

Editorial Introduction

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Livestock Frontiers

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The word *livestock* itself suggests the reduction of animals as living things to animals as economic goods.

Disaggregating the term into its component parts—live and stock—also suggest the difficulty of rendering things that are alive into things that are stocked, especially on large or predictable scales. The be alive is biological; living things breathe, eat, defecate, move, sleep, grow, reproduce, connect with others, get sick, die. To be stock, on the other hand, is economic; stocks are things held and exchanged. In capitalist relations specifically, livestock (and livestock parts) are owned, quantified, rationalized, commodified, specialized, simplified, contracted, accumulated, speculated upon, traded, sold.

Ongoing attempts to make living things into stocks, or commodities, are rife with contradictions and impossibilities.

Fundamentally, biological bodies are barriers to accumulation. The unruliness of living stocks—including their biological needs, the time they take to grow and mature, their propensities toward genetic diversity, and their vulnerabilities in environments where diversity is strictly denied—make them particularly difficult to standardize and simplify for the market. Just as Karl Polanyi (1944) unveiled the fiction of land, labor, and money as commodities, animals must join this list.

As *species of life*, animals are not produced for the market, and are not commodities. What's more, the rhythms (timing) and characteristics of their lives and bodies do not easily align with capitalist demands for efficiency and standardization. But as *species of capital*, animals are produced precisely for the market, as sources of meat and profit, sometimes

aiding state legitimacy in the context of “development,” with increasing meat consumption a key marker of progress and growth.

Livestock as *species of capital* underlies the global boom in meat production and consumption over the past several decades. According to official FAO/OECD figures, in 2019, humans ate an average of 43 kg of meat per person per year. This was a dramatic increase compared to about 60 years ago, when the per capita global average was 23 kg/year, and reflects a doubling of global meat production between 1998 and 2018 to 320 million tonnes. These increases in meat consumption are uneven and reflect broader global inequalities. For example, average per capita meat consumption across African countries is 17 kg of meat per year, while in the US and Australia, consumption is over 120 kg/person/year. Counted in the aggregate at the national level, China is the world's biggest meat consumer. China is home to nearly half of all the farmed pigs on the planet, as well as nearly half of global pork production and consumption. The industrialization of livestock agriculture in China starting in the 1980s launched pork's rise as the most produced and consumed meat in the world (Schneider, 2017).

Official figures fail to capture meat consumed in households that raise and slaughter their own animals, and meat that circulates outside of formal markets. So while they are underestimates, these figures illustrate the sharp and steady increase in global meat consumption in the last century, which came about with the rise of capitalist, industrial livestock production. Although animals have been important parts of farming and pastoral

systems for millennia, in the years following World War II, a radical transformation in livestock production was underway in the United States that would spur industrialization of livestock on a global scale. A convergence of military and industrial interests helped put these changes in motion.

Industrial Livestock

During the early 1940s, the US government constructed 10 large-scale facilities to supply ammonia for manufacturing explosives. When the war ended, the government shifted munitions facilities from bomb to fertilizer production, repeating an “arms-to-farms” project that began during World War I, subsidizing agricultural firms to become chemical manufacturers (Johnson, 2016). With the post-war flood of industrial

nitrogen fertilizer, US agriculture was no longer dependent on manure, legumes, nitrogen-circulating farming practices, or other sources of nitrogen fertilizer to feed crops. Instead, farmers could purchase relatively inexpensive fertilizer, which in subsequent years, they used increasingly to feed monocultural fields of a narrow range of highly subsidized crops including maize, wheat, and later soy.

The fertilizer industry was one of the key forces underlying the separation and specialization of crop farms on the one hand, and livestock farms on the other, which intensified beginning in the 1970s. Building on Marx’s ecology, John Bellamy Foster and Fred Magdoff (2000) termed the separation of livestock and crops in the post-war era as a second “metabolic rift” in human-nature relations under capital. In this metabolic rift, commodified industrial nitrogen (and



New Tennessee Valley Authority synthetic ammonia plant in Muscle Shoals, Alabama, USA, 1 January 1942.
Photographer: Alfred T. Palmer. Photo Source: Library of Congress, United States Office of War Information.

phosphorus and potassium) replaced “natural” nitrogen sources and cycles (especially manure) in farming systems as *the* primary way to provide crop nutrition. This broke a plant-animal nutrient cycle that had enabled and grounded farming for thousands of years; a nutrient cycle that came to be framed as an impediment to scaling, specializing, and modernizing agricultural production. As a result of the rift, specialized crop and specialized *concentrated* livestock production soared in the US, as large-scale and capital-intensive operations emerged and rose to dominance, pushing small-scale modes of farming to the margins. Excess nitrogen became a pressing crisis, both in the form of fertilizer run off from the degraded soils of crop fields, and importantly, in the form of the rivers of manure flowing from industrial livestock production facilities.

Despite the ecological and social problems that began to emerge with the rise of large-scale, specialized crop and livestock operations, this became the model that the US government and US-based firms would export around the world through development projects and financing, US-centered trade restrictions, and the disposal of US surplus production first as aid, and later as “cheap” grains. Referred to as a “livestock revolution,” the production of livestock increased globally during this period, along with rising meat consumption and incomes. From the late 1970s, US-based transnational agribusiness corporations came to play increasingly powerful roles in crop and livestock production and circulation in the US, and in extending the capitalist logics and methods of the industrial mode of production around the world. Agribusiness firms involved in industrializing livestock were also developing in Europe.

Philip McMichael (2009) refers to this post-1970s era as the *corporate food regime*, observing the increasing power of agrifood capitals in the organization and operation of food production, circulation, and consumption. In this period, the profits, market shares, geographic spread, and influence of a narrow range of increasingly concentrated transnational agribusiness corporations (TNCs) has grown. Although agribusiness TNCs record the lion’s share of profit in agrifood systems and enjoy

extraordinary influence in policy circles and over other economic actors, they cannot—and do not—operate without strong financial and other supports from governments and intergovernmental organizations. State actors (ministries, courts, university scientists), international financial institutions and banks, and institutions of global governance facilitate the power of TNCs. Agribusiness-centered laws and regulations in and between countries around the world help to variously subsume the reproduction of contract and other farmers, farm workers, soil, water, nitrogen, and other “resources” into capitalist circuits.

As in other global agrifood sectors, TNCs are powerful in livestock and meat production, particularly in its industrial form. TNCs deal in livestock genetics, bodies, feed (including seed and agrochemicals), pharmaceuticals, equipment, and technological infrastructure. They operate as key components of what Tony Weis (2013) refers to as the *industrial grain-oilseed-livestock complex*.

The industrial grain-oilseed-livestock complex is the dominant system of agriculture across the temperate world, and is spreading to significant parts of the tropics. Its landscapes can be likened to islands of concentrated livestock within seas of grain and oilseed monocultures, with soaring populations of a few livestock species reared in high densities, disarticulated from the surrounding fields. These islands of concentrated livestock and seas of monocultures are then rearticulated by heavy flows of crops such as corn/maize, barley, sorghum, soybeans, and rapeseed/canola cycling through animals. This disarticulation and rearticulation is mediated by an array of technologies, inputs, and large corporations, and marked by the loss of large volumes of usable nutrition. (8)

Weis’s work builds on and echoes Harriet Friedmann’s notion (2000, 481) that in the world food economy,

Plants and animals have been turned into homogenous rivers of grain and tides of flesh, more closely resembling the money that enlivens their movement from field to table, than their wild ancestors.

The edifice of Weis’s livestock-feed complex is built upon attempts to override the animal’s biological body as a *species of life*; to override the barriers to accumulation that eating, moving, defecating, vulnerable-to-disease things create. Industrial livestock production is an edifice—and an enterprise—built on precarious biological foundations.

Today, the spatial separation of livestock from feed production—a separation that can span the globe as pigs in China are fed with soy grown in Brazil and the United States—is one of the hallmarks of modern, capitalist, industrial livestock production. Capitalist firms produce industrial livestock and meat through arrangements with farmers, governments, research institutes, and other firms. Firms and farms feed livestock through the transnationalization of crop monocultures and trade, and work to keep animals productive through infrastructure and technology (especially the confined animal feeding operation, or CAFO), pharmaceutical interventions, and biosecurity measures that discipline hog house labor (Blanchette, 2015). A global livestock genetics industry is steadily reducing genetic diversity in livestock breeding, commodifying genetic materials and

bodies, and narrowing of the genetic pool. Commodified livestock genetics are sold in the form of semen and sexual services, and commodity livestock are sold in live animal form as carriers and embodiments of the genetics that they will pass on to future generations. Commodity livestock are also, of course, sold as flesh.

The industrial livestock production that began in earnest in the US in the years following WWII has come under increasing attack in the past 20 or so years. Scientists and activists have drawn out the tremendous social and ecological costs of rearing domesticated animals such as pigs, cattle, and poultry, and sometimes sheep and goats, in large-scale industrial facilities. The list of “crimes” is long. The FAO estimates that livestock production in general is responsible for 14.5 percent of greenhouse gas emissions. While these figures include all forms of livestock rearing, extensive cattle ranches in countries like Brazil and intensive pig and poultry production in places like the US and China are the major drivers of livestock-related climate change. These extensive and intensive systems are also connected to environmental degradation (through deforestation, water and air pollution, topsoil loss and degradation,



Confined animal feeding operation (CAFO) near La Gloria, Veracruz, Mexico. April 2006. Photo Source: [Flickr](#).

biodiversity loss from pesticide use in fodder production and overuse of synthetic fertilizers and manure), violating animal rights, compromising food safety, and increasing public health risks through zoonoses. At the same time, discourses about the health benefits of animal proteins (meat, eggs, and dairy), virulent throughout much of the twentieth century, have been more and more challenged by a discourse stressing the value of plant proteins and the health risks of (red) meat (over)consumption. Labor abuses, inhumane working conditions and hours, and the degradation of human lives working in industrial production and slaughter facilities are also common, persistent, deepening, and steadily racialized and gendered (see the interview with Carrie Freshour in this issue).

Ranges of Livestock

But while industrial livestock production is the fastest growing and most dominant form of raising animals for meat in the world today, it is one of a broad range of livestock production systems. On one end of the spectrum, concentrated animal feeding operations, or CAFOs, that house hundreds to thousands of animals together in enclosed structures are the ultimate form and expression of industrial livestock production. Corporate and state-owned CAFO firms and farms in the United States, China, and Europe produce most of the meat sold and (over)consumed in the world today.

At the other end of the spectrum are various forms of extensive livestock production, most notably pastoralism. Pastoralism, the “extensive keeping of locally adapted animals on natural bush and grassland” (Meat Atlas: 48), emerged and evolved after the domestication of livestock in the Fertile Crescent about 10,000 years ago and involves various degrees of mobility, from highly nomadic systems to sedentary agropastoralism. Today, the number of pastoralists is estimated at 200 million and, together with their cattle, goats, sheep, yaks, camels, llamas, reindeer, and other animals, they inhabit extensive and often marginal rangelands on all continents except Antarctica.

Between these two poles, people around the world raise animals to work, eat and/or sell in a variety of systems, at a variety of scales, and through a variety of exchange relations. It is a mistake to consider livestock production systems only in the aggregate; a monolithic view of livestock raising centers the dominant industrial mode, with the risk of invisibilizing a range of not-necessarily-capitalist systems, practices, food- and lifeways (see Curley, this Issue; see also Houzer and Scoones, 2021).

Although livestock production in general makes use of more than 50 percent of the world’s lands surface and provides a livelihood for hundreds of millions of people (Meat Atlas: 48), its changing modes of production and its role in transforming the global countryside and shaping the modern world have been long overlooked by historians and other scholars of global capitalism and commodities. The reasons for this neglect are puzzling, especially since livestock and livestock commodities have been shipped and traded over long distances in different parts of the world for centuries, long before the ‘livestock revolution’ in the second half of the twentieth century, and also played a key role in early European colonization efforts (Sluyter, 2012; Woods, 2017).

Livestock are commodified in multiple ways: their meat, milk, and eggs are sold (in many different forms) for human consumption; their genetics are selected, recombined, patented, and sold; their hides, wool, and feathers and other body parts are processed, traded, used, and turned into new commodities (see Marten Vanden Eynde’s interview with Christien Meindersma in this issue); and some animals are themselves commodified as breeding stock. Beyond commodification (and sometimes including commodification), how humans engage livestock animals is also multiple from using manure as fuel and fertilizer, to enrolling animals as draught animals (e.g. cattle, yaks and buffaloes), to using them as human transport (e.g. camels, horses and mules), to serving as “mobile banks” that can be sold when school fees or other bills come due, to carrying out cultural and familial “traditions.” Moreover, in many societies, cattle have long been and still are accumulated to enhance the social prestige and economic security of their



A nomad milks a group of goats that have been tied together by their necks, 21 June 2012. Photo Source: Taylor Weidman/The Vanishing Cultures Project, [Wikimedia Commons](#).

owners and/or to be used for specific transactions such as bridewealth, uses that have not necessarily vanished with the spread of capitalism.

Livestock Frontiers

In this issue of *Commodity Frontiers*, contributors take up issues relating to animals, livestock, and livestock production through a commodity frontiers lens. Fueled by increasing (local, national, imperial, and global) livestock production “developments” and demands for livestock products—most notably (but not only) meat—and reinforced by technoscientific innovations, new livestock frontiers have emerged and spread across the globe. With livestock frontiers we mean both processes and sites in which animals are bred, reared, cured, traded, and commodified in novel ways, by re-allocating land, labour, capital, knowledge, and other resources, to enhance productivity and maximize gains. By doing so, livestock frontiers have changed human-animal and interhuman social

relations, economic systems, and ecological landscapes in various and often unintended ways. Furthermore, livestock frontiers have become deeply entangled with frontiers in agriculture, securing the production of fodder crops such as soy and corn. These changes include, but are not limited to, the industrialization of livestock production that we discussed above.

Given the multitude of actors and processes involved in transforming livestock production and livestock-based commodities in the past and present, there are many possible angles from which to study livestock frontiers. This Issue opens with Tony Weis’s contribution entitled, *Animals as and on Resource Frontiers*, in which he helpfully differentiates the exploitation of non-human animals in two forms: wild animals as “resource frontiers,” and domesticated animals as and on “resource frontiers.” Weis’s piece begins in the confluence of European hunting and trapping of fur-bearing animals with the transformation of ecosystems and the destabilization of Indigenous societies in the development of settler-colonial economies in

North America. He concludes with present and mounting concerns over links between industrial cattle, pig, and poultry production with de-faunation and climate change.

In a similar vein, Joana Medrado examines the history and present-day dynamics of deforestation and cattle grazing in Brazil, one of the most important sites in the industrial grain-oilseed-livestock complex. With a focus on the long-standing alliance between agribusiness and the Brazilian state, she discusses the legal theft of Indigenous lands and the deterritorialization and deforestation of the Amazon.

In their interview with Carrie Freshour, the piece by Hanne Cottyn and Stha Yeni takes us to the “poultry capital of the world” in the US South. They discuss Dr. Freshour’s research on racist exploitation of workers in poultry production facilities, including workers’ resistance, capitalist and state backlash, and the impacts of COVID-19 on workers’ health and safety.

Rounding out the contributions related to industrial livestock production is Maarten Vanden Eynde’s interview with Christien Meindertsma, the Dutch designer who researched and wrote a book called *Pig 05049* that chronicles the many consumer products made from a pig called 05049. They discuss Meindertsma’s motivations for making the book and reflect on some of the challenges of promoting and brining about social change regarding meat (and other) consumption.

Andrew Curley’s piece looks at frontiers as “literal sites of struggle,” discussing the violence of colonialism in the US Southwest and the resilience of Diné (Navajo) relationships with sheep. He considers how Diné connections to sheep are part of decolonial struggles, including among young people and in a locally based organization that promotes “sustainable livelihood through the Navajo way of life.”

Sustainable ways of life are also at the center of Natasha Maru’s contribution about the Salim Mama Youth Course in Gujarat state of Western India, which trains youth in pastoralism and ecosystems. Maru argues that in addition to raising enthusiasm and knowhow around pastoralism, the course contributes to ongoing resistance against state induced corporate capture of economy, society, and nature in the region.

Eric Vanhaute’s article examines peasant work historically and today. As predominantly unwaged labor, he looks at how peasant work underlies the expansion of civilizations, empires, states, and economies for the last ten millennia, and argues that peasant work is foundational for resolving contemporary socio-ecological crises, including those related to capitalist industrial livestock production.

This Issue closes with Jonas M. Albrecht’s review of Joshua Specht’s book *Red Meat Republic*.

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