RESISTANCE TO CORPORATE AGRI-FOOD. THE CASE OF PLANT-BASED MEAT[1]

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ABSTRACT

Resistance to corporate domination is one of the characteristics of agri-food in the era of global neoliberalism. In the case of meat, this resistance targets not only production systems – such as CAFOs – but also, and above all, the consumption of industrially produced meat and meat products. This article probes the research question of the extent to which the development of plant-based meat is an effective alternative to corporate industrial meat production. Through the analysis of two plant-based meat companies, Beyond Meat and Impossible Foods, this work illustrates the limits of the market based business model adopted by these companies. It allows established transnational corporations to appropriate spaces of resistance historically occupied by left leaning groups and discourses. Among the major new initiatives in the global financial market and in the mass consumption sector (fast food and restaurant chains), plant-based meat is a proposal that has received widespread support from all sides of the political spectrum. The article offers a critique of the assumed "progressive" ideology and practices associated with plant-based meat and concludes with a critique of the limits of a technically based proposal.

KEY WORDS

Sociology of Agriculture and Food; Resistance to Corporate Agri-Food; Consumption; Markets; Plant-Based Meat.

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Introduction

Contemporary agri-food faces a number of social concerns such as the limited availability and high cost of healthy food, high levels of capital concentration in production and retailing, labor exploitation and unsustainable degrees of environmental pollution. Most of these problems are associated with the growth of globalization, the implementation of neoliberalism and the resulting expansion of large transnational corporations (Bonanno and Constance 2008). To address these problems, the agri-food scientific community has promoted discussion on resistance and alternatives to the status quo (Bonanno and Wolf 2018). In this context, global industrial meat is one of the most criticized agri-food sectors as charges of high levels of contamination of the environmental, animal abuse, labor exploitation and economic concentration accompany its evolution (Berson 2019; Ikerd 2013; Imhoff 2010; Leonard 2014; Winders and Ransom 2019).

Proposed as a solution to these social and environmental problems, the production of plant-based meat has been heralded not only as one of the most promising alternatives to industrial meat production, but also as an economically effective and environmentally desirable way to produce proteins (Brown 2013; Pollard 2019).

Employing the cases of the plant-based meat companies *Beyond Meat* and *Impossible Foods*, this article's research question probes the extent to which plant-based meat represents an effective alternative to the corporate dominated meat sector and the negative social and environmental consequences associated with its growth. Made exclusively from plants, plant-based meat differs from long existing vegetable patties, nuggets, sausages and similar items that, using vegetable ingredients, generate foods that resemble the shape of meat products. Plant-based meat certainly looks like meat. However, it also tastes, smells, feels and cooks like animal meat to the point that some of its supporters claim that it is the same as

conventional meat. Because the chemical composition of the two types of meat is identical, these supporters contend, the only difference between animal meat and plant-based meat is simply their method of production (Berg 2016).

The article's first section briefly reviews the growth of the meat sector focusing on the growth of CAFOs (Confined Animal Feeding Operations). Considered the most economically efficient form of meat production, CAFOs are associated with a number of negative social and environmental consequences (Ikerd 2013; Imhoff 2010). This emphasis is particularly relevant as the origins of plant-based meat rest on concerns about the exploitation of the environment and farm animals engendered by CAFOs (Brown 2013). This section continues with a discussion of the forms of opposition to industrial meat production. Stressed is the current socio-political context that, generated by the expansion of neoliberal globalization, features the decline of the labor movement, trade unions and associated critiques of capitalism. These "Fordist" agents of opposition have been replaced by new forms of resistance that focus on individual behaviors and market practices. These actions do not contest capitalism and market-based social relations but hope to ameliorate them.

The second section illustrates the two case studies. Founded by Ethan Brown in 2009, Beyond Meat is one of the most sought after companies in financial and commercial markets with a number of the major fast food and restaurant chains introducing plant-based meat items on their menus. Likewise, Impossible Food grew exponentially after its establishment in 2011. Its founder Pat Brown adopted its knowledge and research skills in biology to develop a formula for the creation of meat made of components available in the flora. In both cases, these companies' founders acted in response to the negative social and environmental consequences of industrial meat production and searched for alternative methods of protein production. They overtly voiced opposition to the current corporate dominated agri-food.

However, they also chose a market- based business model to address these problems. They believe that corrections to existing undesirable social and environmental conditions could be brought about through market-based mechanisms that, while offering new technical options, do not alter dominant social relations. This section concludes with a description of the ways in which a number of large agri-food corporations entered the plant-based meat and either collaborated or engaged in direct competition with Beyond Meat and Impossible food.

The article continues with an analysis of the case studies. It stresses a number of implications associated with the selection of a posture that subscribes to the idea that operating in a corporate dominated market permits the development of solutions to agri-food's social and environmental problems. These implications include the fact that the business model prioritizes profit over social concerns, large corporations often co-opt lucrative alternatives, the corporate interest in plant-based meat is largely derived from this initiative's profitability and the selection of a market-based model suggests the ineffectiveness of state intervention and regulation. These points are employed to illustrate the article's conclusions. It is recognized that the problems associated with CAFOs meat production are resolved by the production of plant-based meat. In effect, plant-based meat employs none of the factors of production that make CAFOs socially and environmentally undesirable.

Simultaneously, however, the current plant-based meat initiative offers limited opposition to the corporate domination of agri-food. This section stress that, first, large corporations now control the plant-based meat sector through either cooperation with startups or direct investments. Second, because the current social and environmental problems are largely the product of the expansion of corporate agri-food, a corporate guided solution entails a situation in which the agents causing the problem are those providing its solution.

Third, this corporate domination does not face a progressive opposition as resistance to plant-based production comes from industrial meat producers. Finally, the business approach employed by Beyond Meat and Impossible Foods conflates technical solution with political ones. Accordingly, while a technical solution is available, the political status quo – corporate domination of agri-food – is nether altered not challenged renewing the same conditions that allowed for the development of the current status quo.

Opposition to the Corporate Meat Industry: An Emancipatory Struggle?

The Expansion of Meat Production and CAFOs

The consumption of meat is increasing exponentially worldwide (Winders and Ransom 2019). In the developed world, per-capita consumption more than doubled between 1960 and 2010 and projections call for this pattern to continue unabated for the decades to come (Berson 2019; Winders and Ransom 2019:3). Simultaneously and led by China, meat consumption is growing at even greater rates in countries of the global South (Berson 2019). Propelled by the expansion of confined feedlots and an understanding of productive efficiency that requires an intense use of natural resources, the raising of livestock generates an astonishing impact to climate change (McNerney 2016). Calculated at 18 percent of the global carbon footprint, this impact is greater than that generated by all cars, trains, and planes put together (McNerney 2016; Steinfeld, Gerber, Wassennar, Castel, Rosales and de Hann 2006).

Concerning is also the fact that more than 75 percent of all agricultural land is now devoted to raising animals for meat, dairy products and eggs (Berson 2019:3). Rather than be employed for products used for direct human consumption, this land is devoted to crops that are transformed into feed used in CAFOs, resulting into a net loss in food production capacity

and an enhanced use of technical and chemical inputs (Berson 2019:4). The growth of CAFOs is further accompanied by the drastic decline of grazing and high levels of concentration as CAFOs with more than 1,000 animals account for 90 percent of all cattle brought to market while representing only 3% of all feedlots (Berson 2019:146; McNerny 2016). Ultimately, the expansion of the meat complex has undermined food security, engendered significant negative environmental consequences and enhanced the corporate control of the sector (Winders and Ransom 2019:3).

The environmental, social and ethical problems associated with industrial meat production, and CAFOs in particular, are well documented and contrast the economic efficiency often mentioned in these cases (Berson 2019; Bonanno and Constance 2008, 2006; Winders and Ransom 2019). First, animal welfare activists have long documented the inhumane treatment of confined meat animals (Farm Animal Welfare 2019; Winders and Ransom 2019). While the majority of research focuses on chicken and pig production, a significant amount of evidence illustrates the unethical treatment of beef cattle in CAFOs (Imhoff 2010). Like chickens and pigs, beef cattle is often confined to tight quarters that severely limit not only movement but also any access to the outdoors. Rather than farms, critics contend, CAFOs are nothing more that animal factories (Imhoff 2010). Additionally, critics document that animals' diet of corn and soy is frequently combined with blood and chicken manure to augment the quantity of the meat protein content (McNerny 2016).

Second, CAFOs meat is loaded with antibiotics as animal are fed medicines despite the fact that they are not sick. The United States Department of Agriculture (USDA) reports that about 80 percent of all antibiotics are administered to farm animals and that this is done as a matter of course to prevent possible infectious diseases and promote growth (Mercola 2018). The overuse of antibiotics, however, engenders bacterial resistance that allows

infections to be resistant to established cures. The "super-bacteria" generated by this process are particularly difficult to control and pose a significant threat not only to animals but also to humans as they can spread to the general population. Infections can be spread to humans also by eating contaminated meat (React 2019).

Third, critics have charged CAFOs with high levels of pollution (Bonanno and Constance 2006; 2008). Traditionally, animal waste has always played an important role on the farm as it is an important organic fertilizer. In the case of CAFOs, however, the situation is very different. As indicated above, CAFOs are not farms and, therefore, there is very limited, if any, land that can absorb waste. Additionally and more importantly, the amount of waste generated by CAFOs is enormous. It is estimated that CAFOs produce 130 times more animal waste that human waste (Burkholder, Libra, Weyer, Heathcote, Kolpin, Thorne, and Wichman 2007). This large amount of waste is normally either spread over available land as fertilizer and/or contained in artificial lagoons. In the first case, the amount of land available is generally insufficient to absorb the "sludge" that is generated. The result is over fertilization that damages land productivity. In the second case, lagoons are often overrun by the large quantity of waste causing leaks of contaminated water into the ecosystem but also adjacent groundwater systems (Bonanno and Constance 2006; 2008; McNerny 2016).

Fourth and as indicated above, CAFOs disproportionally contribute to greenhouse gas emission (Cummins 2019; Gustin 2017). This contribution is both direct and indirect. CAFOs directly contribute to global warming by releasing vast amounts to greenhouse gases into the atmosphere. While animal agriculture is responsible for 18 percent of anthropogenic greenhouse gas emission, it also contributes to 37 percent of methane emission and 65 percent of nitrous oxide emission. Methane emission is 70 times more damaging than CO_2 and nitrous oxide is even a more dangerous polluter being 200 times more damaging that CO_2. It

has been estimated that air around CAFOs is often dirtier than that of the most polluted cities in the USA (The Humane Society 2008). CAFOs indirect contribution to greenhouse gas emission refers to the high-energy feed and the vast amount of fossil fuel that they use. CAFOs typically use feed based on crops – such as GM corn and soy – that depend on the use of high quantities of fertilizer. It is estimated that the production of these fertilizers emits 41 million tons of CO_2 per year worldwide (Steinfeld et al. 2006). High amounts of fossil fuel are used in CAFOs to cool, heat and ventilate these very crowded facilities. In addition, fossil fuel is employed to operate machines used in the cultivation of feed crops. This use of fossil fuel results in 90 million tons of CO_2 emitted annually globally (Steinfeld et al. 2006). On average, cattle must be fed between 10 to 16 pounds of feed to generate just one pound of beef and it takes 35 calories of fossil fuel to produce one calorie of food energy on a cattle CAFO (McNerny 2016).

Finally, a significant amount of grain is required to feed CAFO animals. This situation implies that this large source of food is not available for human consumption a condition that contributes to food insecurity, world hunger and the expulsion a small farmers and peasants from the land (Bonanno and Woolf 2018; Winders and Ransom 2019). All of the above are conditions that have been fostered by the increasing corporate domination of the sector ((Bonanno and Woolf 2018; Winders and Ransom 2019). In effect and since the last decades of Twentieth century, the production and distribution of meat and meat products have been almost entirely corporate controlled. Transnational corporations, such as Tyson, Cargill, ConAgra, JBS and retail giants such as Wal-Mart, Carrefour and Tesco dominate the sector leaving very little room for family and small producers and retailers to operate (Leonard 2014; Winders and Ransom 2019).

Opposition

The many problems associated with industrial meat production have motivated environmental, civil society and consumer activists to call for a much stricter regulation of the sector and even the complete elimination of confined production units and meat consumption. This opposition accompanies theorizations of alternative forms of agri-food that dwell on left leaning discourses about the limits of corporate agri-food (Winders and Ransom 2019; Bonanno and Wolf 2018). The crisis of organizations of the left that accompanied the neoliberal era, however, has left many of these initiatives to individual and/or localized efforts (Bonanno and Wolf 2018; Winders and Ransom 2019). Pertinent literature indicates that under the Fordist regime (1945-1975), the power of unions and parties of the left compelled not only corporations to act in socially responsible ways, but also the State to actively promote social oriented projects (Bonanno and Wolf 2018; Eichar 2015; Streeck 2016). As neoliberalism and the conservative forces that promoted its ascendancy became dominant, individually- and locally- oriented forms of opposition proliferated. Because these initiatives are often consumption based, they lack not only the capability to undermine corporate power but also the ability to oppose corporate cooptation (Bonanno and Wolf 2014; 2018). This relevant phenomenon broke the historically established association between the existence of left leaning discourses and organized efforts to alter the conditions of production (Bonanno and Wolf 2018). In essence, these initiatives accept the existence of capitalist social relations and simply aim at their amelioration (Bonanno and Wolf 2018). Labeled as “small ‘p’ politics,” these initiatives include the preference for vegetarian and vegan lifestyles, the purchase of locally produced meat and the consumption of organic products (Winders and Ransom 2019:189-198). Recent programs to create “lab meat” also offer new opportunities for alternatives as they do not call for the use of animals for meat or

crops for the production of feed. Unfortunately, however, their current development remains embryonic as effective solutions for the mass production of in vitro meat are lacking (Wurgaft 2019).

Arguments about the limits of "small 'p' politics" initiatives abound. Among these criticisms three are particularly relevant. First, their implementation does not alter the astronomical expansion of conventional meat production and consumption. Second, they have virtually no impact on the equally significant growth of agri-food transnational corporations and, finally, successful initiatives are frequently co-opted by corporate actors (Winders and Ransom 2019:189-198). To be sure, these actions have achieved some important results including the popularization of discourses that stress the unsustainability, unjust and unethical conditions typical of industrial meat production and the search for alternatives (Ikerd 2013). As theorized by Winders and Ransom (2019:194) these initiatives have "… already made a difference in terms of increasing demand for plant-based meat … thereby incentivizing meat companies to invest in plant-based manufacturing companies…".

CAFO operators and their supporters acknowledge the pressure associated with the development of the protest against industrial meat production. To neutralize it, they mobilize monetary and intellectual resources to project a positive image for CAFOs. Colonizing the very progressive discourses used to criticize them, their pro-CAFO arguments/initiatives employ items such as food safety, consumer satisfaction, animal welfare and water quality to define the characteristics and objectives of CAFOs (Ikerd 2013). The US Farmers and Ranchers Alliance (USFRA) is arguably the most emblematic of these initiatives. Endowed with a multi-million dollar annual budget, sponsored by major commodity organizations and agribusiness corporations and chaired by the president of the pro-CAFOs American Farm Bureau Federation, its official website claims to work in favor of "modern, industrial

agriculture." It defines this label by stating that: "[t]oday's world is demanding more sustainability out of food systems, including farmers and ranchers, to meet the evolving consumer food needs and tackle the challenges of the changing environment and climate to protect our land, air, and water for future generations. The good news is, farmers and ranchers drive by stewardship and continuous improvement are already developing solutions thanks to new technologies and science-based production techniques" (US Farmers and Ranchers 2019: no page number).

The Cases

Beyond Meat

On May 2, 2019, at the Wall-Street Stock Exchange in New York the excitement was not about the many new tech stocks that were introduced to public trading. It was about the IPO (Initial Public Offering) of *Beyond Meat*, a company that promised to revolutionize food consumption by producing plant-based meat (Salisbury 2019). In effect, both on Wall-Street and main street, Beyond Meat was an instant and continuous success. While its intimal IPO was offered at $25, at closing, the stock was priced at $65.75 and only a few month later it soared to $160 (Garcia 2019; Linnane 2019). By early 2020, the market value of Beyond Meat exceeded $11 billion up from $ 3.8 billion that was the value on May 2, 2019. Simultaneously, a bevy of restaurants and fast food outlets –including giants McDonald's, KFC Burger King and TGI Fridays– began to list plant-based meats on their menus (Garcia 2019). This commercial success quickly made Beyond Meat a financial hit.

Beyond Meat, however, is not simply a successful company. It is a company with a political story. Like its trailblazer counterpart *Impossible Burger*, it is the product of the political intent to battle the corporate exploitation of natural resources and, in this specific

case, the exploitation of domestic animals for the industrial production of meat (PETA 2019). This is a cause that, Ethan Brown – the founder and current CEO of Beyond Meat – has espoused since his adolescence (Bessette 2019). Growing up in the Washington DC area, Brown did not have many opportunities to experience farm life. This changed, though, when his father bought a dairy farm (Bessette 2019). As the young Brown spent time on the farm, he began to question the treatment of animals and the entire process of production of animal proteins for human consumption (Bessette 2019).

Brown's original concern later translated into an interest for the overall protection of the environment and the creation of clean energy. He pursued these objectives through his studies at the University of Maryland first and at Columbia University later where he received an MPP (Masters of Public Policy) and an MBA (Masters of Business Administration) respectively (Beyond Meat 2019). After completing his education, Brown worked as an analyst at the "National Governors' Center for Best Practices" and continued working on the production of clean energy when he joined Ballard Power Systems, a public company focusing on the production of hydrogen fuel cells. Following a rapid career that began at entry level, Brow reached a high-level managerial post before leaving the company to establish Beyond Meat (Beyond Meat 2019). At Beyond Meat he serves as President, CEO and member of the board of director. He is also the founder of a center for fuel reformation. He is in his mid-forties and lives in Los Angeles, CA with his family (Bessette 2019).

In 2009, Brown founded Beyond Meat as a more directed way to address his environmental concerns and his desire to establish a startup company devoted to a sustainable, healthy and ethical protein production (Bessette 2019). After establishing a direct sale system, it entered the protein mass market by selling its "faux" chicken at Whole Food in 2013. Acquired by Amazon in 2017, Whole Food is a company known for its commitment to

social causes and its founder's call for companies to take a fundamental role in addressing social problems through an approach known as *Conscious Capitalism*[3] (Mackey and Sisodia 2014). In 2014, Beyond Meat expanded its activities by introducing beef products including its plant-based burger. The success of this campaign quickly attracted the attention of large transnational food corporations. For instance, in 2016, Tyson Food – the world largest producer of chickens and the largest employer in the sector – acquired 5 percent of the company, a quota that was subsequently increased to 6.5 percent. However, and prior to the launching of the IPO, Tyson relinquished all its involvement of the company. This action was the result of tension between the two companies due to Tyson's plans to introduce its own plant-based meat products and rumors that it would attempt the acquisition of Beyond Meat (Reuters 2019). The social elegance of the project and the company's commitment for a better society and environment attracted the attention of socially motivated investors such as established philanthropists, including Bill Gates and Twitter co-founder Biz Stone, and environmental organizations, such as the Humane Society and PETA (Garcia 2019). In effect, PETA awarded Beyond Meat the 2013 "People for the Ethical Treatment of Animal" award (Chang 2014).

The company expansion continued unabated and, following the 2016 original agreement with Don Lee Farms for the exclusive production of all Beyond Meat products, in 2018 a second facility was inaugurated in Columbia, MO.: a move that tripled production (White 2018). Additionally, plans to open a new facility in the Netherlands in 2020 were announced in May 2019 (DutchNews 2019). By the late 2019, Beyond Meat claimed to have more than

[3] Whole Food founder, John Mackey, defines Conscious Capitalism as a way to correct the narrative of capitalism away from the tenet that the search for profit is the ultimate goal of business. Stressing the moral component of Adam Smith's classic economic theory, he and his associates underscore the cooperative nature of capitalism and the fundamental importance of addressing social problems – including income inequality and climate change – as an integral part of doing business (Mackey and Sisodia 2014).

27,000 distribution points in the US and to sell its products in fifty countries. It also indicated that it has established partnerships with international retail giants such as Tesco in the UK and A&W and Tim Hortons in Canada while in the United States, Dunkin' Donuts begun selling meatless sausage sandwiches as part of its breakfast menu (Margaret 2019).

Impossible Foods

Impossible Foods parallels Beyond Meats in the quest to provide a healthy alternative to animal meat. Also like Beyond Meat, the establishment of Impossible Foods is intrinsically linked to the political views and social activism of its founder Pat Brown (no relation with Ethan Brown). Patrick O. Brown is a Chicago born Emeritus Professor of Biochemistry at Stanford University. He received his Ph.D. in biochemistry from the University of Chicago in 1980 and a MD degree also from the University of Chicago in 1982 (Jacobsen 2016). Despite completing a three-year residency in Pediatric, Brown decided to pursue a career in medical research. After a post-doc at the University of California, he joined the Howard Hughes Medical Institute and the Department of Biochemistry at Stanford University (Jacobsen 2016). At Stanford, his research netted significant results as he invented "microarray" a, technology that determines the behavior and properties of genomes (Baker 2005).

This success in research, however, was accompanied by his dissatisfaction with the medical academic system and, more specifically, the publishing of publicly funded scientific discoveries by powerful private publishing houses. Following left leaning critiques of the commodification of public research and life, Pat Brown openly voiced his opinion that the publishing of publicly funded research by for profit journals prevents this information to be available to groups lacking financial resources. He contended that the inability to afford the price of these publications precludes access not only to researchers in poor countries but also

to members of the general public in the US that, ultimately, paid for this research with their tax dollars (Brown 2013). Insisting on the notion of social justice, he became an advocate of open access publishing and, along with a few colleagues, founded the Public Library of Science in 2011 (Brown 2013). He also advocates the free dissemination of research trough internet platforms such as Usenet (Brown 2013).

In 2009, Brown took a sabbatical from his medical research work. His intent was to reorient his professional life and take up new initiatives (Jacobsen 2019). His search focused on the agri-food industry's use of natural resources and, in particular, the wasteful and ecologically damaging growth of the meat industry (Winders and Ransom 2019). Hoping to draw attention to this issue, Brown organized the conference "The Role of Animal Agriculture in a Sustainable 21st Century Global Food System" that, however, had a quite limited impact in political, but also academic and business circles (Jacobsen 2016). Preoccupied with addressing the environmental and negative social consequences of industrial meat production, Brown, resorted to his expertise in biochemistry and trust in the business model to develop an alternative to industrial meat. He theorized that through the selection of key vegetable components it is possible to produce meat that recreates the taste, smell and overall appearance of animal meat products (Jacobsen 2016).

He pitched his idea to a number of venture capital companies in the Silicon Valley of California and quickly was able to raise more than $ 9 million: a figure that was greatly increased in the following years (Moore and Franklin 2019). As in the case of Beyond Meat, investors included philanthropists, such as Bill Gates (again), commercial venture capital firms, such as Kholsa Venture, transnational corporations, such as Google, and global investment banks, such as UBS (Moore and Franklin 2019). With this capital, Brown established Impossible Foods in 2011. The company's objective is to "[work] to transform

the global food system" (Berg 2016: no page) and to provide meat without the environmental and health issues associated with established animal production. The company's web-side summarizes these objectives thusly:

> "We've been eating meat since we lived in caves. And today, some of our most magical moments together happen around meat: Weekend barbecues. Midnight fast-food runs. Taco Tuesdays. Hot dogs at the ballpark. Those moments are special, and we never want them to end. But using animals to make meat is a prehistoric and destructive technology. We're making meat from plants so that we never have to use animals again. That way, we can eat all the meat we want, for as long as we want. And save the best planet in the known universe. (Impossible Foods 2019: no page number).

Following this approach, Brown's Impossible Foods claims that it produces a pound of meat by using 95 percent less land and 74 percent less water than industrial meat production while emitting 87 percent less greenhouse gas (Berg 2016). Additionally, Brown adopts a different understanding of the meaning of plant-based meat than Beyond Meat as he argues that plant-based meat is simply "meat." The only difference with animal meat, he continues, is its production. Therefore, it is incorrect, he contends, to identify this type of meat with qualifiers such as plant-based or faux meat. Brown's broad definition of meant engendered strong responses from segments of the established agri-food industry. Solicited by industrial meat producers, a number of states, including Arkansas, Louisiana, Mississippi, Missouri and Wisconsin, introduced legislation to ban the use of the label "meat" for all plant-based products (Sullivan 2018). This legislation has been challenged in Civil Court (Reinicke 2019). As of the time of writing of this article, Impossible Foods remains a private company with no official plans to offer an IPO in the near future.

Corporate Involvement, Competitors and Opposition.

The commercial and financial success of these two plant-based companies is telling of the actual reasons for corporate interest in alternative protein sources. In effect, this is not a novel stand in corporate behavior, as corporations have consistently invested in financially promising alternative products in a variety of sectors (Kauflin 2017; Pickl 2019). The significant involvement of large oil and gas corporations in the development of alternative energy sources and their supporting pronouncements about the environmental impact of traditional energy production is a case in point (Pickl 2019; Zhong and Brazilian 2018). Brief discussions of examples of corporations' involvement in plant-based meat production follow. These instances show the common corporate plan to approach social and environmental problems through market solutions and their desire to embrace progressive struggles. Mostly, they all subscribe to the idea that addressing social and environmental problem is compatible with conventional economic growth.

Tyson Foods

Agri-food giant, Tyson Foods has been particularly active in the plant-based meat sector. As indicated above, it was one of the original investors in Beyond Meat (Garcia 2019). However, after selling its share of the company prior to its IPO in May 2019, Tyson announced the development of its own plant-based burger to be sold under its new brand "Raised and Rooted" (Durbin 2019). Tyson's involvement in plant-based meat materialized after the corporation recognized the market potentials of the product and the growing demand for healthier and environmentally safe food (Durbin 2019). It also represented a response to stagnant and/or declining earnings forecasted for 2019 (Durbin 2019). The size of Tyson Foods is essential to understand the impact that this corporation has in the shaping of this

nascent sector. For instance, for fiscal year 2019, Beyond Meat had sales totaling $ 210 million. Conversely and for the same fiscal year, Tyson reported $ 40 billion sales counting on 50 processing facilities for chicken alone. Impossible Foods has only one facility in total while Beyond Meat has two plants[4] (White 2018). Tyson's commitment to expand its presence in plant-based meat market is further corroborated by the establishment of the "Tyson's alternative protein business." This division is now a stable component of the internal structure of the corporation (Doering 2019). Additionally, Tyson is active in the manufacturing other types of plant-based meat products. In 2019, it invested in New Wave Foods a startup company producing alternative shrimp meat (Yahoo Finance 219).

Nestlé

The Switzerland-based food giant, Nestlé has also entered the plant-based meat sector as it began selling its "Awesome Burger" in September 2019 (Doering 2019; Durbin 2019). The corporation explicitly underscores the social and environmental importance of plant-based meat. Duncan Pollard, the Head of Stakeholder Engagement in Sustainability at Nestlé, writes "it's rare that an idea or solution comes along that solves a variety of problems facing the world. Plant- based proteins is one of those. Whether it is human health, animal welfare, deforestation or climate change (or all of those) that concerns you, consuming more plant-based proteins can offer a simple (and tasty) way to make a positive contribution to solving them" (Pollard 2019: no page number). Espousing not only the environmental cause but also the importance of sustainability and standing with established radical critiques of industrial beef production (Bonanno and Constance 2008; Winders and Ransom 2019), Nestlé articulates the importance of that animals play in the health of soil and organic and

[4] As indicated above, Beyond Meat will open a new facility in the Netherlands in 2020 (DutchNews 2019).

sustainable farming systems (Pollard 2019). This political discourse translates into a variety of initiatives undertaken recently including the launching of a number of plant-based meat products such as schnitzel, sausage and chicken nuggets (Doering 2019). Investment in research and development and the size of this corporation, place Nestlé among the dominant actors in this expanding sector (Doering 2019).

ConAgra

ConAgra's approach to the introduction of plant-based meat stresses primarily health concerns as it focuses on the availability of healthy diets (ConAgra Brands 2019). It is also viewed as an effective business strategy that meets the demand of an expanding sector. Addressing investors at the 2018 fourth quarter conference call, ConAgra CEO, Sean Connolly, indicated the intention of ConAgra to increase its investment in plant-based products and to occupy additional space in the alternative meat market. This market, he added, includes all food that contain meat (John 2019). The strategy to accomplish this objective centers on the development of ConAgra brand "Gardein" (John 2019). Acquired in 2018 through the acquisition of its parent company Pinnacle Foods, this brand includes a number of products such as meatless meatball, fishless filets, seven-grain nuggets and alternative chicken meat. ConAgra leadership sees Gardein as the perfect tool to participate in this market and address competition from other food companies such as Impossible Foods. To this end, ConAgra is developing a new plant-based beef patty that it plants to commercialize in the near future (John 2019).

Purdue Farms

In the fall of 2018, Purdue Farms implemented plans to enhance its portfolio with the acquisition of plant-based protein plants to address steps taken by traditional global competitors Tyson and Cargill (Siegner 2018; Strarostinetskaya 2018). The corporation recognized the expansion of the vegan market and the demand for healthier food choices. These spaces count with the increase presence of large food corporations, Perdue Farm leadership contended, and require Perdue Farm's investment and presence (Bellon 2019). Stressing more the business aspect rather than the social problem side of the issue, Purdue orchestrated a number of moves that include the 2019 acquisition of Panorama Meats, a company that is the largest producers of 100% grass-fed and grass-finished organic beef, and the production of blended products (Schroeder (2019). Given the competition and the relatively limited capacity to acquire existing companies, business analysts predict that the expansion of Perdue Farms into the plant-based meat will be gradual and more contained than giants Tyson and Cargill (Siegner 2018).

Corporate Retailers

Corporate retailers such as Walmart, Target, Safeway and Whole Foods are all involved in the distribution of plan-based products. They strategically positioned themselves to address the growing demand for pant-based meat and food items generated by concerns over climate change, health and animal welfare (Smith 2017). Data released in July 2019, show the tremendous growth of these products that outpaced that of other food items. For the two years period 2017-2019, sales of plant-based food items in the US grew from $ 3.4 billion in April 2017 to 4.5 Billion in 2019 (Redman 2019). Second only to dairy products, sales of plant-based meat food items grew 10 percent between 2017 and 2019 and represent 2

percent of all packaged meat sales. Within this category, the largest growth is that of refrigerated plant-based meat that grew 37 percent while conventional meat sales expanded only by 2 percent over the same period (Redman 2019). Global giant retailer Walmart has forcefully entered the market of plant-based food. It offers products from plant-based meat producers such as Beyond Meat, Lightlife, Gardein and Coca (Smith 2017). Despite its size, Walmart – along with the second largest global retailer Costco – is not the largest supplier of plant-based meat. Small space retailers, such as Trader Joe's, and socially oriented supermarkets, such as Whole Foods, offer a greater variety of plant-based food and represent the toughest competition to larger retailers (Smith 2017).

Nutritional Value and Composition of Plant-Based Meat

The healthier food choice claimed by both Beyond Meat and Impossible Burger is one of the most appealing aspects of their success. However, the actual nutritional content of these plant- based meat burgers is not necessarily that different from traditional burgers (Kita 2019; Migala 2019). There are a bevy on ingredients associated with these two burgers. However the basic component for Impossible Burger is soy and that of Beyond Meat is pea proteins (Kita 2019; Migala 2019). Surprisingly, these burgers do not contain less calories than traditional burgers. In effect, a 4 ounce Impossible Burger patty contains 240 calories while the Beyond Meat equal size patty contains 270 calories. A traditional burger contains about 220 calories (Kita 2019; Migala 2019). But, the more surprising aspect of the nutritional value of these burgers is that they contain very little vegetables despite being plant-based.

Analysis

The motivations behind the development of Beyond Meat and Impossible Foods are expressions of the opposition against industrial meat production. Pat Brown and Ethan Brown subscribe to environmentalist and left leaning arguments about the many perils associated with CAFO meat production and the evolution of the entire sector. They are part of that broad movement that seeks alternatives to the current corporate production of proteins and the treatment of domesticated animals. To achieve their goal, however, they selected a business model. This means that they believe *that operating in a corporate dominate market* provides the solution to the current problems with agri food. The implications of this position are problematic and manifold.

First, a market-based approach to the creation of alternatives ultimately prioritizes profit making over the safeguard of the environment and the resolution of social problems[5]. Lacking a critique of the expansion of corporate agri-food, its rationality and practices do not allow for the simultaneous, consistent and continuous coexistence of the objectives of profit making and the resolution of social and environmental problems. The now often claimed argument that both of these objectives can be pursued, clashes with historical evidence that indicates that the prioritization of profit is a corporate absolute objective (Bonanno and Wolf 2018; Wright and Nyberg 2015). In essence, when faced with choosing between pursuing profit or supporting the safeguard of the environment and the resolution of social problems, corporations select the former over the latter in virtually all cases. The many scandals that have characterized corporate capitalism testify that corporations are continuously willing to set aside just causes when the generation of profit and the remuneration of shareholders are in

[5] As indicated above, Beyond Meat will open a new facility in the Netherlands in 2020 (DutchNews 2019).

question. Some of these scandals include the recent 2019 Boeing mechanical problems with its 747 Max airplane where the rapid sale of planes took priority over safety along with systematic attempts to avoid regulation. Additionally, there are the Volkswagen gas emission scandal of 2017 that involved the falsification of data on gas emission and the October 2019 NBA versus China controversy whereby the leadership of the NBA dismissed claims in support of individual freedom in order to maintain television and playing rights in that lucrative market. In the case of agri-food and dating back many decades, the list is also quite long. In the 1980s Mad Cow disease and the Beech-Nut fake apple juice cases involved the use of contaminated feeds and the production of illegal drinks to enhance profit. In 2010, Taco-Bell sold beef taco that contained only a fractional percentage of beef. In the UK, Burger King sold burgers made of horsemeat and in 2004 Dasani sold purified tap water as its classic bottled spring water. These examples are backed by investigations that stress the limits of calls for corporate social responsibility in situations when profit making is questionable (Partridge 2015; Vogel 2005; Wright and Nyberg 2015). While there is no evidence that Beyond Meat and Impossible Foods prioritize profit over their declared social objectives, there is also no evidence that in the event of economic problems this posture would be maintained. In effect, the current corporate interests in plant-based meat is, to a significant extent, based on its profitability.

Second, alternatives that offer lucrative market outlooks are often the subject of corporate cooptation (Bonanno and Wolf 2018; Winders and Ransom 2019). The cases of Beyond Meat and Impossible Foods stress that corporate involvement has accompanied the development of plant-based meat production from the outset resulting in a widespread corporate presence in the sector. Equally relevant is the fact that these corporate initiatives extend past involvement with these two companies. Large transnational corporations have

significantly invested in the production and distribution of plant-based meat products and launched a number of programs to strengthen their presence in the sector.

Third, the corporate involvement in plant based meat products centers on their current and projected profitability. To be sure, this profitability is the result of the assumed consumer preference for the value associated with environmentally and socially oriented food products. Accordingly, the environmental and social dimensions are commodified and transformed into entities that are instrumental in the achievement of economic objectives. Relevantly, the argument of the environmental sustainability and social responsibility of meat production is employed also by producers involved in industrial meat production (Ikerd 2013). Given this generalized appeal to sustainability and social responsibility, corporate environmental and social activism remains problematic and lacking the necessary legitimacy.

Fourth, proposing self-regulation, corporations claim that government intervention is not only superfluous, but also counterproductive. Corporate involvement in alternative proposals stresses that companies are inherently good social actors (Barton, Horvath and Kipping 2016; Mackey and Sisodia 2014). Because of the claim that corporations simultaneously operate in the best interest of the economy, society and the environment, State regulation creates unnecessary barriers that add to, rather than solve, problems. In this context, the desirable management of alternative forms of production should unfold primarily in the private sphere. The public sphere's role consists of allowing the private sector to work efficiently. To be sure, the contested nature of the State and the ambiguous posture of corporations about the State manifest themselves through the fact that government intervention is called for by opponents of plant-based meat companies. Industrial meat producers contend that plant-based meat producers are usurping the name "meat" and therefore creating a situation of unfair competition. These groups support State intervention

for the regulation of the market.

Finally, the solution of social and environmental problems is sought through the application of new technology. This version of "ecological modernization" renews the argument that social and environmental problems are technical issues that the expansion of the economy and the associated scientific progress can address. This posture neglects to acknowledge the socially and politically constructed nature of social problems and of the environmental crisis. It underplays the fact that technological development has historically also been be the source of social problems such as the digital divide, greenhouse gas emission, the displacement of workers and more (Wright and Nyberg 2015).

Conclusions

Plant-based meat is proposed as an environmentally and socially sound answer to the problems associated to the expansion of industrial meat production. The documented argument that CAFOs and the overall conventional meat industry abuse domesticated animals, employ a significant amount of natural resources and generate a large carbon footprint are all addressed by plant-based meat products that employ none of the factors that generate these problems. This is arguably the primary answer to the research question of this work concerning the alternative dimension of plant-based production.

However, a number of conditions temper the enthusiasm associated with the existence of such alternative. The first involves the selection of a market-based approach. While the environmental and pro-animal welfare posture of the leaderships of these companies cannot be denied, their selection of the capitalist and financial markets to promote their product cast doubts on their actual alternative dimension. As indicated above, this posture strengthens the discourse that the capitalist market is the answer to social and environmental problems.

Moreover, it gives support to the contention that there is no real alternative to capitalism. The unidimensionality[6] of this posture is reminiscent not only of classic theorizations of the totalitarian nature of capitalist markets, but also of pronouncements that deem futile the search for alternative discourses and system of production. More importantly, this posture does not provide an alternative to the structural contradictions of capitalism that subordinate the solution of socio-economic and environmental problems to profit making. At best, it can offer unverified promises about a more desirable future.

A second dimension that limits the alternative value of plant-based meat refers to the fact that agri-food transnational corporations have not only been active investors in, and partners with, Beyond Meat and Impossible Food, but also they have been involved in the autonomous production of plant-based meat products. In effect and supporting the argument about the unidimensionality of capitalism, the actual evolution of plant-based meat production is colonized by corporate forces that have emerged as the most important actors in the process of promoting this form of meat production.

This situation leads to a third conclusion that states that while the production of plant-based meat is corporate dominated, it does not face a progressive opposition. To be sure, plant based meat production is opposed. However, resistance comes from conservative forces that promote a defense of CAFOs and industrial meat production. The absence of a progressive opposition to plant based meat can be interpreted as a part of the broader absence of a critique of market-based initiatives that characterizes contemporary resistance to corporate agri-food (Bonanno and Wolf 2018). This posture favors consumption oriented

[6] The classic reference here is the production of Critical Theory and, in particularly, the work of Herbert Marcuse (1991[1964]). Marcuse contends that the homogenizing forces of capitalism elevate mass production and consumption as the dominant and unopposed form of organization of society (one-dimensional thought and behavior). This domination makes available forms of opposition conform to the prevailing form of rationality and profit seeking that it supports.

forms of opposition that take for granted the existence of the capitalist social relations and, therefore, lack a critique of the contradictions of capitalism and of the ability of corporations to control the market.

That technical solutions do not substitute for political solutions is the fourth and final conclusion. Plant-based meat is an excellent technical solution to the industrial production of meat. Yet, and as implemented, it does not offer an effective solution to corporate power. Lacking is a proposal that would address the contradictions of market-based social relations and the associated ability of large transnational corporations to co-opt and devitalize alternative initiatives and discourses. Implicit in this context is the limit associated with sectorial attempts to solve social problems. By taking for granted the market-based organization of society, these proposals could only hope for partial results that do not ultimately address the structural reasons behind problems that they attempt to correct. As pronouncements that there is no alternative to the current form of market capitalism enjoy great popularity, perhaps this is the most plausible response to the corporate control of agri-food.

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