Nightcrawler commodities: A brief history on the commodification of the humble dew worm

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Abstract
Each year, 500 to 700 million dew worms are sold from thousands of gas stations, convenience stores, big box retailers, making this particular species, *Lumbricus terrestris*, the most popular live bait for recreational freshwater fisherman across North America. In fishing parlance, these effective bait worms are referred to as “Canadian Nightcrawlers,” not because they are native to the region (they are not) or because they cannot be found elsewhere (they can), but because the entire global supply comes from a stretch of rural land between Toronto and Windsor in Ontario, Canada. How did this simple garden worm become a valuable commodity, and why is production relegated to one single region in the world? In this paper, I rely on newspaper archives and key informant interviews to construct a “capitalist commodification story” that explain why demand for Canadian Nightcrawlers emerged in North America, why the production of nightcrawlers is relegated to southwestern Ontario, and how this lowly living, breathing, squirming creature beneath our feet became a capitalist commodity producing value through competitive markets. In sum, I argue *L. terrestris* became a capitalist commodity when burgeoning demand from a new class of recreational fishermen increased competition between nightcrawler suppliers. The inability of capital to take hold of the ecological conditions of nightcrawler production relegated the most productive producers to southwestern Ontario who had the contingent privileges of useful soils combined and cheap and efficient labor. The materiality of *L. terrestris* physiology is thus constitutive of how capital seeks to accumulate surplus value in a peculiar industry. At the same time, this research shows that no matter how peculiar or banal a commodity may be capitalist logics are constantly experimenting with heterogenous peoples and environments to find a way to increase productivity and accumulate surplus value through market exchange.

Keywords
Commodification, capitalist natures, environmental history, earthworms, recreational fishing

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Introduction

Each year, 500 to 700 million dew worms are sold by the dozen from gas stations, convenience stores, and big box retailers across North America, making them the most popular live bait for recreational freshwater fisherman. Their scientific name is *Lumbricus terrestris*, but they are more commonly known as the “common garden worm,” the “lob worm,” or the “nightcrawler.” Sold for $3 to $4 US dollars (USD) per dozen, these living, breathing, wriggling live specimens generate between $125 USD million and $233 USD million in retail value each year. In fishing parlance, they are not simply known as nightcrawlers, but “Canadian Nightcrawlers.” Calling them, “Canadian” however, is a slight misnomer; this earthworm species is not native to Canada nor do these nightcrawler commodities originate from all parts of Canada. A more accurate moniker would be “southwestern Ontario nightcrawlers;” whether they are sold in a vending machine in Michigan, a Walmart in California, or a bait and tackle shop in London, England, the global supply of these bait worms are hand-picked from farmer fields that stretch between Toronto and Windsor, in Ontario Canada.

How did this simple garden worm become such a valuable commodity? Can’t fishermen just pick them from the ground themselves? Would it not be easier to grow or culture them? And why do all these worms come from southwestern Ontario? The aim of this paper is not to tell a contemporary “commodity story” that follows *L. terrestris* from the soil to the hook. Rather, I wish to tell a *capitalist commodification story* to explain why demand for Canadian Nightcrawlers emerged in North America, why the production of nightcrawlers is relegated to southwestern Ontario, and how this lowly living, breathing, squirming creature beneath our feet became a capitalist commodity producing value through competitive markets.

In doing so, I provide an empirical intervention on the constitutive elements of non-human natures in capital accumulation; I respond to Barua’s (2019) call to go “beyond the antinomies of posthumanist and political economy inquiry” to engage in both the open-ended associations and lively potentials of socio-ecological relations while following how capital accumulates and surplus value is created. The commodification of nightcrawlers is an intriguing case study in this debate because the industry lacks purposeful human agents capable of enrolling the soils, pickers, money, golf courses, into stable “networks” or “assemblages.” Nightcrawler capitalists are not the authors of their own investment, but reactive to provisional assemblages of ecological niches, immigration policies, and soil structures over which they have limited influence. No one set out to develop a profitable bait worm industry in Ontario; it emerged as an industry and took shape through the contingent socio-ecological conditions of production that constituted who worked (under what conditions) and who profited (with what investments).

And yet, this commodification story reveals that no matter how peculiar or banal or seemingly insignificant a commodity may be, capitalist logics are constantly at work, experimenting with heterogenous peoples and environments and finding ways to increase productivity and accumulate surplus value through market exchange. Despite the open-ended, and non-deterministic trajectories of commodifying living organisms (Tsing, 2015), value relations continue to take form and discipline producers; in other words, the pursuit of surplus value in the commodification of nightcrawlers is the glue that holds these disparate people, soils, and worms together.

The next section of this paper defines commodification and outlines contemporary debates around “lively commodities.” Then, the methodology of the study is described. The *Troublesome biologies, ecologies, and physiologies* section explains the emergence of
nightcrawler demand and historicizes the challenges in commodifying this living organism whose physiological and ecological characteristics are not easily subsumed into capitalist production systems. The necessity of working around the given biophysical challenges impacted how, where, and under what conditions labor could be deployed. The Ontario soils and immigrant laborers section describes how the ecological conditions constituted the industry into southwestern Ontario, where soil structures and cycles of immigrant labor increased picking productivity to levels unattainable outside of the greater Toronto area. In sum, I argue *L. terrestris* became the Canadian Nightcrawler commodity by the 1980s when burgeoning demand from a new class of recreational fishermen increased competition between nightcrawler suppliers. The inability of capital to take hold of the ecological conditions of nightcrawler production relegated the most productive producers to southwestern Ontario who had the contingent privilege of useful soils combined with cheap and efficient labor. This explains how the sale of worms went from an impossibility in the 19th century to a boyhood gig in the early 1900s, before developing into a peculiar capitalist production system by the mid-1950s and consolidating in southwestern Ontario by the early 1980s.

**Capitalist commodification stories**

“Commodity stories” are methodological analyses that “remove the veil” from the capitalist socio-ecological relations necessary to produce, distribute, and consume commodities through market exchange. They “follow the thing” (Bakker and Bridge, 2006; Cook, 2004) to uncover the otherwise “hidden geographies” (Bridge and Smith, 2003; Harvey, 1990) and serve as “vehicles” to analyze the interdependent natural, cultural, and economic relations (Bridge and Smith, 2003). The putative materialist turn in geography has also refocused attention on the materiality of the commodity itself and how heterogeneous biophysical, and other “lively” characteristics (Collard and Dempsey, 2013) are constitutive of where, when, and how capital accumulates surplus value along the commodity chain.

Commodity analyses, however, do not de facto address the process of commodification itself. As Campling (2012: 255) notes, “it is surprising that few researchers take seriously the historical and relational specificity of the commodity in question and the implication for chain analysis…” (see also Campling and Havice, 2019). Reframing the analysis around “commodification” as opposed to “commodity” directly addresses such historical complexity and contingency. As such, a capitalist commodification story asks different questions and identifies different—albeit related—tendencies from a commodity story. It does not focus on the unveiling of the specific production regimes, distribution networks, and social meanings of consumption of a particular item as they currently exist. Instead, it is an historical inquiry that asks how the commodity came to be and how it is maintained by examining the myriad of contingent spatial–temporal heterogeneous elements and processes actively at work to ensure successful and perpetual commodification. For lively commodities, commodification inherently poses the question how non-human lifeforms shape and are shaped by the tendencies of capitalist commodification in pursuit of surplus value.

What are these commodification tendencies? At its core, commodification is understood as a process that takes qualitatively different non-market goods, renders them equivalent, and sells them for a monetary price on the market (Castree, 2003; Prudham, 2009). As simple as it sounds, this presupposes an assortment of historical conditions. To begin, the commodity must have a use-value that fulfills the needs and wants of someone, somewhere; this use-value need not be universal and is open to cultural norms, tastes, preferences, lifestyles, social organization, etc. The use-value thus has historical, material, and semiotic characteristics that contribute to its demand. Critically, this demand must be met through
monetary exchange, which in turn presupposes wages where the purchase of commodities for survival has become a “normal social act” (Harvey, 2018: 11). This gives the commodity both a use-value and exchange-value. Under capitalism, production becomes increasingly motivated by this exchange-value (over use-value) to facilitate further capital accumulation.

However, understanding how previously non-marketized living things become sold for a price does little to explain the constitution of its value. Anyone in the world can pick up an earthworm and sell it (and indeed they did as we will see); instead, my questions are why and how did L. terrestris become so thoroughly commodified where effective demand for hundreds of millions of worms developed a competitive market that pit worm enterprises against one another and systemized production in one particular region of the world? In this sense, commodification is more than putting a price tag on something that was previously outside of monetary exchange, but also understanding how capitalist value is determined.

Despite the empirical richness of the commodification of nature literature that has proliferated in past decades, the term commodification is often ill-defined or used in conjunction with or synonymously with such terms as privatization, commercialization, and neoliberalization (for a recent review see Smessaert et al., 2020). The problem with such fluid associations is that it can leave out the questions about the production of surplus value. For example, much recent commodification of nature literature focuses on the financialization of ecosystem service payments in developing nations (Smessaert et al., 2020). Felli (2014) however questions whether such schemes are actually productive of surplus value through market exchange or should more parsimoniously be understood as forms of rent that are drained from the total surplus. Therefore, for the purposes of this paper, I wish to push the definition of commodification a bit further to specifically focus on how the commodity’s value—understood as the average socially necessary labor time—evolves through time. I am not dealing with the commodification of objects sold in specialized or fragmented markets where value is unevenly enforced, or where prices are constructed and enforced as rent. Capitalist commodity exchange is producing surplus value in a more “cost-efficient way in direct competition with others in the same market” (Wood, 2002: 78). Competitive markets “impose certain common conditions of competitive production” and become the “enforcer” of valuation where surplus value is generated by “increasing productivity and cost-effectiveness” (Wood, 2005: 54). Such “coercive laws of competition” (Marx, 1990: 433) forces producers to systematize production regimes that increases labor productivity at least equal to industry averages (Marx, 1990: 739). Failure to do so will run the capitalist out of business. This is the law of value that disciplines producers and generalizes commodity production.

How does this process work when commodifying living, non-human organisms? Kautsky’s (1988) articulation of the “agrarian question” was an early attempt to understand the uneven and contradictory nature of capital’s incursion into agrarian landscapes. Much work has gone into understanding the “problem of nature” to understand how capital confronts the numerous “obstacles, opportunities, and surprises” that shape diverse forms of capital investment and trajectories of commodification (Boyd et al., 2001; Goodman and Redclift, 1985; Goodman et al., 1987; Henderson, 1998; see also Mann and Dickinson, 1978). An increasing focus of this literature is how capital confronts living organisms. Drawing on Marx distinction between the formal and real subsumption of labor, Boyd et al. (2001) suggest capital increases not only the productivity of human labor, but the productivity of nature itself through applications of science and technology. In these cases, capital not only flows around the living organisms, but flows through them. They refer to this as “the real subsumption of nature.” Often, the real subsumption of nature occurs at the
biological and genetic level as is the case, for example, of trees (Prudham, 2005), hybrid seeds (Kloppenburg, 2005), strawberries (Guthman, 2019), and livestock (Cooper, 2017). Boyd’s (2001: 632) analysis of broiler chickens is emblematic of the blurred the distinction between nature and technology where biological production is accelerated and intensified not only through genetic improvement but also confined feeding, nutritional supplements, and antibiotics. Wadiwel (2018) follows Boyd to show how the mechanization of chicken-capturing addresses the persistent “wildness” to increase relative surplus value.

But what happens when capital cannot address the “unruly” or “wild” characteristics of a lively commodity where conscious applications of science, machinery, and genetic manipulation do not increase the productivity of the organism? Do the logics of capitalist accumulation and surplus value fail? If there are no initiators, or purposeful investors shaping the ecological conditions of production, does the law of value still hold? What happens when capital must accumulate surplus value relying on the “archaic” forms of living natures whose quotidian rhythms, physiological traits, or rates of reproduction do not conform to capital’s drive for productivity and accumulation?

The putative materialist turn in geography has refocused attention on the materiality of the commodity itself and how heterogeneous biophysical, and other “lively” characteristics (Collard and Dempsey, 2013) confront capital’s ability to accumulate surplus value. Living organisms, here, are not passive objects left “victim” to the determining political economic forces (Bakker, 2003: 718); instead, their living potentialities are “inscribed” or “embedded” into capital (Leff, 1995; McCarthy, 2012). Particularly, the proliferation of diverse posthumanist, “new materialist,” critical animal studies, and Actor-Network inspired research radically de-centers the analytical focus away from both human agency and capital’s putative deterministic drives. Instead, the generative capacities of non-human natures—their uncooperativeness, unruliness, potentialities—require “non-deterministic notions of nature” with an open ontology of agencies, where complex systems operate “without telos or final cause” (Braun, 2015). Capital is not the acting force that dictates how non-human natures are produced nor can humans utilize their promethean ingenuity to completely harness or mitigate the complex and unstable living dynamics that surround them. Mitchell’s (2002) account of a malaria outbreak in Egypt is an empirically rich account that firmly rejects any notion of capital’s “inner logic” and shows how explanations of historical phenomenon must go beyond human and capital centric analyses. Similar research has made much productive use of the “assemblage” concept—a descriptive that provides a detailed, and open-ended account of associations of heterogeneous elements (institutions, organisms, humans, signs, practices) that are provisionally aligned to maintain a coherent whole (Anderson and Mcfarlane, 2011; Bennett, 2010; Callon, 2008; Tsing, 2015). Both capital and humans do not pre-exist or represent the determinant agents but are constituted by and through their contingent and temporal relationship to other elements in the assemblage. In this way, nightcrawler commodification shows how capital cannot determine production organizations or the application of science and technology as much as the capitalist producers may try. In one way, the nightcrawler assemblage emerges through a temporal and spatial alignment of clayey loam soils, invasive earthworms, immigrant laborers, snow cover, golf courses, and the democratization of recreational fishing. But what ties these open-ended, provisionally alignment elements together? What connects Greek immigrants with dew worms on Ontario golf fairways to the industrial working class with newfound leisure time?

Relegating capital to one element amongst others in the assemblage is problematic. In the extreme, mention of capital accumulation remains absent or minimized (Bennett, 2010; Latour, 2013), or as Fine (2005) notes, incredibly under-theorized (for example speaking to “capitalization” without reference to capital). Emphasizing the constitutive dimensions of
non-human organisms without taking account of processes of capital accumulation risks missing “a vital aspect of their logic and consequences” (Castree, 2002: 123).

Without the pursuit of surplus value, the nightcrawler assemblage would not exist. The aim of this nightcrawler commodification story is to show how capital enrolls, adapts, and experiments with heterogeneous elements in the pursuit of surplus value even when it applications of science and technology cannot address the unruly characteristics of nightcrawler physiology and ecological function. In examining the capitalist commodification of living commodities, capital is not one element existing within an assemblage, but the tying thread that mixes and matches elements to provisionally produce surplus value despite its inability to fully control conditions of production. This inability to harness the lively potentials of non-human natures both explains why capital is stuck in formal subsumption—relying on archaic production regimes—while remaining relatively stable and profitable over eight decades.

Indeed, part of my objective is to provide a case study to draws on insights from literature that examines the co-constitutive dimensions of capital and nature. It is an empirical response to the call from Barua (2019: 665, 655) for future studies to “track the heterogeneous and plural entities that produces surplus, participate in and constitute the economic” which are necessary “if one is to better understand how life itself becomes a locus of accumulation” [italics mine]. Commodification processes are distinct in important ways, likely or unlikely in different instances, but always in need of careful examination and explanation. The nightcrawler commodification story—going from not-a-commodity with no capitalist value to a capitalist commodity whose value is determined by socially necessary labor time—displays how contingent, open-ended, and unplanned the process of commodification is. The Canadian Nightcrawler could not become a capitalist commodity until a Post-World War II rising middle class of anglers with better salaries and structured leisure time demanded an effective, and easily handled bait. The inability to manipulate the conditions of nightcrawler production however required suitable loamy clay soils rich in organic matter to support high nightcrawler densities. Hand-picking worms could only be done at night, under certain conditions, using a piece-rate labor force willing to work arduously for potentially high rewards. Yet, the thread that held these social and biophysical relations together was perpetual drive for surplus value production. However resistant and unruly the worms, soils, and laborers might be, nightcrawler capitalists across the continent competed against one another and established a socially necessary average labor time that could only be maintained in southwestern Ontario where productive soils overlapped with productive laborers. The region emerged as a nightcrawler factory through the contingent assemblage of human and non-human dimensions interacting and experimenting in ways that systemized production and permitted the continual extraction of surplus value.

Methodology

Constructing a commodification story that tracks the nightcrawler commodity from a self-provisioned fish bait in the late 1800s to a capitalist enterprise by the early 1980s is difficult. “Worm picking” has only been mentioned in the academic literature a handful of times, often as a passing reference as a possible job for recent immigrants (MacDonald, 1997; Pfeifer, 1999; Preibisch, 2010). The most detailed account comes from a 10-page book chapter that outlines the basic system of production in the late 1970s and early 1980s (Tomlin, 1983). There are scant government records, incomplete export values, and no official documents about how the industry began. While my broader research focuses on the contemporary nightcrawler industry, only three of my interviewees could recall how the
industry functioned in the late 1960s and mid-1970s, which by then was firmly entrenched around Toronto, Ontario. As such, to track the development of the use value and exchange value of the nightcrawler, I primarily rely on newspaper articles over a century (from the late 1880s to 1980s), which covers the period of transition where nightcrawler went from a self-provisioned bait to a boyhood gig, then transforming to a capitalist industry concentrated in southwestern Ontario. Clearly, newspapers are not de facto objective and subject to omission, mischaracterization, bias, or sensationalization (Allen and Sieczkiewicz, 2010; Bowen, 2009); but excluding such data sources would significantly undermine research agendas especially where alternative data are unavailable (Franzosi, 1987: 23). I collected articles from the online databases newspapers.com, americashistoricalnewspapers.com, and Proquest, which include prominent national papers as well as local papers. Keyword such as “worm picking,” “worm picker,” “dew worms,” “nightcrawlers,” “Lumbricus terrestris,” and “bait” yielded approximately 200 thematically relevant articles that mentioned the self-provisioning and/or sale of bait worms. Articles were categorized chronologically and coded for themes of the labor process, the composition of labor force, capital investments (or lack thereof), and as well as prevalent prices and piece-rate wages. I rely on the presence (and disappearance) classified ads in regional newspapers to track the temporal and geographical shift of the industry as it slowly evaporated from disparate North American regions and settled into southwestern Ontario. I supplement these archival sources with 15 semi-structured depth interviews with actors who had engaged with the nightcrawler industry in the late 1960s until the 1980s, specifically worm wholesalers, former worm pickers, and greenskeepers. These interviews not only provided a richer understanding of the dynamic of the bait industry from the 1960s to 1980s, but also triangulated the scattered data found in newspapers.

Troublesome biologies, ecologies, and physiologies

Two conditions were necessary for the commodification of nightcrawlers. They needed a use-value in strong demand, and the demand had to be met through monetary market exchange (Harvey, 2018; Marx, 1990). As synonymous as the worm is with the hook today, these two conditions were not met in the early days of recreational fishing. It is not entirely clear when fishing for food became fishing for fun as the two objectives are not mutually exclusive. Drawings of Egyptian high priests suggest they were “having fun” fishing for tilapia in large stone tanks (Pitcher and Hollingworth, 2002: 4) and there is reference to Emperor Louis the Pious who went on several fishing excursions in the 800s—most likely not to fulfill in caloric necessities (Hoffman, 2016: 62). The earliest explicit references to fishing for the joy of it comes from 12th and 13th century sources that suggest commoners took pleasure in fishing with a hook (Hoffmann, 1985). By the 16th century, however, recreational fishing was an aristocratic affair. The Enclosure Acts solidified the social practice by denying commoners access to rivers and lakes. Many of the early written pamphlets recreational fishing were explicitly directed at the wealthy class, suggesting that if these techniques and instructions got into commoner hands, they would “utterly destroy” the regal recreation (Berners, 1883: 37).

In these early 16th and 17th publications, worms were considered a suitable bait—alongside grubs, crickets, and artificial flies—if used appropriately in the right season and for the right species of fish. In the 18th and 19th century, however, recreational fishing practices began to change. A hierarchy of fish developed with the “stately” trout and salmon on top, considered “sport fish,” with the lowly carp and cat-fish at the bottom, considered “coarse fish” (Locker, 2014). As recreational fishing clubs increased alongside a burgeoning
bourgeoise class in the 1800s, fishing techniques became codified (Herd, 2003). Fishing with the artificial fly became sacrosanct; fishing with worms profane. As a writer in the English outdoor magazine The Field proclaimed, “In England, we think it is poaching to fish for trout with worms, and I know several men who would not speak to you again did they know you had used that bait” (The Field, 1897).

These elitist ideas about bait transferred across the Atlantic where the wise and knowledgeable angler were fly-fishermen and only the “meat fishermen” used worms. Prior to post-war industrialization, there was both little demand for the worm as a commodity nor was there a wide consumer base with the money to pay for it. After WWII, however, recreational fishing boomed in the U.S. where industrialized work regimes, a Fordist pay-scale, and an infrastructural network provided access to lakes and rivers. The weekend, in particular, as noted in De Grazia’s classic book, Of Time Work and Leisure (1962) created a “dash for the outdoors,” with outdoor recreational activities rising in popularity with the new working class. Recreational fishing in particular caught the attention of the U.S. Fish and Wildlife Service which conducted the first National Survey of Fishing and Hunting in 1955. At the time, there were 18 million recreational freshwater fishermen, spending over a billion dollars on fishing trips, equipment, bait, and fees (Fish and Wildlife Service, 1960). This figures steadily increased with every five-year survey. By 1980, there were 36.4 million freshwater fishermen spending $7.8 billion USD (Fish and Wildlife Service, 1980).

The popularity of fishing among the masses, however, disrupted (and greatly offended) the honorary traditions of fly-fishing that had developed over centuries. Fly-fishers scoffed at these “live bait” fishermen as there was no challenge, no art form, in fishing with a worm that could catch just about anything; “any old woman can catch a fish with a worm” (Vikers, 1951: 474). And indeed, this new rank of amateur fisherman wanted a bait that was effective and could be easily handled. Unburdened from the codified conventions of fly-fishing, demand soared for the so-called “plebeian bait” (Duluth New Tribune, 1896) adaptable to the most diverse of fishing circumstances. The nightcrawler fit the bill (James, 1964).

The exploding demand for nightcrawlers with the ability to pay for it made an exchange value possible. But there was one problem, the physiological characteristics and ecological function of the nightcrawler made it a difficult commodity to produce. The “red wiggler” worm (Eisenia fetida) in contrast is much more cooperative with capitalist imperatives to increase productivity. Red wigglers are categorized as epigeic earthworms—from the Greek word meaning “upon the earth.” These earthworm live, feed, and mate all within the top layer of organic matter, and will reproduce exponentially given optimal temperatures, moisture, and feed. Vermiculture and vermicompost businesses overwhelming rely on the red wiggler (Sherman, 2018). Perhaps the most famous red wiggler farmer in history is Hugh Carter, cousin to President Jimmy Carter. Hugh’s worm farm sold as many as 25 million worms per year throughout the 1960s and 1970s, mostly to recreational fisherman (Sterba, 1976). His worm farm was also rather simple. Worm beds were constructed with concrete cinder blocks and placed under the shade of trees to help mitigate the hot Georgian sun. Simple setups like this continue today, although most red wriggler farms—and there are many—are highly capitalized with industrial equipment such as conveyor belts, mechanized “continuous flow-through beds,” and truck-sized tumblers. Such farms are capable of efficiently producing hundreds of millions of worms with very few employees (Sherman, 2018).

For fishermen, however, red wigglers are judged to be an inferior bait. They are smaller, skinnier, and die quickly under water. They attract smaller fish species, and excrete a pungent mucus when handled (or impaled on a hook!), that many live bait sellers say render
them unpalatable to some fish (Gupta et al., 2019; Strickland and Strickland, 2018). Fishermen only “settle for” the red wiggler (Wolfthal, 1980). In contrast, the long, thick nightcrawlers survive longer under water, writhing to and fro, attracting larger and more diverse fish species, making them the most readily available live bait at bait and tackle shops across North America (Keller et al., 2007).

But nightcrawlers are notoriously difficult to commercially produce. There are no industrialized “nightcrawler farms” despite best attempts to increase reproductive capacity (Butt and Lowe, 2011). Unlike the red wigglers, nightcrawlers are anecic earthworms—“up from the ground”—that construct deep burrows up to two meters deep in the soil. They come up to the surface during nighttime hours to mate and feed. Critically, they are “density dependent” and will either slow or speed up their rates of reproduction depending on the space and resources available to it (Butt et al., 1992; Kammenga et al., 2003). The highest density of these anecic species come not from closed, commercial production systems, but are found in spacious grasslands and no-till, perennial cropping systems (Briones and Schmidt, 2017; Edwards, 1983). Contemporary no-till dairy farms that liberally spread manure over alfalfa fields appear to support extraordinarily high worm populations as there is little soil disturbance and abundant feed (Steckley, 2020). As a result, the most efficient way to “produce” a nightcrawler is also the most rudimentary: bend over and pick it up.

For the early U.S. bait fishermen this was part of their appeal. The worms could be secured by anyone willing to dirty their hands (Aberdeen Daily News, 1905). In the 19th century, fishermen would often bring a shovel to the shoreline and dig for their own supply: “It has been estimated that during the past twenty years there has been enough dirt removed and labor expended in the quest of fish bait to have completed the Panama Canal” (The Times-Picayune, 1914). The fishermen would strike the shovel into the dirt, overturn the earth and pick through soil and debris to find the suitable worms. It was not easy work, with many fishermen having “lamed their backs” blistered their hands, and “wasted their time” (New Haven Evening Register, 1891; Plain Dealer, 1896; Trenton Evening Times, 1922). If you know fishing, one newspaper said, you know “how a fisherman hates to dig bait” (The Times-Picayune, 1920).

There have always been other ways to get the worms to the surface. One suggestion was to put a stick in the ground and grind it like a washboard which would “set the worms in motion” (Plain Dealer, 1896). Such vibratory methods meant “the only labor necessary than [sic] is to pick them up and put them into your can” (The Times-Picayune, 1914). Other fishermen found pouring certain substances over the ground would drive the worms up, saving time, blisters, and back aches. This included soapsuds, cupric sulfate (Plain Dealer, 1896), and more recently, xylene. Earthworm researchers currently use a mustard powder solution to bring worms up to the surface. The problem with each these methods for harvesting nightcrawlers is that all worm species might come up; pouring liquids thus adds the extra step of sorting the useful bait from the useless.

Nightcrawlers, however, are called nightcrawlers for the simple reason that they come up at night. Digging or pouring substances is unnecessary if one adheres to nightcrawler behavior. In 1891, some New Haven residents believed the city’s new electric lights acted “as a magnet” as they witnessed thousands of worms crawling throughout a city park (New Haven Evening Register, 1891). More empirically minded folk, however, suggested the lights only made visible the natural behavior of these worms; the nightcrawler comes up all by itself. In 1896, there is an article that describes the nightcrawler-picking process that has remained largely unchanged for over a century: “some men go around with a lantern on favourable evenings—warm and slightly rainy weather is best—and find the worms crawling
on the worn or barren places” (Plain Dealer, 1896). Other newspapers provided detailed instructions for how to procure this bait. The

easy method of gathering them is at night, when they are above ground, especially after there has been a warm shower. You will need a lantern and a pail. Step along softly, holding the lantern near the ground, and hundreds of worms will be disclosed in the wet grass. (Aberdeen Daily News, 1905)

Not every fisherman wanted to waste their nights collecting bait and would rather pay someone else do it for them (New Haven Evening Register, 1891). They did not have the “inclination to dig up the back yards in search of the worms or creep about on hands and knees looking for night crawlers” (Kalamazoo Gazette, 1912). Kalamazoo businessmen, the Grand Rapids Press writes, simply “have no time” to pick worms (Grand Rapids Press, 1919). Such a dirty labor process is also “rather undignified for a businessman” (Kalamazoo Gazette, 1912). Instead, they would rather pay money to have someone else to procure the worms; this tended to be “boys.”

In 1912, the New York Times describes “fish bait is one of the scarcest commodities in the city” with many “small boys working over time digging worms” (New York Times, 1912). In New Haven, some “citizens have noticed with a great deal of curiosity, groups of boys at work in the nights” collecting the useful bait for fishermen (New Haven Evening Register, 1891). In 1896, a newspaper article notes with surprise how “a small boy will get a can-full [of worms] for a quarter” (Plain Dealer, 1896). “Angle worms are a commodity and 25 cents a can the price,” says another article, noting “the angler hails the bait seller as a friend” (Kalamazoo Gazette, 1912).

However undignified the labor, selling worms appeared surprisingly profitable. “The custom of baiting hooks with worms when angling for fish runneth back to time woeth not,” starts one journalist, “but the custom of using worms for bait when fishing for capital is believed to be entirely original with these youngsters” (The Times-Picayune, 1920). At railway stations, “scores of fishermen leave the city every day for nearby lakes and ingenious small boys have discovered that good bait has a ready sale” (Kalamazoo Gazette, 1914). “A keen competition has sprung up at some of the railway stations between rival dealers, but it is not so strong that there is any reduction in price, for 25 cents is always asked for a can” (Kalamazoo Gazette, 1912). A few years later, the price dips, “Worms! Worms! Only a dime a can!” (Kalamazoo Gazette, 1914). In 1919, a 16-year-old picking and selling nightcrawler made $65.60 USD in one day in this “new and unique business.” The Grand Rapids Press notes for the first time that some people have begun making a living picking worms, generating between $7 and $20 USD per day and mentions rudimentary network of worm pickers and dealers that transport the worms across the country.

In most of these early articles, the worm pickers appear to be their own bosses. The “youngsters” and “boys” picked worms and sold them in their own regions, essentially fragmenting the nightcrawler market. There are several articles, however, that suggest the profit incentive began to shape social relations on increasingly capitalist terms. Worm pickers began to work for a wage, with some of the surplus going to their employers instead of themselves. In 1926, Charles L Carroll of Springfield, Massachusetts, became the self-proclaimed “worm king,” selling over 20,000 nightcrawlers in a season. He employed a “regular force of boys and young men, equipped with pails,slickers and carbon lamps,” who would search the lawns and fields for nightcrawlers (Boston Daily Globe, 1926). The New York Times describes another capitalist who employed 10 “youngsters” who “carry on the production end of the business” (New York Times, 1936).
The post-war boom in recreational fishing and increased demand for nightcrawler further entrenches these relations as more and more nightcrawler capitalists competed with each other across the continent. Mid-century newspaper articles show how worm wholesalers sprouted up in certain regions around North America, where suitable soil types and appropriate climatic conditions could support dense nightcrawler populations. In Canada, there is a report of a nascent worm picking industry in Ottawa in 1951 that describes a worm wholesaler, Pete Therein, who decides to close the city’s “biggest live bait business” when his four worm pickers demanded higher wages. Classified ads show a need for worm pickers around Ottawa and as far north as Montreal. In 1957, worm picking occurs in Vancouver along the boulevards, and public parks (Broomhall, 1957, 1959), where classified ads seeking “Experienced dew worm pickers with own transport” (Vancouver Sun, 1968) run throughout the 1960s to 1973 (and appear sporadically between 1983 and 1987).

Pockets of picking developed across the United States as well. In Oregon, there is early talk of “nightcrawler hunters” getting ready for the start of fishing season (Rupp, 1958), and other complaints about pickers trampling the city of Salem’s rose bushes (Statesman Journal, 1959). Classified ads run throughout the late 1950s into the 1980s and three relatively large nightcrawler companies are established (Easterling, 1984). In Idaho, the State Journal ran ads seeking pickers beginning in 1977 and mention a few larger businesses capable of selling over a million worms (Hodge, 1976; Jackson, 1989). In North Carolina, the industry had consolidated in the hands of Wayne King, another self-described “Worm King” who would send pickers out to golf courses and pastures (Rapid City Journal, 1988).

There are also classified ads and a few smaller companies in Wyoming and Utah (Times-News, 1994), but the majority of U.S. picking occurs around the Great Lake states. In the 1940s and 1950s, there are ads for worm pickers in Chicago, Port Huron, and Rochester (Chicago Tribune, 1943; Democrat and Chronicle, 1950; Times Herald, 1949). In Detroit, greenskeepers begin complaining about worm pickers on their golf courses at night (Beltaire, 1953) a common complaint that would continue for decades (Cooper, 1979). The massive demand for the worm compelled bait shops to advertise they will “pay anyone” who brings them worms (Times Record, 1959). The Decatur Daily Review in Illinois lists classified ads from 1974 to 1987. In Indiana, one ad states “highest price paid by me.” In Ohio, an employer in 1954 is looking for “experienced worm pickers” (News-Journal, 1954) with such ads running until 1978. Wholesalers in the region were confident their soils were good habitats for the nightcrawlers but lamented how “our people aren’t motivated for that kind of labour” (Husar, 1988).

Indeed, the description of the pickers in these articles would not instill much confidence for a business owner hell-bent on hiring the most productive laborers. As Mrs Welty, an Oregon producer stated in 1970, “We got enough night crawlers here in the Willamette Valley for the whole world — if we could only get enough pickers.” Her 400 part-time pickers are described as “retirees, college students, and ‘enterprising children.’” But she says, “elderly women do it best” (Minneapolis Tribune, 1970). In Idaho, pickers were described as “college kids” and other “youngsters” (Hodge, 1976), with one producer stating that more than half of his 25 worm pickers are between the ages of 10 and 18 (Times-News, 1994). In Utah, the Captain Hook Bait Co. describes their workers as “students, housewives, moonlighters, and senior citizens” (Daily Spectrum, 1983).

In sum, earlier attempts at commodifying worms were successful to varying degrees in different regions. Some places still used liquids to get the worms, some used “youngsters” or retired people for labor, some picked on pastures, others on golf courses. The diversity of production systems however had stumbled on two commonalities between these competitors. First, nightcrawler businesses sprang up where soils were albic or luvisol, a loamy clay
structure with low compaction that made suitable nightcrawler habitats. And second, the worm pickers were low-skilled and cheap, the types of workers on the margins of formal workforce: the young, students, the retired, and immigrants. In one particular place, these two conditions came together and formed a regional industry with such efficiency that devastated other geographically dispersed competitors. And the nightcrawler capitalists across the continent knew it. By 1983, an Idaho producer suggests at least 90% of the nightcrawlers were coming from Canada (Daily Spectrum, 1983). Oregon-based Rainbow Northwest Worms says the same thing: “Canada gets them picked so cheap we can’t compete” (Jackson, 1989). Wayne King, the North Carolina worm king, is more geographically specific: “there’s more worms that go into Toronto after a good night’s picking than all the worms produced in North Carolina in a whole year” (Lamphier, 1987).

**Ontario soils and immigrant laborers**

Dave and John Brennen, southern Ontario brothers, started picking nightcrawlers in 1937. Like many other pickers across the continent, they picked worms from lawns, boulevards, and parks to sell to local vendors. When demand increased after WWII, they began to formalize their production and distribution through a network of pickers, trucks, and refrigerated warehouses. By 1955, the Brennan Brothers Bait Co. was the largest supplier in the world exporting 15 million nightcrawlers to the United States annually (Globe and Mail, 1955).

What did southwestern Ontario have that other nightcrawler capitalists around North America did not? In short, fertile soil and cheap, productive labor. Nightcrawlers thrive in the rich loamy clay soil and were quickly snatched up by a motivated immigrant labor force willing to endure the arduous working conditions in exchange for a relatively high nightly wage. The capitalist nightcrawler industry emerged out of southern Ontario, not through intentional capital investments, but through contingent and provisional elements that happened to profitably align at the optimal time. No amount of investment or entrepreneurial creativity outside the region could compete with Toronto’s combination of productive soil and labor. Worm producers in North Carolina, Oregon, and Ohio were simply out of luck.

Southwestern Ontario soils are classified as gray-brown luvisols (Canadian Soil Information Service, 2019), or more broadly defined as orthic and albic luvisols (FAO, 1972). The soils were created about 12,000 years ago when the receding Wisconsian glacier ground up the underlying earth, leaving rich soils behind. *L. terrestris*—actually a European earthworm species—invaded these soils through settler colonialism (Reynolds, 1995). Over the centuries, available organic matter, the loamy clay texture, as well as temperature, acidity, and moisture have allowed *L. terrestris* to thrive in the region (Lavkulich and Arocena, 2011). The soils types are not exceptionally dissimilar to pockets in U.S. (particularly the Great Lake states) and one would expect to observe similar *L. terrestris* populations. In the 1970s, Alan Tomlin, a former agriculture scientist with the Canadian government and the first person to study the worm-picking industry in any detail, suggests the first nightcrawler wholesalers were actually Americans seeking to fill the demand from recreational Walleye anglers around Lake Erie (Brenden et al., 2013; Regier et al., 1969). As recreational fishing greatly increased throughout the 1950s and 1960s (Applegate and van Meter, 1970), nightcrawler producers exhausted their supply from these Great Lake states, and worm dealers moved into Canada looking for more worms and cheaper labor. They found both.

Ontario soils, Tomlin hypothesizes, has some advantages over the similar soil types south of the boarder. To begin, Ontario maintains a thicker snow cover over longer times
compared to their U.S. state neighbors. Snow cover provides an insulating sheet and allows nightcrawlers to remain active and contribute to soil processes throughout the winter (Nuutinen and Butt, 2009). Extending the time underground also protects the earthworms from predation (Tomlin and Miller, 1988). Moisture content is also important for *L. terrestris* biomass and density (Callaham and Hendrix, 1997; Johnston et al., 2018), and it is possible the melting spring snow provides a slow-release “annual soaking” which protects against possible spring droughts. Slightly higher summertime temperature also affects the quality of worms. Worm wholesalers are adamant that their pickers never pick worms when temperatures rise above 17°C, as they become lethargic, overheated, and prone to morbidity. Such climatic differences possibly allow the nightcrawlers to live a bit longer, grow a bit larger, and reproduce a bit more in their Ontario habitats (Lamphier, 1987; Tomlin, 2019, personal communication).

But, as the Oregonian nightcrawler capitalist noted above, certain soils could possess all the nightcrawlers in the world, but it is all for naught without able-bodied productive laborers willing to pick at a competitive price. Where did the Ontario nightcrawler industry get all its labor? Between 1956 and 1976 Canada took in close to one-third of immigrants into North America despite being one-tenth the size of the U.S. (Boyd, 1976; Greenwood and McDowell, 1991). Most of these new immigrants ended up in and around Toronto. Contrary to its multicultural reputation today, pre-WWII Toronto was a rather xenophobic city. Many immigrants in the early 20th century bypassed the urban landscapes and settled in the western provinces working for the extensive resource sector (Troper, 2000). After the war, however, the 1952 Immigration Act sought out immigrant labor to supply the burgeoning urban-industrial work force. In Toronto, massive infrastructure and housing construction projects proliferated and the city began taking more immigrants from outside Great Britain and began accepting people from southern Europe (Troper, 2000: 10). Canada’s Italian-born population, for example, grew threefold in the 1950s, with over half residing in Toronto. The 1956 Hungarian revolution also produced a wave of immigration into the region, in some areas making up 40% of the population (Papp-Zubrits, 1980). Generally, over half of incoming immigrants into Canada headed toward Toronto; by 1957, one in five people in the city were “new Canadians” (Newman, 1957: 14). In the 1960s and 1970s, “other immigrant groups followed suit. Even as Italian immigration continued, Greeks, Portuguese, and the peoples of the Balkan Peninsula began arriving in Toronto in large numbers” (Troper, 2000: 12).

A demographic history of worm-pickers between the 1950s to the 1980s largely mirrors the cycle of immigrants that settled in the Toronto region. Italians and Hungarian pickers were replaced by Greeks and Portuguese, who were subsequently replaced by South-east Asian immigrants beginning in the early 1980s. Each cycle of new immigrants to the Toronto region quickly took to worm-picking as it provided an opportunity to make significant amounts of money with no language requirements or special skills. As several Vietnamese worm pickers told me, Toronto’s worm picking reputation spread to the Hong Kong refugee camps in the late 1970s and early 1980s.

But worm picking was demanding work. One Vietnamese picker I spoke with compared working on a Chinese Communist Party run rubber plantation in 1979 with worm picking in Southwestern Ontario: “worm picking was harder.” Pickers often walk in a squatted position, dipping their hands in a can of sawdust attached to one ankle, to pick the slimy worms and drop them into a can attached to their other ankle. When their knees get sore, they stand up and bend over to pick. When their backs get sore, they go back to squatting. Former pickers and worm wholesalers I spoke with said turnover was and continues to be high. But for those who could pick fast, the piece-rate wages could generate large sums of
money on a nightly basis, especially for recent immigrants who would be promised, “you make money in Canada starting tonight” (Blank, 2015: 2).

With an immigrant workforce and suitable soils, the industry rapidly grew around Toronto. The Globe and Mail notes at the time, “Worms are becoming a big business” (Globe and Mail, 1956). Worm pickers would pick wherever there were worms: lawns, boulevards, and city parks. But, the most productive sites during this time were golf courses. The manicured fairways increased the visibility of the worms, and the constant water supply ensured worms would surface even in the driest of weather. The bait companies would pay the golf courses between $1000 and $5000 for exclusive picking rights.

By 1957, the Brennen Brothers were renting 14 golf courses in Toronto. They increased their warehouse capacity to 15 million worms, selling over 40 million in the year. Their goal, they tell a reporter in 1956, is to sell 100 million worms to the U.S. (Washington Post, 1956). The piece rate for the pickers at the time tended to hover around $3.50 per 1000 worms (approximately $30 in 2020 dollars adjusted for inflation) (Frebman, 1959) with some of the better pickers making $30 per night during productive nights ($300 in 2020) (Globe and Mail, 1956). On average, pickers could collect between 3000 and 5000 worms (Frebman, 1959; Globe and Mail, 1955). However, on optimal nights, when the ideal temperature, moisture, and wind brought the worms to the surface en masse, this could climb to 16,000 (Globe and Mail, 1956). In 1956, Dominion Live Bait said they employ over 200 “mostly immigrant” pickers and sell 40 million worms to the U.S. (Globe and Mail, 1956). By 1961, the Brennan Brothers were renting 27 golf courses and were shipping over 60 million worms to the U.S. (Globe and Mail, 1961). Bob Conroy, another early worm baron, claimed he personally made $35,000 a year selling 80 to 90 million worms by the mid-1960s (approximately $250,000 adjusted for inflation), employing 300 full-time and 400 part-time staff made up almost entirely of Greek and Portuguese immigrants (Calgary Herald, 1968; Cherry, 1968). Joe Haupert, an Austrian immigrant who came to Canada in 1961, started a worm picking business after hearing about the extensive U.S. angling market. In 1966, he signed a lease with a golf course and hired a former jockey to pick worms (assuming erroneously that the smaller frame would make a better picker). By 1968, he had 435 pickers including Canadian residents, as well as Portuguese, and Greek immigrants (Cherry, 1968).

In the 1960s, the piece rate hovered around $5 per 1000 worms ($41 in 2020) (Webster, 1966, Globe and Mail, 1964). A more experienced picker could expect to collect between 6 and 10,000 worms a night, with one person collecting a high of 14,000 (Globe and Mail, 1962). Bait companies reported that an “average” picker could take home between $100 and $125 per week during the April to October picking season (approximately $850 to $1000 today). Better pickers were making over $200 per week ($1500 in 2020) (Calgary Herald, 1968; Cherry, 1968). In 1964, one Portuguese woman, dubbed “the Mickey-mantle of the worm-picking league” picked 50,000 worms in one week taking home $250 (over $2000 in 2020) (Globe and Mail, 1964). With the price of a dozen worms in the 1960s however about 25 to 35 cents in the U.S., pickers were fully aware of their value to the wholesalers and would threaten to work for another company if piece rates were not increased. There were several informal strikes in the mid-1960s with pickers demanding a 50-cent piece rate wage increase (Windsor Star, 1966).

The productivity of pickers rose further in the mid-1960s and the early 1970s. Dave Brennan tells a reporter that good pickers “with experience” can get 12,000 worms a night (Webster, 1966). Others say the average picker on a good night could readily pick 10,000 worms (Globe and Mail, 1971). In 1972, Bob Drouin pays a man for picking 22,500 in a single night, “the so-called record” at the time (Abel, 1998). By the late 1970s, the
continued demand for bait (now close to 40 million recreational freshwater fisherman) drove the piece rate up further to $20 per thousand ($70 in 2020) and the price of a dozen worms close to a dollar (Red Deer Advocate, 1979).

Toronto wholesalers also began holding morning worm auctions outside a cafe in the Greek-town where they negotiated prices for as many as 15 million worms a day. Crew chiefs, those who were selling the worms, were under pressure to sell quickly or risk overheating the tightly packed worms in the back of their vans. This underground auction even makes a brief appearance in Michael Ondaatje’s prize winning, The English Patient: “It was like the stock exchange... where the price of worms kept dropping and rising, five cents, ten cents. People were ruined or made fortunes” (Ondaatje, 2009: 54).

Other regions could not compete with productivity of Toronto pickers. An Illinois wholesaler, in the 1980s, said his pickers could get a paltry 4000 worms on a good night (Husar, 1988). In Ohio, another wholesaler said it was possible to pick 5000 a night, but the piece rate returns set through the competitive Toronto market were not enough to incentive local residents (Marysville Journal-Tribune, 1987). In Detroit, with its similar soils, pickers also collected 5000 worms per night (Cooper, 1979) These low numbers plummet further as picking spreads out. In the 1970s, for instance, Idaho and Oregon pickers could grab a measly 2500 to 3000 per week (Hodge, 1976; Minneapolis Tribune, 1970).

Between the 1960s and 1980s, worm picking consolidated in Toronto with rental agreements, stabilized piece-rate wages, refrigerated warehouses, and customized cube trucks. Toronto was setting the value of the worms that could not be matched by other producers. Retired workers, “youngsters”, and college students on the west coast and Great Lake states were forced to compete with new immigrants picking on productive soils making significantly more money. In short, southwestern Ontario provided the land and labor necessary to turn this side hustle into valuable business regulated by the capitalist value of the commodity. Bait-and-tackle shops and fishermen quickly realized the biggest, juiciest, and most bountiful worm crop came from Ontario and L. terrestris was rebranded as the “Canadian Nightcrawler.”

**Conclusion**

The objective of this paper was to track the process of nightcrawler commodification to explain how Toronto emerged as the “worm capital of the world” through the provisional alignment of heterogeneous human and non-human elements held together through capital’s pursuit of surplus value. Toronto remains the nightcrawler commodity epicenter, and rampant intra-regional competition between nightcrawler capitalists have further increase productivity by unwittingly enrolling new actors and elements into the assemblage and throwing out others. In the 1980s, increased herbicide and pesticide application on golf courses decreased quality and quantity of worms and pickers moved to the undisturbed pasture soils of dairy farms. When cattle moved indoors to confined feeding operations in the 1990s and 2000s, worm pickers noticed the farmer’s alfalfa fields—when liberally fed with cow manure—had exceptionally high L. terrestris densities. The current “Micky Mantle” of worm pickers can collect 30,000 worms on optimal picking nights and collects over $45,000 a year for this “part-time” seasonal work.

The peculiar example of nightcrawler commodities shows there is no single pathway toward the commodification of living things. The empirical tracking of the production of L. terrestris value provides theoretical clarity on the process of capitalist commodification of a lively commodity whose ecological conditions of production inhibit the “real subsumption of nature.” It is a process contingent on the spatial and temporal alignment of social and
ecological processes, both material and discursive, controllable, and uncontrollable, that allow capital accumulation to occur through competitive market exchange. Transforming *L. terrestris* into the Canadian Nightcrawler was thus no easy task and dependent on unforeseen spatiotemporal contingencies. For the emergence of the nightcrawler commodity, this required: a reconceptualization of recreational fishing, a massive demand met via market exchange for a bait with a specific use-value, a particular soil type and climatic conditions, and an immigrant labor force willing to engage in difficult work for potentially high rewards.

And yet, despite the inability to shape the ecological conditions of production, capital manages to formally subsume and coordinate disparate constituent elements to seize any possibilities to increase labor productivity and to capture surplus value when they arise. Capitalist commodification stories provide an historical and geographical analytical frame (related to but distinct from commodity chain analyses) that situates commodification tendencies of living things to show how disparate human and non-human elements are provisionally maintained and readjusted by the drive to accumulate capital. The analysis contributes to the ongoing Marxist and post-humanists discussions around the co-constitutive dimensions of capital accumulation and non-human nature by focusing on the how surplus value is produced in an industry where capital is unable to transform the conditions of production.

Future research on “lively commodification” should continue to breakdown the a-historicity of commodities to understand where, when, how, and why living things become commodities regulated by the law of value. Such analyses can also identify potential socio-ecological ruptures when capital accumulation is threatened and the assemblage is unable to produce surplus value. Indeed, the heterogenous elements that gave rise to the nightcrawler commodity are currently at risk of unravelling. When kids play more on iPads than go outdoors, when regulations restrict the use of certain baits, when climate change reduces the number of optimal picking nights, when dairy farmers charge higher rents for picking rights, and when increases to minimum wages de-incentivize muddy nighttime work, the nightcrawler commodity may start to lose its commodity status, and the little Styrofoam cups may begin to disappear from gas stations across the continent. When capital can no longer produce a surplus from this aligned assemblage of human actors, agrarian landscapes, loamy clay soils and worms, their interaction will dissipate and the Canadian Nightcrawler may become a lowly garden worm again.

**Highlights**
- Focusing on “commodification” reveals how surplus value and the law of value take shape in living organisms.
- Toronto became the “worm capital of the world” through the contingent alignment of loamy clay soils and cycles of immigrant labor.
- This paper shows how capital can accumulate through “lively commodities” despite its inability to transform the ecological conditions of production.

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Notes
1. Unless specifically indicated by USD, all dollar figures are in Canadian dollars (CAD). Throughout the period 1950 to 1990, $1 USD tended to equal between $1 to $1.20 CAD.
2. For a detailed description of the Canadian nightcrawler commodity chain, see Steckley (2020).
3. Following Felli (2014), Andreucci et al. (2017: 30) calls these “pseudo-commodities” where “all or part of the exchange value of such assets are not produced,” but rather “created through the establishment of property rights.”
4. “By cause that this present treatyse sholde not come to the hondys of ech yele persone whyche wolde desire it yf it were enprynted allone by itself and put in a lyttel plunfilet, therfore I haue compylyd it in a greter volume of dyuerse bokys concernynge to gentyll and noble men to the entent that the forsayd yele persones whyche sholde haue but lyttel mesure in the sayd dysporte of fysshyng sholde not by this meane vtterly dystroye it.” (Berners, 1883: 37)
5. This is often called “worm grunting” and is still used to collect the bait worm Diplocardia mississippiensis, particularly in the Florida and Louisiana.
6. After the Vietnam war, refugees in Oregon provided some labor for worm picking, which has allowed the industry to persist (however small) to the present day (MacDonald, 1997: 104).

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