RESENHA

Shapiro, Paul. (2018). *Clean meat*: How growing meat without animals will revolutionize dinner and the world. New York, NY: Gallery Books.

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Abstract: Human consumption of meat causes grave problems for the environment and makes life a living hell for farmed animals, such as cows, chickens, and pigs. Yet, worldwide meat consumption continues to rise. Despite the availability of vegetarian 'meat,' made from plants, such as soy and peas, even well-educated, well-informed people with middle class (or above) incomes continue to eat animals. Their reasons? Taste, convenience, and habit.

But, what if these people could eat real meat that was easily available at prices at or below the current price of meat from slaughtered animals? The book, *Clean Meat: How growing meat without animals will revolutionize dinner and the world* by Paul Shapiro of Humane Society International, explains how well-financed companies supported by top academic minds and breakthrough technology are hard at work growing meat, leather, milk, other animal based products without animals. Now, these scientists are working in laboratories, but the visionary leaders of these companies promise that in a few years (or sooner) their products will be produced in factories and sold in the meat section of grocery stores and in restaurants such as McDonald's.

How does this meat-growing technology work? Scientists take just one cell, perhaps from a discarded chicken feather, and use that cell to grow chicken meat, such as chicken wings, just as today, scientists can grow human skin for use in skin grafts. This is not science fiction, although obstacles still exist, as documented in *Clean Meat*, real progress is being made. Furthermore, Shapiro introduces readers to the people behind these companies, such as Uma Valeti, a former meat eater, whose compassion for farmed animals led him to give up a very successful career in cardiology to set up a clean meat company which now enjoys financial support from traditional meat companies and venture capitalists.

Resumo: O consumo humano de carne causa sérios problemas ao meio ambiente e pode privar a vida de animais como vacas, galinhas e porcos. Apear disso, é crescente o consumo de carne. Em que pese a disponibilidade da carne "vegetariana", originária de plantas como soja e ervilhas, mesmo pessoas da classe média, esclarecidas e bem-educadas continuam a comer carne de animal. Por que razões? Gosto, conveniência e hábito.

E, se essas pessoas pudessem comer carne verdadeira, à venda por preços iguais ou inferiores, em açougues etc ? O livro *Clean Meat* (*Carne Pura*) de Paul Shapiro, membro da Humane Society International (Sociedade Internacional Protetora de Animais), explica

de que modo empresas bem financiadas, que dispõem de mentes acadêmicas brilhantes e de tecnologia de ponta, continuam a realizar um trabalho inovador: produzir carne, couro, leite e outros derivados de animais sem que estes sejam privados do direito à vida. Por ora, esses cientistas ainda estão atuando em laboratórios, mas o líderes visionários nessas empresas prometem que, daqui a alguns anos (ou antes mesmo), seus produtos serão feitos em indústrias e vendidos no açougue ou na seção de carnes de supermercados e também em restaurantes do tipo MacDonald`s.

Como funciona essa nova tecnologia de produção de carne? Os cientistas selecionam uma célula – talvez extraída de uma pena de galinha – usando-a para produzir carne de frango, do mesmo modo que, atualmente, os cientistas criam pele humana para uso em enxertos. Não se trata de ficção científica, apesar dos obstáculos existentes, e como documentado em *Clean Meat*, está havendo progresso. Além disso, Shapiro apresenta seus leitores a pessoas exemplares nessas empresas, como, por exemplo Ume Valeti, um ex-consumidor de carne que interrompeu uma bem-sucedida prática cardiológica para criar uma empresa de Carne Pura que, atualmente, recebe financiamento de empresas tradicionais do ramo de carnes – frigoríficos – bem como de investidores capitalistas.

[Resumo traduzido do inglês por Francisco Gomes de Matos, Professor Emérito da UFPE e Presidente do Conselho da ABA Global Education, Recife].

The review / A resenha

Linguists know that language varies and changes, and that language reflects society, impacts society, and is an area of contention in society. Part of the excitement of being linguists involves seeking to observe, understand, and impact the variation, change, and areas of contention in language. The book being reviewed here can prepare linguists to better understand an ongoing area of language variation, change, and contention. That is whether or not and how humans consume foods created by nonhuman animals.

In particular, this book talks about clean meat, i.e., meat created not from raising and slaughtering animals, but meat that is manufactured outside of animals. This clean meat, as well as similar products such as clean leather and clean milk, is not made from plants or chemicals but uses emerging technology to create meat without animals. Companies making clean meat have financing from some of the big names in the financial world, and even from some of the big names in traditional meat production. Clean meat companies promise to have their products in stores within the next few years. Thus, society is going to change. What about the concomitant language changes?

Meat and other animal based products present many areas of contention in society and language. While the evidence for moving away from animal based products continues to grow, whether it’s new research on the health benefits of plant based foods, or new studies linking animal based foods and the worsening effects of climate change, or new reports on how our fellow animals have more capacity than we ever realised to feel emotions and think in a wide variety of ways. But, in the face of this developing body of knowledge, is society really changing? Despite all the exciting knowledge, the large majority of people continue to eat meat. In fact, global meat consumption continues to increase.

Paul Shapiro, a long time animal activist, wrote this book to explain and advocate for a new approach by animals activists, an approach that could produce better results than what we activists have been doing. That approach is rather than convincing people to give up meat or to eat plant based meat, we should provide people with real meat grown

without any harm to animals. The new meat will be exactly the same as the current meat except safer, healthier, and cheaper, not to mention greener and so much more humane. Shapiro illustrates why it is much more effective to give humans a better version of what they want instead of convincing them to change their consumption habits to be kinder to our fellow animals. His first example concerns whales. In the 19th century, whales were killed because oil from their bodies was used to lubricate machines and to lights oil lamps. Whaling was estimated to be the fifth largest industry in the U.S.

Fast forward to now--the whaling industry is dead; the only ships hunting whales are ships full of tourists shooting whales with cameras, not with harpoons. What killed the whaling industry in the U.S. and most other countries? Was it a whale-sized animal rights campaign on behalf of these giant cetaceans, such as a letter published in a Honolulu newspaper and signed by a "whale"? The letter read in part:

> *I write on behalf of my butchered and dying species. I appeal to the friends of the whole race of whales. Must we all be murdered …? Must our race become extinct? Will no friends and allies arise and revenge our wrongs?*

No, protests didn't save the whales. What ended the slaughter of whales for their oil was the commercialisation of kerosene in 1854 by Abraham Gesner, an entrepreneur. Kerosene was not only cheaper than whale oil, it was also easier to use and more abundant than whale oil.

Something similar to what saved whales happened to save horses from their role as beasts of burden in human transportation. Back in 1866, the American Society for the Prevention of Cruelty to Animals was founded and proposed many reforms to enhance the horses' welfare, such as a fixed number of rest hours, a weekly day off, and more opportunities to drink water. In addition to animal welfare concern, the use of horses for transport also raised environmental concerns, in particular due to the fact that each day, the typical working horse produced more than 10 kgs of manure and 3.75 litres of urine. That sounds a bit like the pollution caused by the bodily waste of the tens of billions of farmed animals trapped on today's factory farms.

Again, the saviours of the animals were not the animal activists but the inventors, people such as Henry Ford who produced the cars that were so much more convenient and comfortable than riding horses. Yet, was the public hankering for cars? No, according to Ford, the public didn't see the future, "If I had asked people what they wanted, they would have said 'faster horses'" [It should be noted that the validity of this quote has been questioned: https://www.entrepreneur.com/article/290410]. The legacy of the use of horses for transport remains in the use of the term *horsepower* to measure the power of cars.

Shapiro's book chronicles the efforts of contemporary inventors who are developing a variety of ways that humans can still have meat and other animal based products, such as leather, but in forms that are less expensive, safer, greener, easier, and quicker to produce, and, of course, more humane. This is not talking about meat substitutes, such as those by the companies Beyond Meat and Impossible Burger which produce burgers, etc. from plants via high tech processes, in order to mimic the taste, texture, smell, and appearance of meat and other products of animal origin. *Clean Meat* is talking about real meat but grown without animals.

Shapiro quotes Winston Churchill, the famous British WWII leader, who in a 1931 essay looked 50 years into the future and predicted, "We shall escape the absurdity of growing a whole chicken in order to eat the breast or wing, by growing these parts separately under a suitable medium" (p. 8). In a somewhat similar spirit, a clean meat pioneer, Andras Forgas, stated that, "We don't have to industrialize sentient beings" (p. 11).

Does this seem Frankenstein-ishly shocking? It shouldn't. Human tissue is already grown in labs on a regular basis, such as for skin transplants. Cells from human patients' skin is cultured to grow new skin for those patients. Furthermore, foods, such as yogurt and tempe, have long been produced via culturing processes. While today *clean meat* seems to be the popular choice for these new real-meat-without-animals products, many other terms have also been proposed, including *cultured meat*¸ *lab meat*, *cellular meat, in vitro meat, synthesized meat,* and even *meat without feet*.

Marketing plays an important role in the acceptance of new products. Thus, it comes as no surprise that companies spent a long time before deciding to use *clean meat,* and the issue may still not be complete decided. *Shapiro* reports that the name *clean meat* was chosen based in part based on research into people's responses to various names. Also, the word *clean* resonates because just like clean energy, clean meat will greatly decrease pollution and people's carbon and water footprints. Additionally, clean meat should help protect people from food borne infections, such as salmonella, and food borne diseases, such as swine flu. However, the clean meat industry may not be able to use the name they choose. For instance, some legislators in France object to the use of 'meat' to describe products manufactured to resemble meat products (BOYD, 2018). Would clean meat escape their objections?

After explaining the foundation of the clean meat movement in the book's first two chapters, Shapiro uses the next five chapters to tell stories of some of the pioneers of clean meat and other products the aim of which is to free animals from the hell of factory farms and slaughterhouses. Chapter 3 tells the story of the famous $300,000 burger, developed by Dutch scientists led by Mark Post and financed by Google co-founder Sergey Brin. It's an exciting story including how in 2013, after years of research, Post's team produced two burger patties in their lab and transported them in a cardboard box to London where a press conference was to be held for the international media. The patties' first journey was a bike ride from Post's university to his house where Post put the box in his family's refrigerator with a sign reading, "Not for Human Use". "*Next to a carton of orange juice and above a drawer of greens sat what was almost certain to become the most important project of his life. Thankfully his kids didn't raid the fridge that night*" (p. 69).

The journey to London was made by train. At a tv studio, designed to look like that of a cooking show, Richard McGeown, a famous chef, added sunflower oil to the already heated pan, and "*placed the product of years of hopes and labor into the heat. It sizzled just like a conventional burger would, and pretty soon, … the aroma of cooking meat filled the air*" (p. 72) in the room filled with VIPs and 100 international journalists. Then, two tasters sampled the burger and declared it close but not the same as the real thing. The tasters had only sampled half the burger, but when journalists asked if they could try the other half, Post replied that he had promised it to his kids.

Chapter 3 also reports that some conventional meat companies including Tyson (the world's largest 'dirty' meat producer) and Soglowek (Israel's largest producer of processed meat) are showing great interest in clean meat. However, this attitude is not

universal among the conventional meat industry. For instance, Shapiro quotes a National Cattlemen's Beef Association spokesperson as saying in response to Post's event, "*We feel confident that consumers will continue to trust and prefer traditionally raised (not lab-engineered) beef. No laboratory product will ever be able to take the place of cattlemen and women or the dedication they have to the customer … or to rural America*" (p. 77).

Chapter 4 looks at clean leather and other wearables. Shapiro estimates that humans have been wearing the outsides of other animals, such as their skin and their fur, for at least tens of thousands of years, and today the global market just for leather is worth more than $100 billion. And, just like meat, leather not only causes tremendous death and suffering to animals, but also creates pollution for the general public and workplace health dangers for employees.

Shapiro wonders if "wearing lab-grown leather [will] make us more likely to eat similarly produced meat" (p. 95). He tells the story of Andras Forgas, a pioneer in clean leather. Forgas was working in China on using 3-D bioprinting to produce human tissues for use in drug testing, when he met the CEO of a leather company who said to Forgas, "*Since you can grow human skin, could you also grow a cow's skin. Think how much money I could save on shoes if you could just grow me the leather. … Why grow the whole cow when all I want is the skin*" (p. 96). Another firm in the same space, Bolt Threads, is already marketing products made from clean spider silk. (BTW, Post and Forgas are just two of the pioneers in clean meat, clean leather, etc. who are not even lacto ovo vegetarians.)

Chapter 5 tells the story of Memphis Meats, a leader in the clean meat space. Its founder, Uma Valeti, was born a meat eater in India, but an incident when he was 12 years old planted the seeds that blossomed into Memphis Meats after Valeti, whose grandfather was a colleague of Gandhi in India's independence struggle, had launched a career and become a leading cardiologist in the U.S. The young Uma was attending a neighbour's birthday party when he decided to temporarily move away from the merriment being enjoyed by his young peers, "*and venture to the back of the house. … As children just yards away were having the time of their lives, the animals who would soon be feeding those children were terrified for theirs. … Over the cries of the doomed beasts, Valeti could hear the cheerful families in the front singing 'Happy Birthday.' 'That's when it really struck me,' Valeti recalls. 'There was a birthday and then there was a death-day— all in the same place and time'*" (p. 112).

After graduating from the Mayo Clinic in the U.S., launching an academic career at the University of Minnesota, becoming a leader of the American College of Cardiology and the American Heart Association, Valeti wanted to give all that up to work full time on clean meat. But, what about his wife and two young children? When Valeti asked his wife, she gave him a very bright green light, "'Look, Uma. We've been wanting to do this forever. I don't ever want us to look back on why we didn't have the courage to work on an idea that could make this world kinder and better for our children and their generation'" (p. 118).

Chapter 5 addresses a major concern with clean meat, the so-called 'yuck' factor: will people be willing to eat meat developed in a lab. Shapiro offers several responses. First, all or almost all processed food is developed in laboratories, even corn flakes. Traditional food companies boast large R&D departments. Second, just like the corn flakes we might

buy at the supermarket, the clean meat that will be on the shelves of the same supermarket will come, not from a lab, but from a factory. Third, take the case of raw fish that today is popular in sushi restaurants in many countries. However, it took time and clever marketing to overcome many people's aversion to eating raw animal flesh. Shapiro recounts how, in a good example of the power of language, sushi marketers called one of their products a *California roll* in order to Americanize it. *Fourth*, Shapiro cites Kristopher Gasteroatos, founder of the Cellular Agriculture Society, who believes that as the Earth's environment continues to deteriorate, people will see the necessity of turning to clean meat, unless they want to give up meat entirely.

In Chapter 6, Shapiro looks at one of clean meat's potential competitors, not meat from farmed animals but plant based meat already being produced via high tech processes and already approaching the taste, look, smell, and texture of "real" meat. Michele Simon, executive director of the Plant Based Foods Association is quoted as saying, *"[C]onsidering just how meat-like and milk-like some of the plant proteins have become, do we really need cultured animal products? It's completely possible that by the time clean meats hit the market at affordable prices, the plant-based products may be already sufficient to offer carnivores the taste and texture they're craving*" (pp. 150-151).

In the debate between clean meat and plant based meat, Shapiro points out that, "*Yes, plant-based meats involve food technology, but nothing on the order of tissue engineering, synthetic serum, and other biotech innovations clean meats companies are borrowing from the medical world*" (p. 151). On the other hand, clean meat advocates express concern that plant based meats will never satisfy hard core meat eaters. Additionally, those who want their food to be "natural" may resist the processed nature of plant based meats. There is, Shapiro states, a compromise position: products can be a blend of plant based foods and those foods produced by clean meat/milk/egg processes.

What about a term that encompasses both clean meat and plant based meat? In other words, we need a neologism. When I wrote to Shapiro for his suggestions, he sent the following: "Right now, it seems like people are using either alt-meat, alt-protein, or in some cases clean protein. (The latter confuses clean meat and PB meat, so it's not as popular.) Most of the time, I just see 'PB meats and clean meats.'"

Chapter 6's focus is the use of clean meat technology to grow the meat of chickens and other birds. The number of chickens whose lives are mangled by modern factory farm madness dwarfs the number of mammals, such as pigs, cows, and sheep. Yet, the numbers of fishes and other marine animals eaten annually is many times yet larger. Fortunately, a company, Finless Food, is hard at work growing clean fish.

Chapter 7 of this comprehensive book examines a third source of alternatives to foods from farmed animals, not plant-based foods, not clean meat (cellular agriculture), but foods from acellular agriculture. Shapiro explains:

> *Cellular ag is best known for generating living cells (like muscle and skin cells) that can proliferate and become food or clothing. Acellular ag entails coaxing living, microscopic organisms, like yeast, bacteria, algae, or fungi, to produce specific organic molecules such as fats and proteins that aren't actually alive themselves. In acellular ag, since you're starting with just yeast or some other microorganism as opposed to a biopsy from an actual animal, there's no animal involved in the making of these animal products. At the same time, despite no animal*

> *being involved, the proteins these companies are creating are the same exact proteins found in the animal products they're seeking to replace*.

After explaining the science behind acellular ag, the chapter goes on to chronicle the founding and development of three companies that use that science. Perfect Day makes cow's milk, Clara Foods makes egg whites, and Geltor makes gelatine, all from microorganisms. Quorn, which I don't recall seeing in the book, is another, older company (founded 1985) working in the same realm. According to Wikipedia, "All Quorn foods contain mycoprotein as an ingredient, which is derived from the *Fusarium venenatum* fungus and is grown by fermentation using a process that its manufacturer has described as similar to the production of beer or yogurt." Most Quorn products contain egg, although there are vegan versions.

What about the yuck factor with eating foods from this source? Shapiro's response is to compare foods from non-animal sources with gelatine, milk, and egg whites from animal sources:

> "*In the case of gelatin, how many people really want to eat hydrolysed collagen from an animal's skin and bones that has marinated in an acid bath for a month? Or milk from a cow who was pumped full of hormones and antibiotics? Or eggs from a bird confined in a cage so small she never spread her wings*" (p. 210).

Conclusion

Clean Meat's final chapter, #8, explores some of the philosophical issues, such as whether by eating meat without animals are we depriving farmed animals the chance to live, no matter how short and miserable their life might be. Then, Shapiro turns to the activists' frustration mention in this review's first paragraph.

> *Humans are great at many things, and one of them is rationalizing our conduct so we don't feel mental conflict about our behaviour. ... [W]e almost always adjust our beliefs to comport with the behaviors we want to engage in. And one of those behaviors humans seem very intent to continue is eating meat. It turns out that the maxim is true: it's easier to act your way into a new way of thinking than to think your way into a new way of acting. Once we start acting in a different way—avoiding meat from slaughtered animals—it becomes much easier to start thinking about animals in a different way, too* (p. 233).

And, that is the hope of this book, that clean meat and its plant based and acellular cousins will provide alternatives that will lead people to abandon slaughtered meat, just as many people in the 19th century abandoned whale oil, and many people in the 20th century largely abandoned the use of animals for transport. Shapiro is to be thanked for crafting a comprehensive, readable, understandable, and compelling book about an important, big idea, an idea that can go far to reduce animal activists' frustrations by doing so much to lessen the suffering of our fellow animals. My only request for a possible second edition of *Clean Meat* is to add an index. For more from Paul Shapiro, you can read an interview with him by The Vegan Strategist, Tobias Leenaert at

https://veganstrategist.org/2018/01/15/clean-meat-animals-best-hope-interview-paul-shapiro

In conclusion, these are exciting times for ecolinguists with the recent launch of the International Ecolinguistics Association (http://ecolinguistics-association.org), with new ideas on how to do ecolinguistics analysis (e.g., STIBBE, 2015), and with growth in the number of academic journals publishing articles on ecolinguistics. The development in the food space chronicled in the book Clean Meat offers many opportunities for linguistic analysis, e.g., Jacobs et al. (2017) used various Google tools to look at the diachronic and synchronic variation in the use of the terms *vegetarian*, *vegan* and *plant based*. Before we can analyse, we must first understand, and Shapiro's book helps us do that.

References

BOYD, P. J. I want to eat a 'veggie sausage', not a 'mycoproteinous food tube'. *The Guardian*. 2018. Retrieved from

https://www.theguardian.com/commentisfree/2018/apr/23/veggie-sausage-food-france-ban

JACOBS, G. M.; JEYAVELU, S.; GRELICHE, N. How should you label? An analysis of different 'vegetarian' terms. *Asia Pacific Food Industry.* 2017. Retrieved from http://apfoodonline.com/industry/how-should-you-label-an-analysis-of-different-vegetarian-terms

STIBBE, A. *Ecolinguistics: Language, ecology, and the stories we live by*. Abingdon, United Kingdom: Routledge, 2015.

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