

Aihwa Ong, *Fungible Life: Experiment in the Asian City of Life*

Durham, NC: Duke University Press, 2016. 284 pp. \$94.95 hardcover, \$25.95 paperback.

Charis Thompson, *Good Science: The Ethical Choreography of Stem Cell Research*

Cambridge, MA: MIT Press, 2013. 343 pp. \$40.00 hardcover.

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These two new books each touch on the molecular biology revolution in Asia (Singapore and South Korea in Thompson’s case; Singapore and Shenzhen, China in Ong’s). Charis Thompson provides an expert account of policy formulation in California and justifies her all-too-brief forays into Asia by reference to Sheila Jasanoff’s comparative work, but she provides only superficial accounts of her Asian cases: in the Singapore case, for a guided tour of buildings and apparently speaking only to three researchers in 2005; and in the Korean case, focusing almost exclusively on the troubled case of Hwang Woo Suk in 2005 and again in 2008, when his bubble burst. In neither Asian case does she do the in-depth analysis of the civic epistemology or assumptions of how regulatory decisions are legitimately made that is the core of Jasanoff’s analyses, falling back on general rubrics like “developmental state” and “internationalism” instead. Thompson’s work on California, however, is systematic and worth thinking about for future work in Asia. It results from her *participation*, as she stresses throughout (designing curricula at Harvard University and University of California, Berkeley, serving on oversight committees, doing fundraising, cohosting a conference with underserved communities, and observing legislative and executive branch processes), as well as observation, in the ethical debates as they played out in the California and US contexts. She provides a valuable set of analyses for how to think about “sciences with ethics” and suggests that “stem cell research has the chance to become a vibrant scientific, medical, and biotechnology field that could also be among the best regulated areas of science” (223). That is, the debates over stem cell research over the Bush and

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Obama policy eras, 1991–2009, provide a matrix of options we can learn from and use to create a more ethical and also better science (the “good science” in her title, in both senses of the pun).

Aihwa Ong, in turn, focuses on Singapore, with an attached chapter on BGI in Shenzhen,¹ albeit through the narrow lens of her ethnicity concerns. She provides a meditation on popular affect about biotechnology issues and continues her speculations on *exceptionalism* and flexibility, both important notions, in Asian forms of capitalist political economy. In previous work Ong pointed to local ritualized mechanisms of worker resistance to arbitrary transnational factory-labor regimes (*Spirits of Resistance and Capitalist Discipline*, 2010), to Chinese mobile investments in real estate as an index of flexible citizenship in globalized economies (*Flexible Citizenship*, 1999, *Neoliberalism as Exception* 2006), and to national projects in Asian bioecologies, including issues of food and genetic sovereignty (*Asian Biotech*, edited with Nancy Chen, 2011). In *Asian Biotech*, Ong argued that blood banks in Singapore were dedicated to racial “communities of fate.” In the new book, she is still centrally concerned with Chinese race or ethnicity in Singapore, but adopts a more flexible notion of “a catalogue of serious diseases [that] acts as a global positioning device in a geo-biosocial project,” or “an intervention into a Euro-American biomedical body that has [until now] been abstract and universal rather than historical and particular about human genetic variation [in Asia]” (52–53).

Ong’s project seems to fall into three strands. First is a vision of how we might reconceptualize *biological markers as recombinants*, as we have progressed from recombinant DNA techniques in 1975, PCR amplification, genome mapping, and now integration of many omics (proteomics) and regulatory factors, enzymes, growth factors, and methylation variance (epigenomics). The goal is to molecularly target therapeutic drugs for stratified population segments (by mutations and other biomarkers) of sufferers of a disease, who might benefit from a given therapy, leading eventually to personalized medicine.

The second strand is how ethnicity or race bedevils *medical statistics* and genomic research and asks whether this is fundamental or will eventually wash out through more targeted clinical analysis and how much clinicians need to know about biotechnology to diagnose and treat.

The third strand, and in some ways Ong’s primary strength, is a focus on affect. It is here in the world of the lay public anxious about the “smoldering fire” of cancer hidden deep within bodies that, in chapter 3, Ong, beginning with her own family and stories of a few celebrities (e.g., Angelina Jolie) and prominent anthropologists (e.g., Lochlann Jain), focuses on “a new ethnicization [that] marks *affective aggregates*” (77; emphasis mine). Ong quotes Singaporean sociologist Chua Beng Hua about another affect, the anxiety that attends bioscience entrepreneurial projects both for the scientists, who constantly have to prove their productivity, and for the nation-state, which funds them on the promise of therapeutic, intellectual-property, employment, or revenue returns. Ong does not follow up much on how this played out in the reorganization of funding in Singapore in 2010 (or again in 2017).

¹ BGI is now the official name of what was once the Beijing Genome Institute. On name changes and various meanings in Chinese, see Michael M. J. Fischer, “A Tale of Two Genome Institutes,” in the journal *Science, Technology and Society* (forthcoming in 2017).

The interface of these three strands is constituted by (a) national programs, to compete in biotechnology as economic engines, and as defenses of their populations' health, against multinational pharmaceutical companies; and (b) these same companies running clinical trials either harmonized across nations or targeted to specific disease populations.

She speaks of the interface space as one both of (a) "pluripotency" analogous to the contemporary fascination with the de-differentiation and re-differentiation of iPS cells; and (b) a double topology of national goals while also contributing to transnational science, as a "shift from the undifferentiated [general genomics] to multiple differentiated [i.e., national or ethnic] realizations." More problematically, she wants to claim that "the pluripotency of the population is in that its singularity can be offered as a generality, and its fungibility is in how these categories travel over space, encompassing larger and larger swaths of a racialized humanity" (14).

Here her prose seems to mix up "stratified medicine" (the effort to parse which patients in a general category, such as liver cancer patients, could benefit from a particular molecular therapy) with broad ethnic clusterings (which operate as marketing claims). Partly the confusions stem from the way in which statistics are collected. As historian of science and STS scholar Evelyn Hammonds, among others, has detailed, one of the bedevils for medical statistics is that they have been collected in legacy (and problematic) rough racial and ethnic categories, often nowadays by self-definition in worlds that are both of increasingly mixed ancestry, and recognitions that what were thought of as homogeneous historically were actually not so. (Singaporeans often make fun of the bureaucratic categories imposed by legacy efforts to create a plural society protected against communal violence, such as insisting that children of a Hindi-speaking mother and a Hokkien-speaking father pick either Tamil or Mandarin as their "native language" that they are required to study in school.) Sometimes nominal categories are used as a quick rule of thumb by time-stressed clinicians to rapidly do a first approximation screen for plausible indications, rather than, as eventually they will have to confront, the actual complex individual patient whose body will be sampled and analyzed (with all the attendant slips of judgment and omissions and missteps any diagnosis might encounter).

Even companies like 23 and Me, with which Ong opens the book, nowadays (not something she acknowledges) have ads in which their users express surprise (and, since they are ads, delight) in discovering that their genetics are not really only one or two ancestries but multiple and often from parts of the world to which they never thought they had any biological connection. The history of the claims and changing grounds for credibility of companies like 23 and Me are not included in this volume, which, along with other lapses, somewhat weakens its claims. Clearly, if medical statistics are to have any therapeutic leverage, they have to get beyond such nominal categories. This is also why true anthropological migration studies and health statistics are pursued in different ways and both with multiple tools, not just GWAS (genome-wide association studies) as Ong seems to insist (in any case, nowadays, imagined as using increasingly cheap and massive collections of whole genomes, not just GWAS, and increasingly moving on to complex cell circuitry models tested biologically to elucidate dynamic intertwined feedback loops and nonlinear interactions). GWAS and meta-analyses have identified genomic regions associated with diseases and traits, but identifying causal variants and biological processes is far more complicated, and at best

even these associations miss many contributing associations of modest effects. So it cannot be, as she insists, that databases are simply collected to be mined: they are *increasingly* complicated and multiple assemblages of data collected with different tools and processed with different algorithms, curated, optimized, and targeted for different purposes with different granularities, that are painfully and slowly put together, reassessed, and rebuilt. They are *emergent* objects, not simple static ones. Pluripotency could provide a rich metaphor, but Ong repeatedly turns instead to a more simplistic language of “repurposing” of the same simple lexemes of race or ethnicity (13).

So, Ong is valiantly striving toward an emergent vision of genomics and molecular biology as “a catalogue of serious diseases [that] acts as a global positioning device” and that, like Google maps, can be zoomed in and out, targeting particular population needs, as a procedural matter. It is odd to read a volume on an emerging and fast-changing set of sciences that addresses almost no scientific articles or controversies (with the exception of the Pan-Asian SNPs Consortium, and even in that case, her account is cut off prematurely after the first pilot project; see below). Rather, Ong seems to take promotional lay language of both the government and pseudonymous scientists at face value in order to extrapolate potential implications. Ong acknowledges that often she doesn’t know whether to take a statement as scientific claim or as marketing claim, which would be all the more reason to do a closer reading of the actual sciences and their fast-moving frontiers and boundaries.

Insofar as she is primarily interested in lay anxieties that mark “affective aggregates,” this is fair enough: we are all perplexed by the changing enigmas that biology is revealing, and by the protective moves that we are urged to adopt. More important, to her credit, regarding the Pan-Asian SNPs Consortium, she points to the fact that its shepherd and champion Edison Liu saw it as less importantly an inquiry into ancestry, albeit that as well, and rather as a tool to get fractious Asian nations to overcome their racisms and nationalisms in an urgent preparation for emerging pandemics (both infectious and oncological) that respect no national borders, what she credits me with calling “scientific diplomacy.”

From an STS or science studies point of view, while many of the anonymized sources could be de-anonymized by collating their names through the text, that still would not answer the fundamental question of how they are to be understood. As Ludwik Fleck pointed out long ago, scientific literature comes in different genres and modes of address and verifiability. To be guided by only the lay-addressed of these is disconcerting. When scientists evaluate a scientific article, their eyes go first to the tables, graphs, data sets, and experimental procedures, and they evaluate these against what they know of other literature and their own lab experiments. The same holds for ethnography. Many of the inaccuracies are minor (Alan Colman did not clone Dolly [2, 142], though he was involved; the cloning was done by Ian Wilmut and Keith Campbell; it is odd to claim that zebra fish are the key nonhuman model species for Biopolis, though they do have a zebra fish facility; Biopolis was planned and started well before 2003; and so on), but there is something strange about casting Singapore only in Chinese racial/ethnic terms, when (a) both ideologically and institutionally, and both domestically and for medical tourism, there is a real concern for Subcontinental (Indian, Bangladeshi) and Malay (Malaysia, Indonesia, including mixed “Peranakan”) patient populations; (b) the bioinformaticists at places like the Genome Institute of Singapore are largely Indian; and (c) even Dr. Ariff Bongso, the Singapore pioneer in

IVF and hES cells, who Ong proudly promotes, is originally from Sri Lanka. Again in the final chapter, on BGI, Ong is a bit heavy handed on the degree to which the research agenda is driven by ethnic categories, though she delightfully scores a point via the two different posters of the tree of life on BGI bulletin boards, one with humans in the middle, the other with a Chinese person at the top.

In sum, the book needs to be read with care to get the most out of it. It is perhaps a step away from Ong's earlier, more narrow concerns with racialized "communities of fate" toward emergent cosmopolitan ones, in which we are more than ever aware of the complexities of our biologies that are not easily disciplined by bureaucratic categories. One of the most fascinating and quite wonderful features of Ong's book is her sharing of her family's placement in our techno-scientific worlds, not merely (a) the crucial sentence on page 173 that begins "As someone . . . who grew up racialized as Chinese in Malaysia," which continues to motivate her thinking, but also (b) the sharing of her family's experiences with cancer (73), and (c) the proud claim that Chinese professionals, such as her brothers (and herself too) constitute a "fraternity [and sisterhood] of unassuming, brilliant, and dedicated professionals in overseas Chinese families *who constitute the backbone of modernity* in Southeast Asia" and elsewhere (86; emphasis mine).

Thompson's book is more openly comfortable with the advances in the sciences, saying at one point that her advocacy is intended to allow donors and their communities to benefit over time from the best the science has to offer. At the same time, (a) she advocates for decommissioning "substitutive research subjects" (i.e., animal models, noting even humans are not good models for humans), (b) advocates for attention to access and reducing health disparities when considering funding priorities, (c) recognizes that women are not a single category, and thus, for example, advocates for women scientists, not just women egg donors, and notes "women who oppose abortion also commonly oppose stem cell research because it destroys embryos, not because of women's reproductive health or women's autonomy," (d) advocates for not overusing gonadotropins in IVF work, and (e) above all, advocates for "sciences that have ethics" (not just codes of bioethical conduct, or ethical, legal, and social implications after the science is over). That is, sciences that have ethics attend to ethical, transparent, and open *procurement* of research material such as tissues; include curatorial *protocols* to track, assign custody, and certify provenance and processing; "*pro-cure*" rhetoric driving innovation and investment; but also give donors some rights in patents or other benefit-sharing, and resource-guiding, mechanisms. An effort not mentioned in Thompson's book concerns the protocols being instituted, not as mere checklists but as presentations in public competitions by synthetic biology college teams in iGEM (internationally engineered genetic machines), supported by academia, biotech companies, and biosecurity experts as a way to instill peer-enforced ethical, privacy, and biosecurity norms.

What Thompson details instead, equally important, are three approaches to revising current intellectual property rules, especially when tax payers' money is involved in private-public partnerships: open consent, privatization benefit sharing, and in-kind reciprocity. These approaches over the past three decades have provided a suite of tools for forging better and more ethical or responsible science. Open consent is associated with those, like George Church's Personal Genome Project, who argue that since privacy cannot be guaranteed on any web- or Internet-using system, it would be better for research to use educated volunteers, and to be open about possible implications for family and community. This approach, Thompson says, was uncomfortable for

California entrepreneurs who wanted an “innovation model” that incentivized scientists, privatized intellectual property, and imposed few requirements of openness on companies, but who wanted altruism on the part of blood or tissue donors. Patient groups such as PXE (Pseudoxanthoma Elasticum), in contrast, use a model of raising money for research, with any patents filed becoming owned or partially owned by the patient group (not individual patients). Benefit sharing in different kinds of data banking (forensic, medical, etc.) has created a differentiated landscape for which general regulations are difficult to formulate. But Thompson thinks that what has been learned from all three approaches can lead to reciprocities that could support a new mode of good biotechnical sciences. Money, as she points out (without using the Trobriand Islanders’ terms that Bronislaw Malinowski and Marcel Mauss turned into basic sociological concepts) is a “gift that bites,” that can end relationships, while *generalized exchange*, done properly, can continue and strengthen socialities, access, and justice. In any case, she suggests, California policy makers came to understand that current informed-consent forms are no longer adequate. She also argues for more embedded approaches to policy making, requiring ethnographic observation of sites and occasions where donors, donated tissue, recipients, funders, and regulators interact and contest reciprocity, rather than just relying on ethicists, lawyers, and economists.

Like Ong, Thompson attends to affect but especially to “affective scripts,” “rehearsed on the web, so each player [donor, recipient, family members, etc.] can learn how to behave” (175). These thus operate differently than Ong’s concerns about “affective aggregates,” hailed by social categories with increasingly little direct relation to the diseases or population segments that clinicians and scientists target in practice.

Each book has something to teach, and they are helpful in tandem: one more concerned with imputed anxieties of a population being subjected to rapid social change, the other a better guide to the rapidly changing science trajectories and to a range of policy options for the ethical “relations of production,” distribution, circulation, and exchange.

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