Roundtable
Fats of the Land: New Histories of Agricultural Oils

Introduction
Interest in agricultural oils has grown dramatically in recent years for a variety of reasons, as the participants detail below: popular attention to the health benefits or perils of food oils, concerns about the environmental and social disruptions associated with various kinds of oil production, and the ways oil histories expose tensions between local biologies and global markets and suggest new ways to think about commodity chains.

Agricultural oils, in short, suggest a kind of hidden history of agriculture. Although the lubricants and paints and varnishes and other industrial products discussed below are not often seen as farm products, it is clear from what follows that in their origins, refinement, distribution, and consumption and use, they are agricultural, and therefore worthy subjects for agricultural history. Which is a reminder, perhaps, that agricultural history can be found almost anywhere, and that one of the important functions of Agricultural History and the Agricultural History Society is to help convene such conversations across geographical, temporal, and methodological lines.

The roundtable was conducted by email from February to November 2018, and is reproduced below with light editing, followed by a bibliography of works cited.

Albert G. Way and William Thomas Okie

Contributors
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**Jonathan Robins** is associate professor of global history at Michigan Technological University. He is currently writing a history of the oil palm industry. His first book, *Cotton and Race across the Atlantic*, was published in 2016.

**Kate Stevens** is a lecturer in the History Programme at the University of Waikato. Her research focuses on comparative histories of cultural, legal, environmental, and economic exchange in the Pacific. She has published on interracial whaling communities in New Zealand, sexual violence and colonial criminal justice in Fiji, Vanuatu and New Caledonia, and coconut commodities across the Pacific. She completed her PhD at University of Cambridge in 2015 with Professor Nicholas Thomas and Dr Sujit Sivasundaram and was subsequently a postdoctoral fellow with Professor Judy Bennett at the University of Otago.

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**Editors:** You are all working on nonpetroleum oil products that have agricultural origins. Why the recent interest in such products? Are they revelatory in ways that other agricultural crops are not?

**Jonathan Robins:** I think this current research “moment” is driven by the convergence of disciplinary trends in history with the realities of the present day. First, the historiography: I see a number of dynamic research agendas leading scholars toward oil crops in environmental history, food history, and energy history. I arrived at the subject by way of commodity history, a field that has long had close ties with agricultural history and food history. While I
don't intend to make any invidious comparisons between fields, I think it’s fair to say that the most influential commodity studies in the past three decades have been about agricultural commodities, food commodities, or both. Here I am thinking of Sidney Mintz’s (1985) seminal work on sugar and the dozens of academic studies that have followed, as well as mass-market successes such as Mark Kurlansky’s *Cod* (1997). Of the thirty working papers published by the UK-based *Commodities of Empire* project, twenty-one focus on agricultural commodities—including tobacco, eighteen deal with foods (https://commoditiesofempire.org.uk). Food history is popular, but oils and fats have not received the same attention in the past as other staples.

Notably, earlier studies of oil crops often emphasized what I call (with some trepidation) “old fashioned” agricultural history. They focused on factors of production, institutions, and states, but often said little about the product itself. Who used it, and why? How did growing it shape the experiences of producers and the landscapes they lived in? Here I am thinking of works like Jan Hogendorn’s excellent study of peanuts in Northern Nigeria (1978), which says a great deal about Hausa farming in the first half of the twentieth century, but relatively little about the environment or the role of peanuts in African and global foodways. My own work on cotton included a detour into the cottonseed oil industry, but it took more work in another field—food history—to appreciate how much we still don’t know about cottonseed oil and other oil crops in the past.

On to the present: contemporary events are shaping our perceptions of the past. The recent trans fat controversy (Schleifer 2012) and the apparent reversal of the Western medical establishment’s views on “good” and “bad” fats has provoked new work on the connections between agriculture, fats, and human health. The proliferation of biofuel mandates, “green plastics,” and other industrial uses of plant oils raise many questions for historians interested in agro-industry, changing land use, “land grabs,” deforestation, and other timely topics. These issues have played a role in shaping my current work on oil palm, and I suspect they will be reflected in some of my colleague’s responses. I am tempted to link my interest in oil palm to an early life experience, however. On a trip with my mother to a supermarket in 1989, I learned two things about “tropical fats”: they were in my favorite brand of cookies, and they were going to kill us if we kept eating them. This story of course has a history; the campaign against tropical fats was as much about the US soybean lobby’s fear of competition as it was about cardiovascular health (Yacob 2018). Most of my work as a historian has been, in one way or another, about understanding
the processes linking consumers in the “Global North” with the farmers in the “Global South” who produce so many important—but often invisible—commodities.

Do these crops tell us something special? Part of the puzzle of oil crops for me is the diversity of ways in which they are produced, processed, consumed, and experienced. The interchangeability of oils meant that American cotton farmers were competing with Filipino coconut growers for the same customers. The same plant product might wind up as soap, or poured on salad. These facts invite (and perhaps demand) a global perspective.

Oil crops also invite interdisciplinary work. Oils must be extracted from fruits, seeds, or flesh with heat, pressure, gravity, or solvents. Humans make decisions—often arbitrary ones—about which of these oils are food, and which will wind up as soap or grease. Food and nonfood oils are subjected to an array of industrial processes: bleaching, deodorizing, degumming, saponification, fractionation, hydrogenation, and interesterification. Few agricultural products receive such a range of industrial treatments. This complexity can be a problem for the historian. Should one scholar be expected to write a great book about cotton agriculture and cottonseed crushing (Wrenn 1995) and take on salad oil, margarine, baking fats, cattle feed, machine lubricants, miner’s lamp oil, soaps, and more? The complexity of oil crops has limited, for good reason, the scope of earlier works on the subject. On the other hand, this complexity opens doors to interdisciplinary work, inviting scholars to take on novel projects.

Kate Stevens: I would like to build on Jonathan’s point about the intersection of scholarly trends and contemporary issues. Food and commodities have proven excellent vehicles for popular history, as Kurlansky and others show (Kurlansky 1997; Koeppel 2008; Standage 2006). This is a two-way street: the contemporary concerns around dietary fats specifically, and over industrial foodways more generally, have arguably driven new scholarly interest in these oil crops. In particular, I think the way that history is popularly imagined plays into the resurgent academic focus on agricultural oil products. After decades of vilification as a “bad” fat, coconut oil, for example, has recently become something of a health superfood and cure-all (Fife 1999). Its popularity is buoyed by marketing that rests on a utopian imagined past of palms swaying in the island breeze and timeless communities living in harmony with each other and the natural environment (Stevens 2018a). Consumers’ rejection of industrial foodstuffs and the associated ills of modern life underpin the desire
to reconnect with the origins of food commodities. Yet these imagined pasts require scrutiny, as the history of such products is much more complex and nuanced than such advertising allows. Moving beyond these oversimplified, mythologized versions of the past has certainly spurred my own research into coconut commodities with Judy Bennett.

Thus historical scholarship may be inspired by, and tap into, issues of contemporary relevance, such as the unequal impacts of global capitalism. Focusing on a specific oil—or food and commodity—often explores these issues in a way that is approachable to a wider audience, given there is something material and familiar at the heart of the discussion, rather than the mysterious hand of the market. Yet this belies the multifaceted interplay of environment, capital, and culture—no simple task for the historian to untangle! Alongside the interdisciplinary potential that Jonathan mentions, I think this complexity makes collaborative study of oil crops, and discussions such as this roundtable, particularly valuable.

The multiplicity of uses at both the start and end of the commodity chain further add to revelatory possibilities of oils crops. Some oils and oil-producing plants had varied uses within indigenous communities, which often continue into the present (Alefosio and Henderson 2018). This imbues the plant and resultant oil crops with diverse and potentially conflicting meanings, sometimes making it a source of tension. For example, across the Pacific Islands and parts of Asia, the coconut tree served numerous functions as the so-called “tree of life” (Foale 2003). The nut provided both food and drink; the oil was a key medicinal and beauty product; and the leaves and wood were widely used for houses, canoes, and other material culture. In many Pacific Islands, it also features in oral traditions and proverbs (Roosman 1970). Colonial attempts to transform the nut into a cash crop from the early nineteenth century onward therefore led to both conflict over its role and significance, as well as new opportunities for communities to engage with the global economy (Journal of Pacific History special issue 2018). Studying oil crops can productively reveal these wider cross-cultural clashes and adaptations. In the colonial and postcolonial era, the differing value placed on oil crops provides a lens into the politics of land use, labor, consumption, and commerce.

To pick up Jonathan’s point on the invisibility, I think that oil crops’ versatility both adds to their invisibility as well as their interest. In comparison to many other commodities, a distinguishing feature of these products is their varied use across time and place. The consumption end of the commodity chain has often been less than obvious to consumers, historians, and stu-
The predominant end-product for agricultural oils in the Global North changed significantly over the last two centuries, as technological innovations, government policies, and consumer preferences shifted. In a pattern seen across these products, coconut oil served initially as a factory lubricant in an industrializing Europe from the early nineteenth century. By midcentury, it was used for candles, and then soap. The development of hydrogenation enabled the oil’s use in margarine (and related biscuit industries) from the turn of the twentieth century. At the start of the chain, there has been a similar series of changes: from oil to copra, and more recently, virgin coconut oil. Such a shifting chronology adds an extra dimension to scholarship on these products, as these transformations track broader economic, environmental, and technological trends over the last two or more centuries. Oil crops were—and sometimes still are—often both unseen and ubiquitous, making them a fascinating historical subject.

Brandon Luedtke: In a 2012 policy paper, finance expert Jonathan Chanis chided market analysts and politicians for misrepresenting the homogeneity of petroleum. “I suspect that crude oil is ‘fungible,’” he jabbed, “primarily for those who have never traded or processed it” (Chanis 2012, 145). As Chanis suggested, the light crude extracted at Ghawar Field differs from the heavy crude found in the Athabasca Tar Sands. The diverse characteristics of these petroleums make swapping one for another difficult, undesirable, or impossible.

I’ve opened with Chanis’ paper for two reasons. First, it illuminates how often oil, in both popular and academic parlance, stands in for petroleum. I get it: each year thirty-five billion barrels of the stuff power global transportation systems and provide feedstock for countless synthetics. Most of us do depend on it. Still, privileging petroleum in this way snubs the remarkable roster of mineral, animal, and vegetable oils that have occupied critical places—many conspicuous, others not—in lives and economies. Doing so also ignores, as both Jonathan and Kate point out, the growing contemporary relevance of nonpetroleum oils. Environmental destruction and contamination caused by the (mis)use of petroleum products has sparked broad interest in renewable and biodegradable alternatives. Studying agricultural oils challenges us to think more broadly about the historical meanings, roles, and potentials of oil.

Second, the reminder that oils are neither necessarily nor easily interchangeable gestures toward what agricultural oils can reveal about the material nature of human history. Jonathan and Kate stress how our stories about oil
unravel the ways consumers have envisioned sameness and the ways producers have created it. Many of the industrial treatments they enumerate tweak the chemical properties of oils in order to enable substitution and broaden utility. I can add to their list: dehydration, which converts nondrying oils into drying oils suitable for use in paints; and sulfonation, which makes oils water soluble for use in detergents. Setting aside the technical specifics of such processes, their multitude alone illustrates the vigor with which experts have tried to overcome the constraints of difference. However, even as we reveal the interchangeability of nonpetroleum oils, our work should also emphasize their specificity. The primary agricultural oils do contain some stew of the same fatty acids. But the complement of these fatty acids and their degree of unsaturation, among other factors, imparts particular physical and chemical properties. This matters. My research on castor oil shows how the presence of a special fatty acid (ricinoleic acid) gives the oil a distinct chemical structure making it uniquely useful to humans as a lubricant and laxative. Long after synthetic greases and pharmaceuticals replaced castor oil, recognition of its efficacy endured in branded motor oils such as Castrol and stimulant medicines such as Castoria. By attending to both the interchangeability and the specificity of nonpetroleum oils, we can arrive at deeper understandings of why producers valued them and consumers used them.

Just as we focus on the chemical composition of agricultural oils, we might also consider the organic cycles of the plants they derive from. For instance, oilseed plants cram fatty acids, instead of starches, into their seeds to expedite germination. Plants like castor and tung sneak in toxic principles (like ricinoleic acid) to prevent predation. If biological processes make lipid stores available for human use, historians ought to study both. Additionally, the botanical characteristics of oilseed plants make them tricky crops to manage. Poor productivity, seed dormancy, uneven maturation, and ballistic dispersal—whereby pods containing the seeds of castor, soy, and rape, for example, forcefully eject their contents—frustrate farmers. Efforts to discipline oilseed crops range from breeding to genetic engineering. Here, too, lies opportunity to engage the role biology plays in shaping human history.

Now, is any of this revelatory? I’m not sure. In my own work, I swat away notions that castor somehow made the modern world. Even in peak years, castor production remained barely a fraction of the output of corn or petroleum. But if quantities of oil crops and crop oils can’t explain the making of the modern world, their qualities might help us to understand how modernization proceeded. Many of the crops and oils we study filled particular niches—on
the farms that grew them, and in the markets that consumed them. They persisted for so long in these niches, I’d argue, because biological and chemical mechanisms made them materially different and, therefore, uniquely valuable. Perhaps, then, the history of producing and consuming nonpetroleum oils reminds us that the predominance of just one oil was never inevitable.

Joshua MacFadyen: Our conversation about nonpetroleum oils has so far focused on consumers, yet one of the most significant reasons to understand this category of agricultural history is surely the impact of its production. An overview of recent developments helps illustrate the importance and complexity of this topic, and it also points to some important precedents.

Global oil crops doubled in area in less than forty years (1977–2016). At 305 million hectares, oil crops were the third largest category of land use in 2016, and they may soon overtake coarse grains to become second only to cereals. A doubling of area is an astonishing trend in a period when the rest of global agricultural land use was largely stable. Indeed, many scientists argue that a controlled intensification and even reduction of land use is required in order to protect biodiversity and remain within other planetary boundaries.

Most of the global expansion was in soybean, a crop that nearly tripled in area over the same four decades. It now occupies over a third of the global oil crop. Soybean also became dramatically more productive, and in the United States, where it is now the country’s second largest crop, its yield per hectare doubled in that same forty years. Soybean expansion was particularly important in the Americas. US soybean growers led the world in both area and production in the second half of the twentieth century, but South American farmers caught up quickly, and since 2002 soybean’s new frontier is in Brazil and Argentina. Other crops like oil palm were smaller, but palm’s exponential growth in southeast Asia since 1970 has surprised most and concerned many. Soybean is often consumed domestically in poultry and livestock operations, but, like oil palm, it also disappears into a world of industrial goods on the global market. Soybean has consistently been the world’s most valuable export crop since 2008, and in 2013 the five most valuable crop exports from any country were soybean from Brazil, the United States, and Argentina, and oil palm from Indonesia and Malaysia (FAO, FAOSTAT, 2018, http://www.fao.org/faostat/).

So, oil crops are big business, highly technical, rapidly expanding, and driving the development of the planet’s last fertile lands. In some ways there is something new under the sun here, and nonpetroleum oils may be pushing
ecosystems toward those planetary boundaries faster than any other crop. However, agricultural historians will recognize many of these trends in other sectors, and indeed even in early oilseeds. A similarly rapid expansion and southward shift occurred a century ago in the linseed oil industry, when farmers in the Northern Great Plains and Prairies responded to a new demand for flax seed (linseed) and were eventually surpassed by growers in the Argentine Pampas.

Linseed oil was the drying vehicle and primary ingredient in paint, varnish, and linoleum, and its byproduct linseed meal was a valuable livestock feed. Linseed appeared in a host of other products, but like soybean, canola, and most of our other oleaginous commodities, the flax plant and the people who grew it were largely invisible. One miller claimed in 1909 that to the public, linseed oil was “very much of an abstraction.” Still, the North American crop expanded from practically nothing to two million hectares of land in 1912. And like soybean, the Argentine flax crop caught up quickly. The 1913 census recorded over 1.4 million hectares of flax, which it categorized under “Plantas Industriales,” and by the 1920s, South American farmers were producing three times as much flax as the North (MacFadyen 2018).

Recently scientists have attempted to explain the distal interactions between consumers and agricultural commodity frontiers as a process of “telecoupled” systems (Liu et al. 2013). The concept is often applied to global oil crops, but this relationship between urban oil consumers and new land has some precedent (Gasparri et al. 2016). Prairie farmers were more likely to plant flax on recently broken grassland, and both millers and scientists considered flax a frontier crop. The nation’s top flax scientist promoted the crop for four decades (1890–1930), but during the Depression he regretted the oilseed’s role in extending agriculture into the semi-arid Northern Plains.

When this oil plant declined, after the introduction of synthetic replacements, farmers and millers substituted other oil crops like soybean in the Midwest and canola in the Northern Plains. The soybean and ethanol producer ADM was originally a merger of Archer-Daniels and Midland Linseed Companies in Minneapolis (MacFadyen 2017). Oilseeds and the companies that produce them remain in many ways an abstraction, but it is important to study their production in one region over time. There are no flax palaces in either the Prairies or the Pampas, but perhaps there should be an oilseed obelisk.

Juan Infante-Amate: Vegetable oils are more present in our economies now
than ever before, not only in our diet but also in industry, cosmetics, and medicine. The growth in their consumption on a global scale is linked to several interconnected processes that affect different historic disciplines. I will identify at least three of them that are complementary with what other colleagues have already pointed out.

First, as Josh has noted, the land area dedicated to the production of vegetable oils has grown more than any other crop type. Furthermore, this growth has tended to be focused in specific geographic areas. Second, this process of expansion has developed in parallel to a similarly rapid process of intensification. Beyond the expansion of the agricultural frontier and regional specialization, production centers have put into practice highly intensive management approaches with a view to boosting production per land unit and invested labor. Intensification is also linked with an increased capacity to extract oil from the fruit or seed. Improvements in physical and chemical processes have not only increased industrial yield (in other words, it is possible to obtain more oil from each fruit or seed harvested), but we can also produce oil on a much larger scale. In the case of olive oil at least, the low production capacity of oil mills prior to industrialization limited the growth of the sector. In fact, in preindustrial systems, olives would be kept laying around for many days before being processed because mills simply could not absorb the production. This phenomenon led to a decline in the quality of the oil produced (Zambrana 1987).

These two processes, expansion and intensification, are responsible for major environmental problems such as deforestation, erosion, the mining of nutrients and the loss of biodiversity. In other words, the greater presence of these crops as well as their derived environmental impacts have made them a highly attractive subject to historians from different disciplines, particularly environmental historians.

Third, the expansion of oil production and consumption is also closely linked to globalization—i.e., to the possibility of bringing these oils to non-producing areas as well as areas that did not traditionally consume vegetable oils. For example, olive oil is a Mediterranean product, and yet its consumption has grown beyond this region since the late nineteenth century, and especially in the final decades of the twentieth century. Palm oil, on the other hand, cannot grow in Mediterranean climates, and yet its consumption has also skyrocketed recently in these countries, as well as in many other non-producing centers. Globalization has encouraged regional specialization and intensification. These changes are of particular interest to economic and food
historians, even more so in view of the fact that change was often mediated by colonial institutions and power relations between territories.

In short, the increasing importance and visibility of these products in our economies has increased our interest in them, as it has done among historians. Ultimately, they are shaping our landscapes, our diets and our consumption patterns in general. Interest is growing as increasingly controversial evidence is emerging about their impacts on our health and the environment.

In relation to the peculiarity of vegetable oils over any other types of crops, I can only emphasize what my colleagues have already expressed. I believe that the diversity of management approaches, industrial processes and final uses make them an exceptional subject for analysis. Vegetable oils come from highly diverse agro-ecosystems including tropical crops (palm), semi-arid woody crops (olives), and herbaceous crops (sunflower). The extraction processes are also extremely diverse, as indicated previously. The multiplicity of uses is even more extreme. Since biblical times, uses have included not only human food, but also as a lubricant, for lighting, medicine, and cosmetics. If we focus not only on oil but on the agro-ecosystem as a whole, the multifunctionality of these crops is outstanding. In the case of olive groves, the by-products of the fruit (pomace) are used as fertilizer or fuel; the leaves of the tree and the ground cover are used as animal feed; and the wood was a key element in sustaining the energy supply of traditional societies. These functions have changed substantially as the energy transition and industrialization have advanced, meaning that many of the traditional functions of oil crops have disappeared (Infante-Amate 2012, 2014). For example, the rise of gas and electric lighting has led to the decline of oil used for such purposes.

I cannot think of any other crop, or indeed any other type of product in general, that presents such a great versatility of uses as oil. Perhaps its changing functionality also makes it such an interesting subject for study. Although in this respect, I should also say that the majority of the literature has focused on oils as mere cash crops, ignoring their potential to provide other products.

Jonathan Robins: I’d like to return to a theme that Kate and Juan both emphasized in their responses: that agricultural history is more than the history of agricultural commodities. Their responses make me question the usefulness of a term like “tree crop,” given the range of economic, subsistence, and cultural services that these trees can provide. Trees are less “mobile” than annual crops, and their histories—rooted in specific places and times—can help us see the importance of the “local” in agricultural industries that span the globe
In a recent debate over the “futures of global history,” David Bell called on historians to appreciate “small spaces.” His argument was that “small spaces” are not merely monitoring sites, where historians measure the impact of inward and outward flows. Specific places and the people, plants, and animals that live in them are real historical subjects in their own right (Bell 2018). I think we would all benefit from some time spent (metaphorically or otherwise) in an olive or coconut grove.

I also find the time scales involved in thinking about olive trees sobering. Trees far older than the advent of industrial capitalism are still bearing fruit. In non–plantation contexts, oil and coconut palms usually outlive the people who plant them. Brandon, Josh, and I are writing about crops in fast-moving agricultural frontiers. I wonder what these histories would look like if we stepped back to a longer time-scale.

Editors: Jonathan’s comment on the local permanence of some oil crops is striking given the constantly shifting nature of the markets and uses of the products over time. How do we square this divergence between local continuity and global change? Or is this just another example of the complexities of studying agricultural/food systems in their full global context?

Brandon Luedtke: I’m impressed by our collective confidence in what histories of agricultural oils can accomplish. I already see our topics moving multidirectionally across disciplinary boundaries—as in the effort to model the linkages that bind humans and natural systems over vast distances. I’m excited by how indigenous and traditional uses for oilseeds complicate assumptions about the value and meaning embedded in various productive processes. Perhaps we might plug these insights into emerging scholarship on “anti-commodities” (Hazareesingh and Maat 2016). Finally, I think there’s great potential in narrating our stories in a way that satisfies growing public curiosity regarding the origins of the many nonpetroleum oils that saturate daily life.

Yet, I’m left wondering: have we overstated our case? This concern nags many who study the life cycles of discrete things. Deciding to closely track the process by which a specific raw material is turned into salable product(s) risks inflating its role in shaping history. Have we fetishized agricultural oils, investing in them more explanatory power than they bear or deserve?

My own hubris is most glaring. Although both castor bean acreage and castor oil production have increased in step with the sharp oil crop accelera-
Josh identified, castor’s part in this “most recent agricultural revolution” is negligible (Byerlee, Falcon, and Naylor 2017, 1). The crop accounts for 0.5% of all land devoted to oil crops, and its oil accounts for 0.15% of agricultural oils produced worldwide (Patel et al. 2016). Neither is this imperceptibility a recent phenomenon. In 1905, the USDA measured the annual production of castor oil in “hundreds of thousands of gallons, where that of either cotton-seed oil or linseed oil amounts to tens of millions” (Daugherty 1905, 287). Any bold claims about castor’s importance to our understanding of, say, petroleum dependency, run up against this stark reality of statistical insignificance.

There is, of course, ample middle ground between the power to explain everything and the inability to explain anything. Jonathan’s challenge to contemplate local dimensions seems especially useful. Any global history of non-petroleum oils must rest on numerous studies of particular crops grown in particular places at particular times. Only with these smaller pieces in hand can we begin to unlock broader patterns. As our discussion has revealed, considerable work interpreting local conditions is already finished and more is underway. But I reckon that we’re at a very early stage, and that a global composite remains some way off.

Allow me to grow our dataset. In 1918, farmers across the American South “did their bit” for the war effort by planting castor beans. Most of them knew castor as an ornamental plant or invasive weed; it hadn’t been grown as a cash crop in the United States for nearly two decades. But the War Department determined that castor oil provided the most reliable lubricant for rotary aircraft engines, and so it called for 6,000,000 gallons of it. Fired by a sense of patriotic duty—or, more likely, happy for the chance to profit off the government’s $3.00 per bushel price guarantee—southern farmers planted 100,000 acres of the beans that would help secure Allied victory over Germany. Or so they thought. Insects ravaged Indian seed stock unacclimated to the American South. Treatment demanded monotonous inspection of individual plants and repetitive hand removal of the pests. Farmers unwilling to engage this tedium, and unable to secure a workforce amid wartime labor shortages, simply fed their crop to the bugs. In the end, American fields yielded a meager 183,816 bushels of castor beans. From this paltry harvest, the government pressed just 150,000 gallons of castor oil in the early months of 1919.

Here we see the (fleeting) promise of oil crop agriculture rather than its permanence. Several similar castor crazes blinked in and out over the past two centuries. In the mid-1900s, agricultural scientists referred to this trend as “spasmodic” (Weibel 1948, 273). During each castor spasm, some specific
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demand opened brief opportunity to grow the crop and manufacture the oil. Eventually environmental strains, unreliable labor, vanishing capital, and/or the discovery of a suitable (often synthetic) replacement burst the bubble.

I’m not suggesting we stare exclusively through microscopes. Our first round of responses highlighted relationships and transfers that attach our studies of individual agricultural oils to studies of global agricultural and industrial systems. We’d be foolish to let these linkages fester. That said, neither should we allow the allure of chasing materials, people, and ideas along entangled pathways distract us from stories best told in bounded geographical space.

Joshua MacFadyen: It is possible to explore this question of local continuity and global change in nonpetroleum oils in almost any meal, even the modern airline equivalent. As I sat on a flight reviewing the responses, I received a tiny Belgian biscuit with the following ingredients: “wheat flour, sugar, vegetable oils … brown sugar, sodium bicarbonate (leavening), soy flour, salt, cinnamon.” For the most part the list is short and sweet. Flour, sugar, oil, more sugar, more flour, spice, and a pinch of soda to leaven—a quick boost of carbohydrates that most find unsatisfying but almost no one can find a reason to reject. Three other labels declared that it is vegan, non-GMO, and free of any other artificial additives.

The real complexity in the ingredients, however, was the parenthetical caveat that I skipped over after oils. It explained that the biscuit “contains one or more of soy bean oil, sunflower oil, canola oil, palm oil.” That catchall is the triglyceride equivalent of saying this product is peanut free but may have come in contact with nuts. For scholars interested in the geography of food products, the list poses a different problem. As Juan reminded us, these four vegetable oils could be from any arable zone on earth. Indeed, there are likely traces of every continent in this simple wafer. How do we write a local history of that?

If the oils in my Belgian biscuit lacked any clear locality, they certainly spoke to global change over time. What does it tell us that these four oils are included and not others? The short answer is that we don’t know, and that suggests that there is a lot of work to be done in this essential area of agricultural history. I suspect that the oil ingredients (especially soy, palm, and canola) help us historicize the product. To give it a whiff of sophistication, the company’s European-style labelling assured consumers that they have been making their product “since 1932.” It is easier to consider why in terms of
wheat (Varty 2004). However, soybean oils were only becoming common in the 1960s and canola in the 1980s. The presence of palm is another oleaginous time stamp, depending on the type. Bakers who used vegetable oils in the interwar period most likely used Crisco, and that was originally based on cottonseed (Wren 1995). Although the recipe of this biscuit might date back to 1932 Belgium, the version they make today is a reflection of the global twenty-first century food system.

I fully agree with Jonathan’s reflection that we should think about nonpetroleum oils at multiple scales. What the Belgian biscuit reminded me of, however, was that even the simplest of commercial foodstuffs are increasingly made from oils that are grown in one agro-ecosystem today and that might appear in a completely different one, or even a new one, tomorrow. The oils that Brandon, Jonathan, and I study seem to follow patterns of exponential growth and relocation, and sometimes collapse and replacement. Some of these trends responded to general economic forces, but other “spasmodic” episodes were exacerbated by the kinds of individual or agency-based actions described in Brandon’s case study. I believe it is possible to move between scales and to explore both the short-term spasms and the longer-term land-use decisions made by producers in place.

As agricultural historians it is essential that we use the microscope and the bounded spaces that Brandon so nicely evoked. However, we are also well equipped to speak to the global changes in nonpetroleum oils that are becoming increasingly urgent areas of inquiry. Rigorous historical research is one of the few approaches that can systematically summarize and recognize the overlapping patterns of oilseed growth and relocation. Sustainability scientists admit that it is difficult to explain oilseed actors even in recent years when the various land-use models occasionally fail to predict stakeholder behavior (Gasparri et al. 2016). The problem is more complex when we consider nonpetroleum oils that frequently appear, relocate, and reemerge based on different oils over the long run. In-depth social histories of the various oils will make this more feasible. As Jonathan mentioned, this research is becoming more common in agricultural history. Geographers are also presenting models worth considering (Barnes 2016).

In my work, I encourage the concept of overlapping commodity webs rather than chains, because I think it is a better framework for explaining the full matrix of options available to producers and the nodes where we see them moving from one commodity to another, usually with related social and economic services. It is critical to investigate networks of environmental
knowledge in each region—both what James Scott calls the “high-modernist” knowledge of the state and what Tina Loo calls the “high modernist local knowledge” of communities (Scott 1998; Loo 2016). The networks are also important (but different, I suspect) in both the established olive and coconut regions and the more ephemeral oilseed “regions” in the Americas. In the case of flax in the Great Lakes and the Great Plains regions, once knowledge networks have been established they tend to transfer between related webs, and they play a critical part in shaping what appears next.

Juan Infante-Amate: Olive growing represents a paradigmatic example of continuity and secular permanence in a specific area: the Mediterranean. The olive tree has been an emblem of the region’s identity from Antiquity right up to the present day. However, within an apparently “local” history we find historical discontinuities and global connections. I would like to tackle the question raised in this second round, and continue with Josh’s and Brandon’s reflections, through what we know about its history.

The main factor that can help to explain this historic permanence is environmental in nature: olive trees grow adequately in Mediterranean climates (Angles 1999). As the French writer Georges Duhamel said, “the Mediterranean ends where the olive ceases to grow.” Without this productive monopoly, its presence would probably not have been as stable in the region. However, the historical evolution of olives in the Mediterranean was also mediated by global processes. In the late nineteenth century, for example, olive cultivation declined owing to competition from new oils produced on the other side of the Atlantic. The majority of these were competing for industrial usages; hence the sector was able to redefine itself, specializing almost entirely in the food market (Zambrana 1987; Ramón 2002). Currently, we are experiencing the entry en masse of other food oils, which represents a challenge for the olive sector. In Spain, the world’s leading producer, olive oil is no longer the most consumed oil for the first time in history (according to FAOSTAT). At the level of production, olive growing is, therefore, a “local” matter in the sense that it cannot be produced beyond the Mediterranean borders. However, in terms of consumption and distribution, olive growing is a “global” matter: it is consumed outside of the Mediterranean, and competition from other oils influences its local (productive) evolution.

The second factor that helps to explain the stability of the olive grove in the region, as suggested by Jonathan, is the morphology of the plant itself. Olives grow on trees, which makes them a less mobile crop than others, particularly
annual crops. The decision to plant an olive tree implies that there will be high replanting costs, but also that there will be several years (more than a decade with traditional varieties) in which the crop will not be productive. It is a decision that will affect the long term. This characteristic helps to explain the widespread presence of so-called *agricoltura promiscua*, or integrated farming, in the Mediterranean, in which olive trees regularly feature. However, this reality also changes over time. In recent years, hyperintensive varieties have been grown, with a more bush-like morphology, and which start to produce within two or three years. The morphology of the tree, as a factor that explains its roots in the locale, loses its explanatory force.

Thirdly, I would like to stress that if we analyze the history of the crop within the Mediterranean, the idea about its mobility changes. The sustained growth of its expansion documented over the last two centuries has not been geographically widespread: whereas in some countries we have seen the land area dedicated to this crop decline, in others, growth has been continuous. Recent research has reconstructed the land area dedicated to olive growing at a local or provincial level for Spain (Infante-Amate et al. 2016) and Italy (Colomba 2017). Both studies have highlighted that the aggregated figure for land area and production is explained by diverging evolution at smaller territorial scales. There have been major changes in the geography of this crop. These studies also pointed to a growing trend towards territorial specialization, meaning that olive growing was previously much more dispersed in the region and now it is concentrated in areas such as the south of Spain, in Andalusia, which is currently home to the greatest concentration of olive trees in the world.

Undoubtedly, in terms of vegetable oils, there are more mobile crops and ones that change more spasmodically than others. However, I would say that this difference is not only due to the nature of the crops, but is also explained to a great extent by the historical contexts in which the expansion of each crop took place. Olive growing is also subject to global forces in the modern world, and it cannot be understood without considering what goes on at supraregional scales.

**Jonathan Robins:** I think we should be careful about associating the “global” with change and the “local” with continuity. In the last century, the “global oil palm industry” (more on this below) has shown a great deal of continuity. The adoption of the *tenera* hybrid variety in the 1950s (Martin 2003) was perhaps the most significant change, but that built on four decades of bio-
prospecting, experimental breeding, and information exchange. Agronomic practice evolved slowly, marked by incremental improvements in yields and labor productivity. The same plantation and palm oil mill designs are used on all three continents where oil palms are cultivated (Africa, Asia, and South America).

Local sites, meanwhile, have experienced radical changes. Ecologically, the local matters. In some regions, large companies continue a century-old process of leasing forest land and clearing it for planting, but in many regions individual farmers are the dynamic actors, responding to local demand for palm oil by felling and burning forest land (Cramb and McCarthy 2016). Clearing peat swamps and rainforest on Borneo is not the same as replanting an old Malayan rubber estate or a Colombian cattle pasture with oil palms. One global thing—the oil palm industry—has very different impacts in different environments.

Politically, the local matters. The Nucleus Estate-Smallholder (NES) model of oil palm plantation development had its origins in West Africa in the 1930s, the idea being to combine elements of plantation and peasant production. The model failed in Africa but was used successfully in Malaysia as a way of resettling landless families in the 1960s and 1970s. When this time-tested model was introduced to Papua New Guinea in the late 1970s, one result was violent ethnic clashes. When it was introduced to the island of Mindanao in the early 1980s, it floundered amid conflict between farmers, communist rebels, and a paramilitary gang.

Economically, the local matters. Malaysia’s government supported a massive expansion of that country’s oil palm industry to produce cash-earning exports, but Indonesia and Colombia initially used state-supported oil palm development to feed their own citizens. Millions of farmers across the tropics are producing for the global palm oil market, but many more produce entirely for local use. Consider the popularity in Brazil of bright-red dendê oil, an unrefined palm oil made from the dura variety of oil palm (Watkins 2015). This oil is “global” in the sense that it can be bought outside Brazil, thanks to shops catering to the Brazilian diaspora, but it has little to do with the “global oil palm industry” and its integrated web of plantations, oil mills, refineries, and food factories making things like Josh’s airline-issued biscuit.

That said, I don’t think we can reject the “global” as a useful category for agricultural history. There is a “global oil palm industry,” in the sense that we can identify a “commodity web” of producers, manufacturers, and consumers across the planet who are connected by this tree and its products. This is not
the entire reality of oil palm cultivation, now or in the past, however. The “global” is perhaps best seen as a work-in-progress rather than a state of being (Cooper 2005). The flows of products, money, and people that might connect Brazilian artisanal palm oil producers with laborers on an industrial estate in Sumatra are not even, not always successful, and often change as they move over ecological, political, and cultural landscapes. I think it’s in the detailed case studies, and especially in comparative work, that we find a useful history of oil crops. The significance of oil crops as food and as substitutes for petroleum means they are politically important, and historians should not be shy about explaining how we’ve arrived at our current moment in history. We can show how diverse cultural, political, and environmental contexts produce different outcomes in the face of global change. We see plenty of examples of what not to do in the boom-and-bust cycles of the past, but we can also highlight cases of more sustainable growth and development.

Kate Stevens: Global histories of these oils that focus on their consumable form—as candles, soap, or margarine for coconut—often risk the erasure of local nuances. An advertisement in The Times promoting “Empire Goods” to the British public asked readers, “Do blue lagoons and South Sea corals make you think of soap and margarine?” (The Times 1927). The answer, then as now, is likely no. The interchangeability of these oils, their industrial transformation—as demonstrated by the ingredients of Josh’s biscuit or by an own-brand supermarket soap—means their histories are both intertwined and can seem placeless.

In considering their global histories, it is important not to lose sight of longer, enduring, local histories of these crops. As Jonathan and Juan suggest, the specifics of ecology and environment are important aspects in making sense of divergence between local and global stories over the longue durée. Here I think there are some notable parallels with Juan’s discussion of the durability of olive oil in the Mediterranean in particular. The coconut has long been widely distributed along tropical coasts, and thus has many geographically specific histories prior to its incorporation into the oil industry. Nevertheless, the biology of the palm has shaped its integration (or lack thereof) into global networks. Like olive trees, the palm is generally slow growing: non-dwarf varieties take around eight years to bear nuts and have a lifespan of around eighty years. Their longevity is intergenerational. However, given the volatility of market demand, planting coconut palms could be a risky investment. As colonial settlers sought to establish large-scale, labor-dependent coconut
plants in many Pacific Islands, they frequently relied on other crops and on copra purchased from indigenous communities as they waited for their palms to mature and beyond. In the late nineteenth and twentieth century, a significant proportion of the copra exported from the Pacific was collected by indigenous communities, who engaged in new trade networks to varying degrees. The coconut as a commodity thus continued to exist alongside the coconut as anti-commodity: not necessarily either/or but also both/and.

Indeed, I think one of the most productive areas for this scholarship is at the intersection of, and tension between, the local and global, whether theorized as glocalization or anti-commodities (Foster 2008; Hazareesingh and Maat 2016). For example, in remote Wallis and Futuna, colonial officials, traders, missionaries, and some chiefs all saw benefits in transforming the coconut from an item of local consumption to one of commerce. Yet most such visions for more systematic planting of these islands remained largely unrealized: in places where trading boats only came a few times a year, the allure of the global economy was never all encompassing and sometimes rejected outright (Roux 1995; Stevens 2018b). In other places, however, the coconut’s local meanings were transformed through the encounter with the plantation economy and global capitalism. In parts of Vanuatu, for example, the palm became “the tree of the whites” despite its long-standing uses within indigenous society (Caillon 2008). For a better understanding of the different impacts of the global oil-crop economy in these specific locations, it is important to interrogate the complexity of continuity and change over various geographic scales.

To return to the global, though there were varying ecological, social, and political challenges to the expansion of the coconut crop, scientific attempts to tame and control local conditions often relied on global circulation of knowledge. In the early twentieth century, for example, planter manuals shared advice on the systematic planting and management of large-scale coconut plantations across Asia and the Pacific (Levy 2018). By midcentury, various colonial governments also established experimental stations, seeking more productive and resilient palms. These endeavors often had limited success but again highlight the interplay of global circulations and local specificities.

Finally, I think Brandon’s caution about overstating and fetishing the role of agricultural oils is an important point. Like castor oil, coconut oil and copra make up a relatively small proportion of the world oil crop, with copra exports in 2015 totaling less than 130,000 tonnes according to FAOSTAT. Yet for the Pacific region, coconut oil or copra has been the most enduring
and, in many islands, among the most significant export products. Thus, while it may be an interchangeable and often anonymous ingredient on the global market, its commodification has had significant influence in many specific places and thus provides a valuable point of entry into agricultural history at a variety of scales.

Editors: You’ve covered a lot of ground here, and it seems clear that tensions between the local and the global—and production and consumption—are inherent to this topic. What other broad questions might one tackle in studying agricultural oils? Where do you see the broader scholarship on agricultural commodities going in the future?

Jonathan Robins: I want to see more research on dirt (see discussion of pedology in Ross 2017). There is perhaps no topic more “local” in agricultural history than soil, but as the basis of cash crop agriculture, it clearly has global significance. Two of the big oil crops, soybeans and peanuts, have long been known as crops that restore soil fertility. In China and the United States, soybeans provided an answer to soil-depleting cotton monoculture; their value as fertilizer and fodder was more important than their use as a source of oil (Prodöhl 2013). However as Smil (2001) has argued, growing leguminous oil crops required farmers to make serious decisions about allocating land for fats, cereals, and pulses. Maintaining fertility often meant giving up food, but choosing a leguminous oil crop could provide some caloric relief. How did farming patterns change when new or improved oil crops arrived? How did these decisions change in land-rich “commodity frontiers”? How do they vary across soils and climates? What roles do market demand and food preferences play in shaping the way farmers confronted environmental realities? The questions can also be posed for the nitrogen-depleting crops like cotton, flax, sunflower, sesame, jatropha, and others. The brassicas, including mustard and rapeseed, are nitrogen “scavengers” and pose an interesting middle case. As oil crops, they have received relatively little attention from historians.

Juan Infante-Amate: Throughout this roundtable discussion one of the most defining characteristics of vegetable oils has been their invisibility. This invisibility, however, has been signaled in two different directions: the difficulty documenting its use, because it is often embedded in other products; and the lack of attention paid to less conventional uses beyond food and industry, which are the dominant uses today.
In my opinion, tackling these two aspects could be extremely interesting in the future study of vegetable oils in particular, and agricultural commodities in general. In the case of the physical invisibility of oil in processes of consumption and distribution, the most eloquent example was provided by Josh and Jonathan when talking about the oil contained in cookies. Oils are not always consumed directly, but rather are often embedded in other products—not only as an integral part thereof (e.g. the oil contained in a food product) but because they are necessary in the production of that food. Oils are, for example, used to fry food or in canning processes, or in a more extreme case, used as lubricants for the machinery that produces a commodity. In recent years, within the field of environmental sciences, concepts such as “consumption footprints,” “consumption-based accounting,” and “telecoupling” or “teleconnected” effects have gained a great deal of traction when studying the hidden impacts of consumption (Peters et al. 2008; Friis et al. 2016; Wiedmann and Lenzen 2018). The rise of these studies is related to the role of China in the global economy, which, when it became the new “world’s workshop,” began to absorb the consumption of intermediate products (e.g. coal or oil) to manufacture goods for export. To identify actual responsibility for consumption, there is a need to identify embodied, hidden, or virtual flows in trade. However, duly documenting these flows is also important to trace the history of any commodity—in other words, to visualize its flows better from production to end consumption (or waste). In terms of a historical perspective, as far as I know, only the work of Kander et al. (2017) has tackled this issue for the case of energy embodied in European trade. My impression is that within agricultural commodities, oil crops are more likely to be hidden within distribution and consumption chains.

The second direction is related with the propensity to focus the study of oil crops on the market flows of production and consumption, especially for food and industrial uses. In my opinion, this means we are not properly examining the historical complexity surrounding the production and functions of oil crops and their agro-ecosystems. I believe that this bias can be explained by two reasons. First, because the growing interest surrounding their study is closely related with the modern increase in their consumption and their global trade, chiefly on the basis of exports from the Global South toward industrialized, northern countries. Hence, we tend to study oil crops almost exclusively as cash crops. However, in traditional societies (preindustrial societies with fewer global interactions), these crops could play a very different role. They were crucial to the everyday sustenance of traditional communities,
providing a wide variety of goods and services in medicine, cosmetics, food for human and animal consumption, lubrication, lighting, and more. The second reason relates to the sources available for study. Ultimately, the majority of these studies only report on globally traded flows, or the industrial or business activity of the oil sector. Studying the role of oil crops in traditional communities is very complicated, given that there are so few sources. For this reason, a very important part of the history of oil crops is made invisible—with notable exceptions, such as the work developed by Kate.

**Joshua MacFadyen:** We have grappled in various ways with the impacts and invisibility of triglycerides, and I think the results shed new light on some of the modern world’s truly essential oils. When we consider oilseeds (such as soybean, linseed, and cottonseed), tree crops (such as olive, palm, and coconut), or animal fats (such as tallow, lard, and of course dairy), we find products that long predated petroleum and a sector that seems poised to outlive the age of oil. To be clear, none of the organic oils and fats could match petroleum in terms of economic value and environmental degradation, but taken together they reveal important new aspects of the socio-ecological transition. Triglycerides were some of the most important materials in the Industrial Revolution, and even though many industrial oils like castor and linseed were eventually displaced by synthetic substitutes, the demand for other nonpetroleum oils continues to drive land-use and land-cover change well into the twenty-first century. For better or worse, it would appear that modern agriculture is nowhere near peak vegetable oil.

I would like to see more systematic research into triglyceride history, including as Juan suggested, an accounting of embodied impacts, and as I argued, an examination of overlapping commodity webs that integrates many of the recent in-depth studies of individual commodities. Historians are only beginning to explore the commonalities and impacts of the various nonpetroleum oils, and the preliminary research suggests a larger sector with greater significance and more areas of overlap than we knew before. Triglycerides remain one of the most important agricultural products that historians know relatively little about. This is partly because of the visibility issues discussed above, but it is also because, as Alan Olmstead and Paul Rhode argued (2008), agricultural historians tend to focus on food and fiber at the expense of animals and feed. Most of the major oils and all of the fats were made possible by livestock, and others like olive oil relied on a system of mixed husbandry (see Juan’s first response). Linseed oil manufacturing yielded an important
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byproduct—linseed meal—that served as a high protein feed supplement. Dairy and draft animals craved it, but oil cake was used selectively at first. As the characters in George Orwell’s *Animal Farm* imagined, heaven was a place where “lump sugar and linseed cake grew on the hedges.” Today canola and soybean produce both oil and feed derivatives, and as Jon suggested, the North American soybean industry as we know it would not exist without the demand created by animal feed. Thus, a systematic study would consider the drivers behind industrial oils, the embodied costs of consuming feed from oil’s by-products, and the telecoupled systems produced by shipping both oil and feed to markets around the world. I hope that this roundtable helps to spark a larger conversation and collaborative research around these triglycerides—the modern world’s essential oils.

Kate Stevens: I’m fascinated by some of the suggestions to push commodity and agricultural histories in new and different directions, such as thinking more closely about the stories that dirt might reveal. This could illuminate the way that decisions about oil planting and production interplayed with specific environmental conditions in new ways; and I imagine the coral or volcanic soils of Pacific Islands would provide a noteworthy contrast to continental lands.

The link between these agricultural triglycerides, animal feed, and animals more generally that Josh suggests is one that I’d like to add to here. Like linseed meal, coconut-based oilcakes were a significant though underappreciated by-product of copra. Livestock were consumers of such agricultural oils; however, they also played more varied roles in the related agro-ecosystem. Just as farmers used soybeans to counteract the detrimental impact of monocultures, some planters consciously integrated animals into the coconut plantation environment. Cattle grazed between palms on plantations in Vanuatu, helping to keep the undergrowth down as well as supplying an additional source of food and profit (Weightman 1989).

And if we follow Ryan Jones’s suggestion to look below the waves as well as below the ground, we might see another intersection: between oils from agricultural sources and those from marine mammals (Jones 2013). At the nineteenth-century height of the whaling industry across the Pacific, any barrels not filled with whale oil might instead hold coconut oil (Maude 1968; Macdonald 1982). Closer attention to such substitutions—and the transitions between marine and agricultural oils—may help us connect the maritime world with agricultural history, not only as a network that moved ag-
Agricultural commodities between lands but also as a source of competing and interchangeable resources.

Thanks to my fellow contributors for a thought-provoking discussion. I’m excited to see where further scholarship on these triglycerides leads, especially as we continue to think and talk about the overlap and divergences between different oils across time and place.

Works Cited


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