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Tea as Hero Crop? Embodied Algorithms and Industrial Reform in India

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In India, an industrial reform movement called ‘Tea 2030’ is underway. Tea 2030 is driven by concern about two numbers: tea prices, determined by expert tasters in auction houses, and labor costs, calculated on tea plantations. According to reformers, prices are too low and labor costs are too high. If this problem could be corrected, reformers claim, tea could change, too, from an oppressive legacy of the British colonial era to a ‘hero crop.’ A hero crop would deliver development benefits in addition to income, improving the lives of farmers and undoing the injustices of a colonial past. The hero crop narrative, however, elides a longstanding, embodied set of relationships between tea and numbers in India. Ethnographic and archival material from tea plantations and tea auctions in Northeast India shows how prices and labor costs emerge as part of colonially rooted evaluative practices. Prices are the outcome of a sensory and linguistic process in which bodies value, while labor costs are the outcome of legal and technical processes that value bodies. These evaluative processes are embodied algorithms. Tea 2030’s proposed restructuring of embodied algorithms for prices and labor costs may, however, do more harm than good.

KEYWORDS: labor, resource materialities, value, development

Introduction

In India, a new effort is underway to reform the tea industry. Under the name ‘Tea 2030’, corporations including Tata Global Beverages (maker of Tetley, Good Earth, and Tata Tea) and Unilever (maker of Lipton, PG Tips, and Brooke Bond) have united with representatives of brands like Yorkshire, Finlays, and
Twinings, as well as NGOs such as Rainforest Alliance and Fair Trade International. The objective of this partnership is to alter the way tea is valued and produced. By systematically addressing a long list of ‘challenges’—from climate change to women’s empowerment—Tea 2030 aims to turn tea from a problematic colonial legacy into a vehicle for development.

A 2014 Tea 2030 report states:

[There is a] real opportunity for tea to become a ‘hero’ crop. A hero crop delivers more than just a commodity. It also delivers major benefits to the millions of people involved in the sector, the planet, and the wider economy. Central to this transition would be a move away from a long, linear supply chain, to a value network that takes into account everyone involved in the tea sector and ... works together to create a more sustainable industry. (Forum for the Future, 2014, p. 5, emphasis added)

To break the ‘chains’ holding tea supply captive, reformers propose recalibrating two numbers. The first is the price of tea, formulated by expert tasters in brokerage houses in Kolkata and other auction centers, from Mombasa to Colombo. For over 150 years, tea has been valued and sold by such experts. Removing the control these brokers have over the formulation of prices is a key element of reform (Besky, 2016). The second number is labor costs, which refers to the composite number of wages and in kind benefits that tea plantation laborers receive. Reformers claim that labor constitutes over 70% of made-tea production costs. For Tea 2030 reformers, devising ‘new remuneration models’ at the site of production is another goal (Forum for the Future, 2013).

Tea 2030’s narrative is that these numbers are in inverse proportion to one another: the process of brokerage, which features an elaborate system of tasting and evaluation carried out by a small group of experts, keeps tea prices too low, while the plantation model, with permanent laborers working under arrangements that net them fixed daily wages and in-kind benefits, keeps labor costs too high.

One might imagine that high labor costs would translate into higher prices, just as one could dismiss the ‘hero crop’ discourse as mere rhetoric. In this article, however, I take seriously Tea 2030’s vision of Indian tea’s future. Situating this vision in historical and ethnographic descriptions of tea plantations and auctions past and present, I ask two questions: What are the relationships between prices and labor costs, and what might their networked future entail? And how, at a more general level, are the material qualities of environmental commodities created and counted across spaces of production, brokerage, and consumption?

Tea makes its way to market in what looks like a linear fashion, passing through fields, processing factories, tasting rooms, and auction houses. My historical and ethnographic findings show, however, that tea gains value through a recursive form of accounting that tacks back and forth between spaces of brokerage and...
spaces of production. Prices are the end-result of a sensory and linguistic process in which bodies value, while labor costs are the end-result of legal and technical processes that value bodies. To describe these processes, I draw on Richardson and Weszkalnys’s (2014) analytical framework of ‘resource materialities,’ as well as theory in feminist science studies that emphasizes the physical, sensorial interplay between things and bodies (Mol, 2002; Barad, 2007; Haraway, 2008).

I am particularly concerned with how the algorithms used to produce these numbers are undergoing change. Algorithms are a set of regularized steps for filtering multiple kinds of information into a single, standardized output. In economic terms, algorithms provide the steps that lead to a single statement of value, for example, a price or labor cost. These two numbers, I argue, are outputs of embodied algorithms, which produce not just standard things in the world but predictable dispositions to and evaluations of those things.

In India, expert brokers, predominantly middle-class men, give tea a price through an intimate sensory engagement with it. Plantation managers, labor commissioners, and union representatives work together to condense an array of social phenomena to calculate labor costs through careful monitoring of the engagements of field laborers (nearly all women) and factory laborers (nearly all men) with tea. Embodied algorithms have long been part the Indian tea industry as well as other markets for commodities that appear to have a seemingly natural sensory effect on people, from coffee to wine to flowers.

In this paper, I draw on fieldwork conducted in the auctions of Kolkata from 2009 to 2010 as well as long-term ethnographic fieldwork, carried out since 2006, on plantations in the Northeast Indian tea-growing region of Darjeeling. I describe how Tea 2030 reformers promote a mode of valuation that is unhinged from sensory experts and state regulators. To do so, I first give some historical context to prices and labor costs in Indian tea. Second, I give a brief overview of the embodied algorithm of tea price. The rest of the article is dedicated to labor costs and plantations, where tea-as-hero reforms are already taking place. Importantly, the ‘hero crop’ in Tea 2030’s vision is not a finished, processed product but unprocessed green leaves: the tea that laborers pull from bushes and deliver to processing factories. Tea 2030’s proposals to dismantle colonial institutions in favor of a networked future are certainly lofty.¹ A resource materialities framework highlights how plantations and auction houses are entrenched socio-technical legacies of a colonial productive order that cannot be dismantled without serious and perhaps detrimental effects on laborers.

**Analytical Perspectives**

Tea, coffee, timber, rubber, and fruit—perennial plants—straddle the line between the analytical categories of resource (with attendant metaphors of extraction) and commodity (with attendant images of constructive labor). The ecology of these
plants is closely intertwined with the biological vitality of tasters, consumers, and laborers. In former colonies, these plants are linked through soil and infrastructure to plantation factories, worker villages, auction houses, hospitals, schools, and other sites where experts monitor bodies, plants, and landscapes (Chatterjee, 2001; Aso, 2012; Mathews, 2011; West, 2012).

Richardson and Weszkalnys (2014) have proposed a ‘resource materialities’ framework, which ‘[draws] attention to resource making as a material process’ (Richardson and Weszkalnys, 2014, p. 8). In particular, the framework focuses on ‘the infrastructures designed to extract resources and those needed to refine, transform, and transport them;’ and ‘how resources are experienced and embodied by people who work with, transform, or (deliberately or accidentally) ingest them’ (Richardson and Weszkalnys, 2014, 17, emphasis added). While the resources that concern Richardson and Weskalnys are mostly inorganic minerals or petrochemicals, the notion of the ‘hero crop’ proposed by Tea 2030 naturalizes tea’s place in India, making it seem less like a crop (e.g. corn or wheat) and more like timber, an organic natural resource that is also of concern to Richardson and Weszkalnys (2014, 17; cf. Henne, 2010; Mathews, 2012).

A resource materialities framework forces us to think differently about resources—to ask how they come to matter beyond their abstracted, commodified form (Richardson and Weszkalnys, 2014, p. 7). Resources are not ‘out there’ in the world, ‘ready to be seized upon and utilized, but always in flux and open-ended’ (Richardson and Weszkalnys, 2014, 17). They are parts of ‘resource environments.’ The concept of the resource environment:

directs analytical attention away from resources as substances with essential qualities that are assumed to exist ‘in nature’ to the complex arrangements of physical stuff, extractive infrastructures, calculative devices, discourses of the market and development, the nation and the corporation... and so on, that allow those substances to exist as resources. (Richardson and Weszkalnys, 2014, 7)

An appreciation of resource environments is key to resisting what Richardson and Weskalnys describe as a modernist tendency to think about resources in abstracted ways.

Resource environments include ‘different types of labor carried out not just by [those] who physically remove the resources from their surroundings, but by everyone involved in their naming, scientific analysis, sale, and so on’ (Richardson and Weszkalnys, 2014, 14). Viewing tea as emerging from a resource environment allows us to look beyond its globally circulating market value, to examine the multitude of ‘calculative devices’—in this case the embodied algorithms—that give it value. Tea’s resource environment includes these devices as well as the bodies of tasters and laborers, the governmental and non-governmental agencies that value these bodies, and tea itself.
Since the colonial era, embodied algorithms have existed for both describing conditions in the microenvironment of the teacup and managing labor conditions in the macro-environment of the plantation. While they may not be tangible in the sense that factory machinery or other tools might be, embodied algorithms are durable. And while the numbers they produce are distinct from the market prices consumers pay for tea, embodied algorithms are historically embedded devices for giving value to environmental commodities (MacKenzie, 2006; Callon et al., 2007; cf. Polanyi, 2001 [1944]). The concept of the embodied algorithm captures relationships between bodies, expertise, infrastructure, and plants.

To explore embodied algorithms in tea, I combine a resource materialities framework with theory in feminist science and technology studies that emphasizes that forms of evaluation cannot be separated from the things being evaluated or the bodies doing the evaluating (Mol, 2002; Barad, 2007). In particular, I follow Donna Haraway’s (2008) suggestion, in her analysis of how humans ‘become together’ with other-than-human beings, that physical touch is central. Indeed, for professional tea tasters and tea laborers, physical contact with tea—learned and passed over generations—is essential to the production of price and labor costs. In the formulation of prices and labor costs, tea and bodies ‘become together.’

This is most obvious in the work of professional tea tasters. The term ‘taste’ connotes both a sensory experience and a metaphorical referent for what Pierre Bourdieu (1984) terms ‘distinction.’ Something can taste good and someone can have good taste. Tea brokerage collapses these two aspects of taste. Tasting is an everyday act that involves a blend of embodied experiences (those of flavor and aroma) with seemingly rigid ideas about market value. Since it requires ingestion, a necessary biological function, tasting, perhaps more than seeing or hearing, has the power to make historical, political, and geographical distinctions appear natural.

But thinking about taste in this way leaves a divide between the thing and its representation, as well as between the thing and the actor doing the representing. The ‘essence’ of resources ‘is . . . located neither exclusively in their biophysical properties nor in webs of socio-cultural meaning’ (Richardson and Weskalnys, 2014, p. 9). To understand taste, then, we must think about tea as a kind of matter with which different kinds of bodies are engaged at different times and which is constituted through those engagements (Tsing, 2012; Brice, 2014; cf. Bennett, 2010). A resource materialities approach refuses to take the material quality of tea at face value (Ingold, 2007). Rather, it prompts us to unpack the historical and social processes by which things like tea come to appear naturally possessed of qualities such as taste and texture, as well as how certain individuals come to appear naturally endowed with the ability to produce those qualities (Paxson and Helmreich, 2014, pp. 169–170). Tasting and valuation can only happen insofar as tea is actively affecting the body of the taster, but the tea
evaluated results from the embodied work of plucking, pruning, and machine-processing that happens in plantations.

Karen Barad, following the work of Leela Fernandes (1997) on Kolkata jute mills, suggests that the mutual becoming of bodies and substances is also crucial in industrial settings, even low-tech ones (Barad, 2007, pp. 227–229). For Barad, ‘shop floor dynamics [can] be understood in terms of the intra-action of “material-discursive apparatuses of bodily production”—that is, the dynamic intra-workings of the instruments of power through which particular meanings, bodies, and boundaries are produced’ (2007, p. 230). In other words, the work of producing and representing commodities through machinery, soils, plants, and the other trappings of a resource environment is always already also a work of producing and representing bodies. Embodied algorithms for tasting and pricing—as well as valuing labor—are calculative devices that bring environmental commodities into being.

As a plan for sustainable development, Tea 2030 purports to reassemble tea’s resource environment. Prices and labor costs—and their constitutive embodied algorithms—are two key points of reform. In Tea 2030’s vision, tea as ‘hero crop’ will provide benefits to all those who care for it. Tea 2030’s plans might look familiar to scholars of alternative agriculture and other kinds of environmental entrepreneurialism, from sustainable timber to ecotourism (Henne, 2010; Lyon, 2011; West, 2012). Consumer demand for such commodities appears to strengthen the connection between bodies and value. The ethical qualities of making are seen to directly inform the sensory qualities of tasting and feeling (Weiss, 2011; Paxson, 2012). In Tea 2030’s model, the well-being of labor arises through entrepreneurial work with an inherently valuable hero tea, rather than dependency on a management algorithm. In this model, tea laborers would look much more like Heather Paxson’s (2012) artisanal cheese makers, who independently develop crafted skills to manipulate soils, water, and plants in a manner that conscientious consumers demand and a delicate Earth requires.

Material from India reveals, however, that the consequences of dismantling embodied algorithms are far from certain. If we are to take seriously the kinds of embodied relationships between producer and product imagined in artisan or (supposedly) sustainable commodities, we must also attend to what kinds of embodied relationships those alternatives might supplant.

**Embodied Algorithms, Past and Present**

Today, approximately 60% of the world’s tea comes from former colonies, from East Africa to Southeast Asia, and over one quarter comes from India. Nearly all this tea is still plucked and pruned by hand on plantations. From plantations, tea is shipped, already boxed and prepared for international transport, to urban auction centers, where it is tasted, priced, and sold. The fact that the contemporary tea
plantation complex has changed so little from its colonial origins is a central concern for Tea 2030.

While the first British-operated tea production in India in the early nineteenth century mimicked a ‘Chinese’ model of ‘family garden farming,’ distinguished by small production plots where farmers grew green leaf and brought it to a centralized location for processing and packaging, British planters soon set out to change that model (McGowan, 1860; cf. Griffiths, 1967). By the mid-1800s, planters had begun construction of on-plantation factories, working towards a faster, more efficient system for converting highly perishable green leaf tea to a fermented, dried, transportable (and drinkable) form (McGowan, 1860; Baildon, 1882, pp. 30–34; Chamney, 1930, pp. 43–45). The tea plantation was one of several sites in which scientific and economic experts devised methods for the ‘improvement’ of India’s landscapes and populations. Indian tea was a target of such improvement, since its taste was seen by many to be inferior to that of Chinese tea (Daniel et al., 1992; Arnold, 1996; Drayton, 2000; Chatterjee, 2001; Sharma, 2011).

Algorithms for calculating and translating labor costs across space were central to the colonial project of improving tea. The Indian tea plantation complex was developed through the careful classification of people, plants, and landscapes into neat and supposedly natural categories, represented in numbers (cf. Cohn, 1996). The archives of the Indian Tea Association, a private guild of tea companies founded in the late nineteenth century, contain reams of gazetteer information that breakdown weekly, monthly, and yearly production costs and enumerate everything from pounds of tea plucked, to Pounds spent on food rations, to birth and mortality statistics for so-called coolies.

The expenses entailed in housing, feeding, and compensating field labor varied from region to region. Costs in Darjeeling might be different in certain respects from those in Assam, and planters needed a common way to reconcile those differences. The labor cost algorithms outlined in Indian Tea Association annual bulletins accounted for place-specific variations. For example, Darjeeling planters had to account for the costs of transport up and down steep mountain ranges, while Assam planters needed to factor in the costs associated with yearly malaria epidemics. Both had to include estimates of annual losses to life and property due to monsoon rains. Over time, these algorithms for valuing and maintaining laboring bodies and their surroundings were written into industry standards and national laws (see GOI, 1951).

The creation of a standardized system of labor accounting on plantations was paralleled by the establishment of brokerage procedures in centralized auctions, first in London (1679), then in Kolkata (1861), and later in other tea producing regions throughout the British Empire. The seventeenth-century London tea auction dealt in Chinese tea. Empire-grown auctions began in the 1830s. The auction system also depended upon a common language that brokers could use to describe the lots of tea available for sale (CTTA, 2008, pp. 49–59). Along
with recommendations for housing and feeding laborers, then, colonial experts developed a step-by-step algorithm for preparing, smelling, touching, and tasting tea. Brokers had to sense tea in a regular manner in order to price it in a commensurable way.

Though they were conceived under a colonial project of improvement, Tea 2030 reformers now view the plantation and auction system as inefficient anachronisms. Tea 2030 reforms purport to replace this ‘linear supply chain’ on which bodies are hierarchically arranged with a ‘value network’ in which an inherently tasty ‘hero crop’ serves as a central axis uniting nominally equal kinds of bodies. In the name of efficiency and sustainability, reformers ironically support a return to a model in which smallholders sell green leaf to centralized factories, as I explain in the penultimate section of this article.

The Price of Tea

For over 150 years, Nilhat House, in the heart of old Kolkata, has been the central meeting place for tea brokers, who act as both tasters and auctioneers. In the tasting rooms of Nilhat, every day, silent white-uniformed workers weigh out samples of tea with a bronze balance before steeping, straining, and arranging ceramic cups on long, narrow, tea-stained tables. In the course of the day, they pour hundreds of cups. And every day, brokers file into this room to evaluate and price these teas. Each broker has a tasting specialty. Some focus on malty Assams, others on muscatel Darjeelings, and others on the tannic cut–tear–curl teas produced throughout the Northeast and drunk across Indian homes. But regardless of region, the embodied algorithm for tea’s valuation takes the same form (Figure 1).

A broker’s embodied work begins at the nose. Before the tea ever passes his lips, he smells a pile of steeped leaves and makes qualitative notes. Only then does he taste it. In tea brokerage, tasting is technically a partial ingestion. The taster allows the tea to enter his mouth, and he aerates the liquid over his tongue by slurping air through it, initiating a chemical reaction on his palette. But he does not swallow it. Instead, he spits the liquor into an aluminum bucket on the floor.

Then he turns to his assistant and describes the tea’s qualities, using a preset array of adjectives—a linguistic palette not unlike those used by sommeliers. The broker sorts through a bank of sense-memories: of taste, color, aroma, and texture of teas that have come up for auction before. He compares this week’s lot to last week’s, grade by grade, plantation by plantation, to reach a singular number: a valuation price for that lot of tea. Important ly, the broker’s notes on quality are not limited to the space of trading. If a tea is ‘flaky’ (flat and open leaf) or ‘cheesy’ (smelling of the glue that holds together tea boxes), he makes a note of it and relays his comments and recommendations back to the managers of the plantations where each particular tea originated.
After tasting and evaluating each cup, the broker goes downstairs to the auction room, where he becomes an auctioneer. His job is now to put the valuation price he set upstairs to the test: to see whether his taste matches that of buyers. His bodily comportment and language are equally important here. He coaxes buyers to bid on certain lots and doles out friendly chastisement when their bids are too low. Before the auction, his brokerage house sends out a small sample of tea to each buyer along with a circular that lists all of the valuation prices for each lot of tea (Besky, 2016).

When buyers taste, they consider their own impressions and the broker-determined valuation price, as well as each lot’s potential to blend with other teas. Much of the black tea global firms sell is blended from several lots, from multiple regions. To produce consistent flavors, buyers must deploy a complex metrology. They use their memories, palettes, and personal relationships to filter catalogue numbers representing age, mass, color, place of origin, season of harvest, and grade, making calculated purchases that yield the tastes that their employers desire. They render these composite sensations into their own valuation price.

The tea auction is thus an arbitration process whereby the valuation prices of brokers and buyers, the end-results of embodied sensation and calibration, come together. In order for tea to circulate from field to cup, it must be made mobile, quantifiable, and durable. Numbers are, of course, central in the language of every auction, but while traders who buy and sell wheat, pork belly, or even coffee futures can easily keep numbers and things separate, at Nilhat House,
numbers can never be insulated from the embodied experience of the tea they represent (Besky, 2016). Valuation prices are both material and ideological inscriptions: other brokers can see them and think, through their own histories of physical contact with tea, about what they signify.

Brokers are esthetic experts, not unlike storytellers or visual artists, but they are also technical experts: part of a resource environment that spans from mountain tea plantations, to processing factories filled with antique coal-fired machines, to the bronze scales, wooden gavels, stained ceramic cups, and white aprons—the ‘calculative devices’ of Nilhat House (Richardson and Weskalnys, 2014). At Nilhat House, brokers’ work with tea—tasting, touching, and describing it with a controlled British lexicon—inscribes colonial material and affective forms into both the product and the bodies who taste it. For professional tea tasters, physical contact with tea—learned and passed over generations—is essential to the production of price. Brokerage as an algorithm entails matter and bodies becoming together in historically embedded ways (Haraway, 2008).

This labor of tasting is one of differentiation. It is possible to understand taste in a representational sense. There are real qualities of tea, and we can discern those qualities with our bodies and use language to represent them. An analysis of taste in the market for environmental commodities might thus center on how experts use language to represent experience, or how they use numbers to represent value. For example, Darjeeling tea is supposed to be drunk without milk or sugar. Its taste is supposed to be light-bodied with a muscatel flavor. This supposed-to-be is at the heart of Bourdieu’s (1984) formulation of taste. How something is supposed to taste is bound up with embodied class practices about how someone is supposed to act, but what are really being embodied are the ideas or representations of taste in both its gustatory and class-based senses. The supposed-to-be is determined through an embodied algorithm.

Tasting is thus not only about the production of a thing but also about the production of a body—that of an expert (in India, nearly always male) taster. When tea exits the tasting room, no matter where it goes, that embodied encounter, that maleness, that colonial legacy, is embedded in it. The concept of the embodied algorithm helps us think about taste as not merely a representation of tea or the sensations associated with it, but instead as a kind of reverberation between matter, discourse, and bodies. Tasting is becoming. It is impossible to separate its material form from its semiotic form. The production of a feeling at the end of the algorithm is inseparable from the production of a material thing.

The head is the locus of Bourdieu’s two notions of taste (1984). It is where the materiality of the thing meets the materiality of the body (Latour, 1986, 2004). Eyes, noses, and tongues sense and evaluate teas, and mouths vocalize value at auction. This embodiment is a process of what Barad (2007) calls ‘intra-action,’ that results in a singular valuation price. It would be misleading, however, to suggest that this form of valuation depends only on the heads of middle-class male tasters. In the auction rooms of Nilhat House, brokers encounter not a raw
material, but a finished product. Brokers understand well that tea, like other potent food substances, ‘is not matter itself all by itself, but rather matter in context’ (Abrahamsson et al., 2014, p. 5; Paxson and Helmreich, 2014, original emphasis).

When they relay messages about quality back to plantation management, brokers link taste to a larger context, particularly the labors of production. If they get a burnt sensation, they tell managers that the tea has been fired at too high a temperature. If they see large, coarse leaves amidst the steeped tea, they report that the tea has been ‘clumsily’ or haphazardly plucked. These comments affect the management of the laboring bodies who pick, prune, and process leaves. The embodied algorithm for valuation price sits within a geographically distributed resource environment, in which metropolitan male experts taste tea harvested by ethnically marked women in fields on the edges of India, from Darjeeling in the northeast to Kerala in the south.

**The Cost of Labor**

If the work of determining price is one of differentiation, then the work of determining labor costs is one of standardization. Algorithms for labor costs—algorithms for the value of bodies—include laborers’ daily wages as well as what planters call the ‘social costs’ associated with tea production. Social costs are outlined in the national-level Plantations Labor Act of 1951, and they include housing, food rations, medical facilities, latrines, and primary schooling for laborers’ children (Besky, 2014a). Monetary wages, on the other hand, are a matter of state-by-state concern. Wages are determined through tripartite negotiations between workers (represented by unions), planters (represented by guild-like regional associations), and the government (represented by the Labor Department of each Indian state). By law, planters cannot pay less than the state-set wage. They cannot pay more either. Through a combination of monetary and in-kind payments, then, the minimal security of each laboring body must be accounted for in a uniform fashion, even as faraway tasters make fine gradations between flavors, ages, and provenances of the tea they produce.

If heads are the embodied center of tea tasting, hands are the embodied center of tea plantation labor. In Darjeeling, where I have carried out fieldwork on plantations since 2006, women workers manually comb tea bushes for tender shoots of tea, breaking them off between their thumbs and index fingers. Conical straw baskets strung from their foreheads act as resting places for plucked tea leaves. Indian labor law mandates that workers be issued plastic aprons and rubber boots to protect them from the sharp bushes, as well as from leech and snake bites. In the off-season, women flog these same bushes with small sickles to ensure that the tender shoots return with the next rains.

Blistered, cut, and blackened by dirt, sap, and chlorophyll, women’s bodies are disciplined by national labor codes as well as international certification schemes. Women on Darjeeling’s numerous organic-certified plantations, for example, are
forbidden from wearing gloves, for fear that cotton or other fabric might adulterate the tea. Women’s fingers pinching the iconic two leaves and a bud of tea are part of Darjeeling tea’s label, which circulates both at home and abroad (Besky, 2014b) (see Figure 2).

On plantations, tea moves from field to factory. In the factory, tea passes through four apparatuses before it is packed for shipping. First, male tea workers place the green leaves onto long elevated troughs with mesh bottoms for withering. Next, the men place the withered leaves on large racks, where they ferment. The green leaves turn brown, signifying the breakdown of the leaves’ chlorophyl and the release of their residual tannins. There is some room for variation in the fermentation process. Different degrees of fermentation yield different tastes, or styles of tea. Green and white teas are not fermented; oolongs are partially fermented; and black teas are fully fermented.

Next, men prepare the fermented but still damp leaves for rolling. Around and around and around, the tea leaves are pressed in coal-fired machinery. The pressure and friction release oils and essences in the leaves. The machine also rolls the once full leaves into cylindrical twists. Finally, the leaves are dried, or fired. The firing machine, something like an oven with a built-in conveyor belt, removes the last bit of moisture. Firing gives the twisted leaves their dry, and even brittle, finish. At this point, the tea returns to the hands of women, who gently sort dry twists of tea by size, trying not to break or crush the brittle matter in their tea-stained hands. Rolled and dried, Darjeeling teas can endure

Figure 2. Billboard in Darjeeling (photo by author). Note the Darjeeling logo in the upper right corner.
the long trip to markets abroad, packaged up in boxes made from locally grown
softwood timber.

Ideas about people and their capacity for field labor were integrated into colo-
nial algorithms for the improvement of tea. From its inception, the plantation
system as a resource environment depended upon the careful and repeated eval-
uation of racially marked bodies (Sawyer and Agrawal, 2000; Stoler, 2002; Daniel,
2013). Richardson and Weskalnys note a ‘porosity between human bodies and
their resource environments’—a porosity that is managed in part through ‘regu-
lations of labor routines and attire’ (2014, p. 22). Embodied algorithms for
labor balance the vulnerability of working bodies against those of tea itself.
Across India, British labor models merged with a ‘cultural taxonomy of labor’
that gave an ethnic dimension to the work (Chatterjee, 2001). Though British
tea-growing regions all contained indigenous populations, the British recruited
or indentured ‘coolies’ from regions and ethnic groups which they determined
most suited for the construction and maintenance of plantation infrastructure
(Chatterjee, 2001; Sharma, 2011; Besky, 2014a).

Since the colonial era, the job of tea planters in India has been to maximize
quality—to maximize a resource’s value—under an algorithmic labor-cost struc-
ture. Tea emerges from a standardized feedback between prices and labor costs.
The quality of fully processed tea, as evaluated by brokers and converted into a
price, is the indicator of how well nature is being maximized on the plantation.
Planters must consider the comments of Kolkata tasters alongside an array of
other numerical questions, from the proportion of burned coal to made-tea, to
the costs of rubber boots, to the price of rice and flour, to the cost of nurseries
and primary schooling. Price derives from the intra-actions of middle-class
bodies and the sensory qualities of processed tea. Labor costs derive from the
intra-actions of office-dwelling planters’ association heads, government bureau-
crats, and state-level union representatives, the hands of women and men planta-
tion workers, and tea itself.

While reformers see the deregulation of wage agreements as key to both the
growth of the industry and the enfranchisement of marginalized people, the
popular image of the Darjeeling tea laborer, head slightly bowed, is more than
simply a representation of tea labor (see Figure 2). The calculation of labor
costs works to materialize that image. As Barad argues, following Fernandes
(1997), gender and ethnicity are not merely cultural add-ons to economic struc-
tures; they are co-constituted by political economic systems and the machinery
(from rubber boots to sickles to coal-fired machinery to algorithms) that supports
it (2007, p. 228). Images fueled by the taste of tea in both of its Bourdieuian
senses, then, highlight the nonlinear nature of the resource environment. What
Tea 2030 is proposing to do is change the ‘intra-actions’ that configure that
environment (Barad, 2007).

For Tea 2030 reformers, the embodied algorithm that leads to the formulation of
labor costs is both unjust and inefficient. Reformers acknowledge that plantation
workers make remarkably low wages, but workers’ wages and benefits constitute the bulk of made-tea costs (Forum for the Future, 2013). As I show below, farm-worker empowerment—particularly women’s empowerment, is a main goal of Tea 2030.

Devaluation and the Future

In my discussions with those involved in reform, it was the price of tea—tied to the space of the auction and the expertise of brokers—and labor costs—tied to the legal definition of a plantation—that seemed most problematic. Reformers want to free taste, price, and labor. In descriptions of the Tea 2030 vision, the price of tea, the cost of labor, and even tea itself, are all held captive by a ‘linear supply chain’ to which brokers, national labor codes, and other intermediaries hold the keys. Once liberated, tea has the power to liberate human actors.

Tea 2030’s vision characterizes breaking the links in tea’s linear supply chain as a transformative act of international development. In recent years, some tea companies, such as Hindustan Unilever, have chosen to sell their plantations, arguing that it is cheaper to buy tea than to produce it. Other corporations are more inventive. Tata Global Beverages, one of the main corporate powers in Tea 2030, is attempting to alter land tenure arrangements on plantations. A regional president of Tata Global Beverages described these reforms:

the Tata Group has a rich heritage of being socially aware and conscious. The group has taken several measurable steps in the awakening of women’s equality and rights. It’s our constant endeavor to be fair and just to women as much possible . . . [I]n our . . . Plantations Company . . . the majority of workers, who are women, have moved to being part owners of the company. (Campaign India, 2013)

This ‘stakeholder model,’ in which tea plantation workers become part owners of the company, has received support across the tea industry (Rosenblum and Sukthankar, 2014). In Assam and West Bengal, Tata’s stakeholder scheme was funded by the World Bank Group’s International Finance Corporation.

Tea 2030’s vision of the value network includes plans to develop workers’ ‘skills’ as tea growers so that they can perform their labor as independent farmers, or at least as part-owners (Forum for the Future, 2014, p. 6, 25). Skill development would turn plantation work from waged to entrepreneurial. The work of production in fields would be de-coupled from factory production, which would be further separated from the work of tasting tea in auction centers. The breakup of the plantation system frees labor costs (and laborers themselves) from an algorithm bound up in colonially derived legal and industrial codes.
Tea 2030’s guiding document proposes:

a world where tea growers could have more control of the value chain and where smallholders could produce more tea. For this model to be successful, producers need to feel more ownership of their product within the network, giving them the opportunity to improve their agronomy and business skills and enhance their share of the economic value created. Ultimately this will not just benefit producers, but all members of the chain, as productivity and professionalism are likely to improve. (Forum for the Future, 2014, p. 25)

Despite this vision, there is good reason to be suspicious about what ‘being part owners’ means for workers. At present, workers in stakeholder arrangements in Assam and North Bengal are not being given a choice about becoming part owners of tea companies, and many are still paying off their buy-in eight-years after the model was first implemented. Land formerly managed collectively by workers for growing vegetables or harvesting fish has been taken over by the company and its ‘stakeholders.’ Though Tata’s stakeholder arrangements are still classified under Indian law as plantations, in a recent report published by Columbia University, workers cited a steady decline in their access to the provisions of plantation labor law (Rosenblum and Sukthankar, 2014).

The stakeholder model, though heralded as the beginning a transition towards the more ‘networked’ future proposed by Tea 2030, actually looks more like a reverse ‘land grab’ in which companies can gradually pass the benefit (and the risk) of plantation ownership onto workers (Li, 2014). Stakeholder models are a distinct form of development, but they are also a vision of a post-union, post-plantation future in which minimal legal provisions for bodily security—food rations, shelter, medical care, and water supply—are replaced with narratives of economic empowerment. The ultimate aim of the stakeholder model, as brokers and retailers in Kolkata told me in interviews, was to eliminate the legal category of the plantation altogether. In its place would be a collection of worker-owned fields selling to what are called ‘bought-leaf tea factories.’

In bought-leaf arrangements, workers in effect trade all the protections (minimal as they are in light of meager wages) of working on plantations (the health care, housing, food rations, and infrastructure that make plantation labor viable) for the right to sell kilos of unprocessed green leaf directly to a centralized factory, owned by a tea company. In such arrangements, workers would not be entitled to a state mandated minimum wage. Instead, they would receive the current per-kilo price for green leaf tea. A well-established (if colonially derived and racially discriminatory) algorithm for calculating the costs of providing laborers with a bare minimum of resources for survival while also accounting for the taste of finished tea will be no more. To survive as skilled stakeholders,
laborers would have to be willing to embody new algorithmic processes to determine the value of their tea (Li, 2007).

It is the raw, undifferentiated green leaf tea of the smallholder, not the fully processed leaf of the plantation, that is Tea 2030’s ‘hero crop.’ Independent, non-plantation production focused on green leaf would, in Tea 2030’s vision, be both more efficient and more seemingly sustainable. With control over their own land, tea farmers would be motivated to avoid overplanting, over-spraying with pesticides, and sapping water and nutrients from soils. Quality green leaf—produced in an ecologically balanced landscape—would provide the benefits formerly offered by plantation owners, but it would also be a carbon sink, a hedge against the lure of overcrowded cities, and—when intercropped with other plants—a way to protect against land degradation. The bought-leaf factory thus constitutes a partial return to what the British disparaged as an ‘inefficient’ system of tea manufacture; the ‘Chinese’ small farmer system to which the imperial plantation was to have been a modern alternative.

As plantations give way to bought-leaf tea arrangements (and related reforms slowly erode the centrality of the auction), the two numbers of most concern to Tea 2030 reformers—the price of tea and labor costs—are collapsing into a new and more flexible number—the price of green leaf. To be sure, such changes reduce the power of middlemen and auction brokers. Laborers are supposed to control land (though perhaps without deed or title) and sell directly to factories. The ‘Future of Tea’ report describes such a recalibration in familiar terms:

By developing tea as a hero crop, it has the ability to secure a sustainable livelihood for producers by empowering them ... Crucially, tea can create a deeper connection between end-consumers and producers, enabling people to better understand the value of what goes into making their favourite drink, and reinforcing the importance of responsible production of a product that has a place in homes around the world. (Forum for the Future, 2014, p. 5)

The valuation of tea shifts from being a relationship between brokers and plantation managers to one between consumers and small farmers. Whereas the state of being tied to a plantation comes to look anachronistic, trade and labor in a free, individualized market comes to look natural (see Watts, 2014, p. 169).

In Tea 2030’s model, brokers would no longer arbitrate price and quality based on esoteric notions of taste. The work of pricing once cloistered in places like Nilhat House would instead become ‘transparent,’ perhaps even disembodied. A new class of direct traders, working online and in small retail settings, would act not as arbiters of taste but as communicators—linking the desires of consumers to the sustainability struggles of smallholders (Forum for the Future, 2014, p. 26, 28). As “The Future of Tea” report notes:
many coffee drinkers now eschew instant coffee in preference for a greater range of ‘quality’ coffees. However, the same understanding of tea has not emerged ... Greater transparency ... can lead to higher standards, a greater demand for social and environmental measures and a demand for better quality tea. Many of the aspirations for becoming a hero crop, and the required investments, will not be possible without the support of consumers. (Forum for the Future, 2014, p. 26)

The elimination of the colonial tasting and brokerage system would promote not just better tea in the eyes of reformers but also further investment, even the growth of a financial futures market (Forum for the Future, 2014, p. 28; Besky, 2016). Financiers would much more confidently invest in an industry focused on the production of undifferentiated green leaves rather than of specific finished varieties. After all, coffee, cacao, wheat, and soy futures markets are all based on the delivery of uncooked product.2

This shift from processed tea to green leaf changes the role of the body in the calculation of value. In a market dominated by green leaf, professional evaluation by trained tasters would no longer be necessary. Instead of promoting investment in the viability of working bodies, as in the plantation system, the proposed new system would promote direct investments in sustainably produced green leaf. Those who were once ‘field laborers’ (one standard class of worker) would be asked to compete with one another as individual entrepreneurs: to sell not taste but sustainable conditions of production to the highest bidder. When green leaf becomes a hero, the quality of field labor is even more intensively evaluated than ever, even as field laborers risk lower rates of remuneration, sacrifice the meager food and health provisions of plantation labor law, and thus experience increased bodily vulnerability. The valorization of the hero crop thus enables de-valuation: the ability to evaluate good taste moves from the spaces of auctions to the spaces of (mostly Northern) consumption, and attention to the vitality of green leaf supersedes attention to the vitality of working bodies.

Conclusion

In this article, I have described a recent push to reform the way tea is produced and valued in India. I have focused on two numbers—tea prices and labor costs—and their associated locations—auction houses and plantations—which industry reformers have identified as problematic. In the vision presented by the corporate, NGO, and government partnership known as Tea 2030, price and labor costs sit in a ‘linear supply chain.’ The replacement of that supply chain with a ‘value network’ would turn tea into a ‘hero crop,’ empowering plantation workers by making them into independent farmers remunerated at a rate more reflective of tea’s natural value. A hero crop would correct the inequities that reformers see in the relationship between these two numbers.
Tea 2030’s vision—while certainly lofty—indexes efforts already in place to change the way tea is produced, valued, and sold in India. These reforms appear to be progressive despite the injustices they produce, particularly in sites of production. As they unfold, these reforms are framed by the advocates of Tea 2030 as a more rational, equitable way of counting (on) nature. Rooted in discourses of alternative and ethical trade, Tea 2030’s vision of the hero crop is one in which farmers, consumers, and retailers are closely connected.

Despite Tea 2030’s characterization of India’s industry as a ‘linear supply chain,’ my discussion of a ‘resource environment’ for Indian tea reveals nonlinear, recursive relationships among tea, the bodies of plantation laborers, and the bodies of professional tea brokers (Richardson and Weskalnys, 2014). These are all connected via ‘embodied algorithms:’ a set of procedures that produces not just a thing but a standardized set of dispositions to that thing. From the colonial period to the present, the valuing bodies of professional tea brokers, trained to describe the experience of tasting tea, have had a discernable material impact on the value of plantation workers’ bodies—hands, feet, and hair—by plantation managers. Attention to embodied algorithms underscores that the numbers we use to count (on) nature are never merely descriptive. They are themselves productive of material conditions.

Tea and bodies are, in other words, co-produced. The co-constitution of matter (specifically tea) and bodies (specifically tasters and plantation laborers) brings together analytical perspectives from feminist science studies (Mol, 2002; Barad, 2007; Haraway, 2008; Bennett, 2010), Bourdieuan ideas of taste (1984), and recent work on materiality (Ingold, 2007; Tsing, 2012; Paxson and Helmreich, 2014). Richardson and Weszkalnys’s (2014) conceptual framework of ‘resource materialities’ prompts us to think about commodity production in new ways. In particular, the framework focuses on ‘the infrastructures designed to extract resources and those needed to refine, transform, and transport them;’ and ‘how resources are experienced and embodied by people who work with, transform, or (deliberately or accidentally) ingest them’ (Richardson and Weszkalnys, 2014 17, emphasis added). This network of bodies, things, and experiences, taken together, are a ‘resource environment’ (Richardson and Weszkalnys, 2014).

In describing resource environments, I have focused on the procedures that go into producing fully processed tea: the product sold on store shelves and brewed in homes from Kolkata to Canberra. Tea 2030 envisions an altogether different product. Its ‘hero’ is unprocessed green leaf tea—a highly perishable form of the plant that has not yet been processed and, by definition, cannot be tasted. The price of tea, in Tea 2030’s vision, would shift from being that of processed tea sold by companies at auction to being that of unprocessed green leaf sold by small, independent farmers: similar to coffee and cacao, which are also bought and sold in unprocessed form. Small coffee and cacao farmers may operate in a volatile market, but as Tea 2030’s proponents claim, at least that market is globally standardized and seemingly transparent (Forum for the...
The price of a kilogram of robusta or arabica beans is translatable across space, whereas the price of a kilogram of French Roast is not.

The rise of smallholder tea production may be slowly diminishing the power of professional brokers and plantation companies over the laborers who grow tea, but it is also changing the definition of a tea laborer, from waged worker to entrepreneurial farmer. Unprocessed green leaf—vulnerable and perishable—is an inherently risky thing through which to calculate labor costs. The minimization of risk in the market for green leaf tea requires both the development of new farming skills and a willingness to compete with neighboring farms. It requires differentiation. Fit into a volatile financial market like green coffee, green leaf tea can provide high yields, but it can also wither and take farmer livelihoods with it. Without the protection of the laws governing wage labor, small farmers must devise their own algorithms—formulas that minimize the bodily costs of making tea.

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Notes
1It is important to note that the producers, which in Indian tea means plantations, are represented by large corporate players.
2Unprocessed tea leaves, unlike unroasted coffee beans, are too perishable for shipment outside of India. Factory production processes must start soon after plucking.
References


Latour, B. (1986) Visualization and cognition: Thinking with the eyes and hands, Knowledge and Society, 6, pp. 1–40.