention to gender masks certain considerations of descent, ethnicity, and language.

I, too, have characterized Taiwan in terms of hybridity, writing on the production of a hybrid genetic identity (Liu 2010). Increasingly, however, in postcolonial studies of technoscience, I think that hybridity has lost its traction and is no longer particularly useful conceptually. In part, this is because hybridity relies upon prior categories and notions of purity. It is also because science, as Bruno Latour (1993) and so many others have made clear, has never been pure. It has never been separable from either technology or the social, and such claims have been made, rather, through social work and specific boundary construction.

Assemblage has shown itself to be a more productive analytical concept in studies of traveling technoscience. As previously mentioned, the notion of the assemblage offers a way to think beyond categorical schemas, to think heterogeneous elements together in shifting and contingent relations, and it has shown itself to be useful for analyses of transnational and global circulations. The assemblage is characterized by contingency, heterogeneity, and nonfixity. It assembles disparate things in nondeterminative ensembles and allows for the multidirectionality of relations of power. Each element in an assemblage is thus not manifesting an essential character(istic); rather, its character is made in its relations within the assemblages. The component things are mobile: they can enter and exit an assemblage, be components in multiple assemblages, and join other assemblages with different effects. The component is thus not defined by an essence but in relations.

In art, for example, assemblage has come most often to denote a collection of found (often discarded) objects that are then combined in novel ways. Julia Kelly (2008: 25) writes of “obsolete consumer goods, cobbled-together contraptions . . . and awkward proppings of everyday things” filling galleries that house art assemblages. She signals the assemblage as simultaneously spontaneous—a “throwing things together into apparently contingent configurations”—but also as “willed and deliberate” in its disruptive capacity and radical dependence on context (27–28). Tim Edensor (2011), writing about a church building, emphasizes the assemblage’s ability to account for innumerable agencies and continuous alteration and emergence even within an apparently stable configuration. Taiwan’s biotech encompasses elements and relations—both spontaneous and deliberate—that shift. Jia-shin Chen (2009: 22), writing on the transplantation into Taiwan of global policy, characterizes such movements as “a series of assemblage formations.” Assemblage, in Taiwan, can take into consideration varied and multiple postcolonial and subimperial relations, but also other relationships that configure contemporary Taiwan and Taiwanese-ness in multiple frames. That is, even as binaries are at times configured and mobilized in subimperial modes, Taiwan exceeds any binary enframing.

Taiwanese desires for a unique identity, even as they draw on genetic narratives of autochthony, are not themselves autochthonous. They are shaped by multiple relation-

ships, past and present (see Hsiao and Wang 2016). A subimperial perspective engages this broad scope. A subimperial biotech assemblage thus takes account of varied forms of occupation and broader global historical and present relations. Thus, multiple occupiers, global flows of capital, US hegemony, Qing imperialism, and Japanese colonialism all figure into a subimperial framing. An analytic approach of subimperialism does not seek to locate things as subimperial. It is not a category of things. Rather, it highlights realms of things—policies, identities, desires, affects, memories, practices, gene fragments, and so forth—that weave in and out of varied assemblages. Thus, Taiwan biotech is not subimperial practice per se; rather, within biotech assemblages elements of the subimperial come into play in varied ways and at particular times. Identities, political sensibilities, alliances, policies, flows of capital, and scientific techniques enable specific involutory and exvoluntary ways of imagining and substantiating specific forms of Taiwanese-ness.

7 Conclusion

7.1 Subimperialism and Postcolonial STS

Subimperialism adds to postcolonial STS in at least three significant ways. First, it insists on attention to the complexity and multidirectionality of postcolonial relations. It is not only one's relationship to the colonizers that is at stake but also one's relationship to multiple colonial others and to oneself.²⁴ Second, it continues to complicate the meaning of the *post* in postcolonial. It insists that colonial pasts shape relationships and desires in the present and that these require sustained attention. Even as global capitalism shapes many of its practices, subimperialist expression is not limited to realms of capital. Third, a subimperialist framing insists on the decentering of Europe, as does writing from Asia, shaped as it is also by Japanese and Chinese imperialisms (Chen 2010). An attention to the "lower-level" imperialisms insists that the physical or geographic absence of formal colonizers does not signal the erasure of their effects. Colonial hierarchies, distinctions, and psychological effects endure and may express themselves in present subimperial relations. Such subimperial formations represent attempts to resolve lingering colonial injuries; this is done, however, through the creation of new kinds of colonialish relations, which are unlikely to heal.²⁵

²⁴ This is well illustrated in Chimamanda Ngozi Adichie's novel *Americanah* (2014: 233–24), in which a character makes the suggestion that *Things Fall Apart* is not about Africa at all: "It was about Europe, or the longing for Europe, about the battered self-image of an Indian man born in Africa, who felt so wounded, so diminished, by not having been born European, a member of a race which he had elevated for their ability to create, that he turned his imagined personal insufficiencies into an impatient contempt for Africa: in his knowing haughty attitude to the African, he could become, even if only fleetingly, a European."

²⁵ Chiu (2000: 104) likens subimperial relations to rape. In his metaphor, one rapes in order to justify or feel better about having been raped: "Within such a logic no attempt needs to be made to distinguish between the right and wrong of rape; all that matters is to become the rapist."

7.2 Successor Biotech?

We really did conquer a continent; we have made a lot of money; we're better off materially than anybody else in the world. . . . How easy it is as a person or as a nation to suppose that one's well-being is proof of one's virtue.

James Baldwin, "The Uses of the Blues"

Even as its economic value is stressed, Taiwan biotech has never been solely about money. It is laden with questions of virtue. James Baldwin (1969), in a London interview at the time of the US civil rights movement, reminded us that liberation is not just about the enslaved or the colonized. Colonial relations, like racial violence, he suggested, damage also the subjectivity of he who lynches, he who colonizes. All are wounded in these relationships even as the damage is different.

In these biotech stories, I have suggested that we can read into some projects underlying subimperial desires and logics: to do unto others that which has been done to us. Indeed, traces of Taiwan's prior colonial relationships manifest as sedimentations in present biotech, and they shape imagined futures. However, an attention to the stories of individual biotech scientists also shows that Taiwan biotech is not reducible to an analytic approach of subimperialism. A reproduction of the colonizer/colonized hybridity is inadequate to a full analysis of contemporary Taiwan biotech. Many factors come together that complicate a singular or even binary framing, including personal biographies and overlapping ethical registers or regimes of value. Does Indigenous research exceptionalism and protection impede care of Indigenous peoples in a lived context of pronounced health disparities? Is an island nation's ambitious plan to develop itself as a biomedical hub for a global Chinese ethnicity limited by a competing framing that requires a Southeast Asian Chinese specificity?

What might a decolonized, deimperialized, de-cold warred Taiwan look like? These are not questions for biotech officials. Biotech inclusion, like political inclusion, may escape the subimperial when Indigenous peoples and others are the authors of their own fates, as the epigraph above suggests. What alternate futures might we imagine when studies about Indigenous genetics and genomics are driven not by scientific curiosity or potential marketization but, rather, by Indigenous peoples' priorities? Harding (1986), among others, advocates for a successor science; this is a science built on projects that start with the priorities of those most vulnerable, those living in the margins. And an expanding body of work considers how to do science more democratically, specifically questioning how meaningfully to include multiple publics in science decision making. Democratic governance does not assume a singular form, nor is it necessarily unproblematic and fair. Numerically, it can be used to justify myriad exclusions and exploitations, as Chiang and Kau note above in their comment about the democratic erasure of Aborigines because of their relatively small population size. Might we nonetheless imagine responsible decolonized science governance in newly democratic Taiwan?

A rich STS scholarly community and engagement suggest that deliberative and democratic science governance may yet emerge. And I, perhaps in too optimistic a mood, read Kuan-Hsing Chen's critique as a way of asking, perhaps with a Levensonian twist, whether there is a way to be "modern" and Taiwanese that is not a (lesser)

reproduction of imperial or global capitalism.²⁶ I believe that Taiwanese of all kinds have an opportunity to take a truly innovative approach to science. Indigenous engagement, strong and engaged scholarly communities, and world-class scientists could remake Taiwan as a new kind of laboratory—not one driven by Shiv Visvanathan's (1997) mandates of vivisection and triage, or as a continuation of Japanese scientific colonialism, but an experimental site of decolonial science. This is a science serving in the interest of justice and serving those who have traditionally been those least served—indeed, most harmed—by scientific endeavors. Might we reimagine Ashis Nandy's (1988) “science as a reason of state” as one that enacts a different vision of scientific modernity, a uniquely Taiwanese modernity, underpinned by serving the greatest number of stakeholders and prioritizing those most injured by prior scientific and imperial orders?

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²⁶ My use of *modern* here is, of course, a nod to Joseph R. Levenson. Modernity as a concept has been amply problematized, as has Levenson's thesis. Modern should be more aptly replaced with “a full player on the stage of global science.”

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